

Use of the International Classification of Functioning Disability and Health (ICF) as a theoretical framework to inform interprofessional assessment and management by health care professionals in Rwanda

A Cluster Randomised Control Trial

by

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DECLARATION

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ABSTRACT

Background: Effective collaboration between health professionals can reduce medical errors and assist in interpretation of health information resulting in improved patient care. The International Classification of Functioning, Disability and Health (ICF) has been suggested as a potential framework to help health professionals develop a common language for better collaboration and to provide more holistic care. In the main, Rwandan district hospitals still utilise the hierarchical medical model of health.

Aim: The aim of the study was to determine whether training on interprofessional practice, using the ICF framework, resulted in improved knowledge, attitudes and behaviour (as determined by improved recording of interprofessional assessment and management in patient records) in randomly selected Rwandan District Hospitals.

Methodology: This study was composed of two phases. Phase I: Preparation. The intervention programme was developed based on a literature review and input from an international panel of experts. A feasibility study in which self-designed instruments and the training programme were tested was undertaken in one district hospital. Phase II: A Cluster Randomised Control Trial. Four district hospitals were randomly allocated to receive a day's training in interprofessional practice using the ICF (experimental hospitals) or a short talk on the topic (control hospital). Participants included medical doctors, nurses, physiotherapists, social workers, nutritionists, and mental health nurses/clinical psychologists. Using self-designed and validated measures, pre- and post-measurements of knowledge and attitudes towards Interprofessional Practice (IPP) were performed at baseline and after training and audit of patients' records after discharge was performed at baseline and at two, four and six months. The independent t-test and Mann-Whitney U test were used to establish if the two sets of groups were equivalent before and after training at baseline and at two, four and six months. Repeated measures ANOVA and the post-hoc Tukey test were used to compare the audit scores at each time point. The Kruskal Wallis test was used to compare rankings of the scores of attitudes of different professions before and after the intervention. Ethical approval was obtained from the Human Research Ethics Committee of the University of Cape Town and the Rwandan National Ethics Committee.

Results: *Feasibility study:* The three outcome measures were developed and tested for content validity using panels of experts. Sixty health care professionals participated in the feasibility study. The results indicated a significant increase in knowledge and positive attitudes post-training in all items. The tested instruments indicated excellent validity, good internal consistency and good inter-

rater reliability (audit questionnaire). The participants were satisfied with the overall training programme, content and organisation and found the training to be relevant to their clinical work.

Cluster Randomised Control Trial: 203 participants were recruited from four hospitals, approximately half of whom were employed in the two randomly selected control and half in the two experimental hospitals. A total of 1600 patients' records were also examined, 400 at each time point. There were no significant differences between the Knowledge and Attitude Scales pre-intervention but post-intervention the mean (knowledge) and median (attitudes) scores on these two tests were significantly greater in the experimental group ($p < .001$ in both cases).

At baseline, the audit of patient records indicated that the mean number of items included was not significantly different between the two groups ($p = 0.424$). At two months post-intervention, the difference between the two groups was highly significant ($p < .001$). The items in which the greatest improvement was noted in the experimental group were related to interprofessional practice, followed by improved reporting on environmental factors, participation restriction and activity limitations. The post-hoc Tukey test indicated that the difference was maintained at every post-intervention audit. The control group remained at the same level and there was no difference in their scores over time.

Conclusion: The use of the ICF as a framework for training health professionals regarding interprofessional practice resulted in a significant improvement in knowledge, attitudes and behaviour as demonstrated by more comprehensive patient records. The introduction of similar training programmes at all district hospitals in Rwanda could result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. It is suggested that the training be extended to other district hospitals and the impact of this should be monitored in the future.

Implication: It is thus hoped that the findings of this study may contribute to improving health care delivery in Rwandan district hospitals and the health system at large.

Key words: Interprofessional, ICF, Rwanda, district hospital.

DEDICATION

I dedicate this thesis to my Saviour Lord Almighty. I also dedicate this work to my lovely wife, Louise Bajeneza, and our children: Axel Ineza Kubaho, Axella Nineza Sezerano and Manel Ihirwe Bajeneza for your love patience and support that you have shown me.

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GLOSSARY

Activity limitation: “Activity is the execution of a task or action by an individual, hence activity limitations are difficulties an individual may have in executing activities” (WHO, 2002, p.10).

Biopsychosocial approach: “A comprehensive model that allows people to address all major areas of the presenting issue across three spheres: physical, psychological, and socio-cultural” (Wade, 2009, p.9)(Salas, E. and Stagl, 2009)(Salas, E. and Stagl, 2009)(Salas, E. and Stagl, 2009)(Salas, E. and Stagl, 2009).

Environmental factors: “Physical, social and attitudinal environment in which people live and conduct their life. These are factors that are not within the person's control, such as family, work, government agencies, laws, and cultural beliefs” (WHO, 2002, p.10).

Health care professional: “A person who by education, training, certification, or licensure is qualified to, and is engaged in, providing health care” (Health Professionals Council, 2011, p.7).

Health related quality of life: “Health-related quality of life (HRQoL) is a multi-dimensional concept that includes domains related to physical, mental, emotional, and social functioning. It goes beyond direct measures of population health, life expectancy, and causes of death, and focuses on the impact health status has on quality of life” (Connor, 1993, p.5).

Holistic care: “System of comprehensive or total patient care that considers the physical, emotional, social, economic, and spiritual needs of the person; his or her response to illness; and the effect of the illness on the ability to meet self-care needs” (Salas & Stagl, 2009, p.3).

Impairment: “Any problem in body function or structure as deviation or loss caused by physical, mental or sensory” (WHO, 2002, p.10).

Interprofessional care: “A group of individuals from different disciplines working and communicating with other individuals. In the interprofessional learning environment each member provides his/her knowledge, skills, and attitudes to augment and support the contributions of others for the same management goal” (Ellingson, 2002, p.5).

Participation restriction: “Participation is the involvement in life situations; hence participation restrictions are problems an individual may experience in involvement in life situations” (WHO, 2002, p.10).

Patient satisfaction: “The degree of congruency between a patient's expectations of ideal care and his /her perception of the real care he/she receives” (Ahmad & Din, 2010, p.96).

Personal factors: “These are factors within the person, including race, gender, age, educational level, coping styles, etc” (WHO, 2002, p.10).

Training: A learning process which involves learning of new skills, concepts and behaviour (Frenk et al., 2010).

LIST OF ABBREVIATIONS AND ACRONYMS

ATHCT	Attitudes Towards Health Care Teams scale
CEM	Continuous Education Meetings
CHWs	Community Health Workers
CIHC	Canadian Interprofessional Health Collaborative
CPD	Continuous Professional Development
CRCT	Cluster Randomisation Control Trial
CVI	Content validity index
ES	The effect size
GCEHP	Global Commission on the Education of Health Professionals
HCP	Health Care Professionals
HIV/AIDs	Human Immunodeficiency Virus Infection/Acquired Immunodeficiency Syndrome
HRQoL	Health Related Quality of Life
ICC	Intra-class correlation coefficient
ICD	International Classification of Diseases
ICF	International Classification of Functioning, Disability and Health
ICPCM	International College of Person-Centered Medicine
I-ICV	Item Content Validity Index
ITRF	Interprofessional Team Reasoning Framework
MMI	Military Medical Insurance
MOH	Ministry of Health
NGOs	Non-Governmental Organisations
NHRC	National Health Research Committee
NISR	National Institute of Statistics of Rwanda
PHCW	Primary health care workers
PLWH	People living with HIV (PLWH)
QoL	Quality of Life
RAMA	Rwandaise d'Assurance Maladie
RNEC	Rwanda National Ethics Committee
S-CVI	Scale Content Validity Index
UHC	Universal Health Coverage
WHO	World Health Organisation

CHAPTER 1. INTRODUCTION

There is growing criticism of the present system of health care management. The introduction section outlines the need for reform, describes the International Classification of Functioning, Disability and Health (ICF) and explains how the utilisation of the ICF framework could impact on health service delivery and issues related to the training of health care professionals. The problems that the thesis addresses are identified and the aim and objectives of the study are presented.

1.1 Background

1.1.1 Need for reform of medical practice

According to the World Health Organisation (WHO), health is defined as *“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”*(World Health Organisation, 2006, p.1). Despite large global gains in health status, brought about in part by the scientific application of medical science, there are still large inequities in health and health care provision, both within and between countries. Maintaining that professional education is producing graduates who are ill-equipped to deal with these problems, the Lancet commissioned a Global Independent Commission into the training of health professionals in 2010 (Frenk, Chen, Bhutta, Cohen, Crisp, Evans, Fineberg et al., 2010). Problems identified by the authors included (amongst others): poor teamwork, *“persistent gender stratification of professional status”* and the *“so-called tribalism of the professions—i.e., the tendency of the various professions to act in isolation from or even in competition with each other”* (Frenk et al., 2010, p.5). Health professionals are health personnel involve in health promotion, prevention, diagnosis and treatment of disease and other health related conditions with the ultimate goal of promoting health outcomes of the individual and the population as a whole(World Health Organisation, 2013b). Therefore, if they are not capable of handling the arising challenges of this century, health may fall into ruin.

For example, it is estimated that a patient, during his/her period of about four days hospital stay can be seen by around 50 different people including medical doctors, nurses, physiotherapists, and others(Daniel & Rosenstein, 2007). Poor collaboration between health care professionals can thus result in medical errors, lack of critical information and poor interpretation of health information, all risks to a patient’s safety (Daniel & Rosenstein, 2007).

The Global Independent Commission, a Lancet Report, also identified a lack of continuity of care as impacting negatively on the health of populations. The bio-medical model of illness tends to concentrate on the health condition of the patient and treatment is provided within health institutions without taking into account the environment of the patient (van Dulmen, Lukersmith, Muxlow, Santa Mina, Nijhuis-van der Sanden, 2013). The bio-psychosocial model, in contrast, recognises that the patient lives within a certain context and that both the personal factors and environmental factors should be considered during assessment and management (McDougall, Wright, & Rosenbaum, 2010).

1.1.2 The International Classification of Functioning, Disability and Health (ICF)

In 2001, the World Health Organisation (WHO) produced the International Classification of Functioning, Disability and Health (ICF) as a member of the International Family of Classifications and as a sister classification to the universally used International Classification of Disease (ICD). The ICD classifies health conditions such as diseases, injuries, or related states and uses an aetiological framework to gather diagnostic information.

The ICF and ICD are complementary classifications (Rauch, Cieza, & Stucki, 2008; Martinuzzi et al., 2010). The ICF conceptual framework provides a common and standardised language for the description of health and health-related states (World Health Organisation, 2002). The ICF framework does not focus only on the impairments of an individual (previously equated with disability), but rather emphasises that functioning and disability as well as quality of life are not the linear consequence of disease or biological dysfunction (Alford, Remedios, Webb, & Ewen, 2013). Disability is therefore seen to arise as a result of the interaction between the health condition, biomedical constraints, the individual and his/her environmental factors including the performance of activities and participation in life situations (Alford et al., 2013).

The ICF has six components which describe a holistic approach to assessment and management of the individual. These include body structures or anatomical parts of the body and body functions which reflect physiological functions of the human body (World Health Organisation, 2001; World Health Organisation, 2013). Activities refer to the execution of actions or tasks by individuals, whereas participation is defined as involvement in life situations by individuals. The ICF also describes contextual factors which are environmental and personal factors. Environmental factors are physical, psychological

and social (psycho-social) environments where a person performs his or her usual life activities (World Health Organisation, 2001;Allan et al., 2006). Personal factors imply how a person experiences a particular health condition(World Health Organisation, 2001).

1.1.3 Use of the ICF to improve medical care

The WHO recommends that health professionals should use both WHO classification systems (ICD and ICF) to understand and describe the link between diseases, injury and functioning (Escorpizo et al., 2013). Similarly, Escorpizo & Bemis-Dougherty (2013) highlight the need to develop an integrated health platform which utilises information related to both the health condition/disease and the functional status of the patient within one health information system. They maintain that the systematic capturing of the impact of disease on functioning has been hampered “by the failure to link ICD and ICF at different (conceptual and operational) levels” (Escorpizo et al., 2013).

In recognition of the need to integrate the management of functional limitation within the medical treatment of every patient, there is a process underway of harmonising the ICD and ICF in the upcoming ICD version 11. This new version will add functioning properties to the classification of disease (Escorpizo & Bemis-Dougherty, 2013). By integrating the ICF into everyday practice, health professionals, who were previously using the ICD, may integrate the ICF into their everyday practice and develop a greater understanding of the relationship between disease and functioning outcomes (Escorpizo & Bemis-Dougherty, 2013), thereby enabling the provision of more holistic care. Furthermore, by sharing a common model of the interaction between health conditions, functioning and context, such as is presented in the ICF, health professionals working in the same health setting may be better placed to work together in setting goals, evaluating treatment outcomes, and communicating as an interprofessional team with the patient and his family (World Health Organisation, 2013a).

McDougall et al. (2011), based on a study on the interrelationship between ICF and a quality of life conceptual framework for patients with chronic condition, reported that the functional and contextual factors around the health problem or disease make a large impact on the quality of life. They conclude that health services should integrate the ICF framework to include other health dimensions beyond the health condition.

The ICF has been found to be a useful framework within which to assess and plan treatment by Weigl, Cieza, Kostanjsek, Kirschneck, and Stucki (2006) in their study to investigate whether the ICF comprehensively covers the spectrum of health problems encountered by medical doctors and physiotherapists in patients with musculoskeletal conditions. They recommended that the ICF can be integrated into clinical settings to inform an interprofessional approach within the various health care settings. They maintain that a patient-oriented approach may be the best way of guiding interprofessional collaboration (Weigl et al., 2006), but the problem highlighted by the authors is that different health professionals do not always work together. To enable effective interprofessional communication to take place within the health care settings, there is a need for a comprehensive communication tool (Daniel & Rosenstein, 2007).

There is evidence of the ICF being used as a measurement and assessment tool for use by physiotherapists and other rehabilitation personnel in clinics, research and teaching (Escorpizo & Bemis-Dougherty, 2013). The ICF has been utilised across cultures in different conditions and health care settings but there is a need for further studies to examine how the ICF can guide clinical decision making across various conditions and populations (Escorpizo & Bemis-Dougherty, 2013).

The researcher's experience working in district hospitals and as a lecturer in a physiotherapy department in Rwanda leads him to conclude that the bio-medical approach is the dominant model in these clinical settings and that there is a lack of collaboration between health care professionals in different disciplines. Working in district hospitals as a physiotherapist, he has encountered many different instances in which the lack of interprofessional collaboration was a barrier to a holistic approach to health management.

1.2 Problem statement

The Lancet Global Independent Commission identified the need for health care reform which should be based on "interprofessional and transprofessional education that breaks down professional silos while enhancing collaborative and non-hierarchical relationships in effective teams" (Frenk et al., 2010, p.1950).

The need for health care reform (specifically the need for improved interprofessional collaboration), a lack of the continuum of care and over reliance on the medical model of care were noted in Rwanda in a

context similar to that of the proposed study. In a study on 500 people living with HIV (PLWH) attending district hospitals in Rwanda, Kagwiza concluded that, as the prevalence of disability in PLWH was considerable and could not be addressed simply by pharmacological medical management, there was a clear need to promote interprofessional collaboration based on a bio-psychosocial approach to reinforce referral within the hospital system (Kagwiza, 2014). Although the subjects were all PLWH, the conclusions are generalisable to other patient groups. Interprofessional patient oriented care that takes into account all factors which can determine health and functioning of an individual is thought to have the most impact on the patient's quality of life (Alford et al., 2013).

The International Classification of Functioning Disability and Health (ICF) has been found to be a useful potential framework to help health care professionals provide a common language that looks beyond mortality and disease at how people live with their conditions (Kohler et al., 2013). This approach can provide a useful framework within which to structure the assessment of patients and other clients, not only for rehabilitation professionals but for medical practitioners and other health professionals who are involved in the care of patients (World Health Organisation, 2013a). However, the application of the ICF is as yet somewhat limited among health professionals, especially those who are not part of a rehabilitation team. This was supported by Rentsch et al. (2003); Cahill, O'Donnell, Warren, Taylor and Gowan (2013); Bagraith and Strong (2013); Rainey, van Nispen and van Rens (2014); Stallinga et al. (2014) and Wijayaratne (2015) who argued that the use of ICF was more frequent in rehabilitation settings. In addition, there are no published accounts of training an interprofessional team to adopt ICF in daily practice. This is the case of health care professionals in Rwanda, where the patient assessment and management are oriented towards the condition or impairment. However, it was not clear to what extent the ICF was known to or used by health care professionals in Rwanda as a framework to inform an interprofessional patient care approach.

1.3 Research questions

The fundamental research question is whether a training programme in interprofessional practice (IPP), using the ICF framework to explore the interrelationship between health condition, functional ability and context, would be effective in district hospitals in Rwanda. Specifically we wished to know:

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- What instruments would be valid and reliable in terms of monitoring change in knowledge, attitudes and behaviour with regard to implementation of interprofessional practice?
 - What would be an appropriate and effective manner in which to train medical personnel in the use of the ICF to inform interprofessional practice (IPP)?
 - Would training in the value and practice of IPP, using the ICF as a guiding framework, result in an improvement in the knowledge, attitudes and practice of health care workers in district hospitals in Rwanda?
 - If an improvement in practice does occur following a training programme, does retention occur after two months? Is the good practice sustained if a two-month follow-up training session is offered? Is this good practice sustained up to six months after the initial training?

1.4 Aim and objectives of the study

The study consisted of two phases; the first is a feasibility study, the second is a Cluster Randomised Control (CRCT) study.

The overall aims of the study are to determine whether the ICF can be used as a framework to inform interprofessional assessment and management within hospital settings in Rwanda and whether its use will result in improved service delivery.

The specific objectives of the different phases are:

- To determine the knowledge, attitudes and behaviour of health care professionals in Rwanda regarding interprofessional practice.
- To develop and pilot a training intervention to introduce the use of ICF into a district hospital.
- To obtain consensus from different professionals regarding the most appropriate methods to introduce the ICF conceptual framework into the routine management of patients within selected district hospitals.
- To develop and validate outcome measures that are responsive to changes in knowledge, and attitudes of health care professionals, and changes in behaviour as demonstrated in patient records.

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- To investigate whether a training programme on the use of the ICF in clinical practice will improve the knowledge and attitudes regarding interprofessional practice in selected district hospitals.
 - To determine if the introduction of the ICF results in improved practice (behaviour) as seen in charged recording of patient assessment and management and, if improvement does take place, whether this is maintained for up to six months after the conclusion of the training programme.

1.5 Justification and significance

In order to ensure affordable, universal health care coverage health care reform is necessary. The introduction of the ICF as the framework of patient management may result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. The patient would be managed as an individual within a context: his/her impairments and functional limitations would be identified and hopefully addressed, as would be the environmental barriers which limit his/her health related quality of life. Effective collaboration between health care professionals may enhance team members' awareness of each other's knowledge and skills, leading to continued improvement in management.

It was anticipated that this study would come up with recommendations regarding an appropriate method of adopting an interprofessional collaboration between health care professionals in Rwanda. Medical condition or disease alone do not predict the needed services, the hospital length of stay, the needed care or the patient's functional outcomes (World Health Organisation, 2002). The ICF framework has been used widely in rehabilitation medicine in high income countries, and has been found to be a very useful tool to inform a smooth collaboration between health professionals. If the use of the ICF is found to improve patient care, the training and implementation model may serve as a model for other low and middle income countries.

1.6 Research setting

The study was carried out in district hospitals in Rwanda. Rwanda is a small and landlocked country situated in central Africa known as the great lake region (USAID, 2011). In the north, Rwanda is bordered by Uganda, in the east by Tanzania, the south by Burundi and the west by the Democratic Republic of Congo (DRC)(Republic of Rwanda, 2015a).The surface area is 26,338 km² divided into five provinces and

30 districts. According to the national census of 2012, the population of Rwanda was about 11 million (National Institute of Statistics of Rwanda, 2012) and the population density is the highest in sub-Saharan Africa (416 inhabitants per square kilometre) (National Institute of Statistics of Rwanda, 2012; Republic of Rwanda, 2015a).

Almost all Rwandans have health insurance, and the poorest people do not pay fees for health services (Farmer et al., 2013). Four provinces are predominated by rural areas whereas Kigali city is predominated by an urban environment (Ngoga, 2013; Republic of Rwanda, 2014a) and about 85% of the population live and work in the rural areas. Therefore, the remaining 15% live and work in the urban areas (National Institute of Statistics of Rwanda, 2010).

The tragic event of genocide against the Tutsi in 1994 destroyed the country's infrastructure, including the health care system and human resources for health (Moodley, Gahima, & Munien, 2011). During the genocide, up to one million people were killed and about three million went into exile in different countries (Republic of Rwanda, 2014b). Nevertheless, after the genocide, the country started to rebuild and reform its health care system and to train health care professionals (Ngoga, 2013).

Rwanda has 40 district hospitals covering four provinces plus four district hospitals in Kigali city to make a total of 44 district hospitals (Rwanda Ministry of Health, 2013b). In general, apart from Kigali city, all district hospitals in Rwanda are similar in terms of patients and conditions, services, materials and equipment as well as health care personnel, so the four hospitals from Kigali were excluded from this study. The district hospitals have both inpatient and outpatient services. Outpatient services include: general consultation, dentistry, laboratory, medical imaging, mental health, ophthalmology, HIV/AIDS unit, social welfare, and physiotherapy. Inpatient services includes: orthopaedic/surgical, medical, paediatrics, and maternity. This study has only recruited patients' records from inpatient services, specifically orthopaedic/surgical, internal medicine and paediatric. This choice was based on the fact that patients in these wards may be hospitalised for longer periods and receive treatment from different health care professionals than those in other wards. The maternity ward was been excluded because the mothers generally spend only one to two days in hospital and are not expected to have complications to be seen by different health care professional, especially when delivery is uncomplicated.

1.7 Description and structure of the thesis

The first chapter of the thesis has given the background, aim and objectives and justification of the study. Chapter 2 presents an overview of the literature. Chapter 3 describes the development and validation of the outcome measures and of the content of the training programme. Chapter 4 presents the feasibility study, which describes how the training programme was trialled and modified and the outcome measures validated. Chapter 5 describes the methodology of the Cluster Randomised Control Trial, Chapter 6 the results of the intervention on knowledge and attitudes, and Chapter 7 describes the impact of the intervention on the initiation and retention of desirable behaviour. The final chapter, Chapter 8 presents the conclusions and recommendations of the study.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction to literature review

This narrative literature review starts by presenting the challenges faced by health care for the 21st century and presents suggested solutions to overcome those problems. To contextualize the current research, the Rwanda health system is then described in detail. This covers the general organisation of the health system, the essential transition in health care from traditional to modern health care, the human resources available for health, the accessibility of health services, and challenges faced by the Rwanda health system.

As interprofessional collaborative practice was identified as contributing to improved and appropriate health care, this concept is explored next. The need for and benefits of interprofessional collaboration as organisational, team, and individual (patient and team member) benefits are elaborated. The interprofessional collaboration competencies established by the Canadian Interprofessional Health Collaborative (2010) are presented as important guidelines to the required skills for health care professionals. These competencies, which include patient/client/family/community-centred care, role clarification, team functioning, conflict resolution, collaborative leadership, and interprofessional communication, are further discussed.

There is an exploration of conceptual frameworks for interprofessional collaboration which could inform the design of the planned intervention. Finally, as the intervention will be based on the training of adults and on principles of adult learning, interprofessional collaboration based training models are also discussed. These includes the development of training programmes, transfer of training and change theory, appropriate instructional/training methods, and the effect of training on changing knowledge, attitudes and behaviour.

2.2 Search strategies

Extensive searches were performed for this narrative literature review. The following databases were searched: PubMed (which includes Medline), Cochrane library, EBSCO, Cumulative Index of Nursing and Allied Health Literature (CINAHL - via EBSCOhost), Google, Web of Science and Scopus (which indexes Embase). The search terms used were "Interprofession*" OR "inter-profession*" OR "interdisciplin*" OR

“inter-disciplin*” OR “interoccupation*” OR “inter-occupation*” OR “multiprofession*” OR “multi-profession*” OR “multidisciplin*” OR “mult-disciplin*” OR “multioccupation*” OR “multi-occupation*” OR “transprofession*” OR “trans-profession*” OR “transdisciplin*” OR “trans-disciplin*” OR “transoccupation*” OR “trans-occupation*” OR “team-based” OR “team based” “AND “education*” OR “learning” OR “training” OR “practice” OR “Care” OR “management” OR “care” AND “collaboration” OR “cooperation” OR “communication”. Hand searched (pearling) and grey literature were also sourced to enrich the review.

2.3 Health care for a new century

The Framework for Action on Interprofessional Education and Collaborative Practice which was established for all countries’ policy makers, health educators and health workers reported that several countries throughout the world are struggling to maintain their health systems and cannot address the problems that are emerging with health care delivery (World Health Organisation, 2010a). Among those problems is the increased complexity of the work to be performed. In addition, challenges are posed by the increased use of information technology, the need for patient and community centred care, patient safety, quality care, seminars and workshop procedures, and the requirement that health professionals should follow the standardised protocols and guidelines during assessment and patient management (Hansen, Savage & Tomson, 2012; Vanderwielen et al., 2014). These challenges are compounded by the rapid growing and very complex science and technology, shortage of staff, poor or inadequate working conditions, and poorly designed systems which can affect patient outcomes (Greiner & Knebel, 2003).

Many of these issues were identified by the Global Independent Commission (Frenk et al., 2010). Health professional education in the past 20th century was strongly influenced by the 1910 Flexner report and the studies around that report (Frenk et al., 2010). The Flexner report aimed at health professional reform for the 20th century by giving guidelines regarding medical education in the United State of America and Canada. According to Flexner (1910), medical education was based on “learning by doing” rather than just following and memorising as was the case previously. Knowledge was emphasised and the proposed curricula were exclusively science based (Ludmerer, 2010). The Global Independent Commission critiqued this approach, arguing that it was more about informative and formative rather than transformative learning (Frenk et al., 2010). Nonetheless, the reforms proposed by Flexner were an enormous step forward in health professional educational reform for the 20th century.

Approximately 100 years later, an international multi-professional commission observed that all was not well in health professional education systems due to rapid changes in knowledge and technology. This led to the meeting of 20 health professional practitioners and educators from different countries to identify deficiencies in health education and develop guidelines which could help health professionals to think beyond the silos of the individual profession (Frenk et al., 2010). Various problems facing the 21st century were identified during the meeting. Not only the Global Independent Commission report, but different researchers, reporters, institutions and organisations also recognised the challenges facing the health system for the 21st century the world over (World Health Organisation, 2010a).

A further problem that has been identified is the imbalance in the health systems both within and between countries (Mathur, 2011). People with higher income, living in urban areas for the most part, can afford quality health care, whereas the rural poor may not have the same access. The WHO highlighted this inequality (World Health Organisation, 2010b) by reporting that although nearly one half of the global population are found in rural or disadvantaged areas, they are served by only one quarter of the world's doctors and by less than one third of the world's nurses. The inequities and gaps between rich and poor communities all over the world, be it within the countries and between the countries, clearly result in inadequate health care and increased mortality and morbidity rates in those deprived of access (Anderson et al., 2011; Dean et al., 2014). The problem of inequality in health care among poor and rich populations can be linked to inappropriate quality health care as a result of maldistribution and/or shortage of health care professionals, working conditions, motivation and insufficient salaries in rural areas (Frenk et al., 2010; Buchan et al., 2013; Tangcharoensathien & Travis, 2016). The Global Independent Commission report identifies the disparity between health care systems to meet the patient and population needs, poor leadership to improve health care systems and poor teamwork as deficiencies in the current health care systems (Frenk et al., 2010). Part of the solution may be to adjust the education of health professionals to address the challenges of the 21st century and to improve the knowledge and hands on skills of health workers as well as to deliver health care to all in need (Hansen, Savage & Tomson, 2012).

The vital importance of health education reform was highlighted by the Global Independent Commission (Frenk et al., 2010), the Board of the International College of Person-Centered Medicine

(ICPCM) (2014) and Sade (2015). One of the targets of health professional education reform was the development of an interprofessional approach, where health professionals from different disciplines (doctors, nurses, and allied health professionals) work together in a collaborative approach for better patient outcomes (Hansen, Savage & Tomson, 2012). Health professionals are thus called upon to foster a teamwork spirit to enhance the interprofessional care process. According to Anderson et al.(2011), a team work approach would address some of the new challenges facing health systems, as it might lead to a holistic approach to health care which would put the patient and the family or community in the centre of health care. Increases in knowledge and technology dominated in the past century, but now the emphasis has shifted to helping and empowering patients and communities through an effective collaboration between health professionals (Hean, Craddock & Hammick, 2012).

Thus, one of the recommendation of the Global Independent Commission was the *“promotion of interprofessional and transprofessional education that breaks down professional silos while enhancing collaborative and non-hierarchical relationships in effective teams”* (Frenk et al., 2010, p.54). This was recommended as the most effective approach to overcome the challenges of shortage of human resource and infrastructure, and poor working conditions.

The importance of collaborative partnerships in health professional education and practice was also recognised by the Board of the International College of Person-Centered Medicine (ICPCM),(2014), by Mathur (2011) and by Hafferty and O'Donnell (2016) as a means to breaking down the health professional silos and enhancing a bio-psychosocial or holistic intervention to the patients.

In conclusion, as countries around the world are trying to re-innovate or transform for a better future health system oriented to patient and population centred care, many authorities, including the WHO (World Health Organisation, 2010a)and the Global Independent Commission (Frenk et al., 2010)recommend that part of the solutions may be interprofessional collaboration. Interprofessional collaborative practice could play an essential role in alleviating various challenges faced by health systems globally. The next section explores the challenges faced by Rwanda in the light of the global problems with healthcare delivery.

2.4 *Rwandan health system*

The Rwandan health system employs a primary health care approach (Republic of Rwanda, 2009).

2.4.1 **General organisation of health system**

Health systems in Rwanda went through the essential transition from traditional healing methods to modern health care (Government of Rwanda, 2005). In the years prior to the 1994 genocide, the health system in Rwanda was centralised. However, the whole system, including the health infrastructure, was destroyed during the genocide. The first years following the genocide were spent rehabilitating fundamental health care and human resources for health. However, the reforms in the health sector started in 1995 when the health care system was restructured based on decentralised management and district-level care as stipulated in the 35th African Regional Committee of the WHO held at Lusaka in 1985 (Republic of Rwanda, 2005; Republic of Rwanda, 2015a).

The three strategies approved by the Lusaka Declaration were the corner stones to build on by the Rwanda Ministry of Health to boost the quality of the health care system (Republic of Rwanda, 2005; Ngoga, 2013). These strategies were the following (Republic of Rwanda, 2015b; Hsiao, 2003):

- Health district as decentralisation of the health care system strategy at the bottom.
- Establishment of the primary health care (PHC) system through its eight basic components.
- Reinforcing community participation in service in different aspect like management and financing.

The decentralisation of health care services has been implemented since 2005 and is regarded as one of the successful innovations in the Rwandan health system (Republic of Rwanda, 2015b).

In line with the decentralisation strategy, the health system in Rwanda is structured according to Central, Intermediary and Peripheral levels. The Central level includes the central directorates and programmes of the Ministry of Health and the national referral hospitals. This level elaborates policies and strategies, ensures monitoring and evaluation, and regulates the health sector (Rwanda Ministry of Health, 2012b). The Central level also organises and coordinates the intermediary and peripheral levels of the health system, and provides them with administrative, technical and logistical support.

At this level, four national referral hospitals are included. These are Butare and Kigali University Teaching Hospitals, and also Ndera Neuropsychiatric Hospital. The fourth referral hospital is King Faisal

which was created to provide a higher level of technical expertise than that available in the national referral hospitals to both the private and public sector. The role of this main higher level referral hospital is also to ensure that there is a reduction in the number of referrals abroad (Rwanda Ministry of Health, 2012b). Therefore, King Faisal Hospital has a role of referral abroad if a condition cannot be treated at this level.

The Intermediate level operates at provincial level, and deals with management and policy issues (Republic of Rwanda, 2005; Republic of Rwanda, 2015a). This level does not always provide health services, but there is the directorate in charge of health at this level which has the responsibility of implementing health policy, coordinating activities, and providing logistical, administrative and technical support. Moreover, there are some district hospitals which are currently operating as provincial hospitals (for example: Rwamagana hospital, Ruhengeri hospital, and Kabgayi hospital) (Republic of Rwanda, 2015a).

The third level is Peripheral which is at district level. This level is composed of the administrative office at district level, a district hospital and a network of all health centres which operate in the district catchment area. Volunteer community health workers (CHWs) and community based organisations (CBO) who provide community awareness and mobilisation interventions (Rwanda Ministry of Health, 2015) are administered at this level. The health district deals with all health problems encountered in its catchment area. The overall responsibility of the health district includes organising all health related services in district hospitals and health centres, administration and logistics as well as supervision (Republic of Rwanda, 2005).

Specific packages at each level are organised in order to provide effective and quality health care across the country and facilitate planning and allocation of resources. It is also organised such that the standardised management protocol will be followed for better services to the Rwandan population (Rwanda Ministry of Health, 2015). The access to health facilities is considered to be satisfactory. For instance, it is estimated that 85% of Rwandans live less than 15 km from a health facility and 75% live less than 5 km (Rwanda Ministry of Health, 2008).

Figure 1 below indicates the levels of the Rwanda health system from primary to referral level and outlines their service delivery outputs according to the Republic of Rwanda (2001) and the Rwanda Ministry of Health (2011, p.7&8).

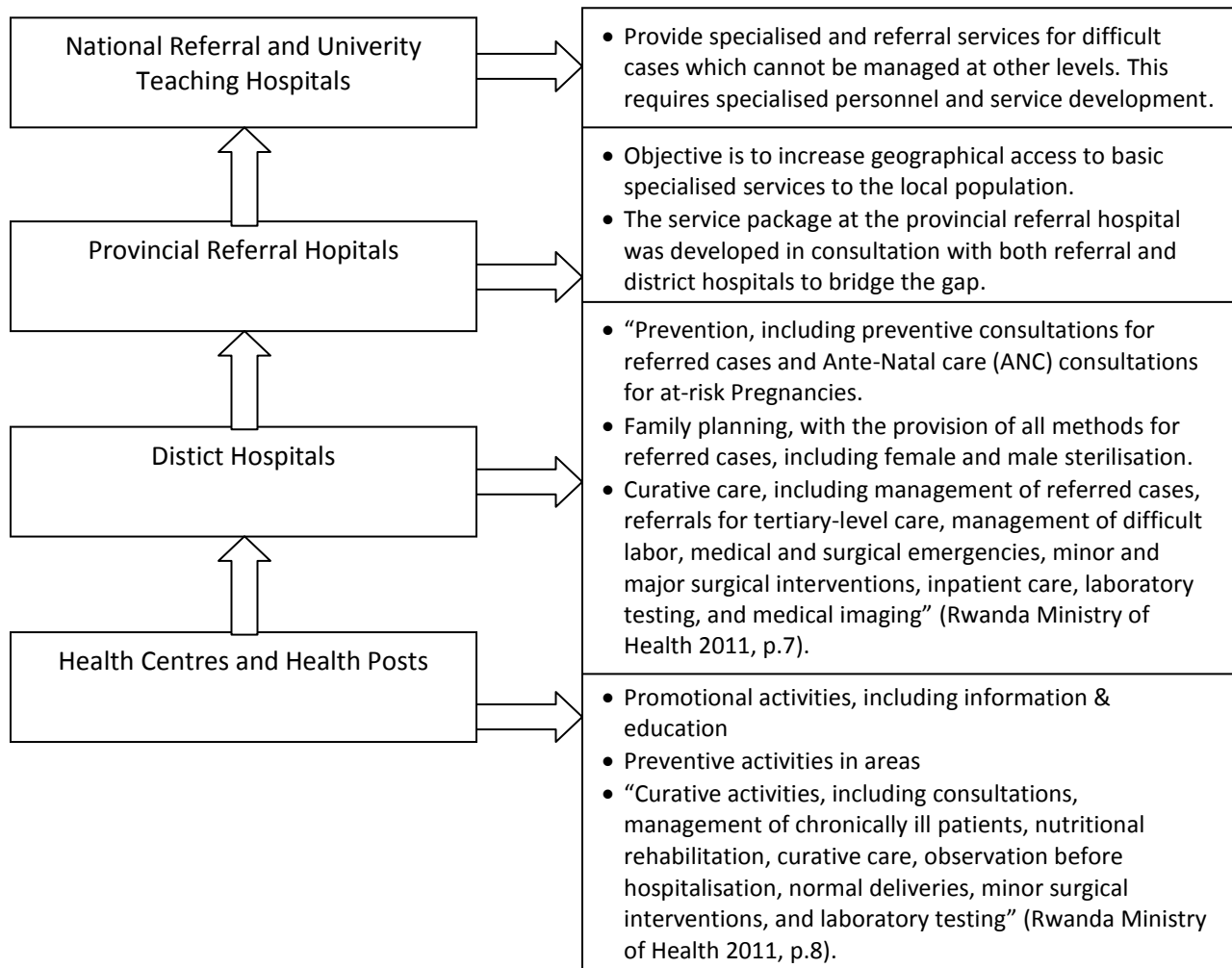


Figure 1: Summary of levels of health system and their packages

In 2015, the Rwanda health system was composed of four referral hospitals, 44 district hospitals, 466 health centres, 30 district pharmacies, 5 blood transfusion centres, 60 health posts, 114 dispensaries, 16 prison dispensaries, 45,000 Community health workers at household level, and 60 private health facilities including clinics and pharmacies (Rwanda Ministry of Health, 2015; National Institute of Statistics of Rwanda, 2012; Rwanda Ministry of Health, 2015).

2.4.2 Human resource for health

In Rwanda, health professionals are registered according to law N° 22/2002 OF 09/07/2002 on general statutes for Rwanda public service (Rwanda Ministry of Health, 2014) in the following categories:

- “Physicians (general practitioners and specialised)
- Dentists
- Pharmacists
- Nurses and midwives (general nurses and specialised)
- Allied Health Professionals
 - Anesthesia Practitioners
 - Biomedical Laboratory Technologists
 - Chiropractors
 - Clinical Psychologists
 - Dental Therapy Practitioners
 - Environmental Health Officers
 - Medical Imaging Practitioners
 - Nutritionists/Dieticians/Nutritionist Assistants
 - Occupational Therapists
 - Ophthalmic Clinical Officers/Cataract Surgeons
 - Optometrists/Opticians
 - Orthopedic Clinical Officers
 - Physiotherapists/Physiotherapy Technicians/Assistants
 - Prosthetics and Orthotics Technicians
 - Public Health Officers
 - Speech Therapists and Physician assistants
 - Emergency Care Officers
 - Biomedical Engineers and Technicians”

(Rwanda Ministry of Health, 2014, p.6).

The human resources for health have been challenged by a significant shortage of health professionals in health facilities of Rwanda. In 2013, in Rwanda, there were 678 doctors, 9,448 nurses/midwives and 400 pharmacists working in health facilities. This number showed the ratio of one doctor for 16,046

people, one nurse for 1,227 people, one midwife for 18,790 people and one pharmacist for 20,000 people (Ministry of Health, 2013). This ratio was also estimated to be the case for allied health professionals as well as health system managers. This ratio, especially for physicians, is very low compared to the desired goal of one doctor per 1000 persons (World Health Organization, 2008). Rwanda like other sub-Saharan Africa countries employs community health workers (CHWs) to bridge the gap existing in human resources for health. Around 45,000 CHWs have been trained at the community level to help by providing some basic health care such as prevention and treatment of malaria, diarrhoea and pneumonia, and facilitate in nutrition and family planning (Haver, Brieger, Zoungrana, Ansari, & Kagoma, 2015). In addition to CHWs, there are some other non-physician cadres who have been trained for minor surgery, for example, cataract surgery (Lewallen, Etya, Kello, & Courtright, 2012).

The shortage of health care professionals was more pronounced in specialist physicians where they represented 24% of all physicians who are in health practice. Moreover, those specialists were mainly in urban areas, specifically in the city of Kigali (Rwanda Ministry of Health, 2013). This implies that, geographically, the rural areas are disadvantaged relative to urban areas in terms of human resources for health (Rwanda Ministry of Health, 2015). In addition, there was an internal migration from the public health facilities to the non-governmental organisations (NGOs) which, basically, are allocated in urban areas (Logie, Rowson, & Ndagije, 2008). Therefore, the urban community may have more adequate medical care than rural communities. Indeed, according to the Ministry of Health (2013), this number of health care professionals was not sufficient to respond to the health needs of the whole Rwandan population, especially in rural areas (Rwanda Ministry of Health, 2013). The Rwandan report was also in line with Frenk et al. (2010) and Buchan et al. (2013) who reported the problem of inequality in health care among poor and rich people due to the maldistribution and shortage of staff for health in rural communities.

In addition, the large number of health care workers and professionals engaged in providing service and listed above underscores the need for interprofessional collaboration.

2.4.3 Accessibility of health services

In Rwanda, transmissible diseases are the most common especially in the rural areas and are the most common causes of morbidity and mortality. The most prevalent diseases include malaria, respiratory infections, diarrhoea, parasites, skin diseases, HIV/AIDS, tuberculosis, typhus, cholera, and meningitis (Rwanda Ministry of Health, 2011). Consequently, a specific package of activities concerning these conditions, including preventive and curative activities, was provided at each level of the Rwanda health system (Rwanda Ministry of Health, 2011).

There has been a considerable improvement in access to health services due to increased health insurance coverage (Logie et al., 2008; Rwanda Ministry of Health, 2012a) in order to strive towards the goal of universal health coverage (UHC) (Nyandekwe, Nzayirambaho, & Kakoma, 2014). The majority of Rwanda's population now have health insurance, and the poorest people do not pay fees for health services (Farmer et al., 2013).

The number of clients seeking health care has increased in relation to the number of health professionals, especially at low levels (district hospitals and health centres) (Republic of Rwanda, 2012). The Rwandan Ministry of Health has thus produced different protocols, standards, and guidelines at different levels for harmonising the health system in order to try to attain quality health care services despite the challenges (USAID/Rwanda, 2013).

2.4.4 Challenges faced by the Rwandan health system

Rwanda, as with other low income countries, faces challenges to its health system. According to Ngoga (2013) and the Rwanda Ministry of Health (2015), some of the challenges are the low number of qualified health professionals and the low capacity of those employed. The authors also added poor deployment of existing health professionals and the increased turnover of health workers as a result of unclear retention procedures, especially in rural health settings. As stated by Frenk et al. (2010), Buchan et al. (2013), and Tangcharoensathien and Travis (2016), maldistribution and/or shortage of health care professionals, working conditions, motivation and insufficient salaries in rural areas may contribute to inadequate health care in rural and poor communities. Therefore, based on the above challenges, there is a need to adopt national strategies that can meet the health needs of the population and to

implement research initiatives for improved accessibility to quality health services (Rwanda Ministry of Health, 2015).

According to the World Health Organisation (2010a) and Frenk et al. (2010), interprofessional collaborative practice could play an essential role in alleviating various challenges faced by today's health systems all over the world. However, there is no known study or report demonstrating whether or how interprofessional collaboration is employed in the Rwandan education and/or health care sectors.

2.5 Interprofessional collaboration

A literature review on interprofessional collaboration was performed. The authors and year of publication, settings, population, sample size and sampling, study design, outcome measures, intervention and the results where applicable are summarised in Appendix i.

“Through collaboration, we can work together for a better future” (Green & Johnson, 2015, p.8). The current health system encounters many challenges, including a shortage of health care providers. At the same time patients also have various health related needs which require more than one discipline to address them (Bridges, Davidson, Odegard, Maki, & Tomkowiak, 2011; Green & Johnson, 2015). Therefore, it is important to find suitable and sustainable strategies to overcome these challenges and interprofessional collaboration is an important strategy for addressing the scattered health problems of today's health system (Schmitt, Blue, Aschenbrener, & Viggiano, 2011).

Collaboration among health care teams is described in a broad variety of terminologies, but all have the nucleus of working together (Xyrichis & Lowton, 2008). Among those terminologies used interchangeably are interprofessional, interdisciplinary, multiprofessional, multidisciplinary, transprofessional, and transdisciplinary which are used depending on the organisation and structure of the team (Nancarrow et al., 2013). The interdisciplinary and interprofessional teamwork are similar, but they differ in that interprofessional only refers to health professionals whereas the interdisciplinary can involve non-professionals as part of the team (Xyrichis & Lowton, 2008).

Both interdisciplinary and interprofessional teamwork integrate different disciplines in sharing expertise, knowledge and skills at one consultation, engaging with and referring to one another more appropriately, and involve patients in the decision making process (Jessup, 2007; Xyrichis & Lowton, 2008; Nancarrow et al., 2013). In contrast, multidisciplinary and multiprofessional teamwork involve different disciplines but each one may consult and treat the patient from their own discipline perspective (Jessup, 2007). Interprofessional teamwork has been found to be more effective than the multiprofessional teamwork based on the advanced quality of the collaboration and team performance (Mirjam, 2010). Thus, the current study is only focused on interprofessional collaboration within the working environment (hospital setting).

Interprofessional collaboration occurs when health professionals from different disciplines with different backgrounds provide patient care together and work closely with each other and the patient, family and the community to deliver the optimum health care (World Health Organization, 2010a; Hall & Zierler, 2014; Roberts & Kumar, 2015; Mahdizadeh, Heydari, & Karimi Moonaghi, 2015). In other words, the professions teach and help one another to improve quality of health care (Hallin, Kiessling, Waldner, & Henriksson, 2009).

Interprofessional collaboration is a new paradigm which brings together two networks for optimum patient care (Newhouse & Spring, 2010). These are the health care network and the patient network. The patient network includes his/her family, relatives and community, whereas the health care team network includes physicians, nurses, social workers, nutritionists, physiotherapists, occupational therapists, and other health care professions (World Health Organization, 2010a; Newhouse & Spring, 2011). The adoption of this paradigm breaks down the silos of thinking about “my patient” to “our patient” (Newhouse & Spring, 2011).

Having defined interprofessional practice, the need for interprofessional practice will now be explored.

2.5.1 The need for interprofessional collaboration

As discussed previously, the 21st century is facing increasing health related challenges. These include but are not limited to chronic illnesses which need long term care, complex working environments and shortage of staff. After evaluation over several years, there is sufficient evidence that the

interprofessional education and collaborative practice promotes health care services, strengthens health systems and improves patients' outcomes (Zwarenstein et al., 2007; World Health Organization, 2010a). In any health care setting, then, health professionals should work in a collaborative manner, given that there is no single profession that can meet all the needs of most patients (Matziou et al., 2014). Quality health care results from working collaboratively in team based interprofessional groups (Matziou et al., 2014).

Interprofessional collaborative practice was approved by WHO as an effective strategy to mitigate the existing shortage of health professionals faced by the 21 century, while at the same time addressing multiple bio-psychosocial issues globally (World Health Organization, 2010a). The WHO Framework for Action on Interprofessional Education & Collaboration Practice states that if people learn together and work together, they provide better health care (World Health Organization, 2010a). In other words, smooth collaboration among health care providers may minimise the medical errors and eventually affect patient outcomes (Fewster-Thuente & Velsor-Friedrich, 2008).

In fact, when different disciplines are involved in a patient's management, this can solve a variety of problems that would not have been met by only one discipline (Newhouse & Spring, 2010).

Interprofessional collaboration has thus emerged as a crucial approach to promote holistic care and to benefit both health professionals, patients, families and the community (Fewster-Thuente & Velsor-Friedrich, 2008).

It has been argued that the interprofessional care in a particular clinical setting is essential for effective patient outcomes (Nancarrow et al., 2013). Indeed, it has been claimed that in any health care setting, most mistakes and errors can be accredited to poor collaboration and poor teamwork spirit among health care professionals (Leonard, Graham, & Bonacum, 2004). For example, failure to collaborate among health professionals has been found to be a contributing element to adverse safety incidents among surgical patients (Greenberg et al., 2007). Furthermore, Zwarenstein et al. (2013) believe that poor collaboration and communication between health care professionals does harm to the patient. There is thus considerable support for the concept of interprofessional collaborative practice; however, there still needs to be evidence that implementation leads to improved health care.

2.5.2 Effect/benefits of interprofessional collaboration

An extensive literature review on the effect of interprofessional collaboration was performed, including the individual studies and systematic reviews. For the systematic reviews, the details about the authors and years of publication, population, studies included, outcome measures and conclusions are reported in Appendix iii. The individual studies are reported in Appendix ii.

Numerous studies and systematic reviews have been conducted on the effects and benefits of interprofessional collaboration. As might be expected with as complex an undertaking as interprofessional collaboration, no definitive statement can be made as to the effects and benefits. However, across the studies and as systematic reviews are conducted, evidence is accumulating about how and in what contexts interprofessional collaboration is effective.

The results of empirical studies on the impact of interprofessional training are, however, mixed. An early systematic review carried out in 1999 by Zwarenstein, Barr, Hammick, Koppel and Reeves (1999) demonstrated that the effect of interprofessional education (IPE) and collaborative practice was uncertain. But, their findings did not imply evidence of ineffectiveness of IPE and collaborative practice. A systematic review on interprofessional collaboration among nurses and physicians conducted by Martin, Ummenhofer, Manser and Spirig (2010) indicated that few studies demonstrated improvement in health care outcome following interventions based on interprofessional collaboration.

In addition, several studies had methodological limitations with regard to sample sizes, patient withdrawal and missing data. These authors recommended further studies to determine its effectiveness. However, overall positive effects were reported in a systematic review on the effects of interdisciplinary team care interventions on general medical wards in which Pannick et al. (2015) concluded that an interprofessional team has various benefits on the organisation and the health care team, as well as the patient. It was also supported earlier by Mickan (2005) in the framework of outcome measures for effective teamwork (Table 1). This framework will be used to structure the discussion of effects and benefits below. Furthermore, a Cluster Randomised Control Trial (CRCT) conducted by Borenstein et al. (2016) among an elderly population demonstrated the need for interprofessional collaborative practice based on its positive effect within the institution, team members and the patients.

Table 1: Outcome measures for effective teamwork

Outcome measures of effective teamwork			
Organisational benefits	Team benefits	Individual benefits	
		Patients	Team members
<ul style="list-style-type: none"> ○ Reduced hospitalisation time and costs ○ Reduced unanticipated admissions ○ Better accessibility for patients 	<ul style="list-style-type: none"> ○ Improved coordination of care ○ Efficient use of health care services ○ Enhanced communication ○ Professional diversity 	<ul style="list-style-type: none"> ○ Enhanced satisfaction ○ Acceptance of treatment ○ Improved health outcomes 	<ul style="list-style-type: none"> ○ Enhanced job satisfaction ○ Greater role clarity ○ Enhanced well-being

2.5.2.1 Organisational benefits

- **Reduced hospitalisation time and costs**

Reduced hospitalisation period implies lowering the number of admission days or time, whereas reducing costs implies decrease in money for both care and patients' wards or rooms. Systematic reviews and RCT have demonstrated the potential for interprofessional care to decrease hospitalisation time and costs (Ivers et al., 2012; Pannick et al., 2015; Mahdizadeh, Heydari & Karimi Moonaghi, 2015).

Reduced hospitalisation periods as one of the benefits of interprofessional collaborative practice has been reported by Pannick et al. (2105) and Mahdizadeh et al. (2015). Interprofessional care can result in earlier discharge and, when combined with home support and care, it reduced patient admission time by 26%, even though only five out of 23 studies demonstrated reduced length of stay (Pannick et al, 2015).

Reduced cost of care has also been demonstrated by Pannick et al. (2105) and Mahdizadeh et al. (2015) in the sense that interprofessional care reduces expenditure. Pannick et al (2015) reported that the interprofessional team lowered total health care expenditures by 13.6% compared with a single discipline management system. Additionally, the interprofessional care contributes to cost-effective medical care by reducing duplications and delayed care (Ontario Clinical Nutrition Leaders Action Group, 2014). Finally, interprofessional collaborative practice can reduce clinical errors and complications, therefore reducing the cost of care (Mahdizadeh et al., 2015). The systematic review conducted by

Pannick et al. (2015) among primary health care teams demonstrated that half of the studies (five out of 10) indicated reduced complications of care.

- **Reduced unanticipated admissions**

Interprofessional care practice has been found to reduce unanticipated hospitalisation in various studies for conditions as diverse as malnutrition, asthma and chronic obstructive pulmonary disease. Those with chronic illness appear to benefit the most from the interprofessional collaboration in relation to the unanticipated admission (Fleming et al., 2011; Borrill et al., 2001).

A study done in Canada on the interprofessional approach to malnutrition in hospitalised adults displayed a reduced risk of readmission (Ontario Clinical Nutrition Leaders Action Group, 2014). Patients who were treated by a team of health professionals from different disciplines were more likely to be treated holistically and more health related problems were addressed than in patients who were seen by only one health professional. This was also confirmed by Fleming et al. (2011) in their study where admission and readmission in a paediatric asthma department and frequency of visits decreased considerably as a result of interprofessional collaboration. In another study on the quality assurance in integrated interdisciplinary care for patients with chronic obstructive pulmonary diseases, the interprofessional collaboration approach was reported to minimise the emergency department visits and the number of hospital admissions was decreased (Dajczman et al., 2013).

In addition to that, a structured evidence-based literature review on discharge, referral and admission demonstrated that interprofessional education and training can play a crucial role in reducing readmission and provide the accurate referral and appropriate discharge system (Australian Commission on Safety and Quality in Health Care, 2010). Furthermore, a literature review on the evidence for effective interventions to minimise unanticipated admission across populations and settings of care also recommended the use of interprofessional practice as a key element to reduce hospital unanticipated admission in primary health care (Boutwell & Hwu, 2009).

- **Better accessibility for patients**

The sixth article of the WHO Alma-Ata declaration on primary health care in 1978 states that primary health care should be *“accessible to individuals and families in the community through their full*

participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination” (World Health Organisation, 1978, Declaration VI, p.2).

In response to the Alma-Ata declaration, interprofessional collaboration was strongly suggested by the WHO as a positive approach to attain the accessibility of health care to patients across the world (World Health Organisation, 2010). For instance, among the benefits of interprofessional collaboration, the discussion paper by the Canadian Medical Association (2007) and Fleming et al. (2011) included better access to health care services. This was also supported by different studies in the interprofessional arena. Lemieux-Charles and McGuire (2004), Barrett (2007) and Pannick et al. (2015) demonstrated improved access to health care by numbers of patients due to interprofessional care practice. The access to health care services can be in terms of access to early treatment, immunisation and early testing stated by Ivers et al. (2012). Furthermore, a study describing the interprofessional care practice for an interprofessional collaborative model for medication therapy management service demonstrated increased accessibility when an interprofessional approach is used (Truong et al., 2012).

2.5.2.2 Team benefits

- **Improved coordination of care**

Improved care coordination is a foundational principle in interprofessional practice and includes the coordination of care between health providers, patient and family to facilitate meeting the needs and expectations of the patient (Mitchell et al., 2012). The coordination of care as one of the benefits of the interprofessional care model was reported by Barrett (2007) in his study in primary health care delivery. In their review of literature, Lemieux-Charles and McGuire (2004) demonstrated that interprofessional care improves access to care and coordination of services, hence the improved chronic disease outcomes and patient safety.

For instance, if health care professionals work together in the assessment and management process, this would prevent duplication of activities and implies coordination health care activities (Barrett, 2007; Lemieux-Charles and McGuire, 2004). The reduction in duplication of services across disciplines has been claimed to prevent further complications (The New York Academy of Medicine, 2013). Furthermore, in an interprofessional study conducted in England, nurses reported improved coordination in working

together in primary health care teams which resulted in better holistic intervention (Pannick et al., 2015).

- **Efficient use of health care services and enhancement of communication**

As was cited before, in preventing duplication of health services and equipment/materials used for care delivery, a shared care approach could utilise the health care services efficiently. This is of great importance in resource constrained environments. Interprofessional collaborative practice enhances effective communication; therefore, patients and staff benefit from good communication and through communication health care services are used efficiently and effectively (Pannick et al., 2015). This was also observed in a primary health care and paediatric asthma department for children, where the use of interprofessional collaboration in routine practice demonstrated better use of clinical resources and appropriate use of specialty care arising from good communication among professionals (Barrett, 2007; Fleming et al., 2011; Green & Johnson, 2015).

Additionally, an audit of team-focused case managers' records reported that patients were referred to different services more often and smoothly than those of lonely care (Pannick et al., 2015), confirming a proper referral system within the hospital facilitates the efficient use of health care services (Barrett, 2007). Based on these few studies, but carried out in different settings and populations, it is evident that effective teams utilise health care services more efficiently and enhance communication among health professions from various disciplines (Lemieux-charles & Mcguire, 2004).

- **Professional diversity**

Active participation and involvement of all members of the health care team is required for better health outcomes in an interprofessional collaborative setting. However, mutual respect among the diverse health professionals is paramount for successful team functioning (Canadian Medical Association, 2007). It is anticipated that during four days of hospital stay a patient may interact with around 50 different people including health care professionals, hospital workers and family members or relatives (J. Wen & Schulman, 2014). Therefore, an effective team should be characterised by proper interaction of diverse individual and professionals from different disciplines. For a team to be effective, it should be characterised by respecting and trusting each other for better collaboration (J. Wen & Schulman, 2014). Actually, for better collaboration, the institutions or professions should know that

working together contributes more than one profession can achieve on its own (Green & Johnson, 2015).

The majority of knowledge, skills and experience gained by health professionals are acquired through the opportunity to learn and discuss with the team members in the same working environment (Barrett, 2007; Lemieux-charles & Mcguire, 2004). Consequently, in so doing, team members improve their clinical performance (Mickan, 2005). Again, knowing diversities from different health care professionals through discussion and learning together, there would be less tension and conflict among caregivers would reduce (Fleming et al., 2011). In fact, positive patient outcomes can be enhanced by a collaborative relationship among a diversity of health care professionals in any health care setting (Fewster-Thuente & Velsor-Friedrich, 2008).

2.5.2.3 Individual benefits (patients/clients)

Interprofessional collaboration can also benefit patients in enhancing satisfaction, acceptance of treatment and improved health outcomes (Mickan, 2005).

- **Enhanced satisfaction and acceptance treatment**

Patient satisfaction could be an outcome of quality care (Wen & Schulman, 2014). However, it requires collaborative communication skills among professionals managing the patient (Hojat et al., 2011). A meta-analysis on team based care and improved patient satisfaction provided evidence that collaborative team-based care might be of greater benefit than lonely care in achieving patient satisfaction (Wen & Schulman, 2014). This evidence is also supported by other studies. An inter-professional approach to malnutrition in hospitalised adults revealed that interprofessional care reduced adverse events which could promote patient satisfaction (Ontario Clinical Nutrition Leaders Action Group, 2014).

Improved patient satisfaction also was demonstrated in hospital-based team home care where both caregivers and patients expressed significantly higher levels of satisfaction at one month, and they went on expressing a great level of satisfaction at six months of care. This satisfaction was expressed by reduced symptoms and, eventually, improved overall health (Borrill et al., 2001), but it was not statistically tested to demonstrate a significant improvement. Moreover, studies carried out in primary

health care (Ivers et al., 2012) and multidisciplinary teams in hospital settings (Epstein, 2014) indicated high satisfaction among patients who had been treated by an interprofessional team.

Interprofessional team-based care was also reported to promote patient satisfaction in a synthesis named Interprofessional Collaboration and Quality Primary Healthcare in Canada. Basically, patients were satisfied due to various benefits across all review areas; the environmental scan confirmed increases and increased access to service across Canadian jurisdictions (Barrett, 2007). These were accompanied by great acceptance of treatment and more comprehensive care in community mental health settings (Barrett, 2007).

- **Improved health outcomes**

Improvement of patient outcomes is the main purpose of all health care. Improved health outcome as a result of interprofessional collaboration was supported by numerous studies, reviews and reports. All of these studies demonstrated benefits in hospital-based settings. Various studies report improvements in generic health outcomes like improved quality of life (Barrett, 2007; Zwarenstein et al., 2014; Kane et al., 2015), decreased complications (Fewster-Thuente & Velsor-Friedrich, 2008; Tsakitzidis et al., 2017), independence for activities of daily living, length of stay in hospital, mortality transitions, and period of rehabilitation (Olsson, Karlsson, Berg, Kärrholm and Hansson 2014; Zwarenstein et al., 2014 & Pannick et al., 2015). Other studies have reported improvements in specific outcomes. These include reduced pain, depression and agitated behaviour (citation), blood pressure control, diabetes control (Tsakitzidis et al., 2017).

Some of these studies are multidisciplinary team in-hospital based conducted by Epstein (2014) who reported that the team-based care has improved health outcome of patients and improved patient-centred care. Moreover, a study conducted by Tsakitzidis et al. (2017) reported the positive effects on health care outcomes as a result of interprofessional collaboration. The positive effects were reported as more standardised care which provides patient stability, minimal risk of complications, and improved audit which also improved patient care. This was in line with a review of literature done by Zwarenstein et al. (2014) and Pannick et al. (2015) which have reported improved patient outcomes in the form reducing complications of care, length of stay, and mortality rate.

As reported by Tsakitzidis et al. (2017) the patient outcome indicators resulting from care by an interprofessional team include reduced pain, depression and agitated behaviour, fall incidence, dependence for activities of daily living, length of stay in hospital, mortality transitions and period of rehabilitation, and improved quality of life. Based on the principles of interprofessional collaboration, it is clear that all health aspects are discussed, hence the expected improved health outcomes. Improved patient outcomes in a team-based intervention were also demonstrated in the study done by Martin et al. (2010). These authors' findings were in line with the findings from a review on multidisciplinary team in-hospital study interventions which concluded that interprofessional practice may improve patient quality of life and reduce symptoms (Zwarenstein et al., 2014).

Another study which compared the inter-professional collaborative models with the uni-professional model demonstrated that a team based care can provide better health outcomes for patients/clients than a lonely model. Among the outcomes mentioned by the author were blood pressure control, diabetes control, health status, and quality of life (Barrett, 2007). In order to promote health outcomes, medical units or departments should be reorganised to work as interprofessional care based teams (Borenstein et al., 2016). Again, a quality assurance study suggests that the integration of a routine interdisciplinary programme for the care of patients with chronic obstructive pulmonary disease (COPD) can improve patient outcomes. However, studies reported that positive patient outcomes are associated with positive relationships among professionals working in hospital settings, especially nurse-physician relationships (Fewster-Thuente & Velsor-Friedrich, 2008). Moreover, a recent systematic review conducted by Reeves et al. (2016) reported the benefit of interprofessional practice in improved health outcome by providing adequate service delivery, hence improved patient/client care.

2.5.2.4 Individual benefits (team members)

Individual benefits for team members include a variety of socio-emotional benefits like enhanced job satisfaction, greater role clarity and enhanced well-being of team members (Mickan, 2005).

- **Enhanced job satisfaction and enhanced well being**

It has been observed that interprofessional collaboration enhances the well-being of health care professionals (Fewster-Thuente & Velsor-Friedrich, 2008; J. Wen & Schulman, 2014). The enhanced well-being has been associated with job satisfaction. Health care professional working in interprofessional

team based care are more satisfied than those working alone; subsequently, they demonstrated enhanced well being (J. Wen & Schulman, 2014; Epstein, 2014).

Health professionals working in an interprofessional collaborative manner are more satisfied and have a more positive experience when compared with other professionals who work in a lonely model (Epstein, 2014; Hepp et al., 2015). Enhancing job satisfaction has been associated with interprofessional team care in various studies. A study conducted among a primary health care team has reported the improvement of health professional motivation and satisfaction when members worked in teams compared to the non-professional model (Mickan, 2005). The improved job satisfaction as a result of interprofessional practice was also reported by Fewster-Thuente and Velsor-Friedrich (2008) among nurses and other medical personnel, and Mahdizadeh et al. (2015) in their systematic research reported enhanced job satisfaction especially among nurses and physicians. Eventually, interprofessional team based care could facilitate a conducive working environment (Schmitt et al., 2011). Therefore, job satisfaction may be a result of a conducive working environment.

In a study conducted in Spain, Peiro, Gouzalez-Roma and Romos (1992) showed relationships between work team processes and behaviours as contributing factors to health professionals' job satisfaction. This was also suggested by Epstein (2014) in his study on interprofessional collaborative practice in hospital settings. The authors went on to argue that the effectiveness of teamwork was also related to job satisfaction of team members (Epstein, 2014). Furthermore, Boulton et al. (2008) in their cluster randomised control trial on early effect of collaborative care on the quality of health care indicated a positive effect on changes in physicians' satisfaction as a result of team based care. The physicians' satisfaction was associated with communication with patients and family caregivers, educating family caregivers, motivating patients to participate in maximising their health, referrals to community resources and knowing all the medication patients are taking (Boulton et al., 2008). Nurses are also satisfied when they observe improved health outcomes resulting from team work, and are dissatisfied when it is not (Fewster-Thuente & Velsor-Friedrich, 2008). Improved teamwork and communication among health professionals are reported as among the most important factors in improving clinical effectiveness and job satisfaction (J. Wen & Schulman, 2014). Moreover, in education setting, the interprofessional education was suggested by Reeves et al. (2016) to improve learners satisfaction.

- **Greater role clarity**

Role clarification is one of the interprofessional practice competency domains and is the key to effective interprofessional collaboration (Brault et al., 2014). Role clarification happens when health professionals understand their roles and those of others and appropriately utilise the gained knowledge to attain the patient, family, and community outcomes (Canadian Interprofessional Health Collaborative (CIHC), 2010). Interprofessional based care facilitates health personnel from various disciplines understanding and valuing the responsibilities and role of each professional, and effectively communicating with each other. Therefore, this could be associated with positive patient and health professional outcomes (MacDonald et al., 2010). For instance, when health professionals manage to identify their roles and those of others, this may build more comprehensive team work and improve health worker performance (Epstein, 2014).

Role clarity as result of interprofessional practice has been reported in various studies. Peiro, Gouzalez-Roma and Romos (1992) and (Barrett, 2007) argued that working in an interprofessional manner could enhance identification of roles of different professions, hence improving working conditions in health care settings. Therefore, a team-based working spirit in health settings contributes enormously not only to enhancing communication among team members but also in having a common vision clarifying their roles and responsibilities in the team so as to work effectively (Baxter & Markle-Reid, 2009). Based on the above statements, one may argue that ineffectiveness of health care and poor service delivery in a health care setting may be the result of poor clarification of different roles of team members (Brault et al., 2014).

2.5.3 Challenges/barriers to interprofessional practice

Despite the potential benefits and effect of interprofessional collaborative practice, there are also some challenges when professionals from various disciplines work together and some of these challenges have been identified by various authors in different settings. At the heart of the barriers to interprofessional collaborative practice in health care setting, there is a lack of professional interaction and communication. It was suggested by Reeves, Pelone, Harrison, Goldman and Zwarenstein (2017) that when health care professional have problems in the way they interact, this may result in inadequate patient care leading to poor health outcomes.

Difficult communication between health care professionals has been observed by several authors including Caldwell and Atwal (2003) in their study assessing problems of interprofessional practice in hospital settings, Scott and Legendyk (2013) in their critical exploration of interprofessional collaborative patient-centered care, Kishimoto and Noda (2014) in interprofessional teamwork among diabetic patients, van Leijen-Zeelenberg et al.(2015)in the study on why the interprofessional communication fails in acute care setting, and Phillips et al. (2016) in the evaluation of Australia national programme on interprofessional practice in chronic conditions. Among these difficulties, the authors included communication within and between profession group by usual face-to-face interaction and documentation in hospital patients' records. Communication problems among health care professionals may be due to the professions speaking "different languages" (D'Amour, Ferrada-Videla, San Martin Rodriguez, & Beaulieu, 2005; Snyman et al., 2015).

Other barriers and challenges to interprofessional collaborative practice include the different goals and priorities among disciplines, misunderstanding of others' responsibilities and roles, and overlapping of some professions' roles during care delivery (Caldwell & Atwal, 2003; Phillips et al., 2016). The lack of recognition of each professional's expertise was also suggested by Supper et al. (2017) in their study on interprofessional practice in primary health care. In addition, Scott and Legendyk (2013), in the Bulletin aimed at overcoming barriers to interprofessional teams, have suggested the resistance to innovation, professional hierarchy, lack of integrative skills, lack of enough time, lack of space, and lack of training programmes are challenges faced by interprofessional collaborative practice.

The first step in interprofessional collaborative practice is learning about other professions'. Therefore, ensuring that the profession difference and competencies are understood is a critical challenge to interprofessional education and practice (Caldwell & Atwal, 2003). Building awareness and perception of each other's role should be facilitated by interprofessional training within education and health care settings (Supper et al., 2017). To mitigate the above challenges, it has also been suggested by Phillips et al. (2016) and Supper et al. (2017) that in the early stages of interprofessional practice, considerable time should be allocated to communication and profession training on task sharing and task shifting. Therefore, the above mentioned challenges and barriers may influence the limited application of interprofessional education and practice.

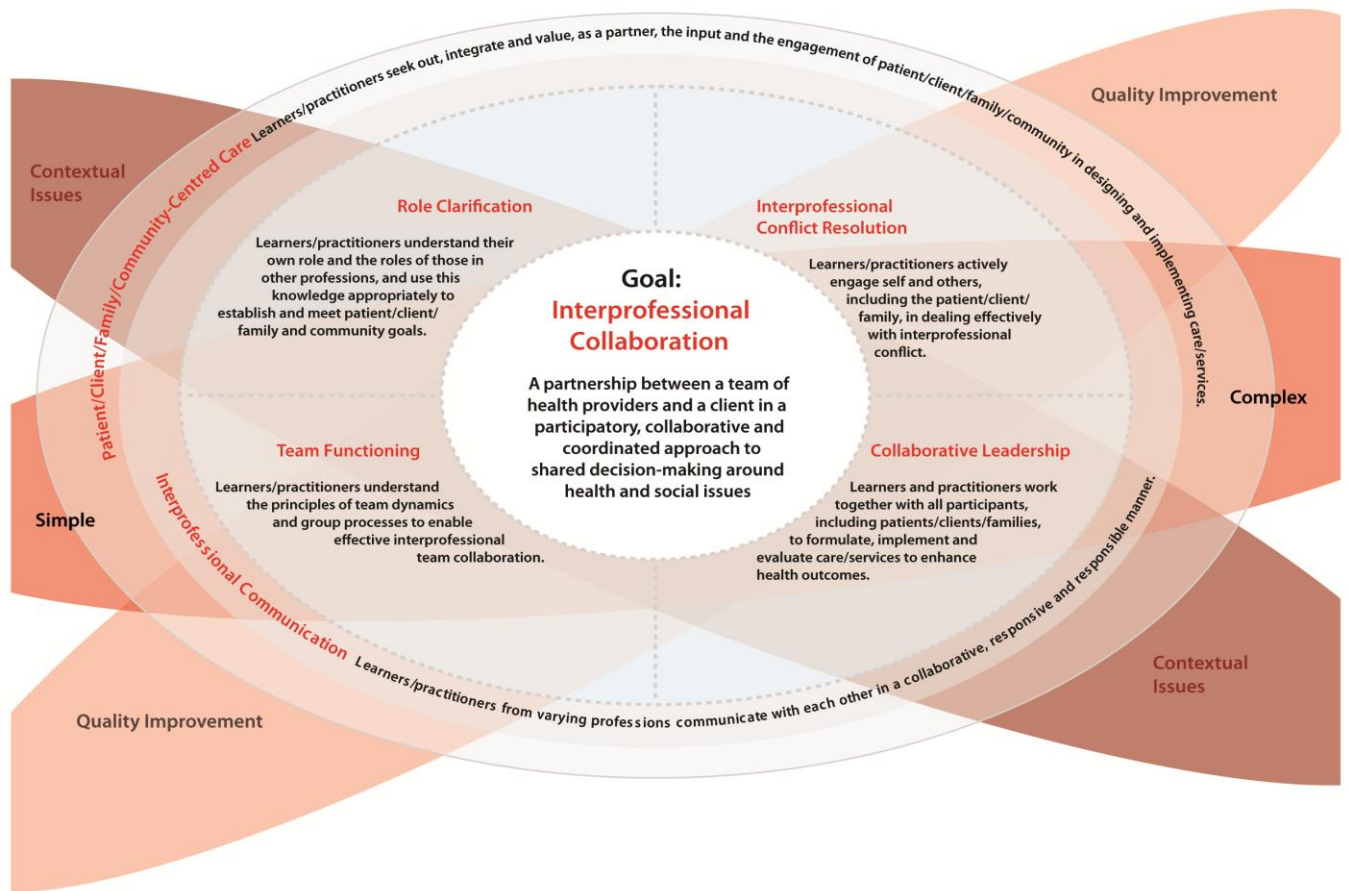
Having reviewed the literature on the effects, benefits and challenges of interprofessional collaboration, attention will now be shifted to what competencies underlie competence in IPP. These are the competencies that any training programme that aims to foster interprofessional collaboration would need to focus on.

2.5.4 Interprofessional collaboration competencies

The main objective of interprofessional collaborative practice is to promote health outcomes for all health system users (Hepp et al., 2015). To this end, the Canadian Interprofessional Health Collaborative (CIHC)(2010) identified six competency domains which would enhance the knowledge, skills, attitudes and values related to developing interprofessional collaborative practice. The six key competency domains ((Canadian *Interprofessional Health Collaboration, 2010, p.11*)

Figure 2) are: patient/client/family/community-centred care, role clarification, team functioning, interprofessional conflict resolution, collaborative leadership, interprofessional communication.

Those competencies are intended to guide health profession students and practitioners to provide high quality care within the health care system context (Puntillo & McAdam, 2006; Canadian Interprofessional Health Collaborative, 2010a). Moreover, the collaborative competences were presented as a long term solution to meet the health needs of many people from various professions, countries, cultures, and beliefs (Frenk et al., 2010) and, it has been claimed that, if completely endorsed in various health care settings, interprofessional collaborative would be optimal (Hepp et al., 2015). Indeed, the interprofessional collaborative competencies have become cornerstone of interprofessional practice in any health care setting (Canadian Interprofessional Health Collaborative, 2010a; Hepp et al., 2015).



(Canadian Interprofessional Health Collaboration, 2010, p.11)

Figure 2: Canadian National Competency Framework

2.5.4.1 Patient/client/family/community-centred care

As the health care system becomes busy and complex, struggling for efficiency, health professionals may tend to deal with patient diagnosis/conditions based on the scientific evidence, symptoms and scientific investigations which may decrease consideration of the patient as a person (Australian Commission on Safety and Quality in Health Care, 2010). Therefore, health professionals' interventions should be structured putting the patient in the centre of medical care, not only focusing on the diagnosis/condition, and taking into account that each patient is unique (Canadian Medical Association, 2007).

Patient-centredness is a concept for delivering healthcare on the basis of patient's preferences, needs and experiences (Tzelepis et al., 2014; Jesus, Bright, Kayes, & Cott, 2016). Simply, the patient-centred

movement which overlaps with the biopsychosocial approach holds that wholly integrating the patient individually as a person at all intervention phases with his/her exclusive needs, problems, and preferences will lead to better health outcomes (Australian Commission on Safety and Quality in Health Care, 2010; Jesus et al., 2016). The patient-centred approach to health care treats each person respectfully as an individual human being and not as a diagnosis/condition to be treated. This approach involves the patient in his/her care and also the families, relatives and the community around the person (Canadian Medical Association, 2007). It is also deals with patients' comfort considering their beliefs and values (Canadian Interprofessional Health Collaborative, 2010a; Hepp et al., 2015).

Interprofessional collaboration is the key approach to attaining appropriate patient/client/family and community health care (World Health Organisation, 2010a). In patient centred collaborative practice, patients/clients are considered as experts in their own health based on their experiences, and should be also considered in making realistic plans for their care as well as for choosing the care they should receive (Canadian Medical Association, 2007).

Patient-centred as interprofessional collaborative competency has been found to be effective in various studies. A study conducted by Olsson, Karlsson, Berg, Kärrholm and Hansson (2014) aimed to compare a standardised care approach to a person-centred one for patients undergoing total hip replacement surgery revealed reduced length of stay in the group receiving the patient-centred approach. The mean length of stay in the control group was 7 days (SD 5.0) compared to 5.3 days in the intervention group (SD 2.2) ($p < 0.0005$) (Zwarenstein et al., 2007). A study conducted in Sweden on the experiences of person-centred care as patients' perceptions concluded that patients were active in participating in their own care, and this produced better health care outcomes (Alharbi, Carlström, Ekman, Jarneborn, & Olsson, 2014). In addition, a systematic review conducted by Kane et al. (2015) concluded that patient-centred care decreases the burden of symptoms and readmissions rate, and improves general patient quality of life among patients with chronic heart failure (CHF). Therefore, in order to strengthen interprofessional collaborative practice, it is recommended that health care workers:

- "Support participation of patients/clients and their families, or community representatives as integral partners with those health care personnel providing their care or service planning, implementation, and evaluation.
- Share information with patients/clients (or family and community) in a respectful manner and in such a way that is understandable, encourages discussion, and enhances participation in decision-making.

-
- Ensure that appropriate education and support is provided by learners/practitioners to patients/clients, family members and others involved with their care or service; and
 - Listen respectfully to the expressed needs of all parties in shaping and delivering care or services” (Canadian Interprofessional Health Collaborative, 2010a, p.13).

2.5.4.2 Role clarification

For effective interprofessional collaborative practice, health professionals should know their roles and those of others in their health care settings. Poor and unclear description of interprofessional roles may lead to conflict and poor communication in the interprofessional team (Brault et al., 2014). Therefore, it is very important to clarify the roles, responsibilities, and scope of practice of every health care professional for the interprofessional team to function efficiently and safely (Strom et al., 1998; Closson & Oandasam, 2007).

Health professionals must often identify who has the required knowledge and skills to meet the patients’ needs for a team to maximise their scope of practice (Canadian Interprofessional Health Collaborative, 2010a). It has been observed that diverse knowledge and competencies among the interprofessional team members have a significant impact on team performance and team climate (Klarare, Hagelin, Fürst, & Fossum, 2013). A study on role clarification processes for better integration of nurse practitioners into primary healthcare teams concluded that role clarification was a competency that every team member should incorporate in his/her daily practice to ensure effective interprofessional practice to better patient outcomes (Brault et al., 2014).

Role confusion has been reported for the roles of occupation therapists and physiotherapists in acute care settings (Hepp et al., 2015) and for the roles of internal medicine trainees at the point of discharging patients from acute care (Card, Ward, Chipperfield and Sheppard 2014). Such role confusion may hamper a smooth running of a health care system, resulting in poor health outcomes. In contrast, groups with good performance in interprofessional collaboration were those in which professionals were able to explain their own roles and understand those of others (Brault et al., 2014).

Eventually, effective communication in health care settings would promote mutual consideration among health professionals and would bring the opportunity to describe properly the scope of everyone’s roles and responsibilities (Closson & Oandasam, 2007). This requires that every health professional must

listen to and understand other professionals in order to know where unique knowledge and skills are in the team, and where are common knowledge and skills (Canadian Interprofessional Health Collaborative, 2010a). Therefore, to promote the interprofessional collaborative practice health professionals should ensure role clarification by:

- “Describing their own profession’s role and that of other professions
- Recognizing the diversity of other professions’ roles, responsibilities, and competencies
- Communicating roles, knowledge, skills and attitudes using appropriate language
- Actively listening respectfully to other professionals to identify where unique knowledge and skills are held and where shared knowledge and skills occur.
- Exploring the roles and responsibilities of an interprofessional group in health promotion and disease prevention issues”(Canadian Interprofessional Health Collaborative, 2010, p.12).

2.5.4.3 Team functioning

Interprofessional care is influenced by a collaborative team-based approach, which leads to a comprehensive health service (Closson & Oandasam, 2007). Collaborative competencies contribute to achieving the overall goals of interprofessional practice within the health care team or individual health professional (Hepp et al., 2015). Health professionals are required to work together from the outpatients department and ward to operating room to achieve their common goals (Greer, Saygi, Aldering, & De Dreu, 2012). Health workers thus need to understand the principles of team work dynamics and their processes. (Canadian Interprofessional Health Collaborative, 2010a).

In collaborative practice, members of the health team should set rules and principles and generate clear planning and ways of solving problems for the best possible health outcomes (Canadian Interprofessional Health Collaborative, 2010a). It has been found that families play an essential role in helping patients during their care delivery, but they are often excluded from the decision-making process (Closson & Oandasam, 2007). It is a part of the role of team functioning to consider the role of patient/client/family in the decision making process and to work towards ensuring that patients and their families are regarded as partners in interprofessional care (Closson & Oandasam, 2007). Therefore, to ensure interprofessional collaboration, health professionals should be able to:

- “Understand the process of team development
- Develop a set of principles for working together that respects the ethical values of members
- Effectively facilitate discussions and interactions among team members
- Participate and be respectful of all members’ participation in collaborative decision making
- Regularly reflect on their functioning with team learners/practitioners and patients/clients/families

-
- Establish and maintain effective and healthy working relationships with learners/practitioners, patients/clients, and families, whether or not a formalized team exists
 - Respect team ethics, including confidentiality, resource allocation, and professionalism” (Canadian Interprofessional Health Collaborative, 2010, p.14).

2.5.4.4 Conflict resolution

In the complexity of the current health care system, conflict in interprofessional teams occurs frequently across health settings. It often happens between physicians and other health professionals, including allied health professionals and nurses (Vaismoradi et al., 2011; Beunza, 2012). Conflict among health professional team members is usually negative for the whole team outcome, and may hamper the quality of team functioning (Greer et al., 2012).

Conflict can come from different sources. Conflict may occur due to differences in backgrounds, individual opinions, beliefs, interests of members of a group who were brought together to work as a team in the interest of institution (Greer et al., 2012). Conflicts between nurses and physicians can be the result of different role expectations e.g., when physicians may think that they are main caregivers whereas nurses are concentrated on the overall team work, and they desire to apply their knowledge specifically to patient care (Matziou et al., 2014). Conflict can also occur due to different personalities, scope of practice and physical concerns and space (Beunza, 2012) and the inability to know everyone’s roles, responsibilities and scope of practice (Bailey, Jones, and Way, 2006); Brown et al., 2011).

Conflict resolution should be among the competencies of interprofessional education and practice in a health setting. Greer, Jehn, & Mannix (2008) suggested that the effective health team should apply the conflict resolution principles as early as possible. Emotion control and collaborative attitudes towards changes are two conflict resolution techniques that can be applied in interprofessional collaborative practice (Beunza, 2012). Positive feeling that focuses only on the patients’ interests rather than on negative issues were also emphasised as key elements of conflict resolution. To successfully deal with task conflicts, it is crucial to make sure that task issues do not develop into relationship issues during the conflict transformation process (Greer et al., 2008). Furthermore, the team should set up a conflict resolution protocol and strategies to solve problems among the team members (Brown et al., 2011).

Interprofessional education and collaborative training are the best strategies to address all these issues (Canadian Interprofessional Health Collaborative, 2010a). This is supported by Kaitelidou et al. (2012) who found that participants believed that the lack of interprofessional education and training contributed to difficulties in team communication and generated conflict among the team members. Interprofessional education training was recommended because learners/practitioners keenly engage in discussion including the client/patient/family, thereby addressing all disagreements in a constructive manner as they occur (Canadian Interprofessional Health Collaborative, 2010a). Effective education and training in conflict resolution could also help the professions to achieve this (Greer et al., 2012). Therefore, in promoting the interprofessional collaborative practice, members of the health care team should constructively address conflict by:

- “Valuing the potential positive nature of conflict
- Recognizing the potential for conflict to occur and taking constructive steps to address it
- Identifying common situations that are likely to lead to disagreements or conflicts, including role ambiguity, power gradients, and differences in goals
- Knowing and understanding strategies to deal with conflict
- Setting guidelines for addressing disagreements
- Effectively working to address and resolve disagreements, including analyzing the causes of conflict and working to reach an acceptable solution
- Establishing a safe environment in which to express diverse opinions
- Developing a level of consensus among those with differing views; allowing all members to feel their viewpoints have been heard no matter what the outcome” (Canadian Interprofessional Health Collaborative, 2010, p.19).

2.5.4.5 Collaborative leadership

Effective interprofessional teams also need effective leadership. Indeed, a well-defined health professional leader is very important for effective running of the team and to enable decision-making to proceed (Canadian Medical Association, 2007). Leadership principles should be applied to support an interprofessional collaborative approach (Canadian Interprofessional Health Collaborative, 2010a). In collaborative care the clinical leader is responsible for maximising the expertise and input of the entire team in order to provide the patient with comprehensive and definitive care (Canadian Medical Association, 2007). Sharing the responsibility has been identified as a key principle for interprofessional care implementation (Closson & Oandasam, 2007). Collaborative leadership is an essential competency for an interprofessional team based on the fact that the leadership can have a positive or negative impact on the team functioning (Klarare et al., 2013).

Collaborative leadership involves two components: relationship orientation and task orientation (Canadian Interprofessional Health Collaborative, 2010a). A team leader should engage other members of the team in the decision making process and sharing responsibilities. This is supported by Hall and Zierler (2014) who stated that leadership in an interprofessional model should be collaborative, encouraging participatory decision-making and respect for the contributions of the health care system. Therefore, education and trainings should be oriented towards collaborative leadership.

In a study conducted among students, the voluntary student leadership in clinic governance structures improved the opportunities for students to enhance interprofessional collaboration, develop leadership skills and enhance patient outcomes (E. A. Scott & Swartz, 2015). In most cases, a physician is the ultimate leader of the clinical team, but should collaborate mutually with the other team members and the patients/clients/families (Canadian Medical Association, 2007). However, in order to promote interprofessional collaborative practice among health professionals, in collaborative manner identify who will lead the team by promoting:

- “Work with others to enable effective patient/client outcomes
- Advancement of interdependent working relationships among all participants
- Facilitation of effective team processes facilitation of effective decision making
- Establishment of a climate for collaborative practice among all participants
- Co-creation of a climate for shared leadership and collaborative practice
- Application of collaborative decision-making principles
- Integration of the principles of continuous quality improvement to work processes and outcomes” (Canadian Interprofessional Health Collaborative, 2010, p.15).

2.5.4.6 Interprofessional communication

It has been observed that an estimate of 50 various people can meet the patient in around four days of hospital stay. These include different health professionals, family and relatives, and other hospital staff (Daniel & Rosenstein, 2007; O’Daniel et al., 2015). Communication is therefore a central domain of interprofessional competency frameworks. It is at the heart of a common understanding of care decisions and shared goals setting (Snyman, von Pressentin, & Clarke, 2015). When health care professionals communicate properly, it may facilitate the identification of the patients’ symptoms and other health related problems and concerns. Therefore, communication is a very important clinical skill for ensuring diagnostics, treatment, health promotion, and rehabilitation (Ammentorp, Sabroe, Kofoed, & Mainz, 2007). The lack of accurate collaboration between health care professionals can result in

medical errors, lack of critical information and poor interpretation of health information, hence risking the patient's safety (Daniel & Rosenstein, 2007). Poor communication among health professionals was high on the list of problems identified by Frenk et al. (2010). In other words, effective communication is the cornerstone for interprofessional collaborative practice towards patient-centred healthcare (Luetsch & Rowett, 2015).

Quality communication skills are fundamental for all health professionals working in the same setting, and this also involves communication with patients/clients/families and the community (Canadian Interprofessional Health Collaborative, 2010a). It is important that, in the collaborative health care setting, all team members communicate to ensure effective care to meet the patient's needs (Canadian Medical Association, 2007). In fact, respectful communication between health care professionals integrates full trust and transparency in interacting with other members and even patients/clients/families (Canadian Interprofessional Health Collaborative, 2010a).

Hepp et al. (2015) reported that the main formal communication means were charting and different kinds of rounds, e.g., discharge rounds, cardex rounds, resident rounds, and interprofessional rounds. In the interprofessional environment, communication is demonstrated during active listening, either verbally or non-verbally, discussing, consulting, interacting, debating, and negotiating (Hepp et al., 2015). The study conducted by Hewitt, Sims and Harris (2015) revealed that, sometimes, interprofessional teams use tactical communication either alone or in small groups. The same authors reported that communicating tactically provides the means to discuss team hierarchies or any conflicting treatment protocols and prevent disagreement between professionals. However, health professionals should be free to express their opinions during the communication process (Ushiro & Nakayama, 2010). Therefore, in daily practice, health care professionals must acknowledge the utility of their successful communication and also establish interprofessional teamwork interventions in order to foster collaboration (Matziou et al., 2014).

Various studies were conducted in interprofessional communication, but many of those studies were about communication between nurses and physicians. Vaismoradi et al. (2011) and Matziou et al. (2014) found that interprofessional respect is an essential output of the successful communication between physicians and nurses. They continued indicating that this may lead to a smooth working together,

hence an effective collaboration (Matziou et al., 2014). Puntillo and McAdam (2006) indicated that the majority of nurses face conflict with physicians due to poor communication and these conflicts were believed to be an important stress factor in their work. Hence, nurses look for professional autonomy and recognition from physicians (Matziou et al., 2014). The hierarchy of the health system, diverse levels of education, various professional cultures, overlapping roles of professionals, health professional perception, status of professions, historical social positioning were thought to be the major factors that may negatively influence communication, hence medical errors in clinical practice (Manojlovich & Decicco, 2007; Zwarenstein et al., 2013).

To overcome the above mentioned challenges to proper communication, interprofessional education and collaborative training interventions would be paramount. For example, an intervention study aimed at improving communication among team members reported taking into account the above mentioned pressure and challenges which have limited the performance of teams in the health care system (Zwarenstein et al., 2013). Furthermore, a study carried out by Luetsch and Rowett (2015) implied that communication skills were accepted as core competency practice among pharmacists. This study revealed that pharmacists improved their communication skills after interprofessional training and believed that the improved communication and relationships with other professionals will benefit patients as well as provide professional satisfaction (Luetsch & Rowett, 2015). Therefore, for fostering interprofessional collaborative practice, health professionals should be able to:

- “Establish team work communication principles, actively listen to other team members including patients/clients/families;
- communicate to ensure common understanding of care decisions, develop trusting relationships with patients/clients/families and other team members;
- effectively use information and communication technology to improve interprofessional patient/client/community-centred care, assisting team members in: setting shared goals, collaboratively setting shared plans of care, supporting shared decision-making, sharing responsibilities for care across team members; and
- demonstrating respect for all team members including patients/clients/families”(Canadian Interprofessional Health Collaborative, 2010, p.16).

A range of interprofessional collaboration competencies have been considered in this section. Of all of these, communication and collaboration between health care professionals are considered the cornerstones to interprofessional practice (World Health Organization, 2010a; Benson, 2014). Effective communication between health care professionals enhances other competencies in promoting effective

collaborative practice, and encouraging teamwork, thus reducing medical errors and mal practices (Clements, Dault, & Priest, 2007; O'Daniel et al., 2015). Therefore, there is a need for an interprofessional framework which should guide communication and collaboration between health care professionals in their clinical settings. Such a framework will be discussed in the next section.

2.5.5 Conceptual frameworks for collaborative practice

Mutual understanding and communication between health care professionals may help in maximising every talent of all team members for the provision of optimum health care (Packard et al., 2012). Effective communication and common understanding in sharing goal settings in clinical practice require the same language in terms of a common conceptual framework and terminologies to be used to attain a holistic approach to person-centred care (D'Amour, Ferrada-Videla, San Martin Rodriguez, & Beaulieu, 2005; Snyman et al., 2015). Therefore, it is important to define an effective communication framework to be used during interprofessional research, education and practice as a tool which can facilitate a smooth patient assessment and management in the clinical settings (Stutsky & Laschinger, 2014).

A comprehensive interprofessional communication framework is crucial to assist health professionals to think, analyse critically and take action on various health issues that may arise as challenges, including the complex and single condition paradigm (Kuipers, Ehrlich, & Brownie, 2014). It could also help foster and evaluate the interaction, communication and roles of different health care professionals who take part during patient care (Retchin, 2008). In that context, a shared language framework is essential for effective interprofessional communication (Allan et al., 2006). A multifaceted framework which should detect all health related aspects, communication and interaction between team members, and the influence of external factors would benefit a team based approach (van Dongen et al., 2016). The question is what such a comprehensive framework would look like.

A literature search was performed to discover whether there are existing frameworks describing interprofessional communication during patient care. The following databases were searched: PubMed (which includes Medline), Cochrane library, EBSCO, Cumulative Index of Nursing and Allied Health Literature (CINAHL - via EBSCOhost), Google Scholar, Web of Science and Scopus (which indexes Embase). In addition to the search terms used in the previous interprofessional search), the search

terms selected for the framework were “framework” OR “model” OR “frame” OR “instrument” OR “Tool” OR “structure” OR “form”. Hand search and grey literature were also sourced.

Various interprofessional frameworks were available, but many of them did not meet the researcher’s main interest of a framework which should guide collaboration and communication in terms of patient assessment and management between health care professionals in their clinical setting. In fact, many collaboration frameworks have been introduced, but the majority of them are related to the structure instead of addressing the process of collaboration during health care practice.

One framework of interest was the “interdisciplinary team communication framework” which was particularly used in a specialised health care centre, specifically in a palliative care unit to identify team structures, processes and outcomes (Kuziemsky et al., 2009). Another framework was the “Inter-professional shared decision-making model” used in primary health care which recommended further studies on how patients should be engaged as part of a team (Légaré et al., 2011). A “conceptual model for developing and sustaining interprofessional care” was also developed by Registered Nurses’ Association of Ontario as a framework that would facilitate interprofessional care to be performed in a systematic manner (Registered Nurses’ Association of Ontario, 2013). In the same year, a “framework of interprofessional capabilities for interprofessional practice” was developed by the university of Ontario to be used by students in primary health care, and it was used only in urban settings (Gum et al., 2013).

Furthermore, the Canadian Interprofessional Health Collaboration developed a “National Interprofessional Competency Framework” (Figure 2) demonstrating the necessary competencies for interprofessional collaboration. This framework includes six competency domains which indicate the knowledge, skills, attitudes and values for an effective interprofessional collaborative practice (Canadian Interprofessional Health Collaborative, 2010). The search also found a “conceptual framework for interprofessional collaborative practice” which also recommended further studies to adapt this framework to capture patients’ outcomes (Stutsky & Laschinger, 2014). However, all the above frameworks were introduced in specific settings, cultures, and boundaries and, beyond mentioning interprofessional communication, did not address in any detail what interprofessional collaboration and communication during patient assessment and management would entail.

One framework uncovered by the search was that introduced by Packard et al. (2012) which can be suitable as a communicating tool to be used by a variety of health professionals during patient care. This is the Interprofessional Team Reasoning Framework (ITRF) (Figure 3). The ITRF is a tool which is constructed based on the ICF proposed to promote the effective collaboration and communication between different disciplines across cultures and boundaries to improve patient outcomes (Packard et al., 2012). Given that interprofessional collaboration requires effective communication between professionals, and effective communication requires a common language (Giacomini, 2004), defining that common language makes sense. Allan et al.(2006) suggested that the framework based on the International Classification of Functioning, Disability and Health (ICF) as a model to address the health issues across all disciplines and cultures would be effective to inform team collaboration. More recently, the ICF based framework was also recommended by the World Health Organisation (2013) as a common language to inform interprofessional education and collaborative practice.

The ICF-based ITRF is an effective instrument used to train health professional students and practitioners in the skills necessary to discuss particular care by determining who will be involved, how and when. Therefore, this framework enhances not only communication, but also other interprofessional competencies like team functioning, role clarification, and collaborative leadership to take place(Packard et al., 2012; Faculty of Medicine and Health Sciences, 2015). Furthermore, the ITRF is a framework used by the Centre for Health Professions Education at Stellenbosch University by students from different disciplines in primary health care settings, where the students experienced holistic care and the patients reported receiving better care. It is, therefore, a comprehensive bio-psycho-socio-spiritual framework which emphasises patient/client /family/community centred care as one the interprofessional competencies (Snyman et al., 2015).

Looking at its simplicity to address all patients' concerns, the ITRF framework, based on ICF, responds to the six interprofessional competencies. In the patient/client-centred domain, this framework emphasises patients' priority, the biggest patient concerns and the professional to address those concerns. In fact, the ICF creates this opportunity to work together and learn from each other to meet the needs of the patient and his/her family or community at large (Allan et al., 2006; Kuipers et al., 2014). In the role clarification domain, the ITRF clearly defines the patient's problems and identifies the

health professionals who could address those problems. In the team functioning domain, the framework indicates how the problem could be addressed from assessment and intervention to evaluation of the patient's outcomes. In the conflict resolution domain, the framework provides the professional who leads the team based on the patient problems and documentation of every activity. In the collaborative leadership domain, the ITRF provides space for participatory decision-making and respect as mentioned by Hall and Zierler (2014). The team leader could facilitate this collaborative leadership. In the interprofessional communication domain, which is central to the interprofessional collaborative practice, the ITRF is based on the ICF framework which provides a common language for communication between health care professionals from various disciplines (Packard et al., 2012).

Therefore, a framework based on ICF was selected to use as a holistic model. The ICF has been found to be a consistent and standardised common language, applicable in a continuum of care across various disciplines, settings, and cultures (WHO, 2002; Allan et al., 2006; Bechard et al., 2010; Packard et al., 2012; WHO, 2013). In the next section, the ICF that underpins the ITRF will be discussed.

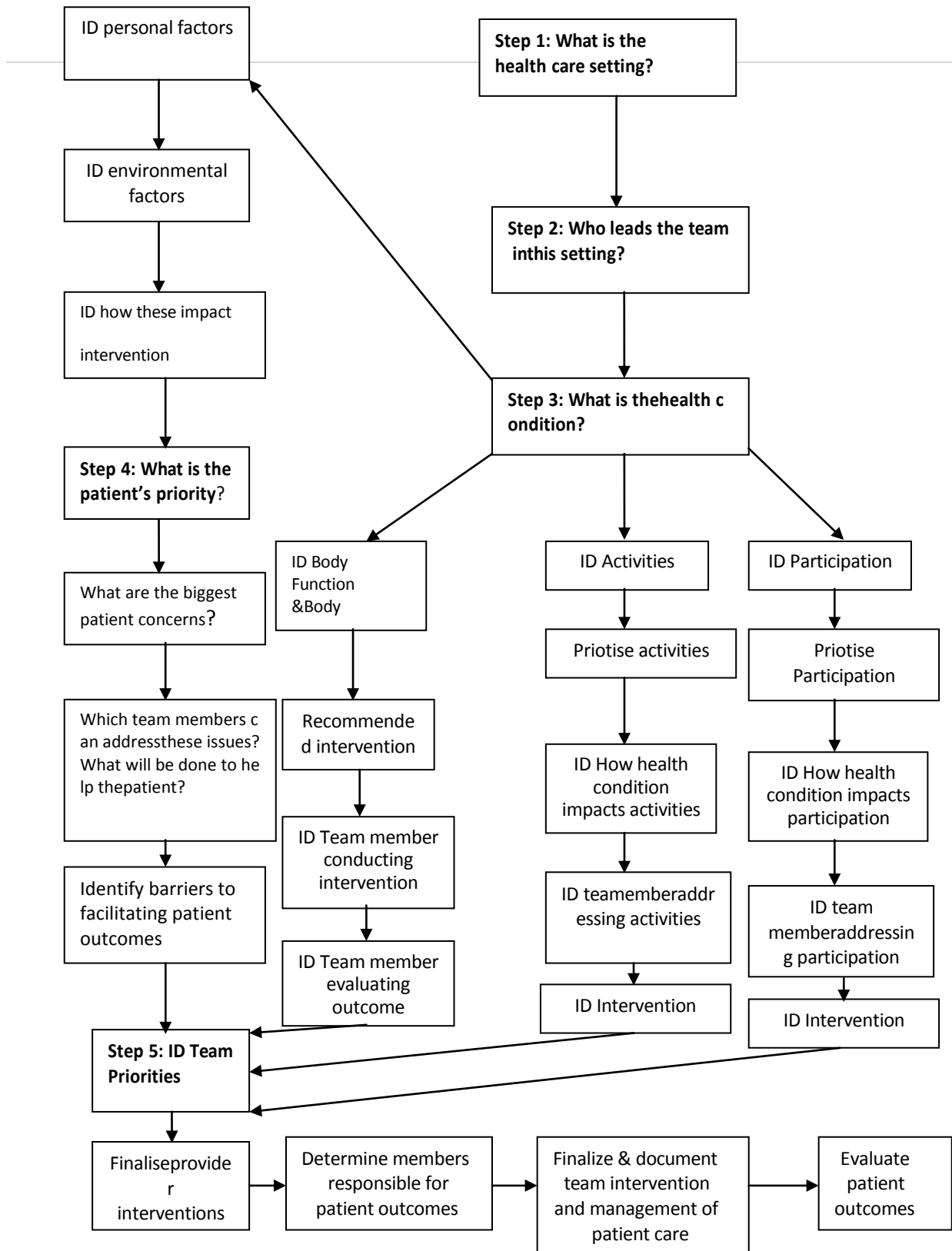


Figure 3: Interprofessional team reasoning framework

2.5.6 The International Classification of Functioning, Disability and Health (ICF)

2.5.6.1 Overview of International Classification of Functioning, Disability and Health

The International Classification of Functioning, Disability and Health (ICF) belongs to the Family of International Classifications (FIC)(World Health Organisation, 2002). It is a standardised framework agreed by the World Health Assembly in 2001 (World Health Organisation, 2001; World Health Organisation, 2013), basically, for classifying and conceptualising functioning and disability.

The WHO International Statistical Classification of Diseases and Related Health Problems (ICD) have been used extensively in order to quantify life expectancy for the population (Ustun, Chatterji, Bickenbach, Kostanjsek, & Schneider, 2003). However, ICD data alone could not describe the entire health status which includes functioning and disability of living populations. Therefore, in order to capture the functioning and disability related information as a consequence of disease, disorder or injury, WHO developed another tool in 1980 (Cieza & Stucki, 2008). This was the International Classification on Impairments, Disabilities and Handicaps (ICIDH)(World Health Organisation, 1980).

After 21 years, WHO revised the ICIDH and came up with a new version of ICIDH-2 which was named ICF(World Health Organisation, 2001). In fact, the criticism that resulted in the revision was based on the fact that the ICIDH viewed disability as a linear consequence of a health condition or disease (Castaneda, Bergmann, & Bahia, 2014). In contrast, in this new version, disability was no longer a consequence of disease but of the interaction between a health condition and individual contextual factors (personal and environmental factors) (World Health Organisation, 2001; World Health Organisation, 2013).

One of the aims of endorsing the ICF was to establish a common language describing health and health-related states to enhance a standardised language for communication between various health professionals (World Health Organisation, 2001; World Health Organisation, 2002; Peterson, 2005).

Actually, knowledge of diagnosis alone cannot predict the needed services, length of hospital admission, return to work and social reintegration, level of care or functional outcomes (World Health Organisation, 2002). Therefore, the ICF framework is based on the bio-psycho-social or holistic model which

comprehensively relates health and functioning at either individual or population levels (Gradinger et al., 2011;Alford, Remedios, Webb, & Ewen, 2013; World Health Organisation, 2013).

In fact, the ICF was found to complement the ICD-10 well, and WHO encouraged health professionals to use both classifications together in order to provide a wider clear picture of health and health-related states in populations (World Health Organisation, 2002;Allan et al., 2006; Alford et al., 2013; Kuipers et al., 2014). According to Ustun et al. (2003), ICD-10 utilises medical assessment that focuses only on the biological medical aspects of the patient, so it is inadequate in providing all the needed information to determine health care services.

Additionally, the ICD-10 classifies diseases, diagnosis and disorders by an etiological framework. By contrast, the ICF classifies functioning and disability as related to the health conditions (World Health Organisation, 2002; Ustun et al., 2003; Kostanjsek et al., 2011). Therefore, the use of the ICD-10 alone cannot predict measurement of the burden of disease. Therefore, when the medical information is used together with the ICF, this can give the most comprehensive plan of patient intervention (Kostanjsek et al., 2011). For more understanding (*WHO, 2002, p.9*)

Figure 4) describes the interaction between the ICF components.

2.5.6.2 How is the ICF organised?

The six interactive components of ICF are structured in two main parts and each component can be used in both positive and negative ways (World Health Organisation, 2001; Allan et al., 2006; Stallinga, Roodbol, Annema, Jansen, & Wynia, 2014). Part one covers information related to functioning and disability, while part two deals with contextual factors (World Health Organisation,2001; World Health Organisation, 2013). Each part also has two components:

- Functioning and disability(body functions and body structures; activities and participation)
- Contextual factors (environmental factors and personal Factors)(World Health Organisation,2001; World Health Organisation, 2013).

The six ICF components in Figure 4below (repeated for ease of reference) are linked by the arrows to illustrate the dynamic and interactive relationship between the components (Allan et al., 2006).

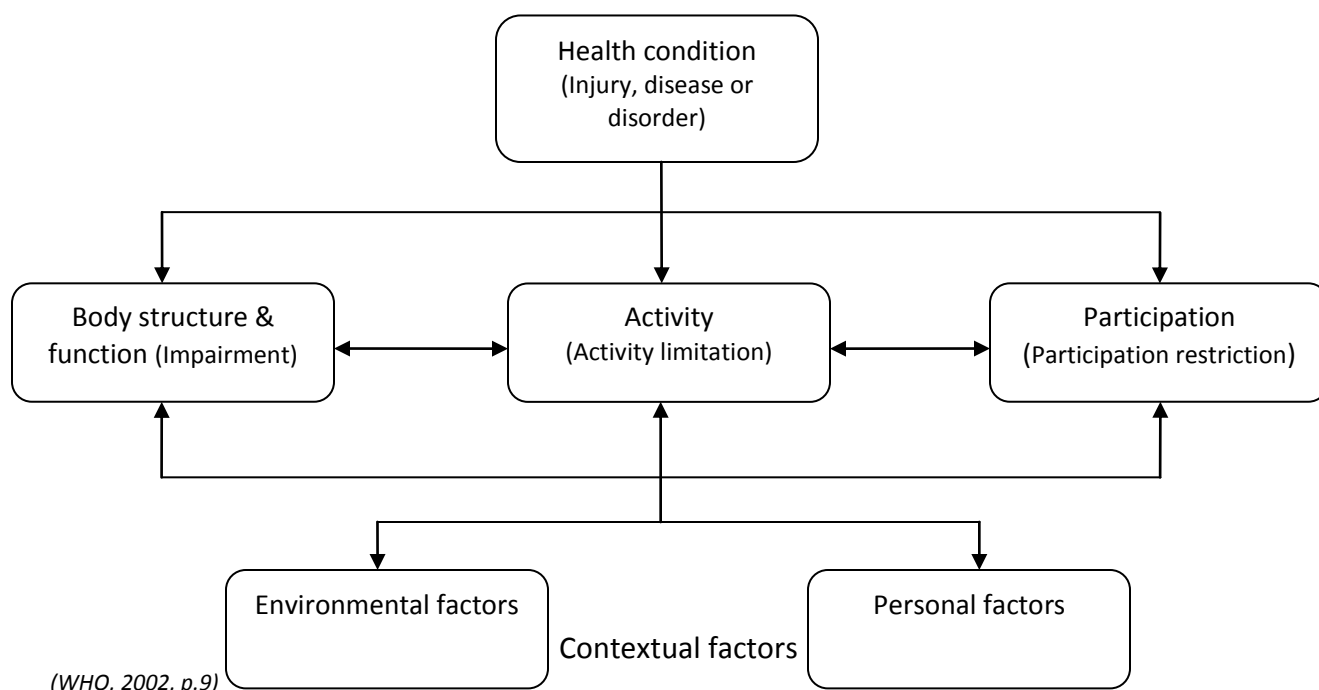


Figure 4: Interaction between ICF components

The ICF is not associated with any particular health condition; rather, it describes the interaction in functioning magnitudes and various angles of individual different levels (body, person and social levels)(World Health Organisation, 2001; Allan et al., 2006). According to the World Health Organisation (2013), the functioning of an individual in a particular domain is an interaction between a health condition and the individual context. Therefore, based on the ICF framework, every patient, as an individual, is unique despite a known health condition and its management protocol (Allan et al., 2006).

Body structures, normally, reflect on anatomical parts of the body (example: legs, arms, neck, etc.) and also organs (example: heart, lungs, brain, etc.)(World Health Organisation,2001; World Health Organisation, 2013). On the other hand, **body functions** reflect physiological functions of the human body (example: psychological function, mental function, voluntary movements, etc.). Therefore, any problem in body structure or function relates to the impairment (World Health Organisation,2001; (World Health Organisation, 2013a).

Activities refer to the execution of actions or tasks by an individual. If someone has difficulties in executing the usual tasks or actions such as walking, sitting, eating and washing, he/she will have **activity limitation** (World Health Organisation,2001; World Health Organisation, 2013).

Participation is defined as involvement in life situations by individuals such as leisure, work, church, family and community, and school activities (World Health Organisation,2001; World Health Organisation, 2013). Therefore, if a person encounters problems hindering him/her to be engaged in those activities as usual, he/she will be having **participation restriction** (World Health Organisation,2001; Allan et al., 2006; World Health Organisation, 2013).

As mentioned above, the ICF also describes contextual factors which are environmental and personal factors.

Environmental factors are physical, psychological and social (psycho-social) environments where a person performs his or her usual activities or lives (World Health Organisation, 2001; Allan et al., 2006). The environmental factors can include a variety of areas such as home, work, policies and legislation, family and community, friends, medications and assistive devices. Environmental factors have an impact upon an individual's functioning as facilitators or barriers (World Health Organisation, 2013a).

Personal factors imply how a person experiences a particular health condition(World Health Organisation, 2001). According to Grotkamp et al. (2012), personal factors are the particular personal background, individual features and lifestyle or living conditions which are different from the health condition, but which can positively or negatively contribute to individual functioning and well-being. According to the World Health Organisation (2001), personal factors include age, gender, education, profession, social background, individual lifestyle, personal character and coping strategies. However personal factors are not classified in ICF because they differ across cultures (Grotkamp et al., 2012).

It was suggested by Ustun et al. (2003) that when measuring and assessing the individual's health or that of the entire population, it is not sufficient to focus only on morbidity and cause of death. Therefore, looking at the above interaction between the ICF components, it is clear that ICF portrays a comprehensive holistic model of health and functioning that is useful to capture a complexity of health

related issues at person and system level so as to deal with the whole person (Kuipers et al., 2014). For instance, the ICF framework emphasises that the presence of a health condition is not automatically linked to the person's functioning in a linear manner (Allan et al., 2006; Kostanjsek et al., 2011). In other words, two persons may have the same health conditions or diseases but differ in their functioning levels depending on their contextual factors within or around. It is a problem of knowing how well a person lives, not how long a person lives (Allan et al., 2006; James, 2011).

The World Health Organisation(2013) and different studies have suggested that ICF can be used across different age groups, cultures and sexes to assess and collect valid and reliable data worthy to be compared on individual and population health outcomes (Chapireau, 2005; McDougall, Horgan, Baldwin, Tucker, & Frid, 2008; McDougall et al., 2008; Illum & Gradel, 2015).

2.5.6.3 The use ICF in clinical setting

It has been suggested that the ICF be used by all people in various clinical settings, not for only persons with disabilities (PWDs) and rehabilitation settings, but also in a variety of conditions across settings at all level of health care (Schneidert, Hurst, Miller, & Ustun, 2003; Chapireau, 2005; Debrouwere, Lebeer, & Prinzie, 2016). Based on its flexibility, ICF has various applications for use at individual, institution, and societal level (Giannangelo, Bowman, Dougherty, & Fenton, 2005).At individual level, ICF can be used as a tool for assessment, planning of treatment, and treatment evaluation. At institution level, ICF was considered to be a useful framework for communication between different health professionals within a particular health setting (Bruyère & Peterson, 2005; Giannangelo et al., 2005).

The ICF has been found to be a useful framework across health conditions and settings in different countries, cultures, and disciplines (Bruyère & Peterson, 2005). Its development was undertaken by a collaborative team of health professionals from various disciplines across different countries and cultures (Jelsma, 2009). The ICF has been used in specialised centres, general hospitals, rehabilitation, and primary care (Raggi, Leonardi, Cabello, & Bickenbach, 2010). Therefore, it was found to be useful to facilitate a comprehensive functioning description in various health conditions and to collect relevant information for patient intervention.

Various studies have been conducted to explore the use of ICF in different settings, disciplines and health conditions. These studies have confirmed the benefits of using the ICF at individual, institution and societal levels. A systematic review conducted by Jelsma (2009) demonstrated the use of ICF across health conditions and countries. However, it is notable that among 243 reviewed papers, only six were from low income countries.

According to Bruyère & Peterson (2005), applying the ICF has resulted in improved clinical outcomes in various disciplines, such as physiotherapy, medicine, occupation therapy, nursing, audiology, and speech language pathology. Another study conducted by Heinen, Van Achterberg, Roodbol and Frederiks (2005) suggested that ICF has potential value to nursing practice if it is used in all areas of nursing diagnosis. In addition, Castaneda et al. (2014) in their systematic review demonstrated the use of ICF in different health conditions and settings such as internal medicine, oncology, orthopaedics, rheumatology, and infectious diseases. Other studies demonstrated that the ICF is a comprehensive framework for interprofessional collaboration in acute and sub-acute (Stucki et al., 2005; Chang et al., 2012), chronic (Albanesi et al., 2009; Bagraith & Strong, 2013), orthopaedic and trauma (Harris et al., 2005; Jerosch-Herold, Leite, & Song, 2006), medical (Marqueset al., 2013; Castaneda et al. 2014) and paediatric conditions (Illum & Gradel, 2015; Østensjø et al., 2006).

ICF has been used in the management of a range of different health conditions, including neurology, musculoskeletal, respiratory, geriatric, paediatric, HIV, cancer, psychiatric (Jelsma, 2009), and depression, vertigo, ischemic heart disease, obesity, stroke, spinal cord injuries and other musculoskeletal conditions Yen et al. (2013).

Therefore, for health professionals who already use ICD-10, there is a need also to incorporate the ICF framework in their practice in order to capture the impact of health conditions in a structured and on an operational level (World Health Organisation, 2002; Escorpizo et al., 2013a).

2.5.6.4 The use of ICF to facilitate interprofessional collaborative practice

The ICF is a framework that has been proposed for use as an interprofessional collaboration tool by all health professionals from any healthcare context and setting (Giacomini, 2004; Boldt, Velstra, Brach, Linseisen, & Cieza, 2013). Indeed, the ICF, by its nature, is multifaceted to be used by different health

professionals (Heinen et al., 2005). The ICF also represents a paradigm for approaching health and health care, and demonstrates the need for different health care professionals. Therefore, it encourages health care professionals to consider health issues underlying their scope of practice (Dufour & Lucy, 2010).

In interprofessional practice, the ICF framework contributed a lot to the assessment of complex health conditions that should not be treated by one profession (Bagraith & Strong, 2013). Based on its nature that tackles different aspects of health, the ICF provides a useful functioning assessment among health care professionals, who basically used the biomedical model of assessment, for identifying all relevant information related to the condition (Stallinga et al., 2014). In this way, the ICF improves communication among health care professionals during patient assessment by providing the universal language and framework for health and functioning (World Health Organisation, 2001; Bagraith & Strong, 2013).

Furthermore, the use of ICF as a tool for interprofessional collaboration improves the quality of the work process through the systematic assessment approach, settings treatment goals and plans (Rentsch et al., 2003). This implies that team work is promoted by using a shared language in the patient management process in either education or practice in the hospital environment (Hollar et al., 2009; Dufour & Lucy, 2010). In fact, the ICF was found to be an effective instrument for decision making, collaboration and communication among health professionals from various disciplines due to its common language across the globe (Miller et al., 2010).

It has been observed that the use of different frameworks among health care professionals hampered the interprofessional collaborative practice (Bagraith & Strong, 2013). ICF has addressed this issue by providing a friendly and flexible framework that can be used across all professional boundaries to assess patient functioning at the body (function and structure), person (activity) and social level (participation) (World Health Organisation, 2002; Wijayaratne, 2015).

The ICF has been used as a theoretical framework to inform interprofessional collaboration in various disciplines and settings. The study conducted by Skarakis-Doyle and Doyle (2008) at the University of Western Ontario in Canada on interprofessional doctoral programme in rehabilitation, suggested that the use of the ICF framework has improved the educational environment, hence the remarkable

academic success in the programme. This was supported by Snyman et al. (2015) from Stellenbosch University, South Africa, in their study where the students' preceptors, students and patients participated. The preceptors included medical doctors, occupational therapists, nurses, dieticians and physiotherapists. All medical students were also included. The study reported that using ICF in primary health care assessment has the potential for learning and improved interprofessional practice as well as patients' outcomes.

Bagraith & Strong (2013) conducted a study on persons with chronic musculoskeletal conditions at a large metropolitan hospital in Australia. This study in the use of ICF in interprofessional assessment was composed of physicians, nurses, physiotherapists, psychiatric, occupation therapists, and psychologists. The results of this study revealed that ICF was found to be useful in assessment of chronic musculoskeletal conditions, and suggested covering all patients' aspects in order to plan a holistic intervention.

A study conducted in a hospital environment by Stallinga et al. (2014) among patients with multiple sclerosis at a university hospital in the north of Netherlands, aimed at comparing functioning based on ICF with conventional medical assessment, demonstrated that the use of ICF improved self-reported patients' problems more than a medical assessment. Furthermore, this study revealed that the use of ICF helped in identifying all health-related information. Another study using ICF in interprofessional collaboration was conducted by Cahill et al. (2013) on physiotherapist and occupation therapist students in their clinical placement in paediatric and elderly rehabilitation units in Ireland. The findings of this study demonstrated that the ICF enhanced learning by the use of a common language, thereby increasing collaboration and communication between professionals. The ICF framework also facilitated a greater understanding of roles during the evaluation of the therapy process.

Various studies have demonstrated the utility of ICF in chronic conditions and rehabilitation settings (Albanesi et al., 2009; Geertzen, Rommers, & Dekker, 2011; Chang et al., 2012; Kostanjsek et al., 2011; McDougall, Wright, Dewit, & Miller, 2014; Patterson, 2014). Furthermore, the ICF application was more in an uni-professional health care team than an interprofessional one in different disciplines, especially in nursing, physiotherapy, and occupation therapy (Heinen et al., 2005; Sykes, 2008; McDougall et al., 2008; Gradinger, Glässer et al., 2011; Boldt et al., 2013). The use of ICF in different professions was also

more frequent in rehabilitation settings (Rentsch et al., 2003; Cahill, O'Donnell, Warren, Taylor, & Gowan, 2013; Bagraith & Strong, 2013; Rainey, van Nispen, & van Rens, 2014; Stallinga et al., 2014; Wijayaratne, 2015).

Comparing the settings in which ICF has been used, the majority of studies indicate that the ICF was more frequently used in interprofessional academic than clinical settings. It was also observed that the ICF as an interprofessional collaborative practice tool was used more in high income countries in Europe, America and Asia, with only one study in Africa, specifically in South Africa.

2.5.6.5 Critique of the ICF

Although the ICF claims to present a holistic conceptual framework and appropriate tool to promote interprofessional collaboration and communication across conditions, settings and health professional boundaries, it has shown some limitation and critiques demonstrated by different researchers either in usual care or interprofessional practice. The title itself, *“International Classification of Functioning, Disability and Health”*, may result in confusion as some clinicians and students may interpret this to mean that the classification of functioning and disability should be done first and thereafter classify health (Mweshi, 2016). The same author has also questioned the relationship between functioning and disability as the two terms do not overtly appear in the framework. After the endorsement of the ICF, in 2001, and more recently researchers have highlighted difficulties in distinguishing between activity and participation (Schneidert et al., 2003; Hammell, 2004; Castaneda et al. 2014). What some people may refer to as individual activity may be participation for others (Hammell, 2004). This may also hamper the distinction between capacity and performance and may influence assessment, intervention, and evaluation of patient outcomes (Schneidert et al., 2003; Hammell, 2004).

Other critiques arised from the ICF users were the understanding of the environmental factors in relation to creation of disability. The problem identified was the impact of environmental factors on body, personal and levels of functioning (Schneidert et al., 2003). The author suggested further studies for broader understanding the interaction between environmental factors and disability. Furthermore, there has been some critiques that ICF framework was not developed in the context of some disciplines (Hammell, 2004; Bechard et al., 2010). A literature survey conducted by Jelsma (2009) also revealed various challenges met by ICF users. Some of the challenges included overlapping, not enough or

missing codes to capture all problems. Another difficulty was demonstrated in the use of qualifiers under the activities and participation which hampered, in some conditions, the standardisation of ICF application which may have led to incorrect and non-standard applications in some cases (Jelsma, 2009).

In interprofessional education and practice, the study conducted by Bagraith and Strong (2013) demonstrates that the ICF can be used as an interprofessional tool in clinical assessments of chronic musculoskeletal conditions. However, its content validity and reliability were questionable. The authors suggested the need for further research prior to widespread application of the tool in clinical practice. Indeed, the ICF may provide a holistic assessment and common language for communication in interprofessional education and practice, however Becharde et al. (2010) and Stallinga et al. (2014) suggested further studies on how the ICF theory would be translated into a routine interprofessional education and practice. Therefore, the above-mentioned problems raised from application of ICF in different settings may contribute to limited use of the framework, especially in a limited resource constrained environment.

A further concern with the ICF, is that although it claims to be based on a bio-psychosocial model of health, it remains biased towards the medical model. This is particularly evident in the use of the ICF within clinical and rehabilitation settings which results in an under-valuing of the effect of the environment on functional limitations and participation restrictions. This issue was highlighted in the systematic review of the use of the ICF within clinical and rehabilitation contexts in the Nordic countries by Maribo et al. (2016) which concluded that the contextual factors were the least used components. In addition, the development of the core sets, which are targeted at specific disease conditions, undermines the principle of causal neutrality and may further emphasise the impairment and health-related aspects of functioning to the detriment of the contextual factors (McIntyre & Tempest, 2007).

Notwithstanding the limited evidence in resource constrained environments, it was anticipated that the integration of ICF in hospital settings in Rwanda could improve interprofessional collaboration and holistic interventions. Adoption of this tool requires interprofessional training based on the ICF as a framework (Brunani et al. 2015). The next section will therefore explore training in interprofessional collaboration.

2.6 Training in interprofessional collaboration

Staff training or faculty development is a cornerstone of medical education (Steinert, Mann, Centeno, Dolmans, Spencer et al., 2006). It has been suggested that in the workplace the employees cannot rely on the acquired knowledge that they have gained from school (Wentling & Park, 2009). In addition, in the work environment, the employees should foster their knowledge and skills through training in order to work effectively (Chang & Chiang, 2013). Therefore, training in the work environment is essential for improvement of a particular institution (Wentling & Park, 2009). It is with these regards in mind that this study focused only on interprofessional training within the work environment, i.e. it means health care practitioners who work in hospitals.

2.6.1 Development of training programme

2.6.1.1 Development of content

Training of health professionals is essential to bring about the desired health care reform, as they should be ensuring the universal coverage of high quality services (Frenk et al., 2010). *“Not all changes are improvements but all improvement involves change”* (Health Foundation, 2012, p.6). Therefore, health professionals need to embrace the changes required.

The Global Commission on the Education of Health Professionals (GCEHP) for the 21st century has reported that the biggest barrier to achieving high quality service is the application of acquired knowledge (Frenk et al., 2010). In order to address this, training and other continuous professional development (CPD) activities are crucial for both acquiring the skills to improve quality of health care and improve the motivation of health care professionals to provide excellent practice (Forsetlund et al., 2009). It was suggested by Anderson et al. (2011) and the Health Foundation (2012) that training may enhance knowledge and skills and improve the behaviour and attitudes of health professionals in their working environment. The on-going training of health care professionals can provide an important opportunity to build on the scientific foundation of health care and to provide interprofessional opportunities to develop collaboration between disciplines in the real world health care settings (Anderson et al., 2011).

In recent years, various training strategies have been put into practice to improve working conditions (Blume, Ford, Baldwin, & Huang, 2010). Continuous professional development (CPD) is now mandatory

in many countries to upgrade knowledge and change attitudes for the better (Khan, 2010). Although different health professional training interventions are conducted, there is an increased emphasis on interprofessional training, particularly in the practical based professionals (Health Foundation, 2012).

A fundamental challenge with workplace based training is the transfer to practice. Different training methods have been compared across settings but the most appropriate training is still uncertain (Blume et al., 2010). The training design and work environment have a strong relationship with transfer of training (Grossman & Salas, 2011). Active learning and participatory methods which emphasise putting quality improvement into practice has been found to be effective in CPD (Schostak, 2010). In addition, the trainees need to be facilitated to put the gained skills into practice in their working environment and the follow up sessions should also be organised for better patient outcomes (Grossman & Salas, 2011). In their review on the trainings or workshops and the effects on professional practice and health care outcomes, the authors indicates the need for more studies in low and middle income countries investigating the effectiveness of training on professional quality healthcare practice and patient outcomes (Forsetlund et al., 2009).

2.6.1.2 Training methodology

For a health professional to benefit from organised training, the changes made should reflect the relevant scientific knowledge (Batalden & Davidoff, 2007, p.1). This requires transforming learning in a working environment as suggested by the Global Independent Commission for Health Professionals for the New Century (Frenk, Chen, Bhutta, Cohen, Crisp, Evans, Fineberg et al., 2010). In the institutional context, training has become a corner stone for improvement and quality of service delivery (Grossman & Salas, 2011). In this context, training was defined by Armstrong (2001) as the *“systematic development of the knowledge, skills and attitudes required by an individual to perform adequately a given task or job.”*

The main purpose of training is to improve the knowledge, skills and attitudes in a systematic manner (Armstrong, 2001). A big challenge is for participants to transfer what they have learned into the workplace. According to Martin (2010), the following questions should be asked during training: are the training objectives well explained to the trainees? Is the training relevant to the usual work activities? Are the knowledge and skills gained in the training similar to the usual skills in use? Is the environment

supportive for effective learning? Will the trainees have the opportunity to put the gained knowledge and skills into practice? Is the training duration enough and flexible according to the actual work of the trainees? Will the trainees have chance to change their practice after feedback and follow up?

It has been found that during transfer of knowledge, an individual works within two environments. These are the training environment and the transfer environment(Ford & Weissbein, 1997). Therefore, intervention design, the trainees' characteristics and the working environment affect the transfer of training process (Velada, Caetano, Michel, Lyons, & Kavanagh, 2007). Furthermore, for effective performance, during the course of the training three types of behaviour should be considered to be changed: cognitive (knowledge), psychomotor (skills) and affective (attitudes) (Meletiou, 2006).

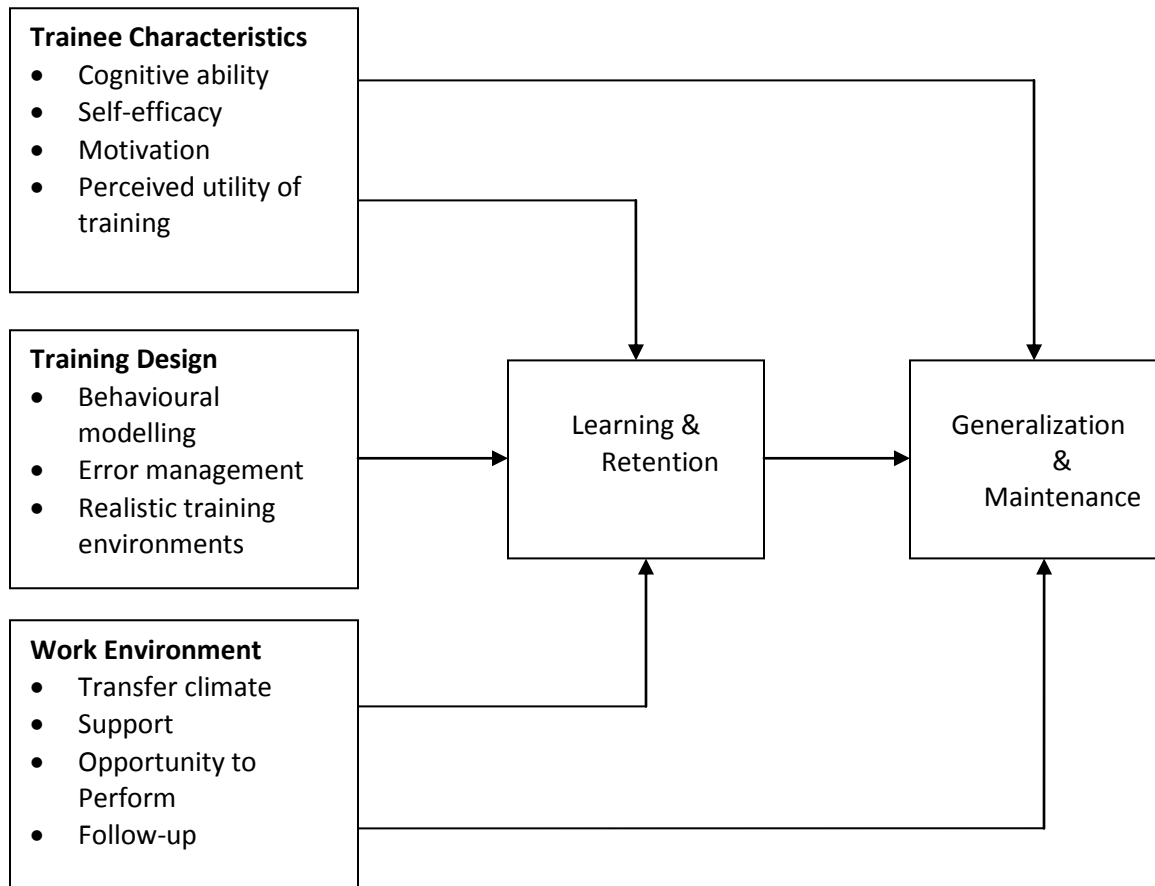
With regard to the preparation and design of a training programme to facilitate transfer, an organisation looking to design training programmes and facilitate transfer must rely on the evidence based practice from updated, strong resources and make a clear relationship with the transfer of training(Grossman & Salas, 2011). A systematic review on faculty development (Steinert et al., 2006) demonstrated the effectiveness of a variety of staff development programmes. They included seminars and workshops, fellowships, sites visits, short courses, and other longitudinal programmes. However, workshops were found to be more useful and relevant in providing shared knowledge and skills, and enhancing positive attitudes (Steinert et al., 2016).

2.6.2 Transfer of training and change theory

For the training to be effective in terms of transfer of acquired knowledge, skills and attitudes to daily working practice, a model of the transfer of training process by Grossman and Salas (2011, p.106) adopted from Baldwin and Ford (1988) was considered to be effective (Figure 5).

Training Input

Training Output Conditions of Transfer



Grossman and Salas (2011) adopted from Baldwin and Ford (1988) (Grossman & Salas, 2011, P.106)

Figure 5: A model of the transfer of training process

Training input is suggested to have a direct or indirect impact on the conditions of transfer of training. This is structured in three categories: trainee characteristics, training design, and work environment (Grossman & Salas, 2011).

2.6.2.1 Trainee characteristics

It is widely accepted that trainee characteristics play a powerful role in the transfer of training (Burke & Hutchins, 2007). Cognitive ability, self-efficacy, motivation, perceived utility of training and personality can influence the training outcome (Ford & Daniel, 1998; Grossman and Salas, 2011;Tziner, Fisher, Senior, Weisberg, & Street, 2007;Martin, 2010). Trainees with high cognitive ability show much ability in

processing, retaining, and generalising the gained skills (Baldwin & Ford, 1988). It was also observed that as trainees develop their self-efficacy they are more confident in their ability to learn and transfer what they learn into their workplace and more likely to persist when facing complex tasks (Chiaburu & Marinova, 2005; Chiaburu & Lindsay, 2008; Martin, 2010). Therefore, these should be considered during training.

“It is recognised that trainees cannot reap knowledge from training without having learning motivation” (Homklin, Takahashi, & Techakanont, 2013, p.3). During the course of training, the trainees must be motivated to learn and transfer throughout the training process as demonstrated by Burke and Hutchins (2007) and Blume et al. (2010) as strong predictor of transfer outcomes.

Trainees or learners must ensure and believe that they have the capability to learn and increase their performance and benefit from their improvement (Grossman & Salas, 2011). Moreover, the perceived utility may also have a positive impact on transfer of training (Burke & Hutchins, 2007). For instance, it was stated by Baldwin et al. (2009) that trainees who have a positive perception of the training as useful and valuable are willing to apply new skills in the workplace.

2.6.2.2 Training design

The design of training has an impact on transfer of training. Behavioural modelling, error management and realistic training environments were suggested by Grossman and Salas (2011) to influence the transfer of training. Behavioural modelling is used to allow the trainees to observe and practice the changed behaviours in improving their ability to learn and retain new information (Grossman & Salas, 2011; Wen & Lin, 2014). Moreover, Taylor et al. (2005) argued that behavioural modelling facilitates transfer of training when positive and negative models are both used, and when times to put the gained knowledge into practice are all provided.

It is positive to engage the trainees in expressing their opinions, either positive or negative, and let them practice and see the results. According to Grossman and Salas (2011, p.111), *“Error-based training allows trainees to anticipate what can go wrong, and equips them with the knowledge of how to handle potential problems”*.

The closer the training environment is to the working environment the more competent are the professionals (Burke & Hutchins, 2007). Therefore, to have an impact on transfer of learning to the job as a result of training, it is better if the training is conducted in the environment that resembles the workplace (Burke & Hutchins, 2007; Grossman & Salas, 2011).

2.6.2.3 Work environment

Work environment refers to the transfer climate or factors perceived by trainees to encourage or discourage their use of knowledge skills and attitudes learned in training (Cromwell & Kolb, 2004). After the training, the work environment has a significant impact on the transfer outcomes to be effective. To practice new skills, a conducive learning environment must be established where the trainees feel comfortable sharing their thoughts and ideas (Poli et al., 2001). Indeed, the work environment influences the worker performance and contributes to knowledge transfer (Hillsman & Kupritz, 2006; Lim, 2016). Therefore, the components of work environment addressed by the author are transfer climate, support, opportunity to perform and follow-up.

Transfer climate: It is the organisational conditions which can, psychologically, influence the individual's performance (Liou & Cheng, 2010; Wen & Lin, 2014). Transfer climate (TC) is the organisational culture which supports the employees in transferring the knowledge or skills obtained from training programmes into the job setting (Wen & Lin, 2014). It has been observed that when the organisational climate is supportive, there is a high possibility of putting the new knowledge into practice within the work environment.

Blume et al. (2010) demonstrated in their meta-analysis that transfer climate was correlated highly with the transfer among other work environment components. Furthermore, Abdullah & Suring (2011) revealed that climate has statistically impacted the transfer of training. Some of the indicators of transfer climate include peer support, supervisor support and sanctions, and performance feedback (Baldwin & Ford, 1988; Holton, Bates & Ruona, 2000). Peer support and performance feedback after the training are especially positive with regards to training transfer (Velada et al., 2007). Therefore, the transfer climate should be taken into account during training in the work environment.

Support: During the course of training, the trainer should highlight the goals regarding the desired performance of the training, the conditions under which the performance will be expected to occur on the job and the criterion of acceptable performance (Burke & Hutchins, 2007). Therefore, positive support from the trainer's follow up and supervision with peer support would enhance transfer of training (Velada et al., 2007). Positive supports from peers or team members while working together are crucial for the trainees' performance. This is supported by Holton, Bates & Ruona (2000) who argued that working with peers can reinforce and support the implementation of what has been learned in the workplace.

Not only the trainer and team members, but also the whole organisational environment should be supportive after training so that the transfer of training will be attained (Holton, Baldwin, & Salas, 2003). Eventually, the supervision support should be organised as the most influencing catalyst of transfer of training in the work environment (Blume et al., 2010). Indeed, supervision is considered an essential element after training due to the fact that it encourages the trainees to transfer skills and also helps in solving any problem that may happen to hamper putting new skills into practice (Lancaster, Milia & Cameron, 2013). However, Khan, Mufti and Nazir (2014) stated that, actually, the trainees' support would start before training, and continue during and after training.

Opportunity to perform: *"Opportunity to perform implies the extent to which a trainee is provided with or actively obtains work experiences relevant to the tasks for which he or she was trained"* (Ford, Quinones, Segó, & Sorra, 1992, p.512). This is when the trainees are given the necessary resources and tasks enabling them to use the gained knowledge and skills in their work environment (Chang & Chiang, 2013). Provision of time to practice new skills was found to be critical for transfer of training in today's work environment (Gilpin-Jackson & Bushe, 2007). Therefore, the trainees need the opportunity to apply their new skills to their workplace for a successful transfer (Grossman & Salas, 2011). Moreover, trainees should be given enough time to apply their new skills in their working environment for positive transfer to occur (Burke & Hutchins, 2007).

Follow-up: The maximum participation and completion of the training cannot predict the training outcome. After the training, various opportunities to enhance learning and maintenance should follow (Salas & Stagl, 2009). Therefore, the follow-up sessions would be important after training. It has been found that in the post-training environment problems and barriers to implement may occur. In fact, this

may interfere with the expected transfer of training in the work environment (Tannenbaum & Yukl, 1992). Actually, the goal of the follow-up sessions is to identify those problems encountered by the employees (trainees) and try to help them to overcome those problems. It is also to look at the employees' performance and working conditions, so that to improve where improvement is required (World Health Organisation, 1999).

Follow-up meetings improve the work performance and prevent errors and further mistakes during practice (Martin, 2010). In fact, in the follow-up meeting there is the possibility of sharing experiences on how employees implement new skills gained from training, sharing limitations to implementation, and helping each other to eliminate those limitations (Saks & Belcourt, 2006). Furthermore, the same authors suggested various follow-up activities to be considered in promoting transfer. These strategies include using a comprehensive action plan, peer meetings, performance assessment, technical support, and supervisory consultations (Saks & Belcourt, 2006). The World Health Organisation (1999) also supported the utility of the follow-up meetings and suggested that at least one follow-up be performed in order to facilitate the employees (trainees) to apply the gained knowledge and skills in their clinical settings.

2.6.2.4 Learning & retention

After training, it is very important to maintain gained knowledge and good behaviour over time. This refers to knowledge and skills retention or continuity (Levy, 2011). Therefore, knowledge retention is a cornerstone of an institution memory concept (Argote, McEvily, & Reagans, 2003). The question to be asked here is: what are the faculty development strategies used to retain the gained knowledge attitudes and good behaviour in the working environment? The retention of knowledge and behaviour is promoted if an organisation provides a learning environment and support that facilitate the employees in personal development (Dalziel, 2010).

A preliminary action in retaining knowledge entails identifying critical areas where the knowledge is at risk (De Long & Davenport, 2003; Levy, 2011). A systematic review conducted by Steinert et al. (2006) concluded that following strategies should be considered during faculty development in order to keep the new behaviour. These include connecting theory with practice, initiating activities that stimulate reflection, considering the importance of context, and assessing changes over time. In some instances,

people retain knowledge through sharing, because knowledge and skills may become beyond an individual's cognitive capacity (Walsh, 1991; Daghfous et al., 2014). This means that people remember and forget to differing extents. Therefore, effective knowledge retention is a product of both remembering and forgetting. In this regard, a study conducted by Noble, Nelson, Sutingco, Marill and Cranmer (2007) demonstrated that knowledge was maintained for at least six months for both short and long training sessions even if there were no more formal training interventions.

However, it is essential for an organisation look for strategies to retain the knowledge and good behaviour among the employees. Otherwise, the organisation will not have the opportunity to learn and make corrections from experience (Martins & Meyer, 2012). Team based training in working environments could enhance the knowledge retention among trainees in any institution (Wallis, Kennedy, & Wallis, 2013). A team-based training approach has been also suggested by Levy (2011) as a strategy in both maintaining the employees and retaining the gained knowledge and skills. Another strategy for maintaining the employees' knowledge and skills is team supervision and motivation. It was suggested by Cox, Burke, Gorely, Beilin and Puddey (2003) that team supervision promotes higher knowledge and skills retention than working on an individual basis.

2.6.3 Effect of retention in work place

The employees' turnover had become an issue in various institutions and settings around the continent (Hausknecht, Rodda, & Howard, 2008; Kar, Sharma, & Borah, 2011). This is more remarkable in low income countries like Africa where there is a shortage of staff. Therefore, if there is no sustainable measure for maintaining the staff, this may negatively impact the institution or organisation (Martins & Meyer, 2012). In this regard, it is essential to understand the impact of losing employees who have already been equipped enough with knowledge and skills to serve the organisation (Martins & Meyer, 2012; Daghfous et al., 2014).

An institution should implement strategies to retain its employees as well as the knowledge and skills gained from continuous professional development or training. It has been suggested by Ahmad (2016) that if the institutions equip their employees with regular training or CPDs, these will be willing to continue working with motivation and satisfaction. Therefore, there is a relationship between employees' retention training or any CPD provided within the work environment (Velada et al., 2007).

However, Nikandrou, Brinia and Bereri(2009) suggested that more evidence was needed to explore that relationship between employees training and their retention.

Nevertheless, training is one the solutions for keeping employees and reducing turnover in an institution (Beynon, Jones, Pickernell, Packham, & Pl, 2015). This was supported by various studies which indicated the link between the training and retention. For example, a study conducted by Beynon, Jones, Pickernell and Packham (2015) demonstrated that employees perceived an association between training provision and retention. Landry, Schofield, Bordage, and Be (2011) supported the hypothesis that the provision of training opportunities for local candidates in a province has considerably promoted the recruitment and retention without a medical school. It was also suggested by Abdullah, Harnizam, Musa and Khalid (2011) that training and employee development resulted in different outcomes including enhancing employee satisfaction, commitment, and retention. Moreover, Beynon et al. (2015) reported that team based training in the work environment decreased staff turnover and improved retention. Therefore, it is clear that the relationship between these two variables (training and retention) exists. Indeed, the solution to keep the employees for a long time could be by training them (Ottoson, 1997; Levy, 2011; Jehanzeb & Arabia, 2013; Wallis et al., 2013; Ahmad, 2016).

2.6.4 Condition of transfer

Generalisation and maintenance implies that a learned behaviour continues and is sustained over time in the work environment, even if there are no conditions that foster its implementation (Stokes & Baer, 1977). It is also the capacity to put the gained knowledge into practice over time, regardless of the situation and settings (Stokes & Osnes, 1989). Therefore, there is a remarkable relationship between generalisation and sustainability in behaviour change programmes (Hargreaves & Fink, 2000).

Before the publication of a study conducted by Stokes and Baer (1977), the method used for generalisation in the most instances was “train and hope” (Stokes & Baer, 1977). For instance, training occurred and no other planned activities for generalisation in the work environment; rather it was expected that generalisation would happen (Burns et al., 2013). However, Hargreaves and Fink (2000) suggested that in order to change the work environment, there should be sustainability strategies for the application of the gained knowledge and skills.

The following

Table 2 2 illustrates the strategies for better generalisation and activities for sustainability in response to intervention implementation (Rtl) from Burns et al. (2013, p.86) with data from Stokes and Baer (1977).

Table 2: Strategies for generalisation and activities for sustainability of training

Strategy	Description	Activities
Natural maintaining contingencies	Teach the skill to be reinforced by naturally existing contingencies	<ul style="list-style-type: none"> • Involve team members in implementation decisions • Team members implement interventions
Train sufficient exemplars	Use numerous examples during training	<ul style="list-style-type: none"> • Use efficient data collection procedures • Provide ongoing professional development in the core components/skill sets of Rtl • Use a broad range of examples of forms that Rtl core components can take (e.g., collecting progress monitoring data for a variety of professional skills) • Train personnel to implement multiple aspects of the grade-level and problem-solving team processes
Train loosely	Expose trainees to a diverse array of the contexts or situations in which skill set is to be used	<ul style="list-style-type: none"> • Train using a variety of contexts and situations in which the same set of skills are required (e.g., monitor progress in multiple areas)
Program common stimuli	Incorporate into training stimuli that are common across contexts or situations	<ul style="list-style-type: none"> • Use a broad range of examples (e.g., what teams are called, which data collection tools are selected) • Use grade-level teams as professional learning communities to make decisions at various tiers
Mediate generalisation	Incorporate tools or strategies that the learner can readily use across contexts or situations	<ul style="list-style-type: none"> • Configure teams (e.g., grade-level teams) of consistent members who will address a variety of contexts and situations together • Use implementation fidelity protocols and checklists • Provide continuous feedback to team members (e.g., team processes, intervention fidelity, assessment procedures)
Train to generalise	Raise awareness of need for generalization during training and suggest use of trained skill sets across contexts and situations	<ul style="list-style-type: none"> • Discuss how existing Rtl practices contextualise into other areas of practice

From Burns et al. (2013, p.86) with data from Stokes and Baer (1977)

2.6.5 Appropriate instructional/training methods

The designing of this training was based on theories about learning which combine learning outcomes, learning activities and instructional methods. The following Table 3 indicates how the learning outcome would be addressed during the training based on the model of de Grave et al (2014, p.187) (book chapter from Steinert, Y 2014, *Faculty Development in the Health Professions*. Springer, Netherlands).

Table 3: Learning outcomes, cognitive learning activities and instructional methods

Learning outcome	<u>Cognitive learning activities</u> Trainees/Learners	<u>Instructional method to facilitate learning activities</u> Trainer/Facilitator
<i>Changes in knowledge and beliefs</i>	<i>Analyse and concretise their knowledge and beliefs</i>	<i>Stimulates participants to articulate their knowledge and beliefs by questioning, mind concept mapping, responding to a statement, etc.</i>
	<i>Apply theoretical knowledge</i>	<i>Provides cases or scenarios to make participants aware of the limitations of their knowledge and beliefs</i>
	<i>Relate their own knowledge and attitudes to those of others and to theories</i>	<i>Presents learning teaching theories, stimulates participants to study these theories and elaborate on them by generating examples</i>
	<i>Critically appraise different viewpoints and draw conclusion for their own actions and theory of practice</i>	<i>Instruct participants to look for similarities and differences between their own knowledge and attitudes, those of others and existing theories</i>
	<i>Observe example</i>	<i>Stimulates participants to make a choice from the different viewpoint or to combine them</i>
<i>Changes in skills and behaviour</i>	<i>Elicit underlying ideas and principles</i>	<i>-Demonstrate new skills and behaviours; other methods may be used as well, such as video, role play, simulation -Create cases or simulation in which participants' skills and behaviour are lacking -Discuss the skills demonstrated, included the underlying choices that were made.</i>
	<i>Experiment/practice</i>	<i>Invites participants to demonstrate their (adapted) skills while other participants observe.</i>
	<i>Evaluate</i>	<i>-Gives feedback and invites other participants and others, such as an actor involved in role plays, to give feedback: What went well, what can be improved and how. -Stimulates participants to discuss their daily behaviour and specify their commitments to change.</i>
<i>Intentions for practice</i>	<i>Learners relate the outcomes of new behaviour and skills practiced during the workshop to their teaching practice</i>	<i>-Discusses opportunities and threats for application in practice with the participants. -Formulates intention to stimulate participants to apply new practices or go back to old practices.</i>
	<i>Critically appraise whether the new skills and behaviour are useful attainable in practice.</i>	<i>Stimulates participants to reflect on/evaluate the effect of new practices</i>

de Grave et al (2014, p.187)

2.6.6 Effect of training in changing knowledge, attitudes and behaviour

There is extensive literature on the impact of training on interprofessional practice, including both individual studies, reviews and several systematic reviews.. It is apparent that the large majority of individual intervention studies report positive results with regard to the range of outcome measures

chosen. However, the research designs are not all robust and include small sample sizes and, in some cases, only descriptive data. Even those studies that did have a large sample size had flaws in their design. For example, the study by Hallin et al. (2009) reported an increase in perceived interprofessional competence post-test and included a large number of undergraduate students in the health professions (616). However there was no control group and no measures of behaviour or knowledge were included.

As this review does not set out to duplicate the rigorous Cochrane reviews that have been produced by Reeves et al. (2013 and 2017), a few selected examples of studies are presented here.

2.6.6.1 Effect of training on knowledge

The main goal of various training in the work environment is to provide the employees with knowledge to be used during their daily work (Shafloot, 2012). In other words, training is a vital channel of knowledge transfer in the work environment (Daghfous et al., 2014). Numerous studies have been carried out to determine whether the training could influence the promotion of knowledge in health care settings.

There is a wealth of studies that demonstrate that appropriate training of adults results in increased knowledge of the topic taught. This is true across disciplines and contexts. Examples of effective training of providers of health care include the following: A study conducted in India demonstrated that a four-day training improved knowledge of community health workers in mental health literacy (Armstrong et al., 2011). This study suggested that the use of case studies, images and diagrams, role plays and other participatory activities have significantly promoted knowledge and attitudes. The effect of training in improving knowledge also was observed among primary health care workers (PHCW) in south-western Nigeria. In this study, the training was suggested to be effective in promoting knowledge in intervention group on nutrition element of safe motherhood initiative programme (Oyewole & Ahmadu, 2014). This study involved two days' training in an intervention group with a training guide, whereas a control group received a placebo. Another study in south-western Nigeria also demonstrated the improved knowledge as a result of a training programme on malaria prevention among role model community care givers (Olalekan & Adebukola, 2015).

A pre-post training study conducted in Turkey among emergency department nurses revealed that their knowledge related to women who have suffered violence was very low before training, but after training they have gained a wider understanding (Yildiz, Selimen, & Dogan, 2014). This is also in line with a systematic review conducted by Carvalho et al. (2016) which indicated that the training of health care professionals in breast feeding demonstrated promotion of knowledge and skills even if the UNICEF standards were not followed. Training conducted with community mental health staff in Guangzhou, China, also yielded positive effects of training in the form of improved knowledge on mental disorders, and improved willingness to meet with persons with mental disorders(Li et al., 2015). Moreover, a study conducted on family physicians and their patients has indicated an increase in physicians' knowledge in communication skills as well as patients' satisfaction as a result of training (Naghavi, 2015).

Training also has been effective in improving interprofessional practice in various fields.

Interprofessional training in Canada was performed among 247 students included physiotherapists, occupational therapists, clinical psychologists, and nurses. The pre-post measurements demonstrated a significant improvement in knowledge as a result of training (Jones, Mcqueen, Lowe, Minnes, & Rischke, 2015). Another study conducted by Tofil et al. (2014) in interprofessional training based on simulation among 72 medical and 30 nursing students in internal medicine clerkship demonstrated the improved knowledge in collaborative ways of managing patients and in identifying roles of one another. The same was evidenced by Weidman-evans, Bigler, Murray, and Wright (2017) in their study employing case study based training among medical and occupation therapy students. The findings revealed improved knowledge of interprofessional collaboration between participants. In education setting, a systematic review conducted by Reeves et al. (2016) also suggested improved knowledge required in interprofessional collaborative practice.

2.6.6.2 Effect of training on attitudes

There is a significant relationship between training and improved attitudes in workplace environment (Dale, Richards, Bradburn, Tadros, & Salama, 2014). For instance, employees with positive attitudes are held to be more reliable in accomplishing their jobs, and they act as stakeholders within institutions. In fact, work related training has a positive correlation with positive feelings about jobs; therefore the positive feelings envisage positive attitudes about job aptitudes (Truitt, 2011).

Various studies have confirmed the effect of training in diverse settings (health care students and clinical settings) in improving attitudes. A two hour training conducted by Dale et al. (2014) using a PowerPoint presentation suggested that a training based intervention could positively impact the attitudes of filmmakers students with regard to mental illness. Another study conducted by Goeldlin et al. (2014) among medical students using a 2.5 hours teaching session followed by supervision indicated that training on geriatric skills-oriented has improved the students' attitudes towards elderly patients. But in comparison with knowledge and behaviour, the improved attitude was small.

It is clearly easier to assess improved knowledge than improved attitudes. In some instance knowledge also may be improved but not the same for the attitudes. For example, a study on the effect of training on attitudes towards sex offenders indicated no attitude change after a two-day training, but health professionals who attended the training course demonstrated improved in levels of awareness and confined in working with sex offenders (Craig, 2005). A mixture of methods was employed in this study such as lectures, cases studies, group discussions, and watching videos. It was also supported by Armstrong et al. (2011) in their study who reported that health professionals training had a very low positive effect on attitudes towards persons with mental disorders. Nevertheless, various studies in work environments demonstrated the positive impact of training on attitudes of health care professionals.

In a study on the impact of training on attitudes of employees regarding work proficiency, the results indicated that 86.8% had positive attitudes toward training and work proficiency (Truitt, 2011). However, the training methods were not well indicated in this study. The improvement in attitudes as a result of training was also demonstrated in a study conducted by Tapola, Wahlstrom and Lappalainen (2016) using case discussion and role-plays as training methods among psychiatric personnel towards quality of treatment of patients who self-injure. A one-on-one training also has been found to be effective in positive change of attitudes (Mcclaran, 2003). However the team training has more impact in improving attitudes of individuals (Ehrke, Berthold, & Steffens, 2014). It is in line with this, therefore, that Grogan et al. (2004) suggested that teamwork training could improve the attitudes towards interprofessional collaboration among health care professionals (Grogan et al., 2004). More recently a systematic review of the effect of interprofessional education has concluded that interprofessional training does result in improved attitudes and perceptions of other team members (Reeves et al., 2016).

2.6.6.3 Effect of training on behaviour

Steinert et al. (2006) have argued for the need for more studies showing that training results in changed behaviour. A variety of studies have been carried out to determine the effect of training on the behaviour or skills of health professionals in the workplace environment and on health care students using different interventions, populations and outcome measures. Examples include the study conducted by Ammentorp et al. (2007) which demonstrated that a 34-hour training based on lectures followed by video recordings in communication skills improved nurses' and doctors' ability to successfully handle communication duties that they face in their everyday practice. Improved practice related to training was also demonstrated with mental health supervisors which showed improved communication behaviour at work, provided that they took part in mental practice.

Similarly, a study conducted by Perron et al. (2014), a communication training intervention as a faculty development programme, improved the ability to deal with necessary communication issues among clinical supervisors. The role-plays in small group sessions and individual coaching were the methods used during training in this study. Several of these reported improved behaviour within the health professional training environment (Fernandez-Olano et al., 2008). Another study which determined the effect of training on skills practice was conducted among medical students who obtained training on multiplayer virtual world using avatars. Lectures were used and different scenarios were provided as training strategies. This study revealed better performance and skills development when student were assessed (Creutzfeldt, Hedman, & Felländer-tsai, 2012). In addition, a systematic review of the effect of interprofessional education suggested improved skills after the interprofessional training (Reeves et al., 2016).

Improved practice was observed in other studies in the workplace environment. A study evaluating the effect of training on service delivery demonstrated that training improved the skills in assessment of motor and process skills (AMPS), however the training methods were not indicated (Mcadam, Thomas, & Chard, 2001). A training programme was also found to be effective in improving the physiotherapists' skills and practice in evidence based practice (EBP) among an intervention group compared to the control group using the training methods indicated above (Olsen, Bradley, Espehaug, & Nortvedt, 2015).

In contrast, an assessment of the effect of information literacy training on junior doctors before their clinical practice revealed that there was no clear correlation between training and participants skills, and very little from the training has been maintained (Cullen, Clark, & Esson, 2011).

A Cochrane review in 2013 assessed experimental studies to determine the evidence supporting positive behaviour change through interprofessional education (S Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013a). The review reported that of the 15 studies that met the inclusion criteria, seven reported positive outcomes, four reported mixed results and four reported no impact. In addition, they judged the methodological quality of the studies was generally poor and the quality of the evidence was low for all the identified outcome measures: Patient outcome, adherence rates, patient satisfaction, clinical process outcomes, collaborative behaviour, error rates and practitioner competencies (Table 4). “Despite marking a step forward in beginning to establish an evidence base for IPE, more rigorous IPE research (those employing RCTs, Controlled before and after studies or Interrupted time series designs) is needed to demonstrate evidence of the impact of this type of intervention on professional practice or healthcare outcomes, or both” (Reeves et al., 2013, p.16).

Table 4: Cochrane review of quality of studies on interprofessional education to improve professional practice

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON *[Explanation]*

Interprofessional education to improve professional practices			
Patient or population: professionals or patients involved in interprofessional education intervention Settings: primarily USA and the UK Intervention: use of interprofessional education to improve collaboration and patient care Comparison: separate, profession-specific education interventions; or no education intervention			
Outcomes	Impacts	No of studies	Quality of the evidence (GRADE)*
Patient outcomes	The care provided by use of interprofessional education may lead to improved outcomes for patients	6	⊕⊕⊕⊕ Low
Adherence rates	The use of interprofessional education may lead to changes in the use of guidelines or standards (e.g. adherence to clinical guidelines) among different professions	3	⊕⊕⊕○ Low
Patient satisfaction	Patients may be more satisfied with care provided by professionals who have participated in an interprofessional education intervention	2	⊕⊕⊕⊕ Low
Clinical process outcomes	Changes in clinical processes (e.g. shared decisions on surgical incisions) may be linked to the use of interprofessional education	1	⊕⊕⊕○ Low
Collaborative behaviour	We are unable to assess adequately the extent to which different professions behave collaboratively in the delivery of care to patients	3	⊕⊕⊕○ Very low
Error rates	We are unable to assess adequately the reduction of error due to improved interprofessional education	1	⊕⊕⊕○ Very low

Practitioner competencies	We are unable to assess adequately the competencies (e.g. skills, knowledge) of professionals to work together in the delivery of care	⊕⊕⊕⊕ Very low
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*GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

Reeves S, Perrier L, Goldman J, Freeth D, Zwarenstein M. (2013) *Interprofessional education: effects on professional practice and healthcare outcomes (update)*. *Cochrane Database of Systematic Reviews 2013, Issue 3*. Art. No.: CD002213. DOI: 10.1002/14651858.CD002213.pub Page 3. Permission to print applied for.

A more recent review examined the impact of changes within the workplace, rather than training alone and which concluded that practice changes “may slightly improve clinical process/efficiency and patient health outcomes compared to usual care or an alternative intervention” (Reeves, Pelone, Harrison, Goldman, & Zwarenstein, 2017, p.21). These findings reinforced those of Pannick et al.(2015) who likewise concluded after a systematic review that there was little evidence to support the efficacy the interdisciplinary team care interventions on general medical wards with regard to traditional measures of quality of health care. These more recent studies contradicted the conclusions of Martin et al.(2010), who while conceding that more rigorous studies are needed, and concluded that the evidence in support of interprofessional collaboration was promising. However, as the current study is aimed at training interventions rather than changes in clinical practice as an intervention, these reviews are not discussed further.

2.7 Conclusions of literature review

This chapter highlighted the challenges facing health care for the 21st century. These include a shortage of staff, increased use of information technology, patient and community centred care, patient safety, quality care, seminars and workshop procedures, use of standardised protocols and guidelines during assessment and patient management. Rwanda also faces the same problems as other countries.

According to the Rwanda Ministry of Health (2014) this may impact negatively on the quality of service delivery and patient outcome. In the light of the above challenges, there is a need to develop national strategies that can meet the health needs of the population and to implement research initiatives for improved accessibility to quality health services. The interprofessional collaborative practice model may play an essential role in alleviating various challenges faced by health systems today.

The interprofessional practice model is defined as an approach where health professionals from different disciplines (doctors, nurses, and allied health professionals) work together to collaboratively achieve patient outcomes. The interprofessional collaborative practice has demonstrated the benefit to the organisation, team of professionals, and patients particularly, although there is still need for more high quality evidence. However, there is no known study or report demonstrating whether or how an interprofessional collaboration is employed in the Rwandan education and/or health care sectors.

A literature search was performed to find out a suitable conceptual framework for interprofessional collaboration to be used in this study. The Interprofessional Team Reasoning Framework (ITRF) which is constructed based on the International Classification of Functioning, Disability and Health (ICF) was found to be useful to facilitate interprofessional collaborative practice. A framework based on ICF was chosen to be used as a bio-psychosocial or holistic model, because ICF has been found to provide a useful framework and a consistent and standardised common language which may be used across the continuum of care across various disciplines, settings, and cultures.

This literature review also highlighted the need for interprofessional based training in the workplace where the employees should foster their knowledge and skills in order to work effectively. Therefore, this chapter focuses only on health care training within the workplace environment and on health care students in the educational environment. For the training to be effective in terms of transfer of acquired knowledge, skills and attitudes to daily working practice, a model of transfer of training process by Grossman and Salas (2011, p.106) adopted from Baldwin and Ford (1988) was considered to be effective. Finally, this narrative literature suggested that team-based training in the workplace environment employing various methods of training such as lectures, role-play, small and large group discussions, case studies, and follow-up sessions improves knowledge, attitudes, and behaviour. However, the evidence is generally of a poor quality.

The current study therefore set out to add to the body of knowledge by undertaking a randomised cluster control trial to determine the impact of workplace training of health professionals on interprofessional practice, using the ICF as a guiding framework. Although Stellenbosch University does use the ICF to train health professional students in holistic, interprofessional collaborative care during rural placements, to the researcher's knowledge there has been no formal research carried out in a rural hospital setting to establish the effectiveness of this approach.

CHAPTER 3. DEVELOPMENT OF THE TRAINING PROGRAMME AND OUTCOME MEASURES

3.1 Introduction

The first step in developing a training programme and a set of outcome measures to evaluate the impact of the training was to identify suitable training content and to test this for content validity. This chapter describes the development of the training programme and the outcome measures. The following chapter then describes the process of validation.

Questionnaires are commonly used to source information from a well-defined population (Chiaburu & Lindsay, 2008; Edwards, 2010) and need to be developed using rigorous methodology, particularly if used for testing improvement in clinical or educational practice (Rattray & Jones, 2007). It is possible that the researchers have the same objectives but use different questionnaires. The aim of this chapter was to develop suitable questionnaires to monitor the effect of training on knowledge, attitudes and behaviour and to determine the satisfaction with the proposed training programme. The objectives were to:

- Identify candidate items based on existing literature and consultation with experts in the field.
- Develop a 'pruned' list of items based on the content validity of the items and removing items that had a low content validity index.

3.2 Research design

The training programme and outcome measures were developed through discussion with experts and a review of the literature, as described under instrumentation in this chapter (3.4). To ensure content validity, the content of the training was assessed by three experts in the field of education. The questionnaires to assess the impact of training were assessed by a further panel of three experts to review for the relevance and clarity of the items in relation to what the questionnaires are intended to measure, and also to check the flow of ideas. Finally, content and construct validity were checked through cognitive debriefing by inviting a team of seven health care professionals to discuss the clarity and understanding of the questions (Table 23). This was done after validation of the study and is described in chapter 4.

3.3 Sample

There were three samples. The Training Programme Assessors consisted of three educationalists from universities in South Africa, two of whom had visited Rwanda. One of these had a PhD in Health Education, and the other two were experts in both education and the use of the ICF in the training of health care professionals, one being a medical doctor and one a physiotherapist. The Outcome Assessors Panel consisted of three physiotherapists, all of whom are expert in the use of the ICF and measurement theory. One of these is a member of the Functioning and Disability Reference of the World Health Organisation and the other two are South African (Table 5). A sample of three was used as based on the literature which suggests that a minimum of three panellists should be employed (Lynn, 1986; Polit & Beck, 2006). After the feasibility study was carried out, cognitive debriefing was done by four physiotherapists and three nurses (chapter 4).

Table 5: Description of panellists

Item	Assessors	Country	Institution	Expertise
Training programme – expert panel	Three medical doctors, educationalist, physiotherapist	South Africa	University of Cape Town University of Stellenbosch	- Key players in the original and on-going development of the ICF. - Developed programmes to enhance IPE -Members of WHO Functioning and Disability Reference Group (FDRG)
Outcome measures – expert panel (Knowledge questionnaire, Attitudes scale, Training satisfaction questionnaire, and Checklist auditing patients’ records)	Three physiotherapists with higher degrees	South Africa Canada	University of Cape Town University of Free State Functioning and Disability Reference Group (FDRG) of the WHO	- Experts in using ICF in education, research and practice -Members of the WHO FDRG and have been involved in developing the ICF
Testing and cognitive debriefing panel after pre- and post-testing (chapter 4)	Four clinical physiotherapists and three nurses	Rwanda	Nyamata Hospital	Working in district hospital similar to all rural district hospitals in Rwanda where the study took place.

3.4 *Instrumentation*

3.4.1 **Training programme**

The content of the training programme was based on literature related to best practice in continuing professional development, faculty development and transfer of training (Refer to section 2.6 in the Literature Review). It was also developed based on the experience from Stellenbosch University through the Centre for Health Professions Education. The training content is in Appendix xxv. The method of presentation was interactive and presented in workshop format, based on the model of the Transfer of Training Process by Grossman and Salas (2011) adopted from Baldwin and Ford (1988). It also took place within the work environment to ensure maximum relevance to daily work. Drawing on the experience of other programmes, different methods were employed such as participatory lectures, practical sessions, and role playing. In addition interprofessional training was used.

The design of this training was based on theories about learning which combine learning outcomes, learning activities and instructional methods as discussed in 2.1.2 of the Literature Review. Table 6 indicates how the learning outcomes were addressed during the training based on the model of de Grave et al. (2014).

Table 6: Learning outcomes, cognitive learning activities and instructional methods

Learning outcome	Cognitive learning activities <i>Trainees/Learners</i>	Instructional method to facilitate learning activities <i>Trainer/Facilitator</i>	Integration with the training programme
Changes in knowledge and beliefs	<i>Analyse and concretise their knowledge and beliefs.</i>	<i>Stimulates participants to articulate their knowledge and beliefs by questioning, mind concept mapping, responding to a statement, etc.</i>	Brainstorming was used during the training.
	<i>Apply theoretical knowledge.</i>	<i>Provides cases or scenarios to make participants aware of the limitations of their knowledge and beliefs.</i>	Using the case study, every participant had to pick the profession which was different from his/her profession.
	<i>Relate their own knowledge and attitudes to those of others and to theories.</i>	<i>Presents learning teaching theories, stimulates participants to study these theories and elaborate on them by generating examples.</i>	ICF was used as a theoretical framework to inform interprofessional practice. Examples were used in every ICF domain.
	<i>Critically appraise different viewpoints and draw conclusions for their own actions and theory of practice.</i>	<i>Instruct participants to look for similarities and differences between their own knowledge and attitudes, those of others and existing theories.</i>	Participants reviewed their practice by checking their patients' records and compare their knowledge with the new knowledge.
	<i>Observe example.</i>	<i>Stimulates participants to make a choice from the different viewpoints or to combine them.</i>	Participants were encouraged to participate in decision making. They were given the opportunity to clear misconceptions.
Changes in skills and behaviour	<i>Elicit underlying ideas and principles.</i>	<i>-Demonstrate new skills and behaviours; other methods may be used as well, such as video, role play, simulation. -Create cases or simulation in which participants' skills and behaviour are lacking. -Discuss the skills demonstrated, included the underlying choices that were made.</i>	-Case studies were used to demonstrate the use of ICF, a tool to integrate the patient assessment and management in interprofessional team. -Real patient records were also used and discussed in small group to identify problems that were addressed and probable problems that were not addressed.
	<i>Experiment/practice</i>	<i>Invites participants to demonstrate their (adapted) skills while other participants observe.</i>	The groups presented their patient records and identified the possible patients' problems, those which were addressed and those which were not addressed; the professions which have intervened and those who did not intervene but were needed.

Learning outcome	Cognitive learning activities <i>Trainees/Learners</i>	Instructional method to facilitate learning activities <i>Trainer/Facilitator</i>	Integration with the training programme
	<i>Evaluate</i>	<p><i>-Gives feedback and invites other participants and others, such as an actor involved in role plays, to give feedback: what went well, what can be improved and how.</i></p> <p><i>-Stimulates participants to discuss their daily behaviour and specify their commitments to change.</i></p>	<p>-The feedback was given by the trainer and the rest of the participants.</p> <p>-Participants were given the opportunity to reflect in their daily practice and share their working experience. They were also given an opportunity to think on how to change their practice towards IPP.</p>
Intentions for practice	<i>Learners relate the outcomes of new behaviour and skills practiced during the workshop to their teaching practice.</i>	<p><i>-Discusses opportunities and threats for application in practice with the participants.</i></p> <p><i>-Formulates intention to stimulate participants to apply new practices or go back to old practices.</i></p>	<p>-After group presentation, the trainer asked the participants: what are the facilitators and barriers to implementing the interprofessional practice in your hospital?</p> <p>-How can you use those facilitators for implementation?</p> <p>-How can you address those barriers to implementation?</p> <p>-What changes may be planned to implement in your facility as an individual, as a group, as an institution?</p>
	<i>Critically appraise whether the new skills and behaviour are useful and attainable in practice.</i>	<i>Stimulate participants to reflect on/evaluate the effect of new practices.</i>	Pre and post-test questionnaire were given to the participants as well as the training satisfaction questionnaire to evaluate whether the ICF framework as an IPP tool is useful and attainable in practice.

The two columns in italics are taken verbatim from page 187 of de Grave et al (2014).

3.4.1.1 Integration of the method of instruction with the ICF training

The target of training was health professionals who were currently working in the district hospitals for at least six months and thus this was a form of adult education. For interacting with these experienced groups of health professionals, special consideration was required to make the training more interactive and effective and transfer of training was essential. The model of transfer of training process by Grossman and Salas (2011) adopted from Baldwin and Ford (1988) was followed and considered to be effective in transfer of knowledge, skills and attitudes (Figure 5). This model considered the trainee

characteristics, training design, and working environment to affect the transfer of training. More details on this model of transfer of training are presented in the Literature Review (2.6.1.2).

- **Trainee characteristics**

During the course of this training the cognitive ability, self-efficacy were considered as referred to Baldwin and Ford (1988). The general attitude of the trainees was viewed based on their willingness to sign the consent to participate voluntarily. The self-efficacy was built among trainees to be confident of learning and transfer. First of all, the trainees were told that what they practice is good but that they all have potential to improve. The confidence was built among participants, and the confidence shown by the trainees was a cornerstone for transfer of knowledge. This was referred to Chiaburu & Marinova, (2005) and Chiaburu & Lindsay (2008). The trainees were motivated that they have capacity to learn and gain new skills that will help them in everyday practice. In addition to the motivation, the utility or importance of the training was emphasised during the course of the training. The trainees had to understand that the training would be useful in their daily practice for better patient outcomes. It is stated by Baldwin et al. (2009) that trainees who have a positive perception of the training as useful and valuable are willing to apply new skills at their workplace.

- **Training design**

During the course of this training, the training design was built on the behavioural modelling, error management and realistic training environments. Behavioural modelling was used in this training in allowing the trainees to observe and practice the changed behaviours in improving their ability to learn and retain new information. Case records of patients were used and practices were performed using patients' records from the hospitals. The participants' ideas were welcomed, feedback welcomed and reinforcement given. In addition, negative and positive examples were also provided. Taylor et al. (2005) argued that behavioural modelling facilitates the transfer of training when positive and negative models are both used, and when time to put the gained knowledge into practice is provided.

The participants in this training were assured that making mistakes or errors would not have a negative impact on their daily work. It is very positive to engage the trainees in expressing their opinions either positive or negative and let them practice and see the results.

- **Work environment**

The workplace can be a supportive and realistic training environment and the more similar the training with the working environment, the better the learning of competencies. This is referred to as the Burke and Hutchins (2007) and Grossman and Salas (2011) theories. The training was conducted in the district hospitals which are the actual work places of the study participants. After training, the work environment has a significant impact on the transfer outcomes to be effective. As described below, the components of the work environment that have been addressed in this study are transfer climate, support, opportunity to perform and follow-up (Grossman and Salas, 2011).

Transfer climate: A positive transfer climate was emphasised, especially after training, for bringing competencies from the training to the working place (hospitals). As an example, supervision during a follow-up session after two months was provided (in the definitive study, not the pilot) and a good atmosphere for peer learning was created among trainees. In collaboration with hospital superintendents, the trainees were also given enough opportunity to practice and were given access to patients' records to allow filling the needed information by all health care professionals who could provide interventions to each patient.

Support: Prior to the training, the trainer highlighted the goals regarding the desired performance of the training, and the conditions under which the performance will be expected to occur on the job. This was referred to by Burke and Hutchins (2007). Towards the end of the training session, the trainees were asked to indicate how they would plan to implement the gained knowledge from the training in future on a personal level, in the team, and at an institutional level. Positive support from the trainer's follow-up and supervision with peer support were proposed to enhance transfer of training. This was referred to in the Holton, Bates and Ruona (2000) theory.

Opportunity to perform: In the main study, health care professionals were given six months to apply their new skills in their working hospitals for positive transfer to occur as referring to Burke & Hutchins (2007). The hospital superintendents were consulted to permit their employees to include practice of new skills into their current workloads. The interprofessional teams were formed and organised the meeting schedules.

Follow-up: The maximum participation and completion of the training cannot predict the training outcome (Salas & Stagl, 2009). After the main training, the follow-up session was provided after two months to foster the knowledge, skills and attitudes towards good practice in interprofessional care gained from the training. This is described in Figure 18. The training procedure is described in 2.6.

3.4.2 Content and description of training

- After signing a consent form and the pre-test questionnaires of knowledge and attitudes towards interprofessional collaborative practice, the participants with the trainer set the rules and regulations of the training sessions. The trainer explained the overall aim of the training. Power Point presentations were used during training. The majority of medical professionals in Rwanda have been trained in and use English in their daily practice. To maintain the original content of the training, the presentation was given in English and, if it was needed, the researcher explained in local language (Kinyarwanda) or in French for more clarity. The trainer presented the objectives and learning outcomes of the interprofessional collaborative practice and its competency domains. These included role clarification, patient/client/family/community-centred care, team functioning, collaborative leadership, interprofessional communication, and interprofessional conflict resolution (Appendix xxv).
- A break of 15 minutes was provided.
- During the team functioning, the getting to know one another play was combined with describing their own professional role and that of another(Appendix xxv).In this activity, the participants explored the roles and responsibilities of different professions. Using the case of a diabetic patient, every participant had to pick the profession which was different from his/her profession. In small groups, the participants wrote everything he/she perceived the profession he/she represented could do for that particular case, bearing in mind the possible complications of the case. They were requested not to talk about their own profession or make corrections.
- *Clearing misconception:* in a large group, the participants presented what they perceived to be the role of other professionals in case management. After presenting each professional's role, the participant from that profession clearly described the role of their profession in managing the given case.

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- Before lunch, the introduction to ICF and its framework was presented as the framework to provide a common language between health care professionals. The ICF was found to be a useful tool for interprofessional collaborative practice.
 - One hour break was provided for lunch.

After lunch, three representative patient records were randomly selected from the medical, surgical and paediatric wards respectively. Three small groups were formed making sure that there were mixed groups of different professions. Each group was given one patient record to analyse using the Interprofessional care framework for continuous interprofessional care (Appendix xxix).

They were requested to identify the problems that were addressed in the patient records and probable problems that were not addressed.

After small group discussions, each group presented its case in the large group. The groups presented their patient records and identified the possible patient's problems, those which were addressed and those which were not addressed, and the professions which had intervened and those which did not intervene but were needed.

- In plenary, based on the discussed patients' records, the trainer asked the participants: what are the facilitators and barriers to implementing the interprofessional practice in your hospital? How can you use those facilitators for implementation? How can you address those barriers to implementation?
- Finally, what changes may be planned to implement it in your facility as an individual, as a group, and as an institution?
- After training, the post-measurement of knowledge and attitudes on interprofessional collaborative practice was performed in addition to the training satisfaction questionnaire. The completed questionnaires were deposited in the provided box for the purpose of anonymity. Only codes were used by participants and participants were requested to use the same code for both pre- and post-test measurements.
- After post-test, the word of thanks to the participants and closing the training by the trainer.

3.4.3 Questionnaires

A self-designed questionnaire was developed to monitor the *knowledge* of health care professionals of interprofessional practice and the ICF (Appendix iv). An existing standardised questionnaire was validated and used to monitor the *attitudes* of the health care professionals towards interprofessional practice (Appendix v). An adapted questionnaire to determine *the satisfaction of health care professionals with ICF training* and the method of implementation was also validated and used in this study (Appendix vi).

The first step in identifying or developing a questionnaire is to do a literature search on the existing questionnaires that measure the same variable of interest in a similar population and setting (Kelley, Clark, Brown, & Sitzia, 2003; Edwards, 2010). The literature for the questionnaire search and grey literature were used to find the existing questionnaires which can measure the construct of the study.

For questionnaire search, the known databases were consulted. The terms selected were “questionnaire” OR “tool”, OR “instrument” AND “knowledge” OR “attitudes” OR “training”, OR “satisfaction” AND “health professional” OR “health care professional” OR “health personnel” OR “health care personnel” AND “interprofessional” OR inter-professional OR “interdisciplinary” OR “interdisciplinary” OR “multidisciplinary” OR “multi-disciplinary” OR “trans-professional” OR “transdisciplinary”. Based on the likelihood of having relevant information, the electronic databases were selected. The following databases were searched: PubMed (which includes Medline), Cochrane Library, EBSCO, CINAHL Cumulative Index of Nursing and Allied Health, Google Scholar, DIRUM (Database of Instruments for Research use Measurement); Web of Science.

Grey literature was also sourced from the Stellenbosch University and WHO. The International Classification of Functioning, Disability and Health (ICF) was used as a framework for the knowledge of health care professionals on the interprofessional practice and ICF. The interprofessional care framework for continuous interprofessional care (based on ICF) which has been used in Stellenbosch University through the Centre for Health Professionals Education was used in developing the knowledge questionnaire. The training satisfaction questionnaire was also developed based on the existing questionnaire developed by the Stellenbosch University’s Centre for Health Professionals’ Education.

3.4.3.1 Knowledge of health care professionals on interprofessional practice and ICF questionnaire

Despite the extensive literature/questionnaire search as explained above, no standardised questionnaire was found to measure the intended construct in knowledge of health care professionals on interprofessional practice and ICF. Using the Interprofessional care framework for continuous interprofessional care based on ICF (section 2.5.3), an integrated case study was designed taking into account the role of different professionals in assessment and management of patient. The questionnaire was developed considering each ICF domain under which the participant should indicate the profession to intervene and the probable required intervention. The questionnaire was composed of three parts: *Part one* consisted of demographic information such as gender, age, profession, ward/department, level of education and years of experience. Part two presented an integrated case study to inform the answers of the 3rd part. Part three included questions relating to the case study. The respondents were requested to identify problems under each of the ICF domains and then to list the professions that should be involved in management of the condition and the possible intervention that they could give. Each of the correct responses was awarded one mark. Apart from the patient conditions, other items of the questionnaire relate to impairment, current activity limitations, activity limitations anticipated on discharge, participation restrictions, positive and negative personal factors, and environmental factors (facilitators and barriers). After developing the knowledge questionnaire and having agreement with the expert in the ICF, questionnaire design and education domains, the validation process was followed. The results of the validity test and internal consistency are also presented in Table 15.

3.4.3.2 Attitudes towards interprofessional practice questionnaire

The Attitudes Towards Health Care Teams scale (ATHCT) was originally developed by Heinemann, Schmitt, Farrell and Brallier (1999) with 20 items in a pre- and post-measure or longitudinal monitor of attitudes toward health care teams among team members and/or trainees and their supervisors in clinically based team training programmes. The scale was developed with two subscales: Quality of Care/Process (14 items) and Physician Centrality (6 items) (Heinemann, Schmitt, Farrell, & Brallier, 1999). According to Heinemann, Schmitt, Farrell and Brallier (1999), the tests of reliability and validity showed that each subscale is a strong measure of its respective underlying concept. The author added further that this scale has the potential for use as a pre- and post-test instrument for evaluating the intervention based on a team training programme for health care professionals from different disciplines.

It was modified by Leipzig et al. (2002) into a 21-item tool with three subscales: Attitudes Toward Team Values (11 items), Attitudes Towards Team Efficiency (5 items), and Attitudes Towards Physician's Shared Role on Team (5 items). It was tested for internal consistency among 137 students from several disciplines (Cronbach Alpha=.83). The attitudes scale has since been extensively used in auditing interprofessional attitudes in the education context (Thannhauser, Russell-Mayhew, & Scott, 2010; Heinemann et al., 2011; Lie, Fung, Trial, & Loherty, 2013). On the basis of these reports, the 21-item scale was used in the feasibility study to monitor the attitudes towards interprofessional practice among health care professionals and to assess if it is responsive in changing the attitudes in a hospital setting. The content validity index (CVI) was calculated (Table 9) and the internal consistency and effect size were determined.

3.4.3.3 Satisfaction with training questionnaire

Various instruments have been used to measure the satisfaction with the training in relating the training with the venue and medium used, the facilitators of the training, time and place¹ (Barbara & Bruce, 2005; Hewitt, 2012). However, no standardised instrument was found to measure the training satisfaction in relation to the overall experience of the training, content and organisation and the relevance of the training to clinical work. The new training satisfaction questionnaire was developed based on an un-published workshop evaluation tool designed by the University of Stellenbosch through the Centre for Health Professionals Education.

Grey literature was also used to find the content of the questionnaire and experts in medical education and training reviewed the tool before a further validation process was undertaken. The developed questionnaire had five sections: Overall experience of the programme (five items), content and organisation (five items), the relevance of the training to clinical work (five items), and how much the training was new or reviewed or not relevant (three items) with a five-Likert scale (Strongly disagree to strongly agree). The scoring of this questionnaire was based on a five-Likert scale: strongly disagree, disagree, neutral, agree, and strongly agree. The last section consists of six open ended questions for the participants to express their opinions on the training through writing in a provided space.

¹Centre for Health Professions Education, the University of Stellenbosch: Training materials that were used during

3.4.4 Translation procedure

3.4.4.1 Introduction

The home language of all Rwandans is Kinyarwanda, but the official languages are English, French and Kinyarwanda. All education was conducted in French before 1994, but after that English and French were mixed until 2008 when the reform to switch from French to English was implemented (Lewis, Sarah, & Freedman, 2010). In addition, some of the Rwandans were grew up in exile where their education was in English or French. There are also some non-Rwandan health professionals working in district hospitals who speech either English or French. The original questionnaires were in English. Therefore, translation was required as some health professionals in Rwanda were trained in English and others in French, but both languages are used interchangeably in the daily work of health care delivery. The recommended process of translation was followed, i.e. forward translation, consensus meeting, backward translation, cognitive debriefing and final reconciliation (Figure 6). The purpose of this translation was to produce a linguistically equivalent translation (English to French).

The flow of the translation process is presented below:

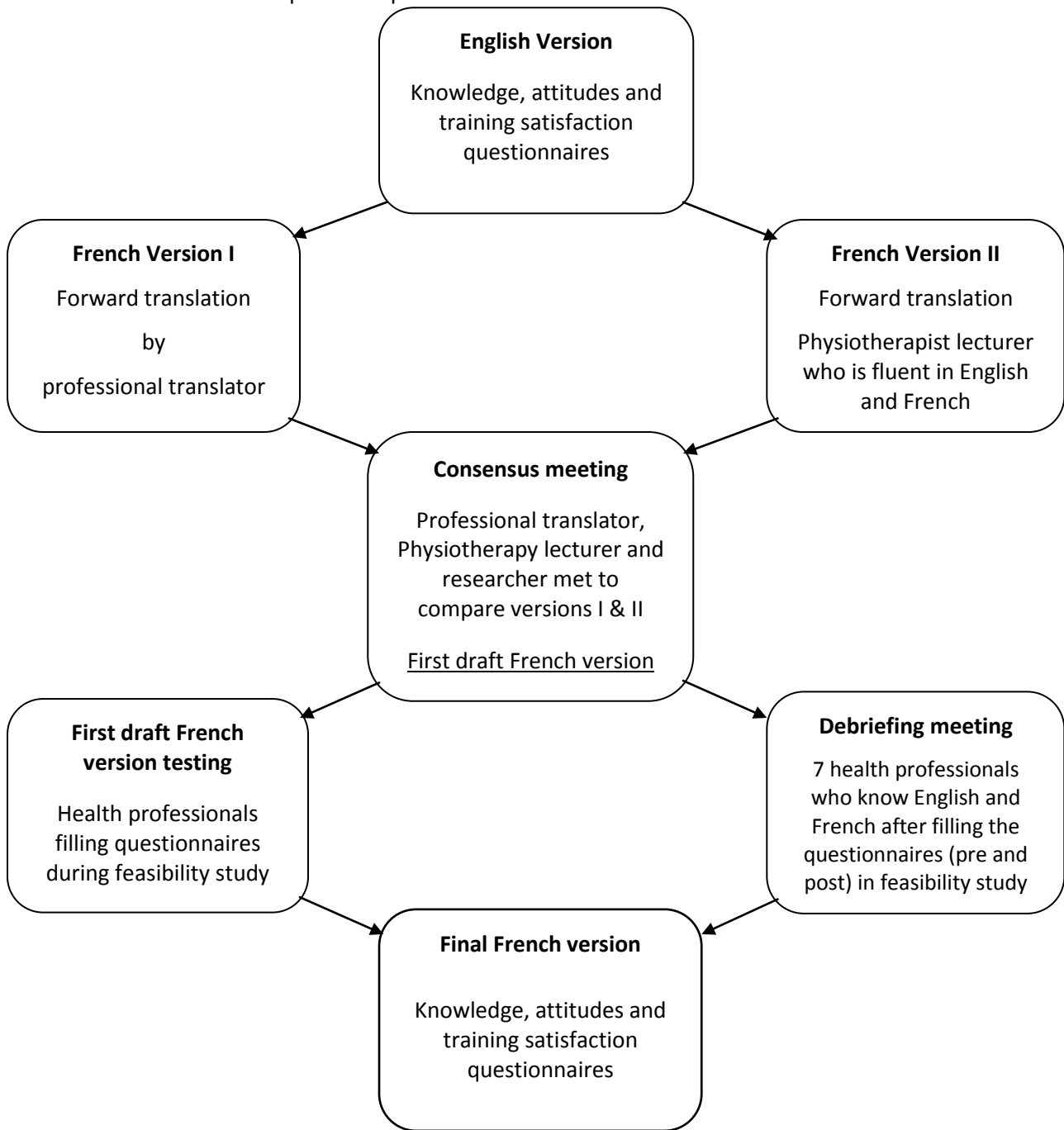


Figure 6: Translation process

3.4.4.2 Forward translation

After selecting the professional translator for forward translation, a meeting was held between him and the researcher to clarify the required translation procedure. It was explained that he should produce one translation aimed at addressing a multi-audience group. The linguistic translation was very important in order to produce the equivalence of the English version. It was also important to keep the scientific wording of the original version. A professional translator was also instructed to highlight and report the terms and phrases which caused problems so that these could be discussed during a consensus meeting. After the first French version was ready, both versions were given to a Physiotherapy lecturer who is fluent in both English and French to check the linguistic equivalence and make corrections to the translated draft (Version I). He was also instructed to keep comments to be addressed at the final consensus meeting. This resulted in a version II.

3.4.4.3 Consensus meeting

After the forward translation, a consensus meeting was organised between the professional translator, the Physiotherapy lecturer and the researcher to reach consensus on the first draft French version to be used during a feasibility study. The following table indicates the corrections made from version I (professional translator version).

Table 7: Translation corrections made during consensus meeting

Original English Version	French Version I by profession translator	Corrections in consensus meeting
Demographic information for all questionnaires		
Department/Ward	Division/ Département	Service/ Département
Medical	Médical	Médecine interne
Surgical	Chirurgical	Chirurgie
Paediatric	Pédiatrique	Pédiatrie
Knowledge questionnaire		
Health condition	Problème sanitaire	Problème de santé
Management	Gestion du problem	Prise en charge du problem
Impairment	Détérioration	Déficiencie
Attitudes questionnaire		
In my opinion	Pour moi	A mon avis/ A mon opinion
Physicians are natural team leaders	la plupart des cas, les médecins sont des chefs d'équipe de soins	Les médecins sont naturellement chefs d'équipe
Training satisfaction questionnaire		
The training content was not relevant	Pertinence du Contenu	Le contenu était non pertinent (non adéquat)
Any other suggestion or comment to help us to improve the future training?	Avez- vous d'autres suggestions ou commentaires à recommander pour la meilleur mise en pratique de cette formation dans le futur ?	Quelles sont vos suggestions ou recommandations pour la meilleure mise en pratique d'autres formations dans le futur?
What, if anything, would you add to the training	Avez-vous quelque chose à ajouter?	Avez-vous quelque chose à ajouter concernant cette formation que vous venez d'y participer?

3.4.4.4 Cognitive debriefing meeting

The first draft French versions of these instruments were then tested during a feasibility study whereby health care professionals filled the questionnaires before and after a training session for knowledge and attitudes, and for training satisfaction after the training session.

The purpose of the cognitive debriefing meeting was to get feedback from a group similar to the substantive participants of the main study. It was anticipated that filling the questionnaires in two sessions would facilitate a debriefing meeting because health professionals who were fluent in both English and French were given the English versions for pre and the French version for Post. After a pre- and post- testing, a debriefing meeting was organised between seven health care professionals who

participated in the study and were fluent in both languages. Amendments were made as necessary and the final version III was produced.

3.4.5 Auditing patients' records checklist

The decision was made, based on the several studies reported in the Cochrane Review (Reeves et al., 2013) which used improved documentation as a measure of behavioural change. For the checklist auditing the quality of patients' records, extensive search was also performed by consulting various databases. The search terms were "checklist" OR "check-list" OR "tool", OR "instrument" AND "patient record" OR "patient's record" OR "patient folder". The electronic databases were selected based on the likelihood of having relevant information. Therefore, the following databases were searched: PubMed (which includes Medline), Cochrane Library, EBSCO, CINAHL Cumulative Index of Nursing and Allied Health, Google Scholar, DIRUM (Database of Instruments for Research use Measurement) and Web of Science.

Grey literature was also sourced, however, no published standardised tool could be found to determine the degree to which all aspects of the patients' health status and functioning are included in patients' records, and how referral and discharge are made. Based on the grey literature, particularly the University of Stellenbosch student assessment forms², a checklist was developed, based on the ICF categories. This was then distributed to the panel of experts, which included three physiotherapists with higher degrees from the Universities of Cape Town and the Free State in South Africa and a member of the Functioning and Disability Group of the WHO based in Canada, to determine face and content validity. The Auditing Patient Record checklist (ARP) is composed of five parts: the patient's demographic information, comprehensive assessment, holistic intervention, continuum of care, discharge and inter-professional practice. This checklist used the ICF components to determine whether the impact of condition on functioning as well as the impact of environmental factors, were recorded in the patient records. Thereafter, the Content Validity Index (CVI) was calculated (Table 11) as well as the inter-rater reliability agreement between two raters who rated a sample of records independently. Translation of the Auditing Patient Record checklist was not needed because it was utilised by the

²Interprofessional care framework for continuous interprofessional care (based on ICF) and : Discharge note for continuous interprofessional care (Based on ICF) used by the Stellenbosch University, South Africa.

physiotherapist who had an English educational background. After developing the checklist auditing patients' records the validation process was followed. The results of the validity test are presented in Table 10 and inter-rater reliability in Figure 9.

3.5 Procedure

Relevant literature was sourced as noted above. A training programme was developed based on the literature and input from the first panel of experts. The outcome measures to monitor changes in knowledge, attitudes and behaviour (as in the audit of patient records) were developed based on modifications of existing instruments. Permission was granted by the authors of the instruments to modify and/or validate the instrument for use in the Rwandan health situation. An alpha draft of the outcome measures was developed.

Approval for the study was obtained from the University of Cape Town Human Research Ethics Committee. Three experts were purposively identified in consultation with the supervisors of the study based on their expertise and availability. All were contacted and agreed to review the instruments. The invitation letter to the expert panellists is found in Appendix ix. The instructions on what the panellists were requested to do for each instrument were also sent by email (Appendix ix). The alpha draft was sent and the panellists were asked to score each item for content validity on the CVI. The 4-point ordinal scale (1= irrelevant; 2 = somewhat relevant; 3 = quite relevant; 4 = extremely relevant) was used. Feedback was sent after the three expert panellists finished scoring the CVI. After receiving the feedbacks from the experts, data were entered in Excel and analysed for the CVI.

3.6 Data analysis

The item Content Validity Index (I-ICV) and the Content Validity Index of the scale (S-CVI) were calculated as outlined in Figure 7 for scales that are to be used as outcome measures. The analysis was done based on the recommendations of Wynd and Schmidt Schaefer (2003) and Polit and Beck (2006). The I-CVI was computed as the number of experts giving a rating of either three or four divided by the total number of experts. The S-CVI was computed by summing the I-SCI and dividing by the number of items. The I-CVI should always equals one (I-CVI=1) if the number of panellists is five or less (Polit & Beck, 2006). If consensus was not reached, the item was flagged and re-examined after the validity

testing reported in chapter 4. For the knowledge questionnaire, the items with I-CVI less than 1 were retained after modification as requested by panellists.

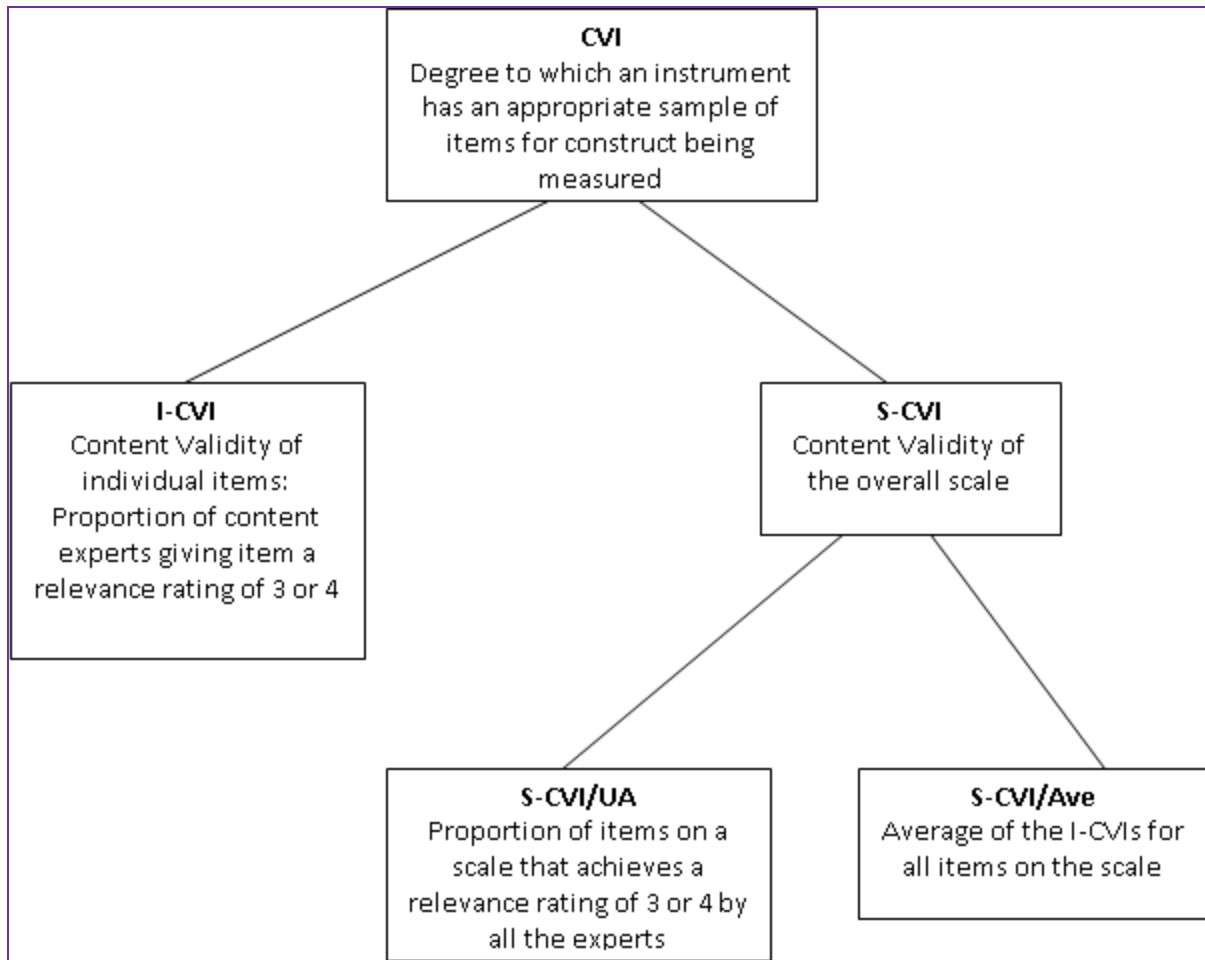


Figure 7: Definitions of content validity terms by Polit and Beck (2006, p.493)

3.7 Results

3.7.1 Knowledge of health care professionals on IPP and ICF questionnaire

Three expert panellists were asked to rate the relevance of each item using a 4-point scale: 1=irrelevant; 2=somewhat relevant; 3=quite relevant; 4=extremely relevant. The content validity of individual items (I-CVI) and the content validity of the overall scale (S-CVA) were computed as indicated in Table 8 below. The results indicate that of the 27 items, 23 items had I-CVI=1 and these were retained, whereas four items (8, 17, 20 and 21) with I-CVI=.67 were retained after the modification requested by experts

panellists. The S-CVI=.97. Table 9: Content validity of knowledge of health care professionals of interprofessional practice and ICF (with experts' comments before correction/modification).

Table 8: Content validity of knowledge of health professionals of interprofessional practice and ICF

Item	Expert 1	Expert 2	Expert 3	NA	I-CVI	Suggestion
1.Health condition	4	4	4	3	1	
2.Profession	4	3	3	3	1	
3.Management	4	3	3	3	1	
4.Impairment	4	4	4	3	1	
5.Profession	4	3	4	3	1	
6.Management	4	3	3	3	1	
7.Activity limitation(current problems)	4	3	4	3	1	
8.Profession	4	3	2	2	0.67	Add Nurse
9.Management	4	4	3	3	1	
10.Activity limitation (problems anticipated on discharge)	4	3	3	3	1	
11.Profession	4	3	4	3	1	
12.Management	4	4	4	3	1	
13.Participation restriction	4	3	3	3	1	
14.Profession	4	4	4	3	1	
15.Management	4	3	4	3	1	
16.Personal factors (+)	4	4	3	3	1	
17.Profession	4	3	2	2	0.67	Add MD & PT
18.Management	4	3	4	3	1	
19.Personal factors (-)	4	4	4	3	1	
20.Profession	4	3	2	2	0.67	Add other HP
21.Management	4	2	3	2	0.67	Add other professions
22.Environment factors(facilitators)	4	4	4	3	1	
23.Profession	4	4	3	3	1	
24.Management	4	4	3	3	1	
25.Environment factors (barriers)	4	4	4	3	1	
26.Profession	4	4	4	3	1	
27.Management	4	4	3	3	1	
S-CVI/Ave					0.95	
Total agreement					23	
S-CVI/UA					0.85	
Proportion relevant	1	0.96	0.89		0.95	

Scale: 1=irrelevant; 2=somewhat relevant; 3=quite relevant; 4=extremely relevant.

HP=Health Profession, MD=Medical Doctor, PT=Physiotherapist. NA: Number in agreement Content Validity Index (the mean I-CVI value= the sum of I-CVI/21 items) = 0.95.S-CVI/UA=Scale-level Content Validity Index, Universal Agreement calculation method=0.85.

3.7.2 Attitudes towards interprofessional team management

Table 9 shows the ratings of the relevance of each item by the three experts. It indicates the content validity of individual items (I-CVI) and the content validity of the overall scale (S-CVI). The S-CVI of three panellists was 0.95 with a total agreement of 18 out of 21 items. It means that 18 items received relevant ratings of 3 or 4 by all experts. Based on the low I-CVI, items 4, 13, and 18 were flagged and the other 18 items retained. The questionnaire is in the Appendix v. The low CVI-I of questions 4, 13 and 18 was noted and these questions were flagged for further examination during the validity testing phase.

Table 9: Content validity index (CVI) of the attitudes towards interprofessional team management questionnaire: Items rated 3 or 4 on 4-point relevant scale

Item	Expert			N A	I- CVI	Action taken
	1	2	3			
1.Working in teams unnecessarily complicates things most of the time	3	3	3	3	1	Retained
2.The team approach improves the quality of care to patients	4	4	4	3	1	Retained
3. Team meetings foster communication among team members from different disciplines	4	4	4	3	1	Retained
4.Physicians have the right to alter patient care plans developed by the team	0	3	4	2	0.67	Flagged
5.Patients receiving team care are more likely than other patients to be treated as whole persons	4	4	4	3	1	Retained
6.A team's primary purpose is to assist physicians in achieving treatment goals for patients	4	3	3	3	1	Retained
7.Working on a team keeps most health professionals enthusiastic and interested in their jobs	4	3	3	3	1	Retained
8.Patients are less satisfied with their care when it is provided by a team	4	4	4	3	1	Retained
9.Developing a patient care plan with other team members avoids errors in delivering care	4	4	4	3	1	Retained
10.When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	4	4	4	3	1	Retained
11.Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	4	4	4	3	1	Retained
12.Developing an interprofessional patient care plan is excessively time consuming	4	4	4	3	1	Retained
13.The physician should not always have the final word in decisions made by health care teams	4	-	4	2	0.67	Flagged
14.The give and take among team members helps them make better patient care decisions	4	4	4	3	1	Retained
15.In most instances, the time required for team meetings could be better spent in other ways	3	4	4	3	1	Retained
16.The physician has the ultimate legal responsibility for decisions made by the team	3	3	4	3	1	Retained
17.Hospital patients who receive team care are better prepared for discharge than other patients	4	4	4	3	1	Retained
18.Physicians are natural team leaders	3	-	4	2	0.67	Flagged
19.The team approach makes the delivery of care more efficient	4	4	4	3	1	Retained
20.The team approach permits health professionals to meet the needs of family caregivers as well as patients	4	4	4	3	1	Retained
21.Having to report observations to the team helps team members better understand the work of other health professionals	4	4	4	3	1	Retained
S-CVI/Ave					0.95	
Total agreement					18	
S-CVI/UA					0.86	
Proportion Relevant	1	0.95	0.9		0.95	

Scale: 1=irrelevant; 2=somewhat relevant; 3=quite relevant; 4=extremely relevant.

NA: Number in agreement I-CVI: Item Content Validity Index (the proportion of experts who rated the item as 3 or 4)

S-CVI/Ave: Scale-level Content Validity Index (the mean I-CVI value= the sum of I-CVI/21 items) = 0.95. S-CVI/UA=Scale-level Content Validity Index, Universal Agreement calculation method=0.86.

3.7.3 Satisfaction with ICF training

Table 11 shows the ratings of the relevance of each item by the three experts. It also indicates the I-CVI and the S-CVI. The S-CVI of three panellists was 0.96 with a total agreement of 21 out of 24 items. It means that 21 items received relevant ratings of 3 or 4 by all experts. Based on the low I-CVI, items 7, 12, and 23 were flagged and the other 21 items retained. The full questionnaire is in Appendix vi.

Table 10: Health care professionals' satisfaction with ICF training questionnaire: Content validity

Item	Expert 1	Expert 2	Expert 3	Number of Agreement	I-CVI	Action taken
1. The purpose of the training programme was explained to me.	4	4	4	3	1	Retained
2. The training programme captured my interest.	4	4	4	3	1	Retained
3. The training was helpful to me.	4	4	4	3	1	Retained
4. In general, I'm satisfied with the training.	4	4	4	3	1	Retained
5. I will recommend someone else to this training programme.	4	4	4	3	1	Retained
6. The content was appropriate and practical.	4	4	4	3	1	Retained
7. It was introduced in the manner with good transitions.	1	4	4	2	0.67	Flagged
8. The training package was stimulating and exciting.	4	3	4	3	1	Retained
9. The training met my expectations.	4	4	4	3	1	Retained
10. I've learned something that is of value to me.	4	4	4	3	1	Retained
11. I will apply the gained knowledge in my clinical work.	4	4	4	3	1	Retained
12. I expect a difference in my daily work because of this training.	1	4	4	2	0.67	Flagged
13. The training was important to bring change in clinical practice.	4	4	4	3	1	Retained
14. This training will improve the patient outcome.	4	4	4	3	1	Retained
15. This training will improve my service delivery.	4	4	4	3	1	Retained
16. How much of the training was new?	4	4	4	3	1	Retained
17. How much of the training was reviewed?	4	4	4	3	1	Retained
18. How much of the training was not relevant?	4	4	3	3	1	Retained
19. What was your most useful part of the training?	4	4	4	3	1	Retained
20. What was your least useful part of the training?	4	3	4	3	1	Retained
21. What are the facilitators to implement the knowledge gained from the training?	4	4	4	3	1	Retained
22. What are the barriers to implement the knowledge from this training?	4	4	4	3	1	Retained
23. Any other suggestions or comments to help us to improve the future training?	2	3	3	2	0.67	Flagged
24. What, if anything, would you add to the training?	4	4	4	3	1	Retained
S-CVI/Ave					0.96	
Total agreement					21	
S-CVI/UA					0.88	
Proportion Relevant:	0.875	1	1		0.96	

Scale: 1=irrelevant; 2=somewhat relevant; 3=quite relevant; 4=extremely relevant.

NA: Number in agreement

I-CVI: Item Content Validity Index (the proportion of experts who rated the item as 3 or 4)

S-CVI/Ave: Scale-level Content Validity Index (the mean I-CVI value= the sum of I-CVI/21 items)

S-CVI/UA=Scale-level Content Validity Index, Universal Agreement calculation method

As the CVI-I was low for Questions 7, 12 and 23, they were flagged for further examination during the validity testing.

3.7.4 Auditing patients' records checklist

Table 11 indicates the relevance ratings of three experts for a 30-item scale. It also indicates the item content validity (I-CVI) and the scale-level content validity index (S-CVI). The S-CVI of the three panellists was 1.0, which implies that all 30 items received relevant ratings of 3 or 4 by all experts. Therefore, all the items were retained. The full checklist is in Appendix vii.

Table 11: Content validity Index of the checklist for auditing patients' records to be used with the ICF checklist

Item	Expert 1	Expert 2	Expert 3	Number in Agreement	I-CVI	Action taken
1.The patient's consent is documented	4	4	4	3	1	Retained
2.The patient's consent is signed	3	4	4	3	1	Retained
3. Patient record number	4	4	4	3	1	Retained
4. Patient's name	4	4	4	3	1	Retained
5. Patient's gender	4	4	4	3	1	Retained
6. Date of birth/age	4	4	4	3	1	Retained
7. Address	4	4	4	3	1	Retained
8. Marital status	4	4	3	3	1	Retained
9. Medical aid/No medical aid	4	4	3	3	1	Retained
10. Patient occupation	4	4	4	3	1	Retained
11. Level of education	4	4	4	3	1	Retained
12. Admit date	4	4	4	3	1	Retained
13. Discharge date	4	4	4	3	1	Retained
14. Health condition and diagnosis (If yes, put the number of health conditions in the box)	4	4	4	3	1	Retained
15. Symptoms	4	4	4	3	1	Retained
16. Assessment of impairment (If yes, put the number of impairments assessed)	4	4	4	3	1	Retained
17. Impact of condition on functioning (Use ICF checklist. If yes, put the number of functioning addressed in the box)	4	4	4	3	1	Retained
18. Impact of environmental factors (Use ICF Checklist. If yes, put the number of environmental factors addressed in the box)	4	4	4	3	1	Retained
19. Health condition managed in context	4	4	4	3	1	Retained
20. Personal factors including mental and spiritual needs	4	4	4	3	1	Retained
21. Impairment addressed	4	4	4	3	1	Retained
22. Functioning addressed	4	4	4	3	1	Retained
23. Environmental factors addressed	4	4	4	3	1	Retained
24. Preventive measures of recurrence of health condition or complications related to condition	4	4	4	3	1	Retained
25. Referral to other services	4	4	4	3	1	Retained
26. Discharge note	4	4	4	3	1	Retained
27. Referrals to other disciplines	4	4	4	3	1	Retained
28. Case managed by different professionals	4	4	4	3	1	Retained
29. Health professional team identified	4	4	4	3	1	Retained
30. Health professionals treating the patient have documented	4	4	4	3	1	Retained
S-CVI/Ave					1	
Total agreement					30	
S-CVI/UA					1	
Proportion Relevant:	1	1	1	Mean Expert proportion	1	

Scale: 1=irrelevant; 2=somewhat relevant; 3=quite relevant; 4=extremely relevant.NA:

Number in agreement; I-CVI: Item Content Validity Index (the proportion of experts who rated the item as 3 or 4)

S-CVI/Ave: Scale-level Content Validity Index (the mean I-CVI value= the sum of I-CVI/21 items) S-CVI/UA=Scale-level Content Validity Index, Universal Agreement calculation method

3.7.5 Finalisation of Beta drafts

The suggested amendments were made and the Beta drafts finalised. The questionnaires were designed in English, so they were not suitable for all health care professionals working in district hospitals because some have an English educational background and others have a French background. This was then subject to translation into French as outlined in 3.4.4.

3.7.6 Summary of the results

The instrument validation process was performed. Three expert panellists were asked to rate the relevance of each item of the four scales to be used in this study. The content validity of individual items (I-CVI) and the content validity of the overall scale (S-CVA) were computed.

Knowledge questionnaire: Of the 27 items, 23 items had I-CVI=1 and were immediately retained, whereas another four items were retained after modification requested by experts panellists. S-CVA=.97.

Attitudes questionnaire: The total agreement was 18 out of 21 items. Based on the low I-CVI, three items were flagged and the attitudes scale remained with 18 items. The flagged items were related to the physician role in interprofessional team. S-CVA=.95.

Training satisfaction questionnaire: Total agreement was 21 out of 24 items. Based on the low I-CVI, three items were also flagged and 21 were retained. S-CVI=.96.

Auditing patients' records checklist: All items had I-CVI=1, so no item was flagged from the checklist. All 30 items were retained based on its S-CVI=1.

3.8 Discussion and conclusion

All instruments demonstrated excellent content validity. However, three items were flagged from the attitudes scale and four items modified in the knowledge questionnaire based on the experts' suggestions. The content validity as determined by the final users was further examined during the validation study and the results are reported in chapter 4.

A sample of three for the content validation of each questionnaire may seem somewhat small but this size is accepted as adequate in other studies and is large enough to compute the content validity index as suggested by Lynn (1986) and Polit and Beck (2006). However, before inclusion of any item full consensus should be reached and I-CVI must be one (I-CVI=1) (Polit and Beck (2006)). The same number

of expert panellists was used by Yaghmale(2003) and Mapeala and Siew (2015) in their studies determining the content validity index of their scales. Salinsky et al. (2016) in validation of the patient questionnaire used only two expert reviewers to assess a structured chart review of patients. Other studies have used a bigger sample but many of them used the Delphi method (Devriendt et al., 2012; Sangoseni, Hellman, & Hill, 2013; Larsson, Tegern, Monnier, & Skoglund, 2015).

The strength of the process is that it combined both international and local expertise, with panellists from Rwanda, South Africa and North America. In addition, different disciplines were represented and there were panellists who had been key players in the original and on-going development of the ICF, in developing programmes to enhance interprofessional teamwork in the education of health professionals and others who had extensive experience of the context in which the study would take place. A weakness of the panel was that there were no occupational therapists included and this was an omission that should be addressed in future studies.

As the questionnaire testing pre- and post-knowledge was self-designed, it was essential the content validity particularly be rigorously determined. After rating the relevance of each item by expert panellists, including members of the WHO Functional and Disability Reference Group who had been involved in developing the ICF, the CVI of the whole scale was .97 which indicates excellent content validity. The CVI was high in most cases compared to the CVI from various studies (Devriendt et al., 2012; Sangoseni, Hellman, & Hill, 2013; Sharma, Kaur, & Brar, 2014; Boll, 2014; Larsson, Tegern, Monnier, & Skoglund, 2015; Bathish, Aebersold, Fogg & Potempa, 2015; Salinsky et al., 2016).

The developed questionnaire was composed of 27 items; among them, 23 items had I-CVI=1, meaning that all the experts agreed on 23 items without proposed amendments. The four items which did not meet the criterion relate to the inclusion of other health professionals in each question and the suggestions of experts were to include other health professionals whom they considered useful in the management of the provided case study. The same procedure was used by Teles et al. (2014); Bathish, Aebersold, Fogg, and Potempa (2015) where the item with CVI less than 1 were revised to represent the construct and changes were made in the wording of items or some items were added to the questionnaire.

An existing Attitudes Towards Health Care Teams scale (ATHCT) developed by Heinemann, Schmitt, Farrell and Brallier (1999) as a 20-item scale and modified by Leipzig et al. (2002) into a 21-item tool with three subscales: Attitudes Toward Team Values (11 items), Attitudes Towards Team Efficiency (5 items), and Attitudes Towards Physician's Shared Role on Team (5 items) was validated in this study. It was important to establish the content validity within the African and Rwandan context as it had previously been used primarily in auditing the interprofessional attitudes in educational context (Thannhauser, Russell-Mayhew, & Scott, 2010; Heinemann et al., 2011; Lie, Fung, Trial, & Lohenry, 2013). The content validity index of the scale was also rated to be excellent (S-CVI=.95). The S-CVI of this study was similar to Shelby (2014) and higher than the S-CVI for Zimmermann, Küng, Sereika, Engberg, & Sexton (2013) and Soleimani et al. (2016) in their attitudes scales. The three items that were flagged for further investigation were all related to the traditional hierarchical structure of the team and the role of the physician as team leader. As the expert panel were of the view that these questions might antagonise the respondents and too directly challenge the existing structure of the system, they were excluded. Other subscales of this scale were all kept, hence the final scale was made up by 18 items. Further validation of this scale was also performed during a feasibility study with seven health professionals invited to a debriefing meeting after filling the questionnaire (see chapter 4).

The training satisfaction questionnaire was self-developed to assess the training satisfaction in relation to the overall experience of the training, content and organisation, and relevance of the training to the clinical work. This was due to the fact that the available instruments on training satisfaction generally concentrated on the venue and medium used, the facilitators of the training, and time and pace (Barbara & Bruce, 2005 & Hewitt, 2012). As with the other outcome measures, the S-CVI was excellent (0.96) but three items did not meet the criteria. There were no similar studies found to compare validating the training satisfaction questionnaire, but the S-CVI was similar to many studies testing the content validity of the questionnaires (Milne, Paine, Sullivan, & Sawyer, 2011; Zaidi, Awad, Mortada, Qasem, & Kayal, 2015; Chuayruang, Sriratanaban, Hiransuthikul, & Suwanwalaikorn, 2015). Two of the items were flagged due to the panel regarding them as having less relevance to the training programme and the last item was deemed to be a repetition of a previous question and was not supported.

For all the instruments used in this study, further validation of this scale was performed during a feasibility study with seven health professionals invited to a debriefing meeting after filling the questionnaire (chapter 4).

The auditing patients' records checklist to be used in district hospitals in Rwanda was also self-designed as no published standardised tool was identified which assessed the degree to which all aspects of the patients' health status and functioning were included in patients' records. There was no disagreement with any item and the Index S-CVI was 1.0. This was maybe not surprising and it was closely modelled on the ICF and required the inclusion of information relating to each of the ICF components to be included in the patient's records.

The content validity of all outcome measures was established, although there were some fagged items that needed further testing. The next step was to establish if the questionnaires would be comprehensible and acceptable to those who would use them in the definitive study.

CHAPTER 4. FEASIBILITY STUDY: TESTING THE TRAINING PROGRAMME AND VALIDATION OF OUTCOME MEASURES

4.1 Introduction

As outlined in the COSMIN paper (Mokkink et al., 2010), there are different types of validity that need to be tested before a questionnaire can be used with confidence. Any new questionnaire should be piloted and validated to ensure that it is measuring what it is supposed to measure (validity) and doing it consistently (reliability) (Chiaburu & Lindsay, 2008). In this chapter the validity and reliability of the outcome measures that were developed in chapter 3 are examined with regard to different aspects of validity. The intervention was novel and the researcher was unsure whether there would be adequate recruitment and compliance with the study. We were unsure of the reception that the Intervention programme would receive as the ICF is not well known by health care professionals in Rwanda, outside of physiotherapy. In addition, the training would be carried out by a physiotherapist, and it was not certain whether medical doctors would take part in the study.

It is generally advisable to conduct a feasibility study prior to embarking on a major clinical trial in order to ensure that the procedure to be followed is feasible and to address any procedural issues that may occur (Thabane et al., 2010). Therefore a feasibility study was carried out at a district hospital which is similar to the settings of the hospitals in the main study. A feasibility study is usually used to determine if the intended intervention is appropriate for further study (Taylor, Russ-Eft & Chan, 2005) and to answer the question “Can this study be done?”. Moreover, feasibility studies enable the researcher to estimate important parameters that are needed in the design of the main study. In this case, these included the time needed to collect and analyse data, willingness to participate, availability and suitability of data, feasibility and duration of training, and testing the validity and responsiveness of the outcome measures. The feasibility study was also to determine if patients’ records could be accessed and whether the audit tool was reliable.

4.2 Aims and objectives

The overall aims of this study were to examine the validity and reliability of the outcome instruments and to determine whether it would be possible to run the intervention programme as planned.

The specific objectives were:

- To pilot a training intervention to introduce the use of ICF into a district hospital.
- To test the responsiveness and the reliability of the developed outcome measures.
- To obtain consensus from different professionals regarding the most appropriate methods to introduce the ICF conceptual framework into the routine management of patients within selected district hospitals.

4.3 Setting

Prior to the main study, a feasibility study was carried out in one selected district hospital. This is Nyamata Hospital which was purposively selected. Nyamata District Hospital is about 30 kilometres outside of Kigali. It has a capacity of 164 beds and employs 14 medical doctors, three social workers, 79 nurses, four physiotherapists, and two nutritionists (Nyamata Hospital, 2012).

4.4 Study design

A pre-experimental study design consisting of one group pre-test/post-test was used to validate the training related instruments and test the responsiveness of the instruments to change. A single selected group was observed at two time points, once before the intervention and once after the intervention (Heffner, 2004). The knowledge and attitudes of health care professionals regarding interprofessional practice were assessed before and after a training session. As there was no control group or randomisation to an intervention group, it was not possible to assign any change in the outcome exclusively to the intervention. However, it did give useful information with regards to planning the main experimental study. The Satisfaction with Training questionnaire was administered at the conclusion of the training and a cognitive debriefing session was held the day after training. In addition, the psychometric properties of the instruments were examined and a post-hoc cross-sectional descriptive study was used to test the instruments and feasibility of the audit of patients' records.

4.5 Population and sampling

A purposive sampling method was used in selecting the hospital, in that a hospital in which the hospital authorities were ready and willing to participate in this feasibility study was identified. As

generalisability of the results of the pre- and post-tests was not required, the study used a sample of convenience and all the above health professionals employed at the hospital were eligible for the study. The inclusion criteria for the training programme included employment at Nyamata Hospital as a health professional, giving consent to participate in the training and being present on the day of the training. There were no exclusion criteria.

Of the sixty participants in the training, seven were available on the following day to take part in a debriefing session. The sample included four physiotherapists and three nurses who were available for cognitive debriefing the day after the training. Other health professionals like medical doctors, a nutritionist, a mental health nurse, and social workers were not available at that time.

The records of all patients discharged from the surgical, medical and paediatric wards in the past two months were included in the audit exercise and a stratified sample of 30-35 records of the most recently discharged patients from each ward (100 patients' records in total) was used. This was a large sample as it was anticipated that effect size would be small due to various confounding variables and to prevent a type II error from occurring. The sample size is explained further in 5.4.2. The maternity ward was excluded as the length of stay in the ward was too short and a limited range of health conditions, impairments and functional limitations were expected.

4.6 Instrumentation

4.6.1 Self-designed questionnaires

The Beta draft of the outcome measures was used, as described in chapter 3. These included the Knowledge, Attitudes and Satisfaction with training questionnaires and the Auditing patients' records checklist was also piloted.

4.6.2 ICF training programme

The content of the training programme was based on literature related to best practice in continuing professional development, faculty development and transfer of training. The design of this training programme was based on theories about learning which combine learning outcomes, learning activities and instructional methods based on the model of de Grave et al. (2014). It was also guided by the experience of Stellenbosch University and evidence from other ICF training programmes. Through the

Centre for Health Professions Education, the University of Stellenbosch has experience of using ICF in interprofessional teaching and training. The major guideline of the training content is summarised in the study outcome framework.

The training materials that were used during the Interprofessional Collaboration Practice Workshop held on 21st and 28th of August, 2014, were adopted according to the Rwandan district hospital context. After adoption of the interprofessional training using ICF, the package was reviewed by the expert panel as presented in Table 5. Because all these experts were from South Africa, the local supervisor reviewed the training package for cultural and contextual content.

4.7 Study procedure

The following steps were taken in carrying out the feasibility study:

4.7.1 Preliminary preparation

Ethical approval was obtained from the University of Cape Town Institutional Review Board (Appendix xi). Approval was sought from the National Health Research Committee (NHRC) (Appendix xii) and the Rwanda National Ethics Committee (RNEC) (Appendix iii) to carry out a study in Rwanda. The final approval for carrying out a study in Rwanda was sought from the Ministry of Education (Appendix xv). Permission was sought from Nyamata Hospital Ethics Committee to gain access to the hospital and to conduct the study. After getting the approval letter from the hospital, the researcher organised the meeting with the hospital superintendent in order to explain the details and the purpose of the study. The information letter was also presented (Appendix xvi); thereafter the director of the hospital gave consent (Appendix xviii) for participation.

After obtaining permission from the hospital superintendent, the researcher had meetings with the medical chief of staff and chief of nurses to plan the intervention. This included selection of participants to be invited, days of training, allocation of participants to different days in order to maintain the clinical work within the hospitals, the venue and all logistics needed during training.

As mentioned above, originally the training was to be conducted in two days but, based on the availability of staff (especially medical doctors), it was resolved to divide the health professionals into two groups, each group to be trained in one full day instead of two days.

The training took place within the hospital meeting room. On the day of training, the researcher explained the overall purpose and rationale, potential benefits and risks of the study. Participants were given the information letters (Appendix xix) for better understanding of the study; and the written consents were signed to show the agreement to participate. All ethical issues were taken into account and explained to the participants to avoid any unnecessary pressure to take part in the study. After obtaining the written consent (Appendix xxii), the pre-test measurements were performed among all participants in order to obtain the baseline data. The French versions of the outcome measures were used for those who were not proficient in written English.

4.7.2 Training procedure

This was a one day training. Due to the limited availability and work responsibilities of staff, the original two days of training was changed to a one day training which was offered on separate occasions over two days. Conveniently, after a meeting with the medical chief of the staff and chief of nursing, health professionals were informed about the study and groups were made based on their working days making sure that each discipline was represented on each day. The participants were then divided into two groups based on their availability and the groups were more or less similar with regards to the professions of the participants, with each profession represented in each group. The participants were then informed of their days and the venue of the training. Group one (day one) was composed of three medical doctors, 23 nurses, two physiotherapists, one social worker, one nutritionist, and one mental health nurse, making the total of 31 participants.

Group two (day two) was composed of two medical doctors, 24 nurses, two physiotherapists, and one social worker; in total they were 29 participants. To make sure that every profession was represented in group two, a nutritionist and a mental health nurse participated in that group to facilitate discussion, but they did not fill the questionnaires because they did this on the first day of training. The training was participatory; the trainees were allowed to raise their opinions and questions at any time. Small group

discussions and case presentations were used during the training. Training strategies and procedures were the same in both groups.

4.7.3 Follow-up

Participants were then invited to attend a debriefing session the following day and seven people were available to take part. The aim of the meeting was to reach consensus on the training content, organisation, and training procedures and materials used in the training. The meeting also resulted in the amendment of the outcomes measures used in the study. In addition, the most appropriate methods to introduce the ICF conceptual framework into the routine management of patients within district hospitals was identified.

To test the inter-rater reliability of the knowledge questionnaire marking, 29 filled questionnaires were independently marked by two markers, using the questionnaire marking guide.(Appendix x). Each marker was blinded to the marks of the other.

4.7.4 Procedure for audit

Data for the validation of the auditing checklist were collected from patients' records from the paediatric, medical, and surgical wards. Data collection was performed over two days. Written consent was obtained from the hospital superintendent to review patients' records for baseline data. As the patients had been discharged prior to the commencement of the study, it was not possible to gain informed consent from them with regard to accessing their patients' records and the hospital superintendent signed on their behalf and there was no harm and risks expected from this study. This procedure was approved by the different research ethics committees. The patients' records were identified by asking the nurses in charge of the wards to select 35 patients' records in surgical, 35 patients' records in medical and 30 patients' records for discharged patients in the paediatric ward. The nurses in charge of the respective wards picked the patients' records that were easily accessible in the store. This is a common practice in retrospective hospital based studies (Zegers et al., 2007).

To test the inter-rater reliability of the knowledge questionnaire marking, 29 filled questionnaires were independently marked by two markers, using the questionnaire marking guide (Appendix x). Each marker was blinded to the marks of the other.

After collecting data, the data were entered and analysed. Once the feasibility study had been conducted and the intervention had been finalised, the details of the intervention and amended informed consent documents were submitted as an amendment for approval to the Faculty of Health Sciences Human Research Ethics Committee (HREC).

The framework of the feasibility and validation study is depicted in Figure 8.

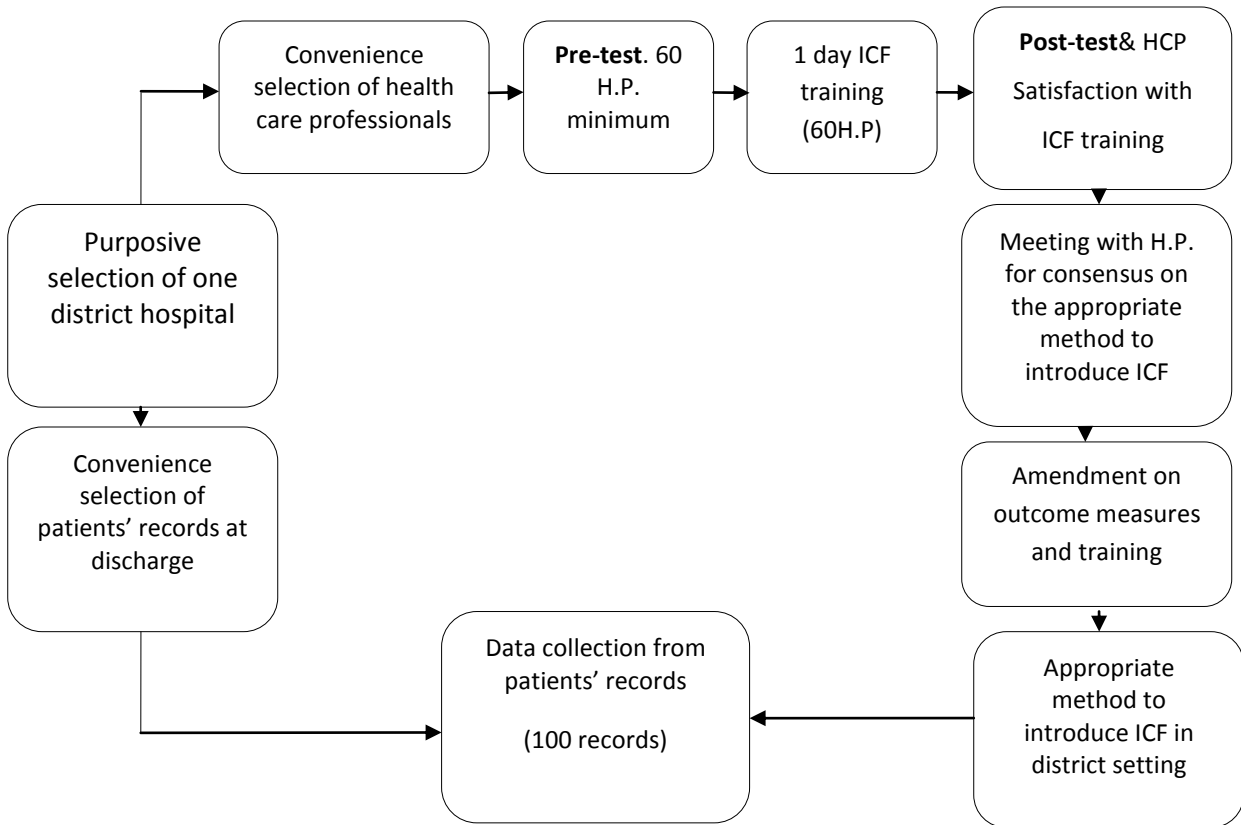


Figure 8: Feasibility study framework

4.8 Data analysis

Data entry was performed in Excel and analysed using STATISTICA (Version 13) and SPSS (version 21). Data cleaning was performed in Excel. Descriptive statistics were used to describe the characteristics of health care professionals, such as profession, gender, ward/department, and education level. Mean age and standard deviation of health professionals were computed. The mean and standard deviation, minimum and maximum scores in pre- and post-training responses were also performed.

The independent t-test was used to compare the means before and after intervention (training) to detect whether there were any statistically significant differences between the two means. The ICC for absolute agreement between two raters' scores of the 29 knowledge questionnaires was used to determine the reliability of the scoring. This was also performed for testing reliability of the patients' record checklist. Data were presented in the form of tables, scatterplots, and graphs.

To ensure the reliability of the instruments, internal consistency was established through the use of Cronbach's Alpha, with the coefficient set at >0.70 to indicate internal consistency. For ordinal data, such as the attitudes questionnaire, the effect size was calculated using the formula $(ES=Z/\text{Sq. Rt. } N)^3$ where Z is derived from the Mann-Whitney U test. The effect size, Cohen's d for numeric data, was calculated as

$$d = \frac{\bar{x}_1 - \bar{x}_2}{s} \quad \text{where} \quad s = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2}} \quad (\text{Cohen, 1992, p.25})$$

d=Cohen's d
 \bar{x}_1 = mean pre-test
 \bar{x}_2 = mean post-test
 S= standard deviation

n_1 =number of participants pre-test
 n_2 =number of participants post-test

4.9 Ethical considerations

These are discussed under the Randomised Control Trial chapter 5, section 5.8.

³<http://yatani.jp/teaching/doku.php?id=hcistats:wilcoxonsigned>

4.10 Results and Discussion of Validation of outcome measures

4.10.1 Participants

A total of 60 participants took part in the training. Five medical doctors out of 12 in total, 47 nurses out of 79, four physiotherapists out of four (all were trained), one mental health nurse (only one in hospital), one nutritionist (only one in hospital), and two social workers out of two (all were trained) were available and agreed to participate during the time of the feasibility study. The mean age was 33, standard deviation=4.9, minimum=25 and maximum=50. The details relating to their place of work, education and gender are in Table 12.

Table 12: Demographic characteristics of participants

		Medical doctors	Nurses	Nutritionists	Physiotherapists	Social workers	Total
Gender	Female	1	39	0	1	2	43
	Male	4	9	1	3	0	17
Ward/depart.	Medical	3	16	0	0	0	19
	Mental Health	0	1	0	0	0	1
	Nutrition	0	0	1	0	0	1
	Paediatric	1	11	0	0	0	12
	Physiotherapy	0	0	0	4	0	4
	Social Welfare	0	0	0	0	2	2
	Surgical	1	18	0	0	0	19
Educational level	Secondary	0	20	0	0	0	20
	Diploma	0	25	1	1	1	28
	Degree	5	3	0	3	1	12

N = 60

4.10.2 Knowledge of IPP and ICF questionnaire

The percentage knowledge mark score of both pre- and post-training are depicted in Table 13. Of the 60 participants only 57 filled the knowledge pre-test and 53 filled the post-test. Three participants did not fill the pre-test and seven did not fill the post-test for unknown reasons.

Table 13: The pre- and post-training responses to the knowledge questionnaire

Variable	Pre-test N=57				Post-test N=53			
	Mean	Minimum	Maximum	Std. Dev.	Mean	Minimum	Maximum	Std. Dev.
Health condition %	31.1	0	66.7	21.6	51.6	16.7	91.7	16.5
Impairment %	6.1	0	44.4	11.2	39.1	0	83.3	19.4
Current activity limitations %	8.4	0	34.8	9.9	29.2	0	78.3	18.8
Anticipated activity limitation %	5.3	0	41.7	10.6	35.4	0	66.7	20.3
Participation restriction %	3.3	0	27.3	5.7	17.7	0	36.4	11.1
Personal factors (positive)%	5.4	0	28.6	9	28.7	0	64.3	16.2
Personal factors (negative)%	6.9	0	38.5	10	28	0	76.9	19
Environmental factors (facilitators)%	4.9	0	30.8	7.5	22.8	0	61.5	16.8
Environmental factors (barriers)%	2.7	0	17.6	4.9	20.5	0	64.7	16.3
%	7.5	0	25	5.6	29.3	9	53.5	11.8

Green=Least, Red=Highest

4.10.2.1 Internal consistency

The Cronbach’s Alpha of the whole scale before the intervention programme was .693 (questionable IC) and post Alpha was .854 (good IC). The item Cronbach’s Alpha, as indicated in

Table 15 shows that no item needed to be deleted. As the Alpha was lower than desired, exploratory factor analysis (Table 14) with normalised Varimax rotation was done and three factors emerged, which generally represented knowledge regarding the health conditions and impairments, personal and environmental factors and the functional aspects of activity limitation and participation restriction.

Table 14: Factor analysis of the knowledge questionnaire Items

Items	Personal and environmental factors knowledge	Health condition and impairment knowledge	Functional limitation knowledge
Health condition	0.02	0.67	0
Profession	0.02	0.65	0.06
Management	0.09	0.74	0.06
Impairment	0.24	0.68	0.15
Profession	0.08	0.67	0.17
Management	0.19	0.74	0.24
Activity limitation (Current problems)	0.13	0.58	0
Profession	-0.09	0.65	0.15
Management	-0.15	0.64	0.29
Activity limitation (Anticipated problems)	0.38	0.2	0.5
Profession	0.09	0.23	0.83
Management	0.14	0.24	0.85
Participation restriction	0.08	0.1	0.54
Profession	-0.17	0.03	0.8
Management	-0.12	0.15	0.81
Personal (Positive)	0.76	0.11	0.46
Profession	0.62	-0.03	0.56
Management	0.66	-0.02	0.4
Personal (Negative)	0.64	0.17	0.48
Profession	0.53	0.01	0.7
Management	0.65	-0.13	0.38
Environmental factors (Facilitators)	0.63	0.04	0
Profession	0.76	0.17	-0.09
Management	0.79	0.06	-0.14
Environmental factors (Barriers)	0.08	0.07	0.23
Profession	0.2	0	0.02
Management	0.34	0.17	-0.03
Eigen value	4.63	4.35	5.09
Proportion of total	0.17	0.16	0.19

Table 15: Internal consistency of the knowledge questionnaire per ICF component

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Pre-test				
Health condition %	42.9	1858.6	0.3	0.8
Impairment %	67.9	2214.5	0.5	0.6
Current activity limitations %	65.6	2414.3	0.4	0.7
Anticipated activity limitation %	68.8	2164.1	0.6	0.6
Participation restriction %	70.7	2578.5	0.4	0.7
Personal factors (positive)%	68.6	2340.7	0.5	0.6
Personal factors (negative)%	67.1	2248.5	0.5	0.6
Environmental factors (facilitators)%	69.2	2552.7	0.3	0.7
Environmental factors (barriers)%	71.3	2748.9	0.2	0.7
Post-test				
Health condition %	221.3	9100.4	0.6	0.8
Impairment %	233.5	8538.7	0.6	0.8
Current activity limitations %	243.4	8890.3	0.5	0.8
Anticipated activity limitation %	236.9	9202.6	0.4	0.9
Participation restriction %	255.2	9643.2	0.6	0.8
Personal factors (positive)%	243.9	9022.7	0.6	0.8
Personal factors (negative)%	244.3	8592.6	0.6	0.8
Environmental factors (facilitators)%	249.7	8750.9	0.7	0.8
Environmental factors (barriers)%	251.9	8792.8	0.7	0.8

The mean pre-test percentage was 7.5 (SD=5.6) and post-test percentage was 29.3 (SD=11.8). These were significantly difference ($t=-12.2$, $p<.001$, calculated with separate variances). The ES was 2.4, which represents a large effect size.

4.10.2.2 Inter-rater reliability

Two observers marked 29 questionnaires separately and entered the results. Figure 9 below illustrates a scatterplot for inter-rater correlation between marker one and marker two.

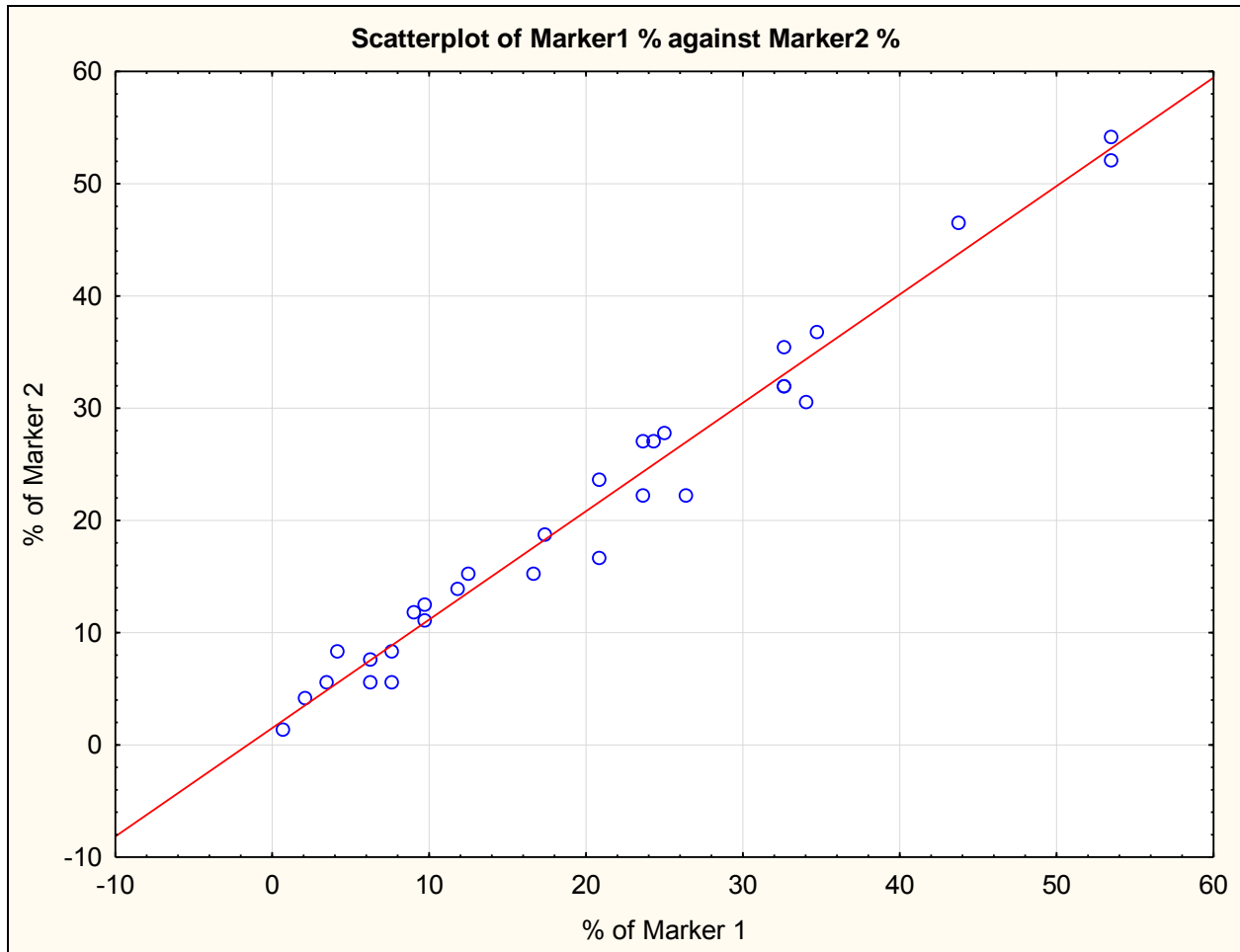


Figure 9: Scatterplot of inter-rater correlation between Marker1 and Marker2

The Intra-class correlation for absolute agreement was .976 (Confidence Intervals (CIs) =.962, .987)

which indicates excellent agreement.

4.10.3 Attitudes towards interprofessional practice questionnaire

The responses of both the pre- and post-training are depicted in Table 16. A shift was observed from less desirable to more desirable attitudes from the first to the second administration. The largest changes were seen in the items relating to the role of the physician (Questions 4, 6, 13 and 18). There was one missing response to Question one and two to Question 10 in the post-test.

Table 16: The pre- and post-training responses to the attitudes questionnaire

Item		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N
1. Working in teams unnecessarily complicates things most of the time	Pre	22	12	11	8	5	58
	Post	31	14	7	1	0	53
2. The team approach improves the quality of care to patients	Pre	4	2	8	33	12	59
	Post	0	0	0	21	32	53
3. Team meetings foster communication among team members from different disciplines	Pre	2	5	19	26	7	59
	Post	0	1	2	26	24	53
4. Physicians have the right to alter patient care plans developed by the team	Pre	3	14	13	19	10	59
	Post	10	24	5	10	4	53
5. Patients receiving team care are more likely than other patients to be treated as whole persons	Pre	4	14	19	14	8	59
	Post	1	1	8	24	19	53
6. A team's primary purpose is to assist physicians in achieving treatment goals for patients	Pre	3	9	6	28	13	59
	Post	10	25	12	5	1	53
7. Working on a team keeps most health professionals enthusiastic and interested in their jobs	Pre	6	8	20	13	12	59
	Post	0	0	10	26	17	53
8. Patients are less satisfied with their care when it is provided by a team	Pre	10	14	21	10	4	59
	Post	24	17	6	4	2	53
9. Developing a patient care plan with other team members avoids errors in delivering care	Pre	5	13	13	19	9	59
	Post	1	2	2	23	25	53
10. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	Pre	13	11	17	12	6	59
	Post	13	12	11	11	4	51
11. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	Pre	6	12	20	17	4	59
	Post	2	4	7	23	17	53
12. Developing an interprofessional patient care plan is excessively time consuming	Pre	4	13	18	17	7	59
	Post	16	22	10	5	0	53
13. The physician should not always have the final word in decisions made by health care teams	Pre	5	8	11	21	14	59
	Post	5	20	17	10	1	53
14. The give and take among team members helps them make better patient care decisions	Pre	6	6	8	22	17	59
	Post	2	5	3	22	21	53
15. In most instances, the time required for team meetings could be better spent in other ways	Pre	8	12	11	19	9	59
	Post	15	16	13	7	2	53
16. The physician has the ultimate legal responsibility	Pre	9	11	11	14	14	59

Item		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N
for decisions made by the team	Post	10	14	15	11	3	53
17. Hospital patients who receive team care are better prepared for discharge than other patients	Pre	6	8	10	21	14	59
	Post	0	1	7	26	19	53
18. Physicians are natural team leaders	Pre	6	7	10	22	14	59
	Post	20	18	9	3	3	53
19. The team approach makes the delivery of care more efficient	Pre	3	6	19	21	10	59
	Post	1	5	3	20	24	53
20. The team approach permits health professionals to meet the needs of family caregivers as well as patients	Pre	4	3	9	31	12	59
	Post	0	3	2	24	24	53
21. Having to report observations to the team helps team members better understand the work of other health professionals	Pre	7	4	8	27	13	59
	Post	1	0	4	19	29	53

N=60 Green=Least, Red=Highest

4.10.3.1 Internal consistency

The items which indicated a negative attitude towards team work were rescaled so that 5=1, in other words the scale was scored so that a higher score indicated better attitudes towards team work. The Cronbach's Alpha of the whole scale before the Intervention Programme was .440 (Unacceptable IC). After removal of items which had a very low correlation with the overall score, the Alpha value rose to .504 (poor IC). These three items were the same three items that had been identified as having a low CVI. The post Alpha value was .760 (acceptable IC) once the same three items had been removed, as can be seen in Table 17. Once the Alpha value is rounded off to one decimal, the removal of no item affected this value.

Table 17: Internal consistency of the attitudes questionnaire – Pre-test

Items	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Working in teams unnecessarily complicates things most of the time	63.3	-0.038	0.45
2. The team approach improves the quality of care to patients	63.1	0.152	0.41
3. Team meetings foster communication among team members from different disciplines	63.4	0.097	0.42
4. Physicians have the right to alter patient care plans developed by the team	63.8	0.147	0.4
5. Patients receiving team care are more likely than other patients to be treated as whole persons	64.6	-0.058	0.45
6. A team's primary purpose is to assist physicians in achieving treatment goals for patients	63.7	0.341	0.36
7. Working on a team keeps most health professionals enthusiastic and interested in their jobs	63.7	0.232	0.39
8. Patients are less satisfied with their care when it is provided by a team	63.7	0.299	0.37
9. Developing a patient care plan with other team members avoids errors in delivering care	63.8	0.082	0.42
10. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	63.9	0.226	0.39
11. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	64.1	0	0.43
12. Developing an interprofessional patient care plan is excessively time consuming	63.3	0.199	0.39
13. The physician should not always have the final word in decisions made by health care teams	64.1	0.058	0.43
14. The give and take among team members helps them make better patient care decisions	64.2	0.163	0.4
15. In most instances, the time required for team meetings could be better spent in other ways	63.5	0.11	0.41
16. The physician has the ultimate legal responsibility for decisions made by the team	63.5	0.389	0.36
17. Hospital patients who receive team care are better prepared for discharge than other patients	63.2	0.098	0.42
18. Physicians are natural team leaders	63.4	0.258	0.38
19. The team approach makes the delivery of care more efficient	64.4	-0.028	0.44
20. The team approach permits health professionals to meet the needs of family caregivers as well as patients	64.5	-0.072	0.45
21. Having to report observations to the team helps team members better understand the work of other health professionals	64.5	-0.079	0.46

Table 18: Internal consistency of the attitudes questionnaire – post-test

Items	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Working in teams unnecessarily complicates things most of the time	68.9	0.43	0.74
2. The team approach improves the quality of care to patients	68.7	0.504	0.74
3. Team meetings foster communication among team members from different disciplines	68.9	0.406	0.74
5. Patients receiving team care are more likely than other patients to be treated as whole persons	69.2	0.069	0.77
6. A team's primary purpose is to assist physicians in achieving treatment goals for patients	69.6	-0.036	0.78
7. Working on a team keeps most health professionals enthusiastic and interested in their jobs	69.2	0.409	0.74
8. Patients are less satisfied with their care when it is provided by a team	69.3	0.63	0.72
9. Developing a patient care plan with other team members avoids errors in delivering care	69	0.585	0.73
10. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	69.9	0.418	0.74
11. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	69.4	0.158	0.76
12. Developing an interprofessional patient care plan is excessively time consuming	69.4	0.38	0.74
14. The give and take among team members helps them make better patient care decisions	69.3	0.265	0.75
15. In most instances, the time required for team meetings could be better spent in other ways	69.6	0.267	0.75
16. The physician has the ultimate legal responsibility for decisions made by the team	70	0.268	0.75
17. Hospital patients who receive team care are better prepared for discharge than other patients	69.1	0.438	0.74
19. The team approach makes the delivery of care more efficient	69.2	0.394	0.74
20. The team approach permits health professionals to meet the needs of family caregivers as well as patients	69	0.355	0.75
21. Having to report observations to the team helps team members better understand the work of other health professionals	68.9	0.397	0.74

Factor analysis of the pre-questionnaire with Varimax Rotation revealed six factors with an Eigen value of greater than 1, however, no items loaded with a correlation of greater than .7 and only two had a loading of greater than .6. In addition, several items did not load on any factor at all. It was thus not possible to identify clear factors.

Table 19: Factor analysis of the Attitudes questionnaire

Item	Factor					
	1	2	3	4	5	6
1. Working in teams unnecessarily complicates things most of the time	-0.09	0.00	0.27	-0.51	-0.42	0.10
2. The team approach improves the quality of care to patients	-0.46	-0.17	0.22	-0.10	0.39	0.23
3. Team meetings foster communication among team members from different disciplines	-0.45	-0.39	0.01	-0.02	-0.03	-0.22
5. Patients receiving team care are more likely than other patients to be treated as whole persons	-0.59	-0.15	-0.16	-0.22	-0.02	0.24
6. A team's primary purpose is to assist physicians in achieving treatment goals for patients	-0.44	-0.51	-0.03	-0.34	0.06	-0.10
7. Working on a team keeps most health professionals enthusiastic and interested in their jobs	-0.55	-0.13	-0.27	0.11	-0.09	-0.13
8. Patients are less satisfied with their care when it is provided by a team	-0.39	-0.03	0.26	0.31	-0.30	0.01
9. Developing a patient care plan with other team members avoids errors in delivering care	-0.56	-0.08	-0.25	0.08	-0.18	-0.14
10. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	-0.24	-0.39	0.45	0.04	0.33	0.06
11. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	-0.29	-0.09	-0.34	0.19	-0.15	0.64
12. Developing an interprofessional patient care plan is excessively time consuming	-0.02	-0.23	-0.06	-0.31	-0.41	-0.41
14. The give and take among team members helps them make better patient care decisions	-0.48	0.21	-0.24	0.29	0.23	-0.38
15. In most instances, the time required for team meetings could be better spent in other ways	-0.17	-0.12	0.65	0.27	0.10	-0.18
16. The physician has the ultimate legal responsibility for decisions made by the team	-0.24	0.01	0.34	0.47	-0.51	0.15
17. Hospital patients who receive team care are better prepared for discharge than other patients	-0.59	0.36	-0.18	-0.02	0.11	0.01
19. The team approach makes the delivery of care more efficient	-0.29	0.59	0.40	-0.31	-0.06	0.02
20. The team approach permits health professionals to meet the needs of family caregivers as well as patients	-0.46	0.33	0.13	-0.22	0.09	0.17
21. Having to report observations to the team helps team members better understand the work of other health professionals	-0.35	0.59	-0.00	-0.01	0.02	-0.20
Eigen value	2.96	1.69	1.48	1.20	1.11	1.06
Proportion of total variance	0.16	0.09	0.08	0.07	0.06	0.06

Based on the lack of clear factors emerging and the final acceptable internal consistency, the questionnaire was analysed as a unidimensional scale, using non-parametric statistics.

The median score of the pre-test was 60 (range 59-77) and the post-test was 72 (57-88). The Mann Whitney U test indicated that there was a significant difference between the pre- and post-test ($Z=7.3$, $p<.001$) (Table 20).

Table 20: Rank sum test for pre and post measurement

	Rank Sum pre	Rank Sum post	U	Z	p-value	Valid N pre	Valid N post
total	2127.5	4088.5	297.50	-7.290	<.001	60	51

The effect size (ES) was = .69 which represents a large ES.

4.10.4 Satisfaction with training questionnaire

The satisfaction with the training questionnaire displayed an excellent internal consistency (Cronbach's Alpha = .914) and no item detracted from this score.

4.10.5 Auditing patients' records checklist

The frequency distribution of the Auditing patients' records checklist is shown in Table 21. The results indicate that the items related to patient identification were regularly recorded, but patient occupation recording was poorly reported and level of education was not recorded at all. The items related to the condition and impairment were also recorded infrequently, and the functioning, personal and environmental factors were very seldom recorded.

Table 21: Auditing patients' records checklist

Items	Frequency of records correct	% of applicable records correct
Patient record number	100	100
Patient's name	100	100
Patient's gender	96	96
Date of birth/age	98	98
Address	100	100
Marital status (30 not applicable)	56	80
Medical aid/No medical aid	78	78
Patient occupation	4	6
Level of education	0	0
Admit date	100	100
Discharge date	100	100
Health condition and diagnosis	100	100
Symptoms	99	99
Assessment of impairment	94	94
Impact of condition on functioning	6	6
Impact of environmental factors	2	2
Health condition managed in context	3	3
Personal factors including mental and spiritual needs	1	1
Impairment addressed	86	86
Functioning addressed	13	13
Environmental factors addressed	6	6
Preventive measures of recurrence of health condition or complications related to condition	5	5
Referral to other services	21	21
Discharge note	72	72
Referrals to other disciplines	15	15
Case managed by different professionals	8	8
Health professional team identified	8	8
Health professionals treating the patient have documented	3	3

The mean score was 51% (SD=8.3) correct of applicable items, with a range of 36-86%.

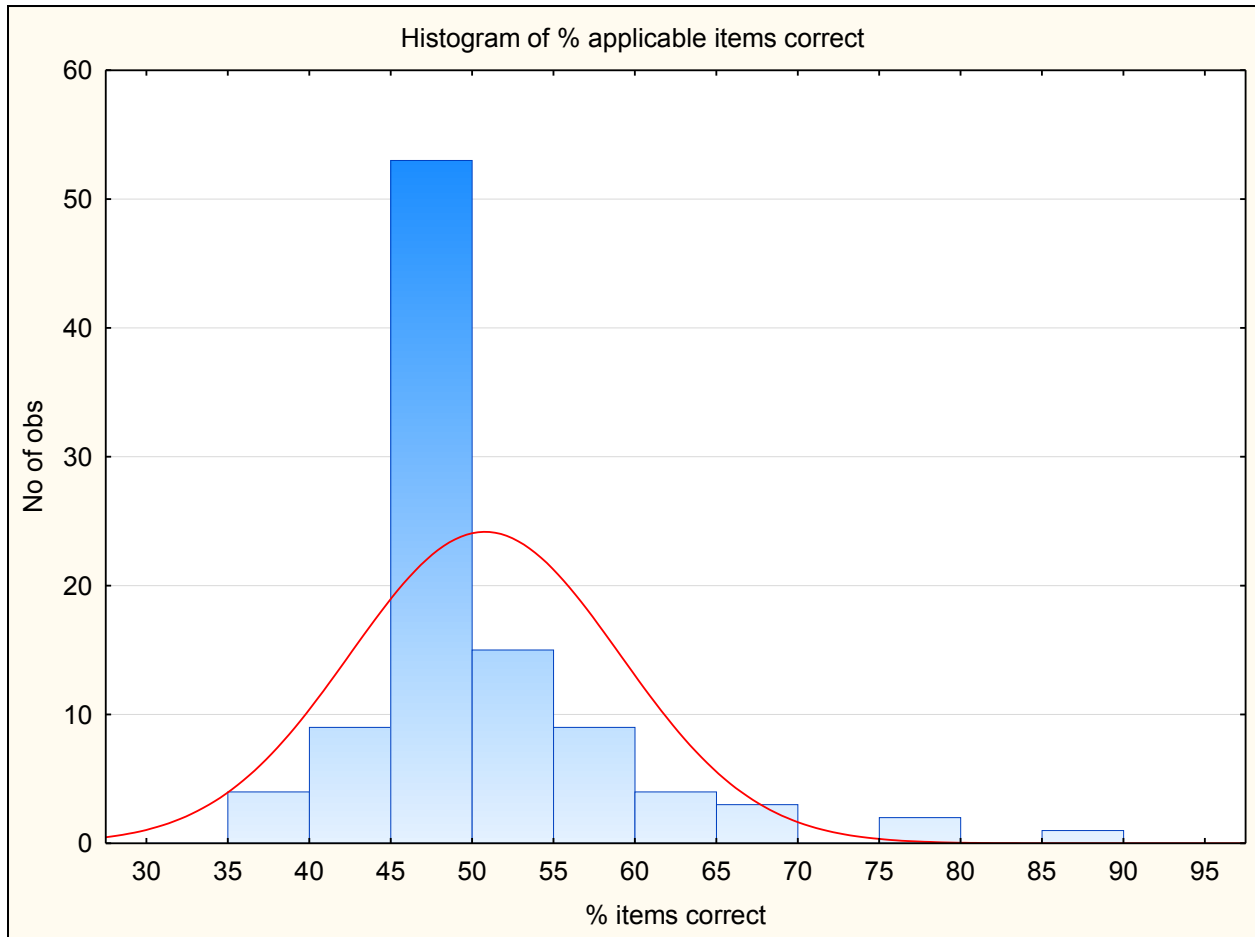
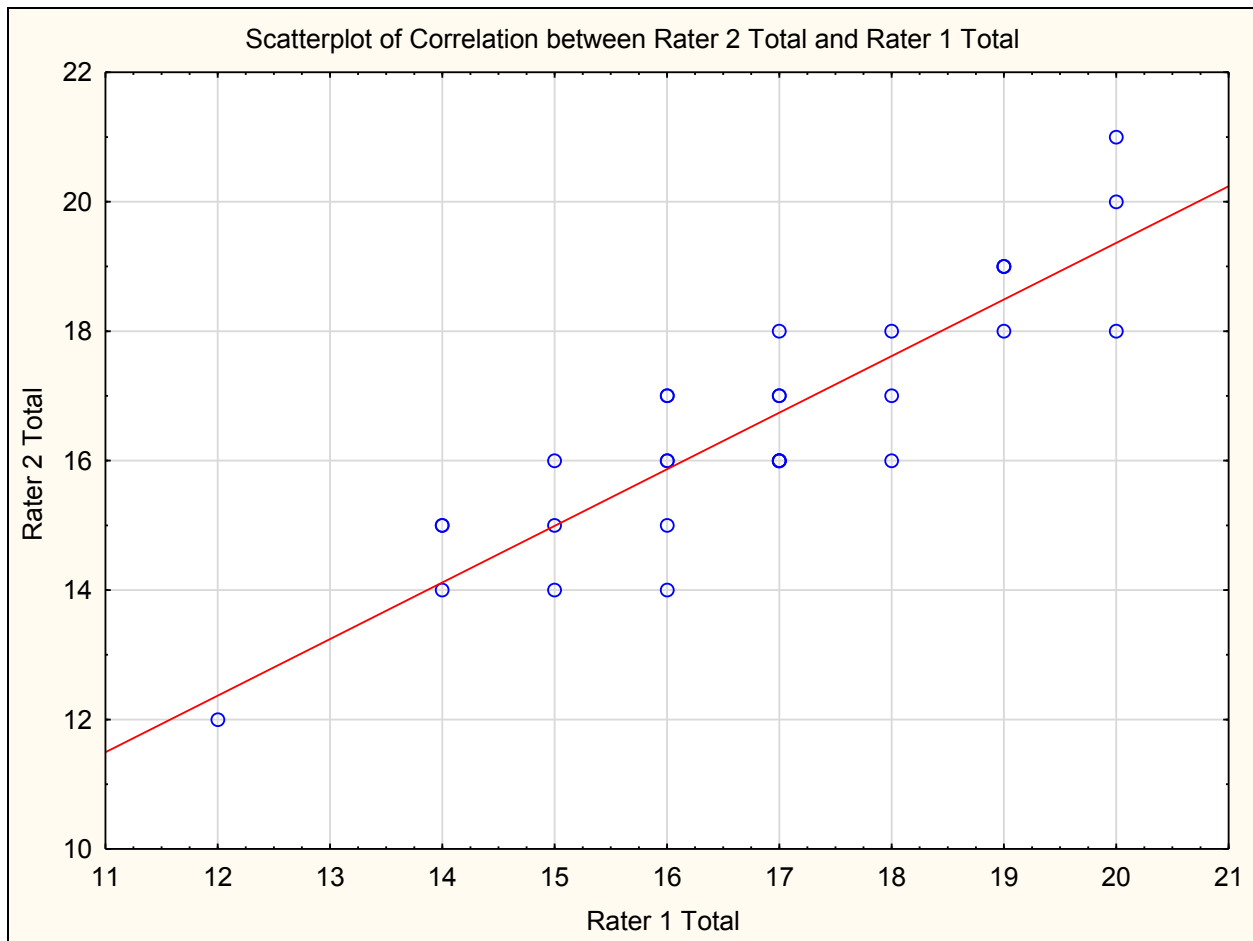


Figure 10: Percentages of applicable item correct of patient records checklist

4.10.5.1 Inter-rater reliability

Two health professionals were trained and independently audited the same patients' records on separate occasions. Figure 11 below illustrates a scatterplot for inter-rater correlation between observer one (rater 1) and observer two (rater 2).



N=30

Figure 11: Scatterplot of inter-rater correlation between rater 1 and rater 2

The intra-class correlation for absolute agreement was .885 (Confidence intervals Cis=.774, .943), which indicates excellent agreement.

4.10.5.2 Summary of results:

Knowledge questionnaire: The results indicate an increased knowledge in post training responses compared to the pre training across all items. The knowledge questionnaire indicated a good internal consistency (IC) after training. The post training mean % was also high compared to pre training, and t-test calculated with separate variance found a significant difference between pre and post measurements. The knowledge questionnaire was responsive based on its large effect size. The inter-rater reliability calculated by ICC for absolute agreement also indicated excellent correlation.

Attitudes questionnaire: Responses of both pre and post training indicated a shift from less desirable to more desirable attitudes from the first (pre) to the second (post) administration. The largest changes were seen in the items relating to the role of the physician. The Cronbach's Alpha for internal consistency was unacceptable but after removing the items with a very low correlation the internal consistency was accepted. The Mann Whitney U test indicated that there was a significant difference between pre and post training scores. The attitude scale also showed a large effect size. Although it was possible to identify theoretical factors, they do not seem to cluster around intuitive factors and the questionnaire was not analysed as a multi-attribute scale, as was the Knowledge questionnaire.

Satisfaction with the training questionnaire: This questionnaire displayed an excellent internal consistency and no items were deducted from this scale.

Auditing patients' records checklist: It was possible to access relevant patient records with the assistance of ward staff. The items related to patient identification were regularly recorded, but patient occupation recording was poorly reported and level of education was not recorded at all. The items related to the condition and impairment were also recorded infrequently, and the functioning, personal and environmental factors were very seldom recorded. The ICC calculated with absolute agreement indicated excellent correlation between rater one and rater two.

4.10.6 Discussion of validation

4.10.6.1 Knowledge and Attitudes questionnaires

The questionnaires generally performed well and, with few modifications, were found to be suitable for the main study.

The scoring of the Knowledge Questionnaires by independent raters demonstrated high inter-rater reliability and the scoring rubric can be used with confidence.

Of interest and concern was that Cronbach's Alpha was not acceptable prior to training but increased after training, which could be an indication that, prior to training, there was no single construct, i.e. knowledge or attitudes tested. However, once the training had been given and items that were poorly correlated with the scale were removed, the responses of the participants indicated that the scales did measure a single construct and the reliability reached acceptable levels. Tavakol & Dennick (2011) state that "if multiple factors/traits underlie the items on a scale, as revealed by Factor Analysis, alpha underestimates the reliability of the test". This was the case with the pre-test results of the knowledge questionnaire but no specific factors could be identified with the attitudes questionnaire and it is unclear as to why the pre-test version did not demonstrate reliability. The IC of the modified 18 items of the attitude questionnaire scale was still lesser than reported in similar studies (.83 in the 14 items of the Attitudes Towards Health Care Team Scale used by Curran, Heath, Kearney, and Button (2010) and .83 in the original scale used in this study by Leipzig et al. (2002)). This discrepancy may be a reflection of the different cultural contexts. As many of the Rwandan participants may not have been exposed to the concepts of interprofessional teamwork and the ICF previously, the constructs may not have been understood prior to the training. It was reported by participants during a cognitive debriefing meeting, for example, that "the terms used in the questionnaires were not clear before training as participants were not familiar with ICF, but after training all the questions were well understandable". This may have caused inconsistency in responses from participants.

The fact that there were many missing responses on the questionnaires before training because of poor knowledge for some health professionals in ICF might have also influenced the homogeneity of the instrument before and after training. Sattler, Mcknight, Naney, and Mathis (2015) reported an increase

in reliability in the trained group compared to untrained group. They further assumed this to be related to having experience and a better understanding of the instrument.

It was decided to proceed with the questionnaires, following the exclusion of problematic items and modification of the format as suggested during the cognitive debriefing exercise. The issue of reliability was flagged for investigation during the main study.

The large effect size of the training, as measured by these questionnaires, indicated that they were both responsive and sensitive to change. This was encouraging as it not only supported the use of the questionnaires but provided evidence that the intervention was promising and that running a randomized control was justified. The results were not unexpected as several studies have demonstrated that training improves knowledge (Gallagher et al., 2013; Reilly et al., 2014; P.Kaur, G.Kaur, R.Kaur, & Sood, 2014).

4.10.6.2 Auditing of patients' records

A checklist was developed because there was no standardised instrument to determine the degree to which all aspects of the patients' health status and functioning are included in patients' records, and how referral and discharge are made. Although the content validity was established, it was necessary to determine if the marking schedule was reliable. Inter-rater reliability was determined to be excellent and it was concluded that the audit tool was both reliable and valid and could be used for Auditing patients' records to assess the interprofessional collaboration using the International Classification of Functioning, Disability and Health (ICF).

4.11 Results and Discussion: Testing of the training programme

4.11.1 Participants

These have been described in 4.10.1 above

4.11.2 Training satisfaction

Only 55 of the original 60 participants were available to fill in the training satisfaction questionnaire. The responses to the satisfaction with training questionnaire are in Table 22 below.

Table 22: Health professional satisfaction with the training

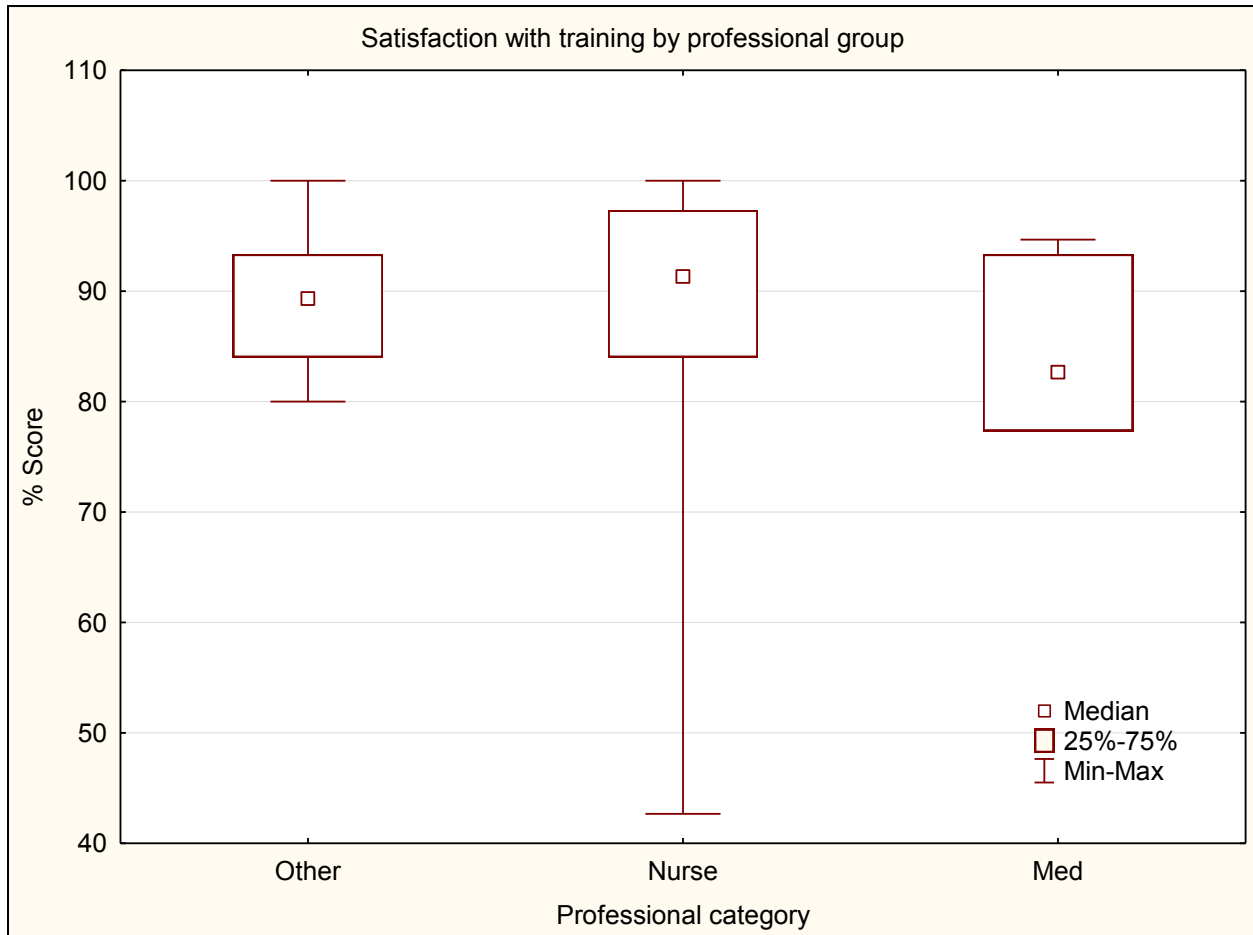
Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total positive responses
The purpose of the training programme was explained to me.	0	0	3	19	33	52
The training programme captured my interest.	0	1	1	26	27	53
The training was helpful to me.	1	0	0	22	32	54
In general, I'm satisfied with the training.	0	1	5	23	26	49
I will recommend someone else to this training programme.	0	3	2	18	32	50
The content was appropriate and practical.	0	0	3	23	29	52
It was introduced in the manner with good transitions.	3	1	5	19	27	46
The training package was stimulating and exciting.	2	2	0	19	32	51
The training met my expectations.	1	0	5	29	20	49
I've learned something that is of value to me.	2	1	0	21	31	52
I will apply the gained knowledge in my clinical work.	0	1	2	23	29	52
I expect a difference in my daily work because of this training.	2	0	1	19	33	52
The training was important to bring change in clinical practice.	0	1	0	20	34	54
This training will improve the patient outcomes.	1	0	2	14	38	52
This training will improve my service delivery.	0	0	2	21	32	53

N = 55

The median score was 90.7 (range 42.6-100). There were four items that had one or more disagreeing with the statement. Nine respondents did not agree with statement “*It was introduced in the manner with good transitions.*”

4.11.2.1 Training satisfaction by profession

Figure 12 compares the median scores of satisfaction with the training across professions.



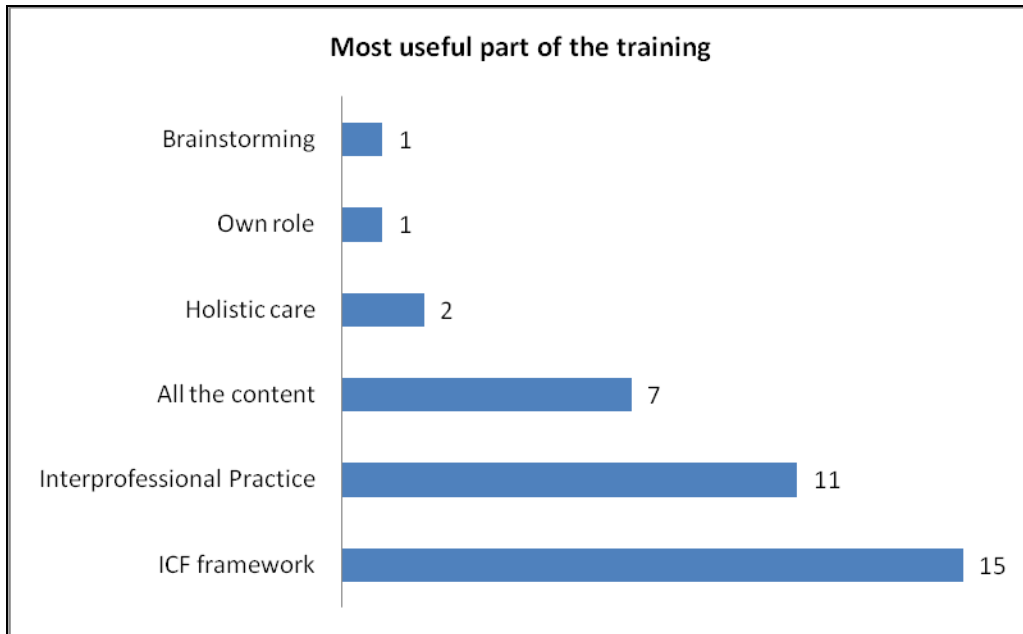
N=55

Figure 12: Training satisfaction by professional group

There was no significant difference between the scores on satisfaction between the nurses, medical doctors and other health professionals (Kruskal-Wallis test: $H(2, N=55) = 1.71$ $p = .425$).

4.11.2.2 The most useful part of training

In addition to the rating scale options, the open ended questions allowed the participants to express their thoughts about the training. Regarding the most useful part of the training, the majority reported the ICF framework to be the most useful part of the training (Figure 13). Only 38 of 55 participants answered this question.



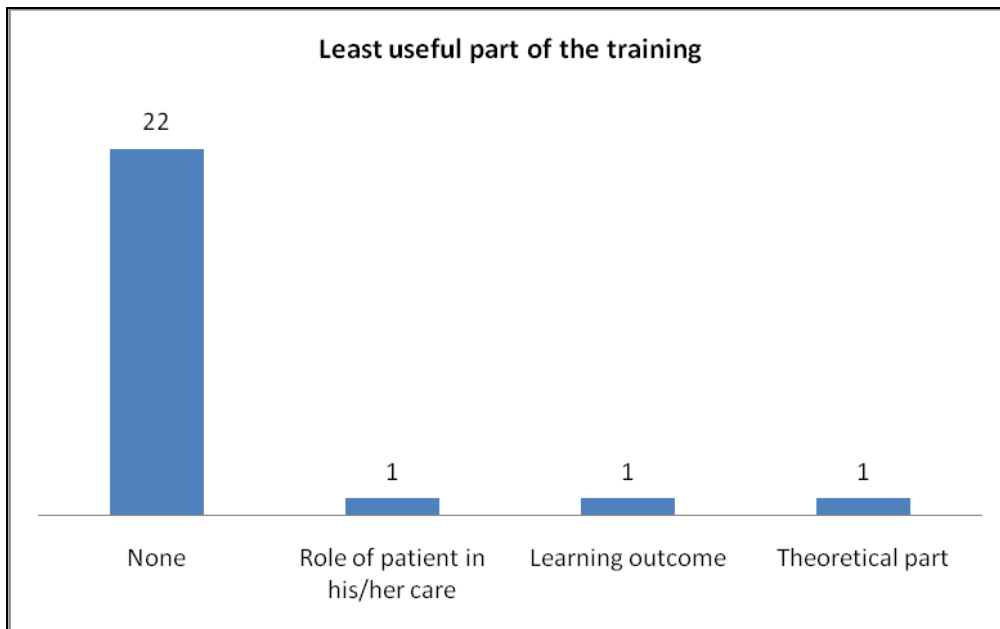
N=38

Figure 13: Most useful part of the training

4.11.2.3 The least useful part of the training

Concerning the least useful part of the training, the majority reported “none” (Figure 14).

Only 25 participants answered this question.

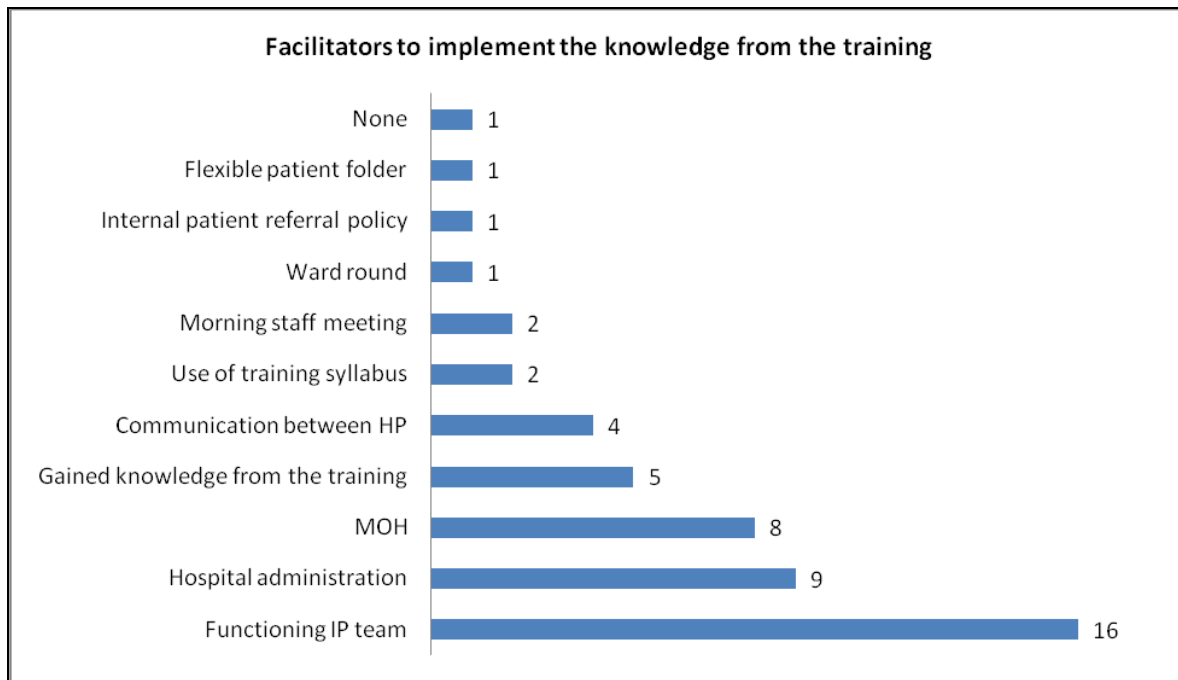


N = 25

Figure 14: Least useful part of the training

4.11.2.4 Facilitators to implement the knowledge from the training

In response to the question about the facilitators of implementation of the knowledge a large number reported a functioning interprofessional team followed by supportive hospital administration (Figure 15).

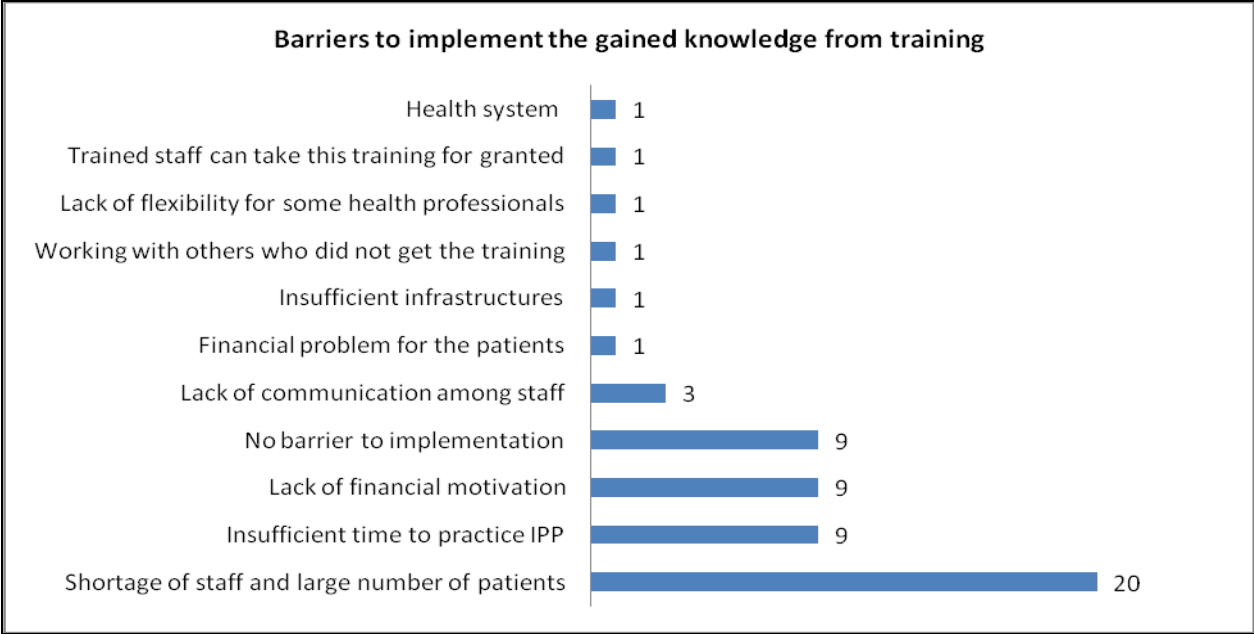


N=36

Figure 15: Facilitators to implementation the knowledge from the training

4.11.2.5 Barriers to implementation

Figure 16 illustrates the barriers health professionals perceived to implementation of the gained knowledge from the training. The majority reported a shortage of staff in relation to a large number of patients. Thirty eight participants responded to this question.

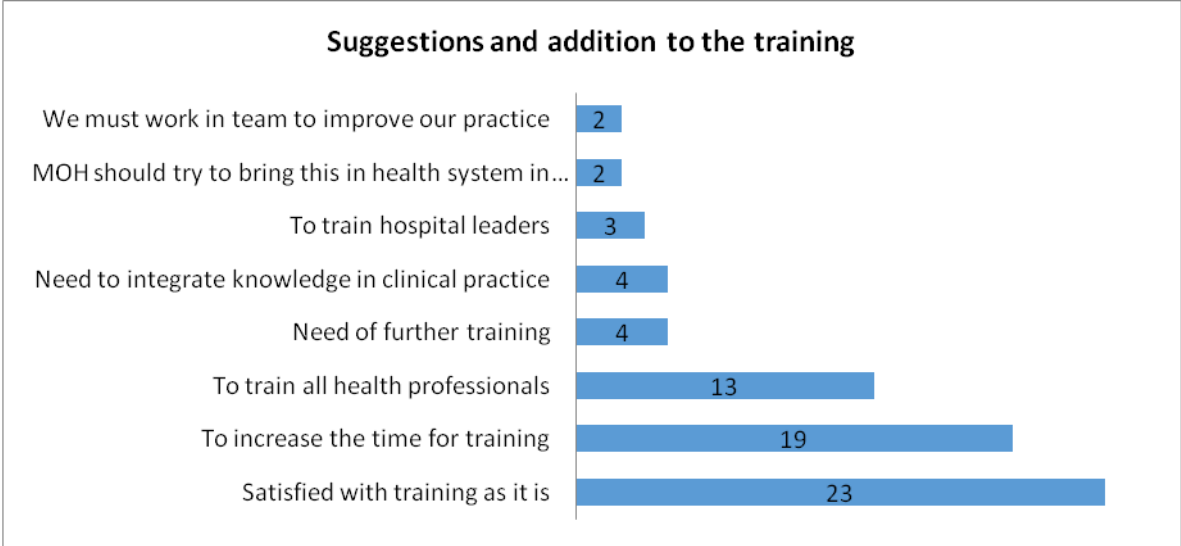


N = 38

Figure 16: Barriers to implement the knowledge from this training

4.11.2.6 Suggestions for better organisation of the training

The suggestions or comments sought from the participants about better organisation and implementation of the training in future are presented below. The majority reported to be satisfied with the training as it was. Others suggested increasing the time for training followed by training all health professionals (Figure 17). Forty four (44) participated in this question.



N = 44

Figure 17: Suggestion and additional comment to the training

4.11.3 Debriefing exercise report

Seven participants, four physiotherapists and three nurses were available for cognitive debriefing the day after the training. The report of the debriefing meeting is outlined in Table 23. The suggested amendments were incorporated into the final version which was developed after analysis of the results of the validation/feasibility study.

Table 23: Debriefing meeting with health care professionals

Item of discussion	Comment	Amendments suggested																
Questionnaires																		
Knowledge questionnaire	-The questionnaire was well prepared. -The case study was cross-cutting or integrated. -The case showed that we really should work in a team. -The terms used in the questionnaires were not clear before training as participants were not familiar with ICF, but after training all the questions were well understandable. -On the part of ward/department: the questionnaire was providing the space for medical, surgical and paediatric wards only. It was suggested to add mental, social, physiotherapy and nutrition departments because these departments are not part of surgical, medical and paediatric wards. -Some service are not include like spiritual	-The first table of the questionnaire where the participants give their identifications was amended: physiotherapy department, mental health department, nutrition department, and social department were added (see Appendix iv & Appendix v)																
	The space provided for the responses in the questionnaire was not enough to put all needed information.	The space provided for open questions was suggested to be increased based on the expected size of the responses																
Attitudes questionnaire	The questionnaire was clear but we suggest using the agree/disagree words instead of putting the numbers (Strongly disagree=1, disagree=2,) in the questionnaire because it was confusing some of us.	The meeting suggested using the full words in the questionnaire instead of using their representing numbers.																
Training satisfaction questionnaire	The following question "E" was not clear to the majority of the participants because it needs high thinking and analysis. How much of the training was: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>1. Some</th> <th>2. All</th> <th>3. None</th> </tr> </thead> <tbody> <tr> <td>New</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Review</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Not relevant</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>		1. Some	2. All	3. None	New	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not relevant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	This question of how much of the training was suggested to be deleted from the questionnaire.
		1. Some	2. All	3. None														
	New	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>															
Not relevant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>															
Question G: What are the facilitators to implement the knowledge from the training? It was not very clear what the question meant by "facilitators". It was suggested to put some explanations.	It was suggested to ask the question like this: "What are the facilitating means to implement the knowledge from the training?"																	
Question "J" and "K": Any other suggestion or comment to help us to improve the future training? And What, if anything, would you add to the training? The two questions were found to be overlapped and have similarities. The meeting suggested having one question instead of two questions.	The questions suggested to be merged in one: "Any other suggestion, comment or addition to the training?"																	

Item of discussion	Comment	Amendments suggested
Training		
Training content	Practice using the case and patient records was the most useful part of the training, so need to be emphasised on/ during the future training.	The meeting suggested reducing some theoretical parts and increase practice (Case studies and patients' records).
Training organisation	The training was well organised but the time was very short to capture everything taught in one day.	The meeting suggested the training to be done over two days.
Training procedure	There was not enough breaks during the training and the training needs to be more participatory than slide show.	-The meeting suggested increasing brain storming -To increase break if the training is in two days. -More participatory than slide show
	The slides should be minimised.	-The meeting suggested decreasing the slide show.
The most appropriate method to introduce ICF as theoretical framework to inform interprofessional practice	If the above comments are considered, the introduction of ICF as theoretical framework to inform interprofessional practice should be through the same training.	-Need to follow and respect all the above amendments.

4.11.4 Discussion of results of testing the training programme

The training was conducted and its objectives were achieved. Generally, participants were satisfied with the overall training programme, content, and organisation. They also found the training to be relevant to their clinical work. There was no significant difference in satisfaction between professions. In addition, the majority of participants reported the ICF framework to be the most useful part of the training.

One of the objectives of the study was to establish whether there would be interest in and compliance across the different health professions. The hierarchical structure of the traditional health has been previously discussed. There was the possibility that physicians would resist participating in a study that not only challenged this model theoretically, but also practically in that the exercise was led by a physiotherapist. Ultimately all professions were represented, although amendments to the length of the training had to be made to accommodate the physicians particularly. The proportion of each profession in this study is presented in 4.10.1. This proportion demonstrates that more than half of professions were represented with the exception of medical doctors who were represented at 42%. It was also due to the busy schedule of medical doctors in district hospitals to serve a large number of the population. This sample size was adequate and higher than the recommended sample to be used in pilot and feasibility studies by Julious (2005) who recommended a maximum of 24 participants, and Sim and Lewis (2012) who recommended 50 participants. However, it was noted that the sampling frame (i.e. the

hospital), was purposively chosen due to the good relationship that the PI had with the hospital administration and the health professionals employed. There was thus a possibility that recruitment might be less in randomly selected hospitals.

The timing and duration of the training was also amended in the light of the difficulties in releasing all professionals for a two day training period. As mentioned, it was not possible to have all those health professionals in one day training session due to their working schedule; however the arrangement was made by the medical chief of staff and chief of nursing to make available two groups of participants. Group one was trained on day one whereas group two was trained on day two. This made it difficult to ensure that every discipline was represented in each group. There are some disciplines or specialities, such as mental health or nutrition, which have only one professional working in the hospitals. In these professions, the same person participated in group one and group two in order to facilitate interprofessional discussion and maintain the balance between the two groups during the training. However, they filled questionnaires in only once. This is the situation in many district hospitals in Rwanda, where the number of mental health nurses and so called paramedical or allied health professionals is either one or two in the whole hospital. The protocol of the randomised trial was thus amended to reflect a single day's training, repeated twice on consecutive days at each hospital.

Of the sixty recruited, there was an attrition of seven (more than 10%) in the post test of the knowledge questionnaire and five in the training satisfaction questionnaire; however, all 60 filled the post-test for the attitudes scale. Their reasons for not completing the post-test and training satisfaction were not known as participation was voluntary and everyone had the right to withdraw at any time he/she wanted to do so. There are some reasons that one may think like: training was long because it was planned to be conducted in two days, so participants were tired; some participants might be on night duty on the same day of training; the knowledge questionnaire was more difficult to complete given the fact that it has a case study and open end questions, whereas the training satisfaction and attitudes scale were easy to complete (Disagree-Agree scale). The findings of the feasibility study helped in planning the main study to reduce this attrition. The training was adjusted to a comprehensive one day of training, the training ended early in order to leave enough time for post-test measurements and, finally, more arrangements were made in allocation of health professionals' training days in relation to their working schedules.

The details related to the training programme, instruction methods as well as the training procedure are indicated in 4.6.2: ICF training programme. The satisfaction with the training questionnaire indicated that the overwhelming majority of participants agreed or strongly agreed with the statements which were all couched in positive terms. Of interest was that there were no differences in the level of satisfaction across the disciplines. This was encouraging as it indicated that, although the amount and type of professional training that the participants had was different, the information and manner of presentation appeared to be appropriate for almost everyone.

Useful suggestions were made with regard to amending the questionnaire and these are listed above in Table 23. Changes were implemented based on these comments and some questions were excluded from the final version. Not everyone was satisfied with the training and felt that it did not meet their expectations (6-7 did not indicate satisfaction). Suggestions that were made during the debriefing meeting suggested reducing some theoretical parts and increasing practice as case studies and reviewing patients' records within the hospital. Indeed, participants were in agreement with the model of de Grave et al. (2014) which emphasises that learning outcomes should be addressed during the training and cases studies and real patients' records should be used.

The length of training was also discussed and it was suggested that two days (as originally planned) might have been more useful. However, as explained previously, an extended training period was not practical and one of the findings of the feasibility study was that a one day training was adequate to bring about changes in knowledge and attitudes. However, based on this feedback, a follow-up training visit was then incorporated into the protocol of the main study.

Of note was that the sections on interprofessional practice and the ICF were rated the most useful parts of the training, thus supporting the choice of the ICF as a conceptual framework. Finally, participants concluded that if the above comments are considered, training will be the best way to introduce the ICF as a theoretical framework to inform interprofessional practice in district hospitals. Therefore, the suggested amendments to the questionnaire as well as the training package and procedures were incorporated into the final version.

However, there were some barriers health professionals perceived to implementation of gained knowledge from the training. The majority reported a shortage of staff in relation to a large number of patients which can affect interprofessional collaboration in the sense of being overloaded. It was recognised, though, that interprofessional collaboration may be a means of meeting the needs of a large number of patients when the number of staff is not sufficient. It was observed during training that there are some duplications of task among health care professionals

Of note was that the sections on interprofessional practice and the ICF were rated the most useful parts of the training, thus supporting the choice of the ICF as a conceptual framework. It was also encouraging that several participants suggested that all health professionals should be trained which implies a high satisfaction with the training programme and an appreciation of the need to implement this model of interprofessional practice and teamwork.

4.12 Discussion

The feasibility study was encouraging and there was generally a positive response in terms of both recruitment and feedback with regards to the training. In addition, all the instruments tested demonstrated responsiveness and reliability, and the internal consistency was acceptable, but only post-training and once certain items were removed.

4.13 Conclusion

The main objective of this part of the study was to develop and validate outcome measures that are responsive to changes in knowledge and attitudes of health care professionals, and changes in behaviour as demonstrated in patient records. All questionnaires and the audit checklist demonstrated content validity and varying degrees of internal consistency or reliability. The answer sheet for the knowledge questionnaire was reformatted according to the comments given by experts. Three items were deleted on a 21 items attitudes scale based on their poor IC and ICC. A final 18 item attitudes scale is a valid and reliable tool which may be used in assessing the attitudes towards interprofessional teams in hospital settings. The training satisfaction questionnaire has also displayed an excellent validity and internal consistency. However, one question was deleted after a debriefing meeting and another two questions were merged into one. The training satisfaction questionnaire was found to be a reliable tool to be used in health professional training and it is not specific to a particular topic.

The training content, organisation and procedure were found to be relevant and useful to the integration of ICF as a theoretical framework to inform interprofessional practice in district hospitals. All suggested amendments to questionnaires as well as the training package and procedure were incorporated into the final version which was developed after analysis of the results of the validation/feasibility study. Finally, the Auditing patients' records checklist displayed an excellent validity and reliability and no item was deleted from it. This checklist was demonstrated as tool which can be used for auditing patients' records to assess the interprofessional collaboration using the International Classification of Functioning, Disability and Health (ICF).

CHAPTER 5. RANDOMISED CONTROL TRIAL – METHODOLOGY

5.1 Introduction

The feasibility study demonstrated that it would be possible and useful to test the training programme through means of a definitive experimental trial and this chapter describes the methodology used in the main RCT study. As there are two separate groups of subjects in the study, the participants and the records that were reviewed, the results and discussion for these two have been presented in two different chapters, chapter 6 deals with the impact of the training on knowledge and attitudes, whereas chapter 7 addresses the change in behaviour, as evidenced by the audit of patient records.

5.2 Objectives

The specific objectives of this study were:

- To determine the knowledge, attitudes and behaviour of medical and allied health practitioners in Rwanda regarding interprofessional practice.
- To investigate whether a day long training programme on interprofessional practice, using the theoretical framework of the ICF (Experimental Group) would improve the knowledge and attitudes regarding practice in selected district hospitals compared to a one hour lecture (Control Group) on the importance of interprofessional practice.
- To determine if the training would lead to the introduction of the ICF framework and an improved practice (behaviour) as seen in changed recording of patient assessment and management in the hospitals with the longer training in the experimental group compared with the control hospitals.
- To establish, should improved behaviour be recorded, whether this improvement is maintained up to six months post-intervention, and what is the pattern of retention over time.

5.3 Study design

This study was carried out in district hospitals in Rwanda as described in the research setting. A Cluster Randomised Control Trial (CRCT) using a pragmatic study design was used in this study. A Cluster Randomised Controlled Trial (CRCT) is a design used in health research services whereby clusters are randomised to intervention groups. This design is primarily used to avoid contamination between the control and experimental groups when a single setting (such as a ward) is utilised (Hemming,

Girling, Sitch, Marsh, & Lilford, 2011). A pragmatic trial design was also used for the purpose of testing the effectiveness of the intervention in a real life routine clinical practice in order to optimise the generalisability and applicability of the intervention and its outcomes (Patsopoulos, 2011). This design is appropriate to compare the outcomes of the intervention between the experimental and control groups.

To investigate the immediate and medium term effect of the intervention on practice (behaviour), repeated measures were used. The repeated measures consisted of an audit of patient records for evidence of holistic care. Reviews of randomly selected patients' records of recently discharged patients was done at four time points: at baseline, between baseline and eight weeks post-intervention, between nine and 16 weeks post-intervention and between 17 and 24 weeks post-intervention.

5.4 Population

The population for the study was the same as the feasibility study. This included the above mentioned health care professionals and patients' records of discharged patients. According to the submitted reports from different hospitals and the Rwanda Ministry of Health (2013), district hospitals had the average capacity of around 160 beds. The average staffing complement included eight doctors (general practitioners), 80 nurses, two physiotherapists, one mental health/clinical psychologist, one nutritionist, and two social workers. In general, these are the health care professionals who provide ward service in the district hospitals of Rwanda. The majority of nurses and medical doctors work in medical, surgical, and paediatric wards in all district hospitals.

5.4.1 Inclusion criteria

The following were the inclusion criteria for health professionals and patients' records to participate in this study.

5.4.1.1 Health professionals

- Health care professional working either in orthopaedic/surgical, medical or paediatric wards.
- Full time health care professionals during the period of intervention and data collection.
- Qualified health care professional who have at least A2 level of education.

-
- Health care professional with at least six months of working experience in the above mentioned wards.

5.4.1.2 Patients' records

- Records of patients who have been admitted to the orthopaedic/surgical, medical and paediatric wards and stayed for at least five days.
- Records of patients who have been discharged from the above mentioned wards within the two months prior to the assessment.

There were no exclusion criteria.

5.4.2 Sample size calculation

The sample size calculation for cluster randomised trials is more complex than for simple comparison of randomly selected individuals as "Similarities among subjects in clusters can reduce the variability of responses from a cluster compared with those expected from a simple random sample. If statistics meant for simple random samples are used to design and analyse clustered studies, they will result in overestimation of the effective sample size" (Killip & Mahfoud, 2004). In order to ensure adequate power, the effective sample size or ESS needs to be calculated. The ESS is the sample required to reach adequate power, once the design effect has been taken into account. The design effect is a measure of the correlation between subjects in each cluster. The more similar they are with regard to the outcome of interest, the greater the design effect and the smaller the ESS becomes. The design effect, or inflation factor is

$$1 + (n-1) \rho$$

Where n the number per cluster and ρ or rho is the intra-cluster correlation (ICC).

Killip and Mahfoud (2004) reports that in human studies values of ICC rho fall between 0.01 and 0.02 and we thus used a rho of .02.

Using STATISTICA, we calculated that, in a simple RCT, a sample of 16 would be necessary in each group if we anticipated that the control group would improve their scores in the knowledge questionnaire to

15 and the experimental up to 29 with the SD gained from the pilot study of 11.8 (based on the feasibility study results). The p value (Alpha) was set at .05, and the power (Sigma) at .9.

	Value
Population mean post intervention of control group	15.00
Population mean post intervention of experimental group	29.00
Population S.D. (Sigma)	11.80
Standardized effect (Es)	-1.19
Type I error rate (Alpha)	0.05
Critical value of t	2.04
Power goal	0.90
Actual power for required N	0.90
Required N (per group)	16.0

If we then enter these values into the equation to calculate the ESS, which is

$$N * \text{number of clusters} / \text{design effect (Killip, 2004)},$$

we get

$$(16 * 4) / (1 + (16 - 1) * .02) = 48$$

In other words, to be adequately powered, the study would need a total of 64 participants but due to the design effect, the ESS becomes 48. If the sample at each hospital is increased to 50, the ESS becomes

$$(50 * 4) / (1 + (49 * 0.02)) = 101$$

A sample of 50 in each hospital would thus give an ESS of 100 which would be more than the 64 required to ensure adequate power if there were no clustering. As all health care professionals were to be invited to participate and there were approximately 60 at each hospital, the study was unlikely to be underpowered.

The primary outcome of this study was the improved interprofessional practice within the district hospitals and comprehensiveness of the patients' records demonstrated by the score. It was not clear what the impact of the training would be as this was not tested during the feasibility study. Inserting the same parameters as above and using a conservative estimate of a difference of 5% between the scores of the intervention and the control hospitals, and using the SD of 8% as found in the feasibility study, 55 records were required per group, a total of 220 records. The ESS once the same design effect had been

factored in was $(55*4)/(1+(15*0.02))=170$. By increasing the sample size to 100 in each cluster, the ESS rose to 307, which would be adequately powered to detect the predicted difference. Thus a sample of 400 patients' records (100 from each hospital at every audit) was audited and in all a total of 1600 patients' records were audited on four occasions (baseline, two-month, four-month, and six-month). This is a large number but, as it was anticipated that the effect size could be small due to the presence of so many confounding variables, a large sample size was required to prevent a Type II error from occurring.

5.4.3 Recruitment and sampling method

The following are the strategies used during sampling of district hospitals, health professionals and patients' records.

5.4.3.1 District hospitals

Stratified random sampling was used to select the district hospitals within 40 districts of four provinces (North, South, East, and West). Boxes were used to represent the provinces. The names of all hospitals in each province were written on pieces of paper and deposited in the corresponding box representing the province. A blind-folded person randomly picked two hospitals in the Eastern Province and two hospitals in the Northern Province. As two hospitals were from the same province (two from East and two from North), there was a need to allocate one in either experimental or control group so that each province would be represented in both groups. Therefore, with the same procedure, the same individual chose one paper from each box to randomly allocated two hospitals to the experimental arm and the remaining hospital was in the control arm. The experimental arm was composed of hospital A of the Eastern Province and hospital B of the Northern Province. The control arm was composed of hospital C of the Eastern Province and hospital D of the Northern Province.

5.4.3.2 Health care professionals

Convenience sampling was used to recruit the health care professionals who participated in this study. All medical doctors and nurses who were available working in the selected district hospital (surgical, medical and paediatric wards) and met the inclusion criteria were recruited. The sample was also composed of physiotherapists, social workers, mental health/psychologists, and nutritionists/dietetics

who were available working in the selected district hospitals during the period of intervention and data collection. The minimum sample from each hospital was 50 health care professionals.

5.4.3.3 Patients' records

Stratified random sampling was used to select the patients' records that met the inclusion criteria to be involved in the study. In each hospital, 400 patients' records were audited, 100 at baseline, after two months, four months, and six months after intervention. Patients' records were given numbers according to their respective wards. The number representing each patient record was written on a slip of paper. All slips from each ward were put in the opaque box separately, one ward at a time (medical, surgical, surgical, and paediatric ward). The research assistant picked the papers from the box one by one and wrote the number appearing on the slip in order to identify the corresponding folders. This was performed in all hospitals (experimental and control) to select patients' records under study. In each hospital, 35 patients' records were selected from medical, 35 patients' records from surgical and 30 patients' records were from the paediatric ward to make a total of 100 records.

5.5 Instrumentation

As established in chapters 3 and 4, the instruments used in the intervention study were valid and reliable to be used. It means that the instruments were able to test what they were supposed to test and do it consistently. The instruments thus used were:

- Knowledge of Health Care Professionals on Interprofessional Practice and ICF Questionnaire which consisted of nine items based on the ICF framework under each there was professions who could intervene with a proposed management. Therefore, each item could have different correct answers (health condition=12, impairment=18, current activity limitation=23, anticipated activity limitation on discharge=12, participation restriction=22, positive personal factors=14, negative personal factors=13, environmental factors as facilitators=13, environmental factors as barriers=17). One mark was given per correct answer in each block of the questionnaire which came to a total of 144 marks from each questionnaire component. The scoring was done by a trained researcher who had demonstrated inter-tester reliability.
- Attitudes towards Interprofessional Team Management Scale consisting of 18 items scored on a five point Likert attitude scale.

-
- The Patient Record Audit Checklist of 30 items scored as absent, present or N/A to give a maximum score of 30. The scoring was done by a trained researcher who had demonstrated inter-tester reliability.

The experimental group received the training programme run over one day as described in chapter 4. The training agenda is presented in Appendix xxviii and the training content is in Appendix xxv. The control group was given a lecture on interprofessional team work and the ICF. This was a two hours introduction to ICF. Its aim was as stated by WHO (2001) and the interactions of ICF components using its diagram.

The experimental group received a follow up refresher course at three months post training. A short training guide was designed with the aim of reinforcing the improved knowledge, attitude and behaviour from the initial training, getting feedback regarding implementation, challenges and giving information to plan further improvement. This included introduction and aim of the training, brief recap of ICF and Interprofessional Collaborative Practice, participants' views, and comments and action to be taken in order to overcome challenges. This guide did not go through the validation process, but its content validity was approved by experts in medical training and research from the University of Cape Town.

5.6 Implementation strategy and procedure

Before conducting this study, ethical clearance was obtained from relevant institutions (see Ethical considerations, section 5.9). Thereafter, the selection of the hospitals and allocation to either experimental or control groups was performed. The letters requesting permission to conduct the study in those hospitals with the hospital superintendent's information letter (Appendix xvii) were then submitted. Before granting permission and signing the consent, the hospital superintendents had meetings with the researcher for more clarity and understanding of the study.

After obtaining permission from the hospital superintendents, the researcher had meetings with the medical chief of staff and chief of nurses to plan the intervention. This included selection of participants to be invited, days of training, allocation of participants to different days in order to maintain the clinical

work within the hospitals, and the venue and all logistics needed during training. It was planned to have two groups of health professionals (group one to be trained on day one and group two on day two) as it was done in the feasibility study, but it became necessary to run a third day of training to accommodate and recruit at least 50 health professionals at each hospital. Once the list of participants in each group was drawn up, they were invited to attend on the appropriate day of training.

Prior to the start of the training session, the participants were given the study information letter (Appendix xx) for them to read and clearly understand the entire study. They were then given the opportunity to ask questions for more clarity and then the consent forms were provided for participants to be signed if they agreed to participate. The participant information letter and the consent forms were in English and French so that participants could use either language. The same activities were done in the control hospitals.

Before recruitment and training began in each hospital, a research assistant who remained blinded to the allocation of the hospitals and was not involved in selecting the hospitals was trained to audit the patients' records of discharged patients in the above hospitals based on the inclusion criteria. The research assistant was trained regarding the basic ICF framework and needed information from the patients' records, and how to assess the records and to fill the checklist as well as the selection criteria. The audit of patients' records (baseline data) was performed prior to the intervention in all hospitals (experimental and control) using the audit checklist (Appendix vii).

The researcher and local supervisor organised and started training with the experimental hospitals. The sessions were held within the hospitals' facilities. The training agenda for the experimental group is presented in Appendix xxviii and training content is in Appendix xxv. The training procedure was based on that used during the feasibility study, but adapted as needed according to the experience from the feasibility study. All amendments and modifications of instrumentation, training package, and procedure from the feasibility study were considered during the intervention study. As was done in the feasibility study, one day was used for the training in each group. A Power Point presentation was used, role plays, case studies, and a review of hospital patients' records were performed.

The post-test measurements on knowledge and attitudes were supposed to be obtained after training but it was not possible due to time constraints. Therefore, the post measurements were proposed to be submitted one day after training. Many health professionals did not submit on that day, so the research assistant had to request the chief of nurses to make a follow up until they all submitted the post measurements. This was the same case in both the experimental group hospitals and it took three days to get the post measurements.

The control hospitals received no training during this time, but they were given some basic introduction to the ICF framework (Appendix xxvi) which took between one to two hours. The two hours ICF introduction in the control group was conducted in one session at each hospital during their morning staff meeting. Pre- and post-test measurements on knowledge and attitudes were also taken in the control group.

A two month follow-up refresher session was performed after the initial training in the experimental group hospitals whereas the control group received no follow up session. The follow-up sessions were organised with the medical chief of staff and chief of nursing one week before. This was to arrange the day and trained staff to be available. The appropriate time to conduct the follow up session was the morning staff session in both experimental hospitals. The length of the follow-up session was about two hours in every hospital. The content of the session consisted of introduction and aim of the meeting, brief recall of ICF and IPP, views of participants on the experience and challenges met during two months of implementation, what they needed to be reminded, and the action to be taken in order to overcome the problems and challenges (Appendix xxvii).

The audit checklist of patient records was performed during the 2nd month, 4th month, and 6th month after training the experimental and control groups. The intervention study conceptual framework (Figure 18) illustrates the summary of the study procedure.

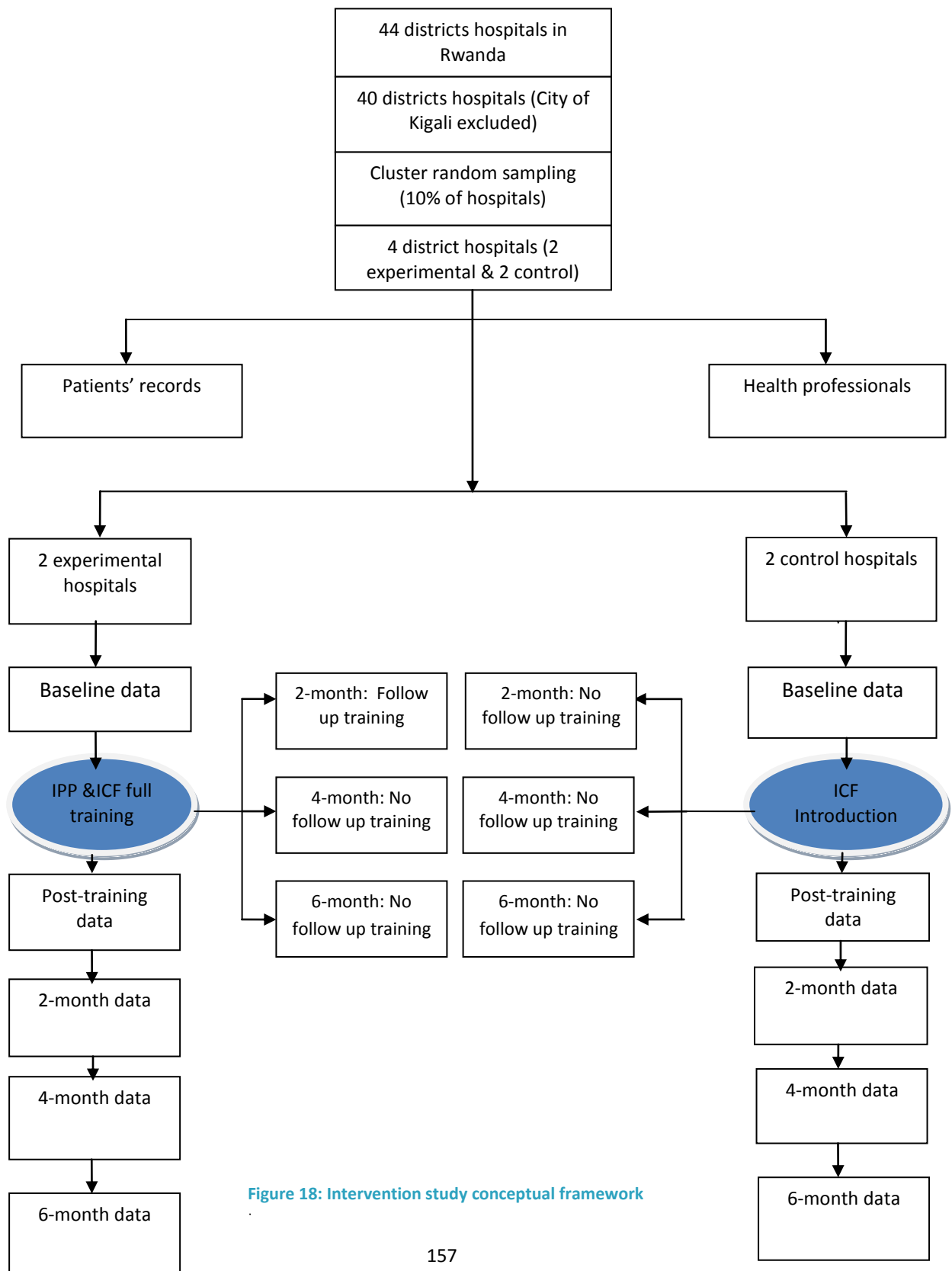


Figure 18: Intervention study conceptual framework

5.7 Data analysis

Data were entered into an Excel sheet by the research assistant. In order to facilitate analysis, the items in the attitudes questionnaire, which were framed in such a way that a negative response (strongly disagree) was the desirable response, were inverted so that strongly desirable responses were all 5 and strongly undesirable responses were all 1. The analysis was performed by IBM SPSS (version 21) and STATISTICA (Version 13.2 DELL INC).

Descriptive statistics such as frequencies, percentages, mean and standard deviation, median, minimum and maximum were used to describe the characteristics of the health care professionals and the scores on the different outcome measures. These were also used to establish the frequency, percentage and mean of item correct of the checklist at baseline, two months, four months and six months.

The experimental and control groups were compared at baseline to ensure equivalence between the demographic characteristics of the participants. The Chi-square test was performed to determine whether there was an association between gender, profession, place of work and group (experimental and control). For continuous variables (such as percentage of correct responses) parametric tests, such as the independent t-test and ANOVA, were used to compare the two groups. As the sample size was large enough, the central limits theorem applied and parametric tests were used. This theorem states that even when the “underlying trait follows a highly skewed distribution, the means approach a bell curve as the sample size increases, but researchers estimate that, even with extreme deviations from normality, a sample size of approximately 80 is usually enough to run a t-test” (Sainani, 2012, p.1003).

As the attitudes scale yielded ordinal data, the Mann-Whitney U test was used to establish if the two sets of groups were equivalent before and after training at baseline and at two months, four months, and six months. Rank Sum Scores of Attitudes Scale across the group was also performed. The Kruskal Wallis test was used for rankings of the scores of different professions before and after the intervention. Spearman’s rank correlation between knowledge and attitudes before and after intervention was also performed. A significance level (α) of 0.05 was used throughout the study. The data were presented graphically in the form of tables, box plots, and graphs.

5.8 Ethical considerations

Before conducting this study, permission to conduct the study was obtained from the relevant institutions and participants. Ethical approval was sought from the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee (Ref: HREC/REF: 085/205) (Appendix xi).

Amendments were made to the initial protocol which included reducing the number of hospitals based on the large effect size demonstrated by the feasibility study and displaying posters in wards alerting patients and their families to the research and the possibility of refusing to allow their records to be utilised, and permission was granted for these amendments.

As the study was based in Rwanda, approval was sought from the National Health Research Committee (Ref: NHRC/2015/PROT/016) (Appendix xiii) and Rwanda National Ethics Committee (RNEC) (Ref: 145/RNEC/2015). A final approval to conduct a study in Rwanda was obtained from the Ministry of Education (Ref: MINEDUC/S&T/318/2015) (Appendix xv). Finally signed informed written consent (Appendix xxii) was obtained from each health professional who participated.

5.8.1 Autonomy and respect

Although the central and local authorities had authorised the study, health care professionals and patient records were treated as autonomous agents. A hospital superintendent information letter was provided and an informed consent form (Appendix xviii) was requested from each hospital.

Different participant information letters were provided to the experimental group hospitals (Appendix xx) and the control group hospital participants (Appendix xxi). The information letter was necessary for participants to have enough information about the study, what is needed to be part of the study, and potential risk and benefits in order to take a voluntary decision to participate. A signed informed written consent (Appendix xxii) was requested from each health care professional to show voluntariness and comprehension. Participation in the study was voluntary, and health professionals were told that they were free to withdraw from the study at any time without penalty or loss of benefits. After a thorough explanation about the study, those who agreed had to sign an informed consent which shows agreement and voluntary participation. Given the fact that their names were not used in the study, participants could withdraw from the study without the researcher knowing his/her name. This could

also help them to feel free to make their decision. Participants were provided with information about the study so as to empower them to make an informed choice of participating in this study.

5.8.2 Confidentiality

Participants were assured of confidentiality and anonymity. Each participant and patient record was given a code number and these codes were used rather than names on the health care professionals' questionnaires and the patients' records checklist. Health care professionals, after filling the questionnaires, were provided with a box to submit the questionnaires. Only the researcher and research assistants had access to the collected raw data. For accessing patients' records of discharged patients, permission was sought from the hospital authorities. This was the ideal for getting patients' retrospective information from the patients' records in the Rwandan context. Moreover, a patients' notice was placed in wards (paediatric, surgical, and medical) in every hospital for patients or caregivers to read (Appendix xxiii). The notice informed the patients about the study, the possibility of their data being included in the study, the benefits and possible risk of the study, patients' privacy, and how data would be treated as anonymous. In addition, there was a form (Appendix xxiv) available in every ward to be signed by the patient or caregiver who did not want his/her folder to take part in the study, and then the signed form was kept in the patient folder.

5.8.3 Risks and benefits

The potential benefits and expected risks of the study were well explained to all health care professionals who participated in this study. It was anticipated that this study would help inform policy in enhancing an interprofessional practice and holistic care of patients and enhance collaboration between health care professionals. As a result, this study may improve patient care for better outcomes. This was expected in experimental hospital, but after completion of this study the results will be presented to the Ministry of Health and one of the recommendations is to roll out the training programme in all district hospitals. There was no physical, psychological, social, legal and economic risk which was expected, but after completion of the study there was a risk that certain hospitals might be identified as having poor practice; even if the names of the hospitals were not known, they might have been identifiable to the authorities.

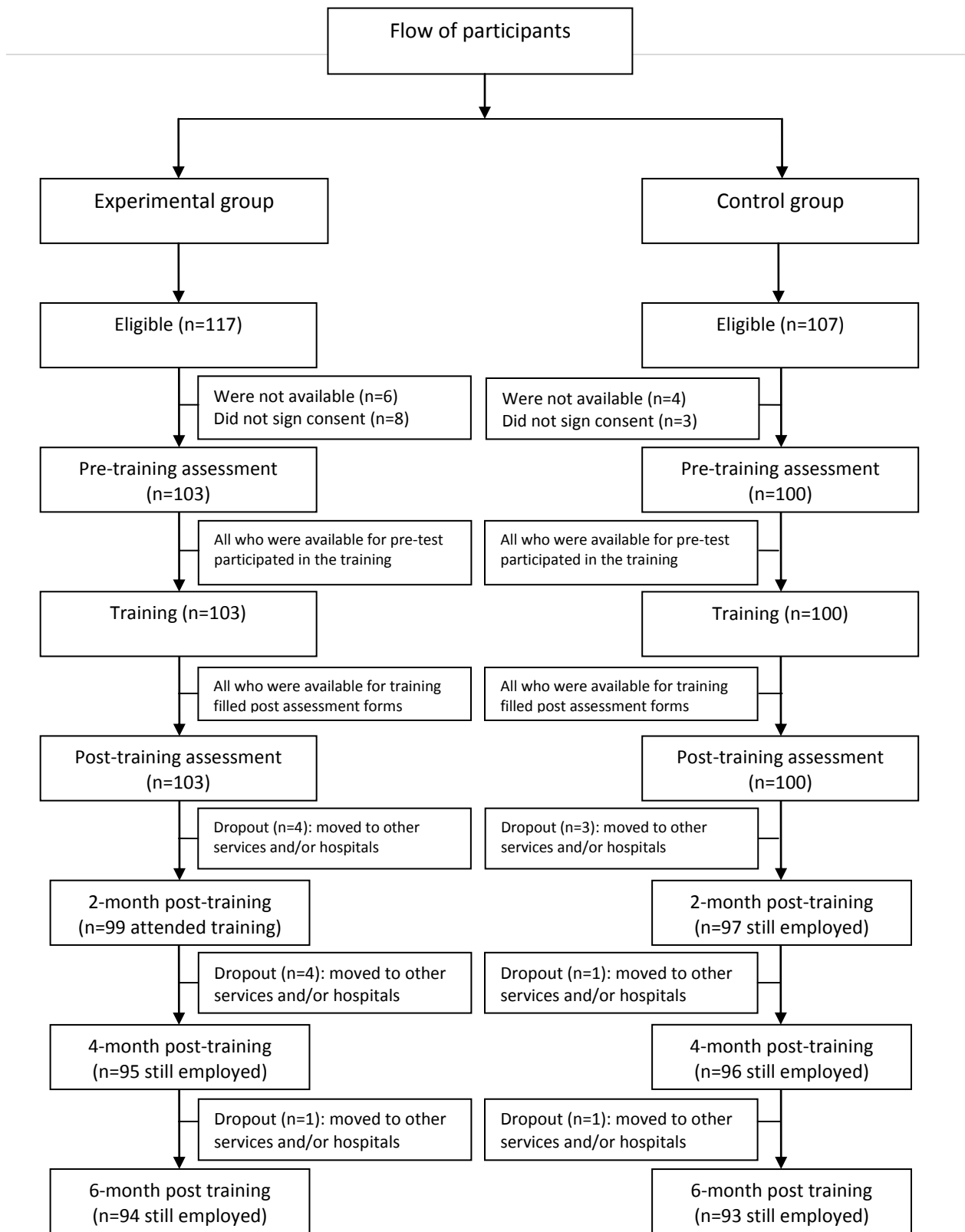
Another risk was that poor attitudes and lack of knowledge might have been exposed during the sessions, leading to stigmatisation of certain participants. In order to minimise these risks, much emphasis was kept on anonymity and confidentiality. Participants and hospital superintendents were not aware of participants' scores and patients' folder findings.

5.8.4 Justice

For achieving social justice, a cluster randomised control trial was used and all experimental hospitals were treated equally in terms of intervention and data collection, and all comparative hospitals were also treated equally. Once the intervention is found to be effective, there is a plan to roll out the intervention in other district hospitals.

5.9 *Overview of recruitment*

The flow-chart of participant recruitment for the entire study is presented in Figure 19 below.



Note: n from 2 months on refers to the number of original participants who were either trained or still working at the same hospital.

Figure 19: Flow chart of participants throughout the study

CHAPTER 6. RESULTS OF THE RCT: KNOWLEDGE AND ATTITUDES

6.1 Introduction

This chapter provides the results of knowledge, attitudes and the follow up training held in two experimental hospitals at two-month after the initial training session. The flow chart of participants through the study, demographic characteristics of the participants, the results of knowledge across the group and professions, and the results of attitudes across the group and professions are all described in this chapter. Finally, the chapter explores the relationship between knowledge and attitudes towards interprofessional practice among health professionals.

6.2 Results

6.2.1 Demographic and professional characteristics

A total of 203 health professionals participated in the study, with recruitment from each hospital ranging from 50 to 53 participants. No professional refused to participate in the study after reading through the Information Sheet. Note that there some health professionals who were on their annual leave during the course of the study.

Table 24 summarises the distribution of health professionals in every hospital. The mean age was 35.7 years (SD=8.29) and there was no significant difference between the two groups (experimental and control) ($p=.208$). The proportion of medical doctors who were eligible to attend and did so was lowest of all the health professionals, apart from the mental health workers (Table 25).

A slightly greater percentage of the control group personnel attended (91% compared to 88%).

Table 24: Distribution of participants in four hospitals

Health Professions	Experimental hospitals		Control hospitals		Total
	Hospital A	Hospital B	Hospital C	Hospital D	
Medical doctors	2	3	3	3	11
Physiotherapists	3	2	2	2	9
Nurses	44	38	38	42	162
Social workers	2	4	4	1	10
Nutritionists	1	1	1	1	4
Mental health nurses	1	1	1	1	4
Clinical psychologists		1	1		3
Total	53	50	50	50	203

Table 25: Participants through the study across the groups and professions at baseline

Group	Profession	Eligible	Baseline	% attending
Experimental	Medical doctors	10	5	50.0
	Nurses	87	83	95.4
	Physiotherapists	6	5	83.3
	Social workers	6	5	83.3
	Mental health nurses	4	2	50.0
	Nutritionists	4	3	75.0
	Total Experimental		117	103
Control	Medical doctors	9	6	66.7
	Nurses	84	80	95.2
	Physiotherapists	4	4	100
	Social workers	5	5	100
	Mental health	3	3	100
	Nutritionists	2	2	100
	Total Control		107	100
Total		224	203	90.6

Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

There was no significant association between gender, profession, place of work and group (experimental or control) (Table 26). However, the results indicate that the experimental group had a significantly greater number of years of experience ($p=.030$).

Table26: Comparison of demographic and professional attributes between the two groups

	Experimental	Control	Row	Chi Sq	P
Gender				0.097	0.755
Male	39	40	79		
%	37.86%	40.00%			
Female	64	60	124		
%	62.14%	60.00%			
Totals	103	100	203		
Profession				1.45	0.694
Doctor	5	6	11		
%	4.85%	6.00%			
Physio	5	4	9		
%	4.85%	4.00%			
Other	10	10	20		
%	9.70%	10.00%			
Nurse	83	80	163		
%	80.58%	80.00%			
Totals	103	100	203		
Ward/depart				1.56	0.955
Surgical	22	21	43		
%	21.36%	21.00%			
Physiotherapy	5	4	9		
%	4.85%	4.00%			
Nutrition	3	2	5		
%	2.91%	2.00%			
Mental	2	3	5		
%	1.94%	3.00%			
Social	5	5	10		
%	4.85%	5.00%			
Paediatric	29	26	55		
%	28.16%	26.00%			
Medical	37	39	76		
%	35.92%	39.00%			
Totals	103	100	203		
Years of experience	10.5	8		Sep var t=2.19	0.03
SD	8.58	6.4			

Note: % refers to column percentage. Note that "Other" includes ten social workers, five nutritionists and five mental health nurses. Experimental n = 103, Control n = 100

6.2.2 Knowledge Questionnaire

Cronbach's Alpha for the knowledge scale was .790 pre- and .943 post-intervention. As the years of experience between the two groups was different, the correlation between experience and pre-intervention knowledge score was tested and found to be $r = -.11$, $p = .145$.

The total marks expected from all participants for each ICF domain is also in Table 27 and the mean scores of the experimental and control groups respectively were 12.4 (SD=6.4) and 12.8 (SD=5.0) respectively. There were no significant differences between the mean percentages of pre-intervention knowledge of the two groups on any of the items (Table 27) or in the total score ($t = -0.5$, $p = 0.61$).

Post-intervention testing indicated that there was a highly significant difference between the groups in knowledge in all items and in overall score ($p < .001$). The mean total scores were 41.3 (SD=9.5) and 17.7 (SD = 4.7) in the experimental and control groups respectively ($t = 22.5$, $p < .001$). There were also significant ($p < .001$) within group differences with both the experimental group and the control group demonstrating significant improvement.

Table 27: Comparison of knowledge by group

Item percentage	Total expected Marks/each ICF Item		Experimental		Control		t-value	p
	Experimental	Control	Mean %	S.D	Mean %	S.D		
Pre-intervention								
Health condition %	1236	1200	49.6	16.8	47.4	14.6	1	0.32
Impairment %*	1854	1800	8.2	15.3	11.7	12.4	-1.8	0.077
Activity limitation (Current problems) %*	2369	2300	17.4	14.2	15.7	11.5	0.9	0.351
Activity limitation (Problems anticipated on discharge) %	1236	1200	9.5	16	11.4	13.7	-0.9	0.35
Participation restriction %	2266	2200	4	6.8	4.5	5.6	-0.5	0.62
Personal factors (positive)%	1442	1400	5.5	10.7	6.7	10	-0.8	0.42
Personal factors (negative)%	1339	1300	13.4	16.3	13.7	14.5	-0.1	0.91
Environmental factors (facilitators) %	1339	1300	7.2	11.1	6.8	9.1	0.3	0.78
Environmental factors (barriers) %	1751	1700	5.5	8.4	6.4	8.1	-0.8	0.45
%			12.4	6.4	12.8	5.0	-0.5	0.61
Post-intervention								
Health condition %	1236	1200	68.9	11.4	56.8	9.6	8.2	<.001
Impairment %*	1854	1800	44	20	20.8	16.1	9.1	<.001
Activity limitation (Current problems) %*	2369	2300	38.6	14.8	21.2	9.9	9.9	<.001
Activity limitation (Problems anticipated on discharge) %	1236	1200	52.6	28.1	18.8	13.7	11	<.001
Participation restriction %	2266	2200	29.8	14.4	7.3	5.4	14.9	<.001
Personal factors (positive) %	1442	1400	37.1	21.8	13	11.2	10	<.001
Personal factors (negative) %	1339	1300	42	22	14	14.4	10.7	<.001
Environmental factors (facilitators) %	1339	1300	45.5	20.4	10.6	10.9	11.3	<.001
Environmental factors (barriers) %	1751	1700	33.8	17.3	7.4	7.5	14.2	<.001
%*			41.3	9.5	17.7	4.7	22.5	<.001
Within group comparison								
Experimental group							33.82	<.001
Control group							13.13	<.001

Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

Experimental n=103, Control n=100

The histograms below illustrate the comparison between pre-intervention scores (Figure 20) and post-intervention knowledge scores (Figure 21) between the experimental and control groups.

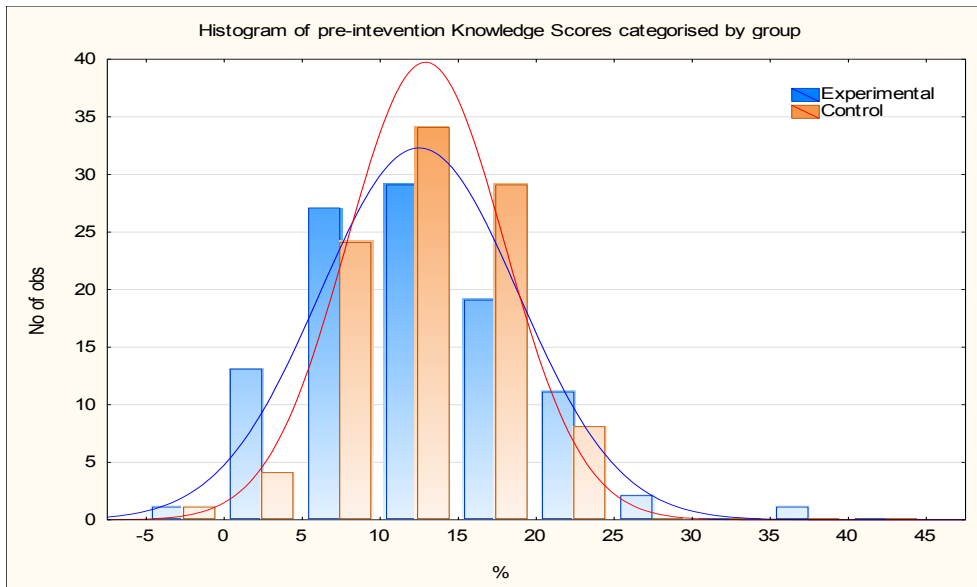


Figure 20: Pre-intervention knowledge scores by group

Experimental n=103, Control n= 100

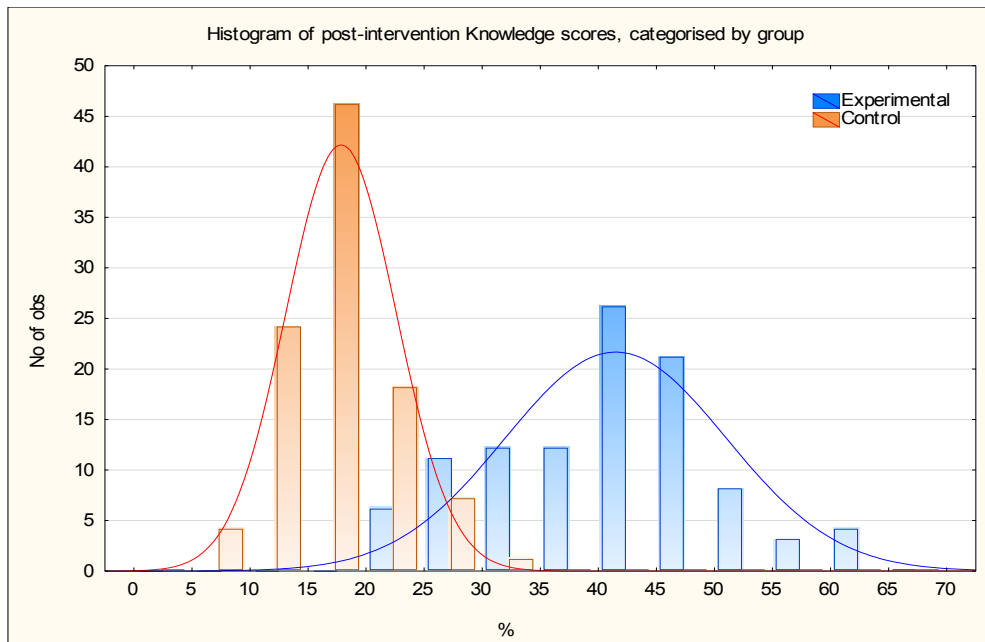
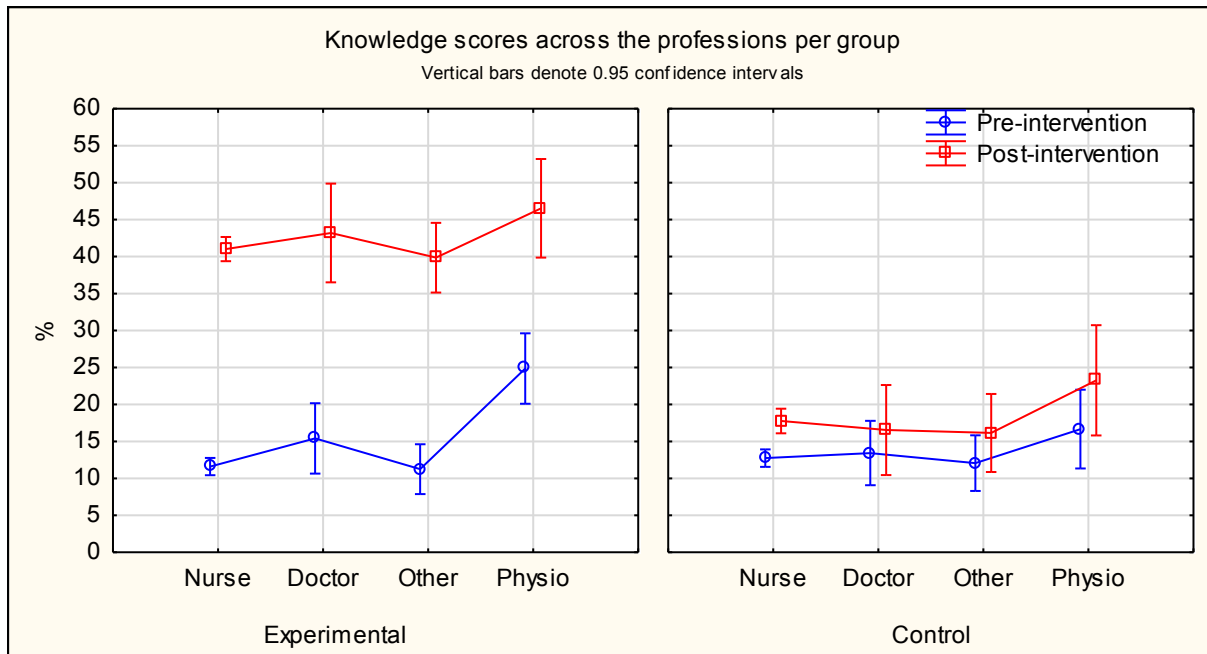


Figure 21: Post-intervention knowledge scores by group

Experimental n=103, Control n=100

The increase in knowledge in the experimental group compared to the control group was evident across all professions post-intervention.



Experimental n=103, Control n=100

Figure 22: Knowledge scores across professions per group

Pre-intervention knowledge scores show that physiotherapists scored higher than other professionals in both the experimental and control groups (Experimental n=103, Control n=100)

6.2.3 Attitudes Scale

In order to facilitate comparison of items, the questions in the attitudes questionnaires have been reframed for analysis in such a way that disagreement indicates an undesirable response, e.g. the item “Working in teams unnecessarily complicates things most of the time” in the questionnaire has been reframed in the table as “Working in teams does not unnecessarily complicate things most of the time”. The scores have been consequently inverted for these items. The Cronbach’s alpha pre-test of the attitudes scale was .485 and post-test it was .668. The correlation between the pre- and post-intervention scores was rho=0.353 in the experimental group and rho=0.396 in the control group, both significant at a p<.01 level.

As the number of years of experience between the two groups was significantly different, the correlation between age and the pre-intervention attitudes scale was tested and found to be $\rho = -.07$, $p = .353$.

As can be seen in Table 28, the items that more than 15 respondents disagreed with included that *“working in teams does not unnecessarily complicate things most of the time”*. After the intervention, there was no item in the experimental group that had more than 15 respondents disagreeing. In the control group, six items still had disagreement, and five of these had a higher frequency of disagreement post-test. The level of agreement was almost the same between two groups before intervention, but after intervention the level of agreement was higher in experimental compared to the control group.

Table 28: The pre- and post-training responses to the attitudes questionnaire

	Exp*	**1	2	3	4	5	Con*	1	2	3	4	5
1.Working in teams does not unnecessarily complicate things most of the time	Pre	4	15	13	27	44		5	15	17	30	34
	Post	0	1	9	24	69		0	3	17	32	49
2.The team approach improves the quality of care to patients	Pre	0	9	15	35	44		0	10	9	39	43
	Post	2	1	0	12	88		1	13	5	31	51
3.Team meetings foster communication among team members from different disciplines	Pre	2	4	16	36	45		3	3	11	40	44
	Post	2	0	0	17	84		1	5	3	36	56
4.Patients receiving team care are more likely than other patients to be treated as whole persons	Pre	3	7	20	38	35		2	3	19	43	34
	Post	1	0	0	20	82		4	2	5	40	50
5.A team's primary purpose is not to assist physicians in achieving treatment goals for patients	Pre	10	14	30	23	26		3	18	25	24	31
	Post	0	2	10	35	56		3	9	12	28	49
6.Working in a team keeps most health professionals enthusiastic and interested in their jobs	Pre	1	8	14	41	39		0	6	13	47	35
	Post	1	0	2	13	87		6	4	16	36	39
7.Patients are highly satisfied with their care when it is provided by a team	Pre	4	12	17	26	44		1	16	14	35	35
	Post	0	1	11	20	71		11	14	7	30	39
8.Developing a patient care plan with other team members avoids errors in delivering care	Pre	2	5	12	27	57		1	1	13	35	51
	Post	3	0	0	10	90		6	8	15	26	46
9.When developing interprofessional patient care plans, not much time is wasted translating jargon from other disciplines	Pre	2	12	30	29	30		0	15	13	34	39
	Post	1	0	4	32	66		2	5	4	39	51
10.Health professionals working in teams are more responsive than others to the emotional and financial needs of patients	Pre	9	10	19	38	27		6	7	17	44	27
	Post	0	3	9	34	57		3	5	11	41	41
11.Developing an interprofessional patient care plan is not excessively time consuming	Pre	4	9	29	30	31		0	8	23	25	45
	Post	0	4	12	40	47		0	5	9	30	57
12.The give and take among team members helps them make better patient care decisions	Pre	4	3	8	36	52		2	2	10	44	43
	Post	1	1	2	27	72		15	13	5	32	36
13.In most instances, the time required for team meetings could not be better spent in other ways	Pre	4	16	22	34	27		3	12	19	38	29
	Post	1	2	13	32	55		1	7	14	36	43
14.The physician does not have the ultimate legal responsibility for decisions made by the team	Pre	6	15	24	34	24		2	9	26	29	35
	Post	0	0	14	30	59		3	4	18	27	49
15.Hospital patients who receive team care are better prepared for discharge than other patients	Pre	8	8	10	33	44		7	6	13	38	37
	Post	0	1	6	24	72		14	13	11	27	36
16.The team approach makes the delivery of care more efficient	Pre	1	4	3	40	55		4	4	5	42	46
	Post	3	3	9	27	61		13	8	9	28	43
17.The team approach permits health professionals to meet the needs of family	Pre	4	8	12	36	43		5	5	13	42	36
	Post	0	2	11	26	64		5	13	16	31	36

caregivers as well as patients												
18.Having to report observations to the team helps team members better understand the work of other health professionals	Pre	1	8	9	44	41		1	1	13	43	43
	Post	1	0	2	40	60		11	5	13	33	39

*Exp=Experimental Group; Con=Control Group*1=strongly disagree; 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

The median scores of the experimental group improved from 77.8 to 91.1%, whereas the median scores of the control group remained approximately 80% (Table 29).

As the analysis of the summed scores may have introduced bias, each item was analysed separately and the rank ordering of the control group on item 11, was significantly higher than the experimental group ($z=-2.1, p=.032$), i.e. the control group did not think that developing an interprofessional patient care plan was excessively time consuming. Post training 14 items were significantly different at the $p=.05$ level, three at the $p=.1$ level and the same item, item 11, was not significantly different, $p=.167$.

Table 29: Pre and post-intervention median scores across the groups

	Valid N	Median	Minimum	Maximum	Lower Quartile	Upper Quartile
Experimental						
Pre-score	103	77.8	60	92	74.4	83.3
Post-score	103	91.1	76.7	100	88.9	93.3
Control						
Pre-score	100	80	62.2	99	75.6	85.6
Post-score	100	81.1	54.4	100	77.8	84.4

The figures below compare the scores of the attitude scale before training (Figure 23) and after training (Figure 24) between the experimental and control groups.



Figure 23: Pre-intervention attitude scores per group

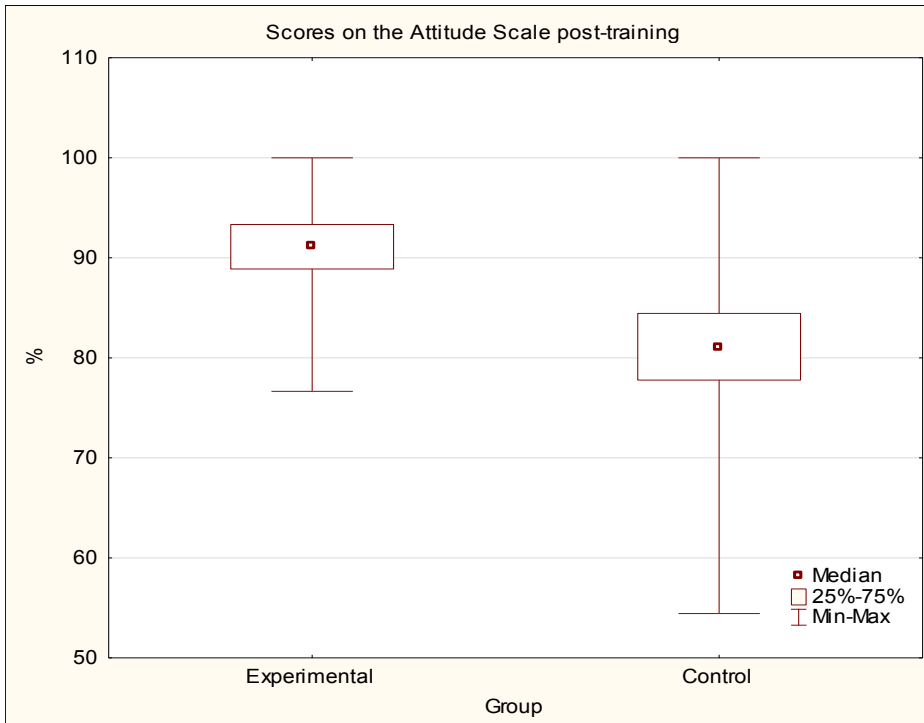


Figure 24: Post-intervention scores attitudes per group

There was no significant difference in the ranking of the scores on the attitudes scale of two groups prior to training, although the control group did do marginally better than the experimental group ($p=.098$). However, after training the experimental group scored significantly higher ($p<.001$) (See Table 30).

Table 30: Rank sum scores of the attitude scale across the group

	Rank Sum Experimental	Rank Sum Control	U	Z adjusted	p-value	Valid N Experimental	Valid N Control
% Pre-intervention	9861	11050	4505	-1.66	0.098	103	100
% Post-intervention	15070	5840	689	10.72	$p<.001$	103	100

Table 31: Sign test to test within group differences in attitudes pre- and post-training

	No of non-ties	% Post-test higher than pre-test	Z	p-value
Experimental group	103	98.06	9.656	$p<.001$
Control group	93	59.14	1.659	0.097

To test within group differences the sign test was to test within group differences in attitudes pre- and post-training (Table 31). In the experimental group 98% of the participants improved their score on the attitudes scale ($<.001$) whereas only 59% ($p=.097$) of those with non-tied scores improved in the control group.

As the internal consistency was low, further analysis was done to explore possible reasons for this. The following table includes the original phrasing and it can be seen that of the nine items that have 30% or more disagreeing with the rephrased desirable question, eight of them are questions that were couched in negative terms and only one was originally positively phrased.

Table 32: Cronbach's alpha for the scale of negatively couched items and positively phrased items

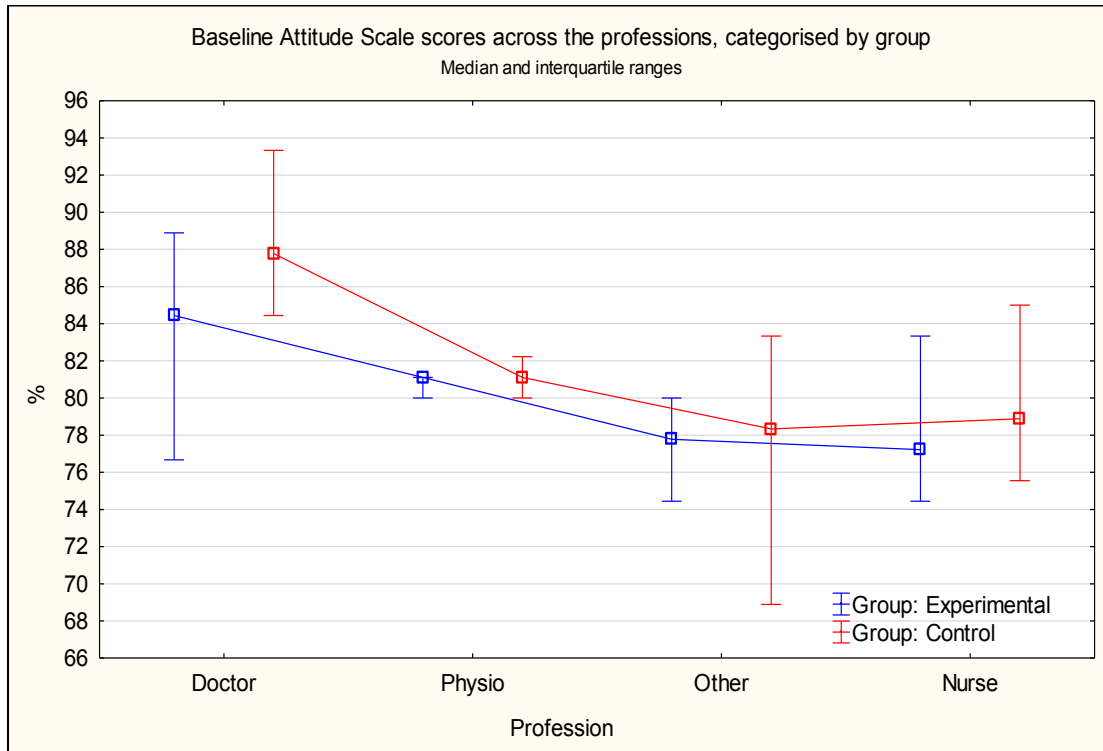
Original phrasing	Phrasing	% not agreeing with statement inverted to be desirable in both groups combined
1. Working in teams unnecessarily complicates things most of the time	Negative	34.0
2. The team approach improves the quality of care to patients		21.2
3. Team meetings foster communication among team members from different disciplines		19.2
4. Patients receiving team care are more likely than other patients to be treated as whole persons		26.6
5. A team's primary purpose is to assist physicians in achieving treatment goals for patients	Negative	49.3
6. Working on a team keeps most health professionals enthusiastic and interested in their jobs		20.7
7. Patients are less satisfied with their care when it is provided by a team	Negative	31.5
8. Developing a patient care plan with other team members avoids errors in delivering care		16.7
9. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	Negative	35.5
10. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients		33.5
11. Developing an interprofessional patient care plan is excessively time consuming	Negative	36.0
12. The give and take among team members helps them make better patient care decisions		14.3
13. In most instances, the time required for team meetings could be better spent in other ways	Negative	37.4
14. The physician has the ultimate legal responsibility	Negative	40.4
15. Hospital patients who receive team care are better prepared for discharge than other patients		25.6
16. The team approach makes the delivery of care more efficient		10.3
17. The team approach permits health professionals to meet the needs of family caregivers as well as patients		23.2
18. Having to report observations to the team helps team members better understand the work of other health professionals		16.3

The Cronbach's alpha for the scale if the negatively couched items were removed improved to .673. However, exclusion of the negatively phrased items did not influence the outcome as there was still no significant difference in rank ordering pre-test ($p=.775$) and a highly significant difference post-test ($p<.001$). Pre- and post-interventions scores with the negative items removed (Table 32).

6.2.4 Comparison of attitude scale scores across the professions

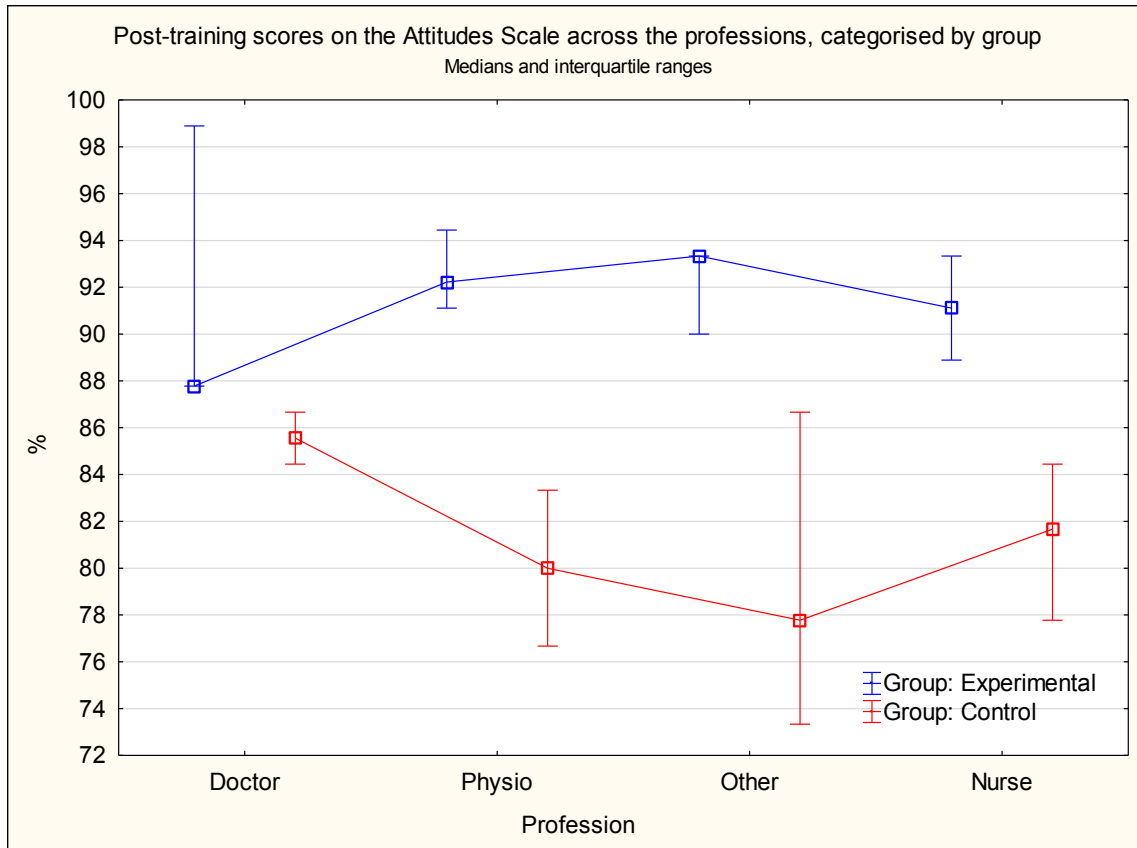
The Cronbach's alpha was .485 pre- and .668 post-intervention. The Kruskal Wallis test indicated that there was no significant difference between the rankings of the scores of the different professions in

either group, either before or after. However, Figure 25 and Figure 266 clearly indicate that, whereas the pattern of scoring remained the same in the control group, with medical doctors scoring the highest both pre- and post- test, the pattern changed considerably in the experimental group post-training. Whereas the doctors scores remained similar, the other three professions showed considerable improvement and all scored higher than the doctors on post-testing.



Experimental Group N=103, Control Group N=100
 Kruskal Wallis for: Experimental group (3,103) = 2.215, $p = 0.529$; Control group %: $KW-H(3,100) = 5.258$, $p = 0.154$.

Figure 25: Pre-intervention attitude scale scores professions, categorised by group



Experimental Group N=103, Control Group N=100

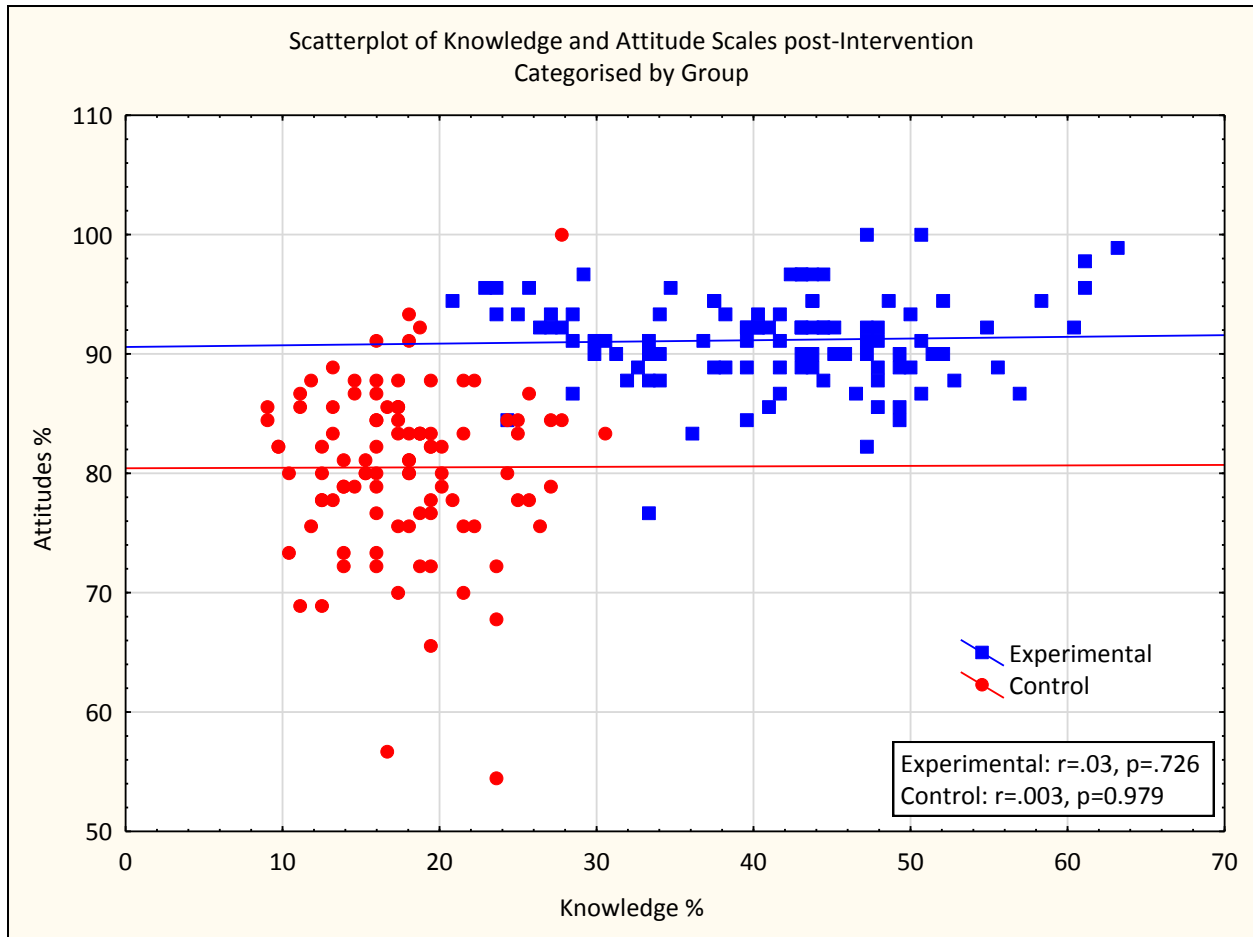
Group: Experimental %: KW-H (3,103) = 3.6184, $p = 0.306$; Group: Control %: KW-H (3,100) = 4.3114, $p = 0.230$

Figure 26: Post-intervention attitude scale scores professions, categorised by group

The interquartile ranges were large and there was no significant difference detected by the Kruskal Wallis ANOVA between the scores of the different professions in either group, either before or after the intervention.

6.2.5 Relationship between knowledge and attitudes

Prior to the intervention the correlation between the knowledge and attitudes total was not significant ($r=.120$, $p=.089$). After the intervention the correlation was significant ($r=.615$, $p<.001$, two outliers removed). However, the correlation within each group between the two scales was not significant (experimental $r = 0.035$, $p = 0.726$, control $r = 0.003$, $p = 0.979$).



Experimental Group N=103, Control Group N=100

Figure 27: Correlation between scores of knowledge and attitudes post-intervention

6.3 Follow-up training

A two hour face to face meeting was held two months after the training sessions with all trained health professionals in the experimental group. The following tables 34 and 35) summarise the follow-up sessions held in two hospitals. This includes introduction and aim of the meeting, brief recall to ICF and IPP, participants' views, comments and action to be taken in order to overcome challenges. The follow-up training guide (Appendix xxvii) used during this exercise was developed by researcher and his co-supervisor who is expert in medical education and training. The research conducted the training follow-up in form of meeting while all information was gathered by writing.

- The following tables provide comments and recommendations which arose from the follow-up training in the experimental hospitals (Table 33 and Table 34).

Table 33: Follow-up training: Hospital A

1. Introduction and aim of the meeting		
2. Brief recall to ICF and IPP: ICF framework and interprofessional care framework for continuous interprofessional care (based on ICF) were used.		
3. Participants' views	Comments	Action that should be taken by hospital staff
Has the training you received been helpful in your daily work?	<ul style="list-style-type: none"> -In general, the training was much needed as it was about working together towards patient's centred care. -The involvement of social workers in our patients' management is helpful. -Yes, the training was helpful because at least health professionals came to know their role. Before, it was not the case: some health professionals were working only in their services and their role was not clear to everyone. But now, if you meet the case that needs other professionals, you call them and discuss the case. For us, this is very positive. 	<ul style="list-style-type: none"> -To avail time for discussion. -To train other professionals who work in other services like ophthalmology, anaesthesia, laboratory, dentistry. -The training should also be expended to others who were not trained.
<ul style="list-style-type: none"> -Do you think that the way you are working with other professionals has changed? -Can you give some specific examples? 	<ul style="list-style-type: none"> -Yes, after the training the ways we work with other professionals have been positively changed. Examples: <ul style="list-style-type: none"> -Documentation and recording in patient records have improved. Some health professionals were not aware that they can write the intervention in the folder. -There are various cases presented in the hospitals managed by different professionals, which was not the case. 	<ul style="list-style-type: none"> -The documentation must be emphasised on by all health professionals. -To increase the number of staff in some services or departments.
What changes would help you to implement the interprofessional practice better?	<ul style="list-style-type: none"> -More trainings, refresher courses and facilitations are needed for better implementation of interprofessional practice in this hospital. -All staff should be involved. -Some services have shortage of staff, so the hospital should recruit health professionals where it is necessary for better implantation of interprofessional practice. 	
What has been helpful or made easier?	<ul style="list-style-type: none"> -There are some facilities within the hospital which made the practice easier. These include free user phones available in the hospital, 	<ul style="list-style-type: none"> To use these facilities for better practice.

	internal referral forms, and morning staff, ward round, and flexible patient folder. Friendly buildings in the hospital, culture of helping each other when there is shortage of staff, and involvement of caregivers in reporting.	
What do you like to be reminded about?	Participants asked to be reminded about participation restriction.	Participation restriction was explained as the problems an individual may experience in involvement in life situations. Examples were also given based on the case study.
What would you like to discuss that I have not mentioned?	Nothing	
Any question/suggestion/comment?	How can the training or interprofessional practice reach to other health professionals who were not trained?	The results of this study will show if the training for interprofessional practice is needed; thereafter the recommendations will be based on the findings.

Table 34: Follow-up training: Hospital B

1. Introduction and aim of the meeting		
2. Brief recall to ICF and IPP: ICF framework and interprofessional care framework for continuous interprofessional care (based on ICF) were used.		
3. Participants' views	Comments	Action that should be taken by hospital staff
Has the training you received been helpful in your daily work?	-Yes, the training has been helpful in a way that it helped us, especially nurses, to be considered. -Though we don't have enough time to discuss about the training, you can see some few changes in our daily practice. -At least we can collaborate, but we still need some training and refresher courses.	-Training is needed to others who were not trained. - Need for refresher courses -Need of time to discuss on the gained knowledge during training -Need of involvement of the hospital authority
Do you think that the way you are working with other professionals has changed? -Can you give some specific examples?	-Yes, of course after training there were some changes. Examples: -The freedom to call someone from different profession from yours was increased. In other words, the collaboration and communication were increased. -We changed our minds; we can now refer patients in different disciplines more than before.	We still have a shortage of staff. We recommend increasing the number of staff in all disciplines.
What changes would help you to implement the interprofessional practice better?	-Training of all staff. -Refresher courses. -Increase the number of staff. -Provide time for interprofessional discussion.	The same as above.
What has been helpful or made easier	- In general it was difficult, but we can have some facilities to implementation like: morning staff and ward round.	If we have enough staff, things can be easy.
What do you like to be reminded of?	Generally, the ICF framework.	ICF framework was revised.
What would you like to discuss that I have not mentioned?	Nothing	
Any question/suggestion/comment?	How this can be taught in all professions across the country.	The results of this study will show if the training for interprofessional practice is needed, thereafter the recommendations will be based on the findings.

6.4 Summary of results

A total of 203 health professionals participated in this study. The two groups were equivalent with regard to demographic details. Although there were no significant differences between the groups prior to the intervention, the experimental group scored significantly higher in all items and in the total scores of both the knowledge and attitudes scales post-intervention. The experimental group demonstrated a significant within group improvement in both scales whereas the control group only improved in the knowledge scale.

There were no significant differences between the scores on either questionnaire of the different health professionals either pre- or post-intervention. However, the pattern of responses changed considerably in the experimental group as the doctors' scores remained similar, but other health professionals improved and scored higher than the doctors after training. There was no correlation within groups between the knowledge and attitudes scores, either before or after intervention.

Follow-up training: The participants' views and comments from the follow up sessions imply that the training was helpful in that it brought a working together spirit in the hospitals. Health professionals came to know their roles and the roles of others in a positive manner. Health professionals mentioned the facilities within the hospital which will help the implementation. These include free user phones available in the hospital, internal referral forms, a morning staff ward round, and flexible patients' records. They also highlighted some challenges for implementation. These include shortage of staff, and time for discussion. As suggestions, the trained health professionals stated that more training and refresher courses are needed for sustainability and to train other health professionals who were not trained in these hospitals and others.

6.5 Discussion

The results of the study provided conclusive evidence that a one day training programme can result in a large improvement in both the knowledge regarding the ICF interprofessional teamwork and attitudes towards teamwork within the Rwandan context. To a lesser extent, change was also brought about by a one hour lecture in terms of knowledge but not in attitude change. To the best of our knowledge, this is the first study on the use of ICF as a theoretical framework to inform interprofessional assessment and management by health care professionals in Rwanda (specifically in a hospital setting). There have been other studies that utilised the ICF to inform interprofessional practice in different health conditions, but these were mostly within academic rather than clinical settings (Skarakis-Doyle and Doyle, 2008; Cahill et al., 2013; Snyman et al., 2015). Furthermore, the majority of studies using ICF in interprofessional care were generally conducted in rehabilitation settings and in high income countries (Rentsch et al., 2003; Cahill, O'Donnell, Warren, Taylor, & Gowan, 2013; Bagraith & Strong, 2013; Rainey, van Nispen, & van Rens, 2014; Stallinga et al., 2014; Wijayaratne, 2015). Therefore, studies involving interprofessional training using ICF as a communicating framework in hospital settings in resource constrained environments are scarce.

6.5.1 Sample

The willingness of district hospital staff to participate was encouraging and 91% of eligible health professionals were recruited, with all disciplines included. Several of those not attending were reported anecdotally to be on leave or have other concerns. The approval granted by the local Human Research Ethics Committee and the support of both the central and local health authorities played an essential role in gaining buy-in from the health professionals. Rwanda has a relatively small pool of health professionals and the high recruitment may be a reflection of the influence that authorities have over the decision making of those employed in the public sector and possible peer pressure. There is a strong commitment to improved health care and the rebuilding of the health care system after the genocide (Ngoga, 2013; Republic of Rwanda, 2014b) and the high recruitment may have been an indication that the Rwandan public health system is ready to embrace interprofessional teamwork as a means to that end. This is a likely explanation as several respondents suggested that the training be incorporated into the training of health professionals at all levels.

The respondents were also relatively young (35.7 years, SD = 8.29) as a large number of health care professionals were trained after the 1994 genocide. Unfortunately, a large number of health care professionals trained before the genocide, while others went in exile. Therefore, Rwanda has started to rebuild its health care system after the genocide (Ngoga, 2013; Republic of Rwanda, 2014b). It was also observed that, in Rwanda, a number of health professionals upgraded their education level in other fields and changed their careers to something other than medical after some years of practice. Therefore, this explains the young age group of health care professionals working in Rwanda district hospitals. As younger people may be more responsive and open to new ideas (Walker, Perezniето, Bergh, & Smith, 2015; World Health Organisation, 2016), the age of the participants could also have contributed to the success of the programme.

Although the proportion of medical doctors and mental health workers recruited was the lowest of all professions, at least 50% did participate. This lower rate of recruitment could have been a source of bias as the traditional hierarchical view may have led to resistance to attending sessions led by a physiotherapist. It is more likely that the lower recruitment rate reflects an increased work load (there were only 19 doctors in the four hospitals). In any case, the first step in breaking down the professional silos is to get the different health professionals talking to each other about issues related to interprofessional practice which was achieved in this study.

The majority of participants in this study were female (experimental = 62.14%; control = 60.00%). It is in agreement with other studies involved in training of healthcare professionals (D'Alton & Reygan, 2011; Osakwe, Oreagba, Adewunmi, Adekoya, & Fajolu, 2013; Bain et al., 2014). This is not surprising because a large number of participants were nurses (experimental = 79.61; control = 84.00) and professional nurses are predominantly female in Rwanda. These figures are in line with other studies which employed interprofessional training in work and school environments (Grogan, Stiles, France, Speroff, Morris et al., 2004; Pare et al., 2012; Osakwe, Oreagba, Adewunmi, Adekoya et al., 2013; Turrentine et al., 2016).

The sample thus appears to have been representative of health professionals in the selected hospitals. As a similar staffing complement is deployed to most district hospitals, it is likely that the results can be generalised to all district hospitals in Rwanda.

Sample sizes in similar studies vary widely, from 35 health professionals and 59 students from family medicine, social work and nursing in a study in Quebec (Pare, Maziade, Pelletier, Houle and Iloko-Fundi, 2012) to 341 health care professionals participating in the training and completing questionnaires Osakwe et al. (2013) However, the current study was adequately powered to detect change once the design effect had been factored in and the ESS was calculated.

The randomisation process resulted in two equivalent samples and there was no significant association between gender, profession, place of work and group (experimental or control). This is not surprising as all district hospitals are generally similar in terms of health professional disciplines, services, and number of health professionals working in those services or departments. The one difference between the groups was found to be years of experience. Hinderer et al. (2016) reported a negative correlation between years of experience with knowledge and attitudes and the difference in experience may thus have introduced bias. However, there was no evidence of this as no correlation was found between years of experience and pre-intervention scores on either questionnaire.

6.5.2 Impact of training on knowledge

The pre-intervention results indicated a low level of knowledge regarding the ICF and holistic management of patients. The participants scored highest with regard to those aspects of patient management which are traditionally included in the examination of patients. These include the health condition (nearly 50% answered this section correctly), followed by functional problems with regard to limitations in activities and personal characteristics which would impact negatively on health. In contrast, those components which are part of a more holistic approach to management, such as activity limitations anticipated after discharge, participation and the impact of environmental factors were poorly understood. The pre-intervention results supported the original contention that health care in district hospitals in Rwanda did generally apply the medical model of care, rather than a more holistic bio-psycho-social approach.

It is noteworthy that physiotherapists scored higher than other professionals particularly in the experimental group. Most Rwandan physiotherapists were trained in the same institution (University of Rwanda) and are more likely to have some ICF knowledge from their education training as this is offered

during the physiotherapy programme. Despite having had previous exposure, they still scored 25% or less, which would indicate that more time should be spent on the ICF and interprofessional practice during their basic training.

The intervention resulted in an improvement in both groups, but it was significantly larger in the experimental group. This implies that the provision of a lecture and handouts does result in an increase in knowledge, but that the full day training was more effective in bringing about change. These results were not unexpected. The ICF and the concept of interprofessional practice are relatively new to Rwanda, in contrast to professionals working in HIC who may have more exposure to the ICF framework and the need for collaborative team work. As the knowledge levels were low at base-line, there was much room for improvement.

The literature also supports the effectiveness of training in improving knowledge of interprofessional practice (Woods, 2014). Papers that have reported on effective knowledge transfer through training include those by Pless et al. (2009) in their study evaluating the in-service training in using the ICF and ICF-CY and Phillips et al. (2016) who demonstrated immediate improvement in knowledge after training across all questionnaire items; Ericson, Masiello and Bolinder (2012) on interprofessional training in health care students; Bays et al. (2014) on interprofessional communication in serious diseases; Bain et al. (2014) on interprofessional training in chronic disease settings; and Zanotti, Sartor and Canova (2015) in on-field training in interprofessional education among medical students. The positive impact of the two-hour ICF introduction (Appendix xxvi) intervention supplied to the control group should not be overlooked, as it may be a cost-effective method to introduce the district health teams to the concepts of interprofessional practice and the ICF.

Interprofessional collaboration could be enhanced by strategies like interprofessional ward rounds, education, clubs, and trainings on top (Sharma & Klocke, 2014). The fact that the ICF framework provides a common language for biopsychosocial holistic patient care facilitates effective interprofessional collaboration (Pless et al., 2009). By improving knowledge, the interprofessional training can improve the collaborative health care team and the quality of care (Yamani, Asgarimoqadam, Haghani, & Alavijeh, 2014). Furthermore, the improved knowledge after training may result in both a change in attitude and in practice (Pare, Maziade, Pelletier, Houle, & Iloko-Fundi, 2012).

6.5.3 Impact of training on attitudes

Generally the baseline scores of both groups were high before the intervention, and the median was above 80% in both the experimental and control groups and above 75% in all professional groups, indicating a positive attitude towards interprofessional practice. As with the knowledge questionnaire, the experimental group demonstrated a very large improvement (over 10%) compared to the control group which did not improve. The issue of poor internal consistency in the attitudes scale was flagged during the feasibility study and this was further explored. It became clear that the items which had the largest number of “less desirable” attitudes were those that were couched in negative terms and the Cronbach’s alpha did increase once these items were removed. Analysis was rerun without these items but exclusion did not alter the main findings, i.e. that the intervention resulted in a highly significant increase in the attitude score. A further concern was the bias that might have been introduced by the analysis of the summed questionnaire items as a uni-attribute questionnaire. However, the results of individual item analysis were similar to the overall summed score analysis and we could find no evidence of systematic bias introduced by summing the questionnaire.

Although the correlations between the pre- and post-intervention scores were significant, they were small in both groups, which again raises concerns regarding the reliability of the responses. One positive finding was that the pattern of median scores across the two groups was consistent before the intervention, which might indicate that the same construct was being measured in both groups. We concluded that, although the instrument had not demonstrated high validity, the results could be accepted, particularly as the difference in scores between the two groups post-intervention was so large. However, further research needs to be done on this instrument if it is to be used in the future. The impact of negatively couching questions (i.e. least “desirable” is Strongly Agree) needs to be examined in the future as some respondents might have been confused by what could be read as a double negative.

Our findings were consistent with several studies which assessed the impact of interprofessional training in improving attitudes, although many were with health care students across disciplines (Jacobsen & Lindqvist, 2009; Ruiz, Ezer, & Purden, 2013; Ehrke, Berthold, & Steffens, 2014; Carr, 2015). The majority of these studies suggested that interprofessional training has a positive impact on attitudes. As the importance of interprofessional practice is increasingly recognised globally (Frenk et al., 2010; Nørgaard

et al., 2013; Reeves et al., 2017), it is not surprising that the attitudes of health care professionals prior to intervention were positive, both in this study and in other published research (Grogan et al., 2004; Ruiz et al., 2013; and Darlow et al., 2015). This could be a reflection of the growing acceptance of good practice, but may also be due to participants choosing socially desirable answers. The finding that respondents demonstrated less socially desirable responses to negatively couched questions in our study might indicate that it is more difficult to detect what is socially desirable in these questions.

The improvement in positive attitudes as results of interprofessional programmes has been demonstrated in several studies in various fields, but many of those studies did not have control groups. For example, a study conducted by Stone (2006) in an interprofessional education project in a rural setting revealed a highly significant change in positive attitudes among students and preceptors after intervention, but there was no control group in this study. Another study conducted by Ehrke, Berthold and Steffens (2014) demonstrated that a diversity of interprofessional interventions improved the attitudes of all the professionals among the participants in the intervention group more than in the control group. Jacobsen and Lindqvist (2009) also demonstrated a positive change in attitudes after a two-week interprofessional training programme among students from occupation therapy, physiotherapy, nursing and medicine with no control group. This was also reported by Darlow et al. (2015) in their controlled trial on the interprofessional education session in medicine, physiotherapy, dietetic, and radiation therapy students. It was also supported by Carr (2015) in his study among students from medicine, physiotherapy, social workers, and nursing who suggested that interprofessional training is the best way to improve the attitudes towards teamwork and collaborative practice.

Although there were no significant differences detected between the scores of the different professions, this may have been as a result of the small sample sizes for some professions and the large inter-quartile ranges. However, it is interesting to note that, based on the plots of the pre- and post-intervention scores for each group, medical doctors scored highest in each group pre-intervention and showed the least improvement post-intervention (approximately 4% compared to the overall improvement of 10%).

The lack of responsiveness by medical doctors to training on attitudes toward interprofessional practice has been noted by other researchers. A study conducted by Jacobsen and Lindqvist (2009) demonstrated

the change in attitude in other professionals similar to our study, but medical doctors remained almost the same despite a two-week interprofessional training. Another study conducted by Delunas and Rouse (2014) demonstrated that medical students started their career with less positive attitudes towards interprofessional care and these attitudes persisted after the intervention period, whereas other professionals' attitudes improved. This resistance to change can be a barrier to interprofessional practice because medical doctors and medical students are the ones who, in one way or another, lead a whole medical team within the hospital settings (Frank, 2007). Medical doctors should have high positive attitudes since they are the link between other professionals in having an overall vision about patient, prescription, referral for further investigation and management, and other coordination (Muller-Juge et al., 2013). Indeed, if doctors have less positive attitudes towards interprofessional collaboration, this may impact the team as well as patients' management (Hawkes, Nunney, & Lindqvist, 2013).

The current study did not find less positive attitudes in medical doctors, but rather a lack of impact of the training on their scores on the attitude scale. The nursing and other groups scored the lowest. This could have been due to confusion regarding the negatively couched phrasing of some of the questions as it is to be expected that some members of this group might not be as proficient in English or French as the medical doctors. Alternatively it could be that the training of nurses still conforms to the hierarchical medical model in which the medical doctor or physician is regarded as the undisputed leader of the team. This speaks to the need to engage nursing training institutions in similar training programmes.

The intervention appeared to be most effective for other professions and the lack of effect on medical doctors should be taken into account when future training programmes are planned. One possibility to explore is that this may relate to professional identity and professional identity formation (Vivekananda-schmidt, Crossley, & Murdoch-Eaton, 2015).

6.5.4 Relationship between knowledge and attitudes

It had been anticipated prior to the study that knowledge and attitude would be correlated and the two scales would be measuring the same construct. However, this was not the case and neither in the pre- nor post-intervention was any relationship found within the groups. This was concerning as we had

theorized that knowledge of the ICF framework would be positively related to attitudes towards interprofessional practice. On reflection, this was not as surprising as knowledge of a framework to implement holistic care does not necessarily imply a more positive attitude toward interprofessional practice. This was evident in that all professions (including medical doctors) showed a very large increase in knowledge scores from a relatively low base and the pattern of scoring across the disciplines remained the same after the intervention. On the other hand, there was a differential gain observed in the attitude scale score, with medical doctors gaining less than half the percentage points of the other professions. The conclusion made by Fabrigar, Petty, Smith and Crites (2006) suggests that knowledge may affect the attitudinal processes among psychology students. Additionally, Joukar, Mansour-Ghanaei, Soati and Meskinkhoda (2012), in their study on knowledge levels and attitudes of health care providers toward patients with hepatitis C virus infection in Iran, demonstrated that knowledge levels influence directly the attitudes. Moreover, the study conducted by McAllister, Coxon, Murrells and Sandall (2017) concluded that increased level of knowledge was associated with positive attitudes ($p < .001$).

In contrast, we concluded that the knowledge questionnaire that we developed did not measure knowledge of interprofessional practice but rather of a framework to provide holistic care, of which interprofessional practice was an integral part. The attitudes scale specifically tested attitudes without reference to a framework that could be used to realise improvement in practice. It was thus important that both scales should be used as the information that each provided was unique.

6.5.5 Study strengths and limitations

The strengths of this study included a rigorous feasibility study which led to useful amendments to the protocol, the training and the outcome measures. The randomisation selection of both the districts that were to participate and the random allocation to either experimental or control group assisted in minimising bias and the two groups were equivalent in all important variables at the start of the study. The high rate of compliance on behalf of the participants also strengthened the conclusions. All measures were marked and entered by a research assistant who was blinded to group allocation.

The major concern was the performance of the attitudes scale, as described above. If it is to be used in similar studies, it is necessary to ensure that the items are appropriate and that the reliability is

acceptable, particularly if it is to be used in LIC, such as Rwanda. The existence of sub-scales within the set of attitudinal items should be investigated. A further consideration is that, post-training socially desirable answers might have become apparent Beaulieu, Adrien, Potvin and Dassa (2014) and this could have resulted in bias towards reporting improved attitudes without a genuine change taking place. This is a problem common to many attitudes scales and it was thus necessary to include the monitoring of behaviour change in addition to the knowledge and attitude changes.

6.6 Conclusion

The main objective of this part of study was to investigate whether a training programme on the use of the ICF in clinical practice improves the knowledge and attitudes regarding interprofessional practice in selected district hospitals in Rwanda. The intervention proved to be very effective and was well received by the participants.

The importance of this study was that the ICF framework was used as the basis of training and was found to be very effective in explaining the practical nature of interprofessional practice. Bagraith and Strong (2013) and Stallinga et al. (2014) also recognised the important role that the ICF can play in elucidating interprofessional practice based on its nature of tackling different aspects of health and in improving universal communication among health care professionals. The ICF also forms the basis for the training of health professionals in interprofessional practice at the University of Stellenbosch (Snyman et al., 2015). However, this is the first time, to the knowledge of the authors, that the effectivity of this approach has been tested empirically in rural settings in a LIC.

Training clearly improves the attitude towards interprofessional practice, as measured on scales designed to measure this construct. However, “deep” or fundamental changes in attitude should be reflected in practice. It proved to be relatively easy to change knowledge and reported attitudes through training intervention. However, the real challenge was to alter behaviour and the impact of the intervention on daily practice is examined in the next chapter.

CHAPTER 7. RCT – RESULTS AND DISCUSSION OF THE AUDITING PATIENTS' RECORDS

7.1 Introduction

The interprofessional training using the ICF framework as a collaborative tool was found to be effective in improving both knowledge and attitudes in the intervention group as described in the previous chapters. However, the impact of the training on behaviour still needed to be determined. This chapter presents the impact of the training on behaviour and practice, as reflected by the degree to which the documentation of patient management in their hospital records reflected important elements of both interprofessional teamwork and holistic patient management.

The questions that are addressed in this chapter include:

1. Did a one day training intervention improve the interprofessional management in the short term, as reflected in the documentation of the patients' management in their records two months after training?
2. Was improvement maintained at four months if there was a “booster” follow up training session provided at two-month?
3. Was the improvement sustained a further two months later in the absence of any further training sessions, i.e. at six-month after the initial training session?

7.2 Aim and objectives

The primary aim of this section of the study was thus to determine whether the initial and two month follow-up sessions improved the behaviour of health care professionals working in selected district hospitals in Rwanda, as reflected by more comprehensive documentation of holistic management in patients' records . A further aim was to establish whether the practice, if improved, was retained for six months after the initial training session.

As described in chapter 3 (3.7.4) a checklist was developed to score the number of items reflecting holistic practice documented in the patients' records. The specific objectives of the study were:

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- To determine whether there was a significant difference in score on the checklist between the control and intervention group at two, four and six months after the initial training session.
 - To determine whether there was a significant difference in score between the different wards.
 - To determine the change over time in both groups with respect to the scores on the checklist.
 - To determine whether retention of good behaviour (if any) was maintained at four-month and six-month after the initial training session.
 - To compare the expected drop-off rate of the scores between the four sites.
 - To establish whether there was a difference in the checklist scores between different conditions.

At each time period, baseline, two-month, four-month and at six-month, 200 patients' records were drawn at each hospital, a total of 1,600 records. Due to expected redundancy of information and time constraints, demographic information was only collected at the four-month data collection point from 400 patients' records. Data regarding the performance on the auditing patients' records measure was collected at each time point. Details of the methodology have been described in chapter 5.

7.3 Results

7.3.1 Health professional participation

It was necessary to ascertain whether the staff members who had originally been allocated to the control and experimental groups remained in employment in the same hospitals to ensure that those delivering care during the six months of the study were those that had been recruited and trained at baseline. Six months after the start of the trial, nine of the original group of health professionals had left the employ of the experimental group and seven had left the control group hospitals. Table 35 indicates a slight decline of participants at every two-month interval. The highest decline was seen among medical doctors particularly at six months in the control group.

Table 35: Participants through the study across the groups and professions (from baseline to six months)

Group	Profession	Baseline	2month	%	4month	% of original group	6month	% of original group
Experimental	Medical doctors	5	5	100	4	80	4	80
	Nurses	83	80	96.39	77	92.8	76	91.6
	Physiotherapists	5	5	100	5	100	5	100
	Social workers	5	4	80	4	80	4	80
	Mental health	2	2	100	2	100	2	100
	Nutritionists	3	3	100	3	100	3	100
	Total Experimental	103	99	96.1	95	92.2	94	91.3
Control	Medical doctors	6	6	100	5	83.3	4	66.7
	Nurses	80	80	100	79	98.8	77	96.3
	Physiotherapists	4	4	100	4	100	4	100
	Social workers	5	4	80	4	80	4	80
	Mental health	3	2	66.7	2	66.7	2	66.7
	Nutritionists	2	2	100	2	100	2	100
	Total Control	100	97	97	96	96	93	93
Total	203	196	96.6	191	94.1	187	92.1	

Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

7.3.2 Demographic and diagnostic details from the four month sample of patients' records

The demographic and medical conditions of patients whose folders had been drawn were compared for the control and experimental group to test for equivalence between the two samples. The mean age of the group was 32.5 years (SD=24.8) and there was no significant difference between the ages of the control and experimental groups ($p=.828$). The histograms indicate that more than 25% of both samples were under the age of ten years (Figure 28).

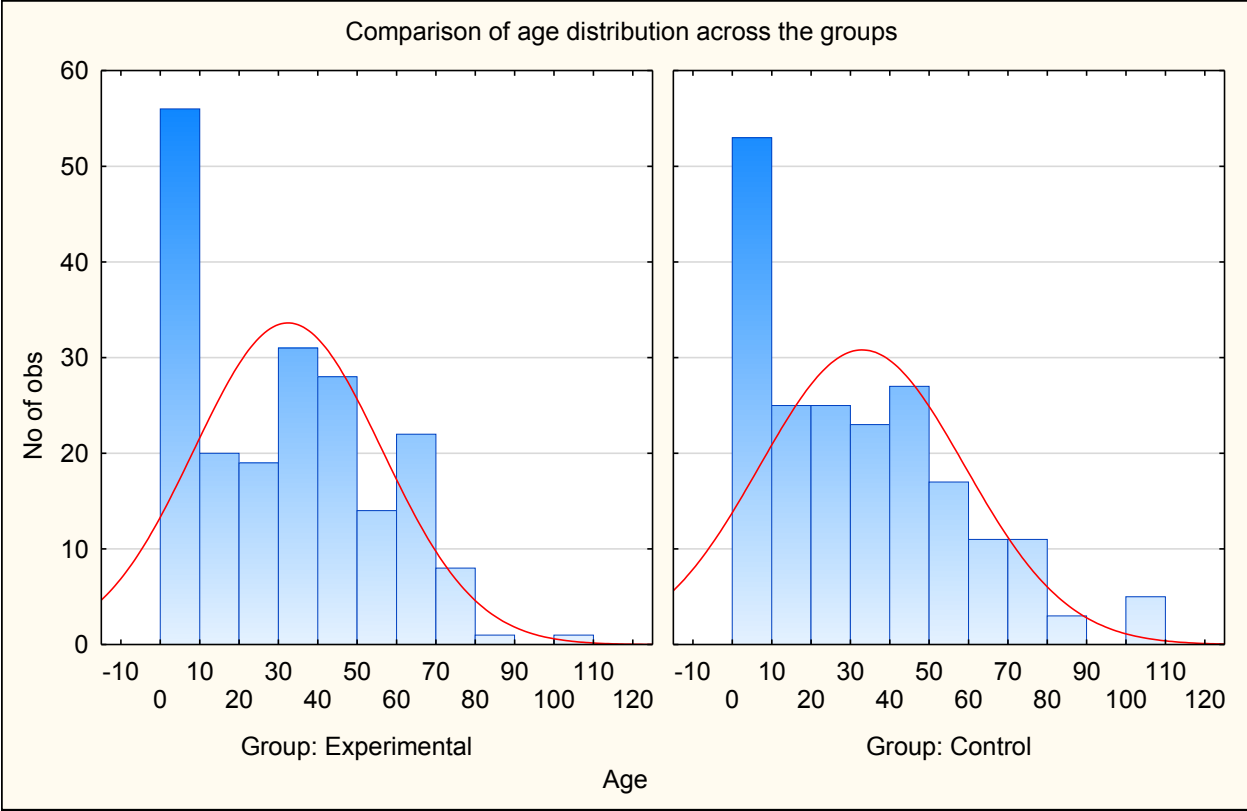


Figure 28: Comparison of age distribution across the groups

There were more males in the control group (55.7%) compared to the experimental group (44.3%) and gender was significantly associated with group ($p=.023$). See Table 36.

Table 36: Frequency table for gender distribution across the groups

Gender	Group Experimental	Group Control	Row Totals
Female	112	87	199
Row %	56.30%	43.70%	
Male	80	108	196
Row %	44.30%	55.70%	
Totals	200	195	395

N Experimental group = 200, N of control group 195, 5 missing. Chi Sq=7.57, p=.023

As presented in Table 37, malaria was the most common diagnosis/condition followed by fractures.

Table 37: Frequency table of diagnosis/conditions

Diagnosis/Conditions	Frequency	%
Malaria	86	21.5
Fractures	58	14.5
Gastro-intestine disorders	51	12.75
Musculoskeletal disorders	50	12.5
Lower respiratory tract infection	45	11.25
Wound	29	7.25
Mental disorders	27	6.75
Cardio-vascular disorders	14	3.5
Neurological condition	11	2.75
Metabolic disorders	11	2.75
HIV related conditions	10	2.5
Genito-urinary conditions	5	1.25
Upper respiratory tract infection	3	0.75
Total	400	100

Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

7.4 Baseline and two month scores

7.4.1 Comparison across experimental and control groups

A total of 200 patients' records were examined in the experimental and 200 in control hospitals. Of these, 70 were from the medical, 60 from the paediatric and 70 from the surgical wards in each group. One hundred and forty were thus adults and 60 were children in each group. Table 39 below lists the frequency and percentage of correct responses categorised by the ICF domain. The items with the highest completion rates were those related to demographic information, such as gender and age, medical conditions and impairments. The difference between baseline and two months indicates that the experimental group improved in practically every domain and showed the highest difference in positive responses in the Interprofessional practice domain. The control group demonstrated a small improvement in some domains, but also a decrease in the number of patients' records which included marital status, patient occupation and referral to other services items.

Table 38: Correct responses categorised by ICF domain by group

		<i>Experimental</i>					<i>Control</i>				
		Pre-	Pre-	Post-	Post-	Dif	Pre-	Pre-	Post-	Post-	Dif
		N	%	N	%	%	N	%	N	%	%
Demographic information & personal factors	Patient record number	200	100	200	100	0	200	100	200	100	0
	Patient's name	199	100	200	100	0	200	100	200	100	0
	Patient's gender	193	97	200	100	3	182	91	177	89	-2
	Date of birth/age	199	100	200	100	0	181	91	182	91	0
	Address	198	99	200	100	1	175	88	182	91	3
	Marital status (30 paediatric not applicable in each group)	123	88	128	91	3	119	85	104	74	-11
	Medical aid/No medical aid	185	93	186	93	0	164	82	170	85	3
	Patient occupation	89	64	118	84	20	96	69	81	58	-11
	Level of education	0	0	0	0	0	0	0	0	0	0
	Admit date	199	100	200	100	0	195	98	196	98	0
	Discharge date	182	91	200	100	9	192	96	199	100	4
	Personal factors including mental and spiritual needs	32	16	65	33	17	22	11	35	18	7
Health condition	Health condition and diagnosis	175	88	194	97	9	175	88	180	90	2
	Symptoms	167	84	181	91	7	161	81	171	86	5
Impairment	Impairment addressed	110	55	147	74	19	65	33	73	37	4
	Assessment of impairment	133	67	144	72	5	103	52	126	63	11
Activity limitation	Impact of condition on functioning	18	9	55	28	19	19	10	27	14	4
	Functioning addressed	13	7	46	23	16	19	10	28	14	4
Environmental factors	Environmental factors addressed	1	1	20	10	9	3	2	15	8	6
	Preventive measures of recurrence of health condition or complications related to condition	5	3	41	21	18	21	11	19	10	-1
	Impact of environmental factors	4	2	33	17	15	5	3	14	7	4
	Health condition managed in context	17	9	61	31	22	29	15	31	16	1
Inter-professional practice	Referral to other services	13	7	55	28	21	50	25	20	10	-15
	Discharge note	87	44	155	78	34	88	44	97	49	5
	Referrals to other disciplines	19	10	74	37	27	32	16	38	19	3
	Case managed by different professionals	9	5	85	43	38	21	11	28	14	3
	Health professional team identified	6	3	75	38	35	15	8	24	12	4
	Health professionals treating the patient have documented	5	3	74	37	34	16	8	24	12	4

Blue colour: Very low frequency, Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

At baseline, the mean number of items correct was not significantly different between the two groups ($p=0.424$). At two months post-intervention, the experimental group had improved by 13.8% and the control group increased by .7%. The difference between the two groups was highly significant ($p<.001$) (Table 39).

Table 39: Difference between the mean number of items filled in

Correct	Mean items correct: Experimental	Std. Dev.	Mean items correct: Control	Std. Dev.	t- value	df	p
Pre	47.3	7.2	46.7	7.5	0.80	398	0.424
Post*	61.1	10.4	48.4	7.6	13.96	363.0	<.001

**Tested with separate variances*

As mentioned, the items in which the greatest improvement was noted in the experimental group were related to interprofessional practice, followed by improved reporting on environmental factors, and participation and activity limitations (Table 40). As most of the demographic information was complete at baseline, there was no improvement in these items.

Table 40: The items with greatest improvement at two months after intervention

ICF domain & IPP	Items	Post-Pre difference (Experimental)	Post-Pre difference (Control)
Interprofessional practice (IPP)	Case managed by different professionals	38	3.5
IPP	Health professional team identified	34.5	4.5
IPP	Health professionals treating the patient have documented	34.5	4
IPP	Discharge note	34	4.5
IPP	Referrals to other disciplines	27.5	3
Environmental factors	Health condition managed in context	22	1
IPP	Referral to other services	21	-15
Participation restriction	Occupation	20.7	-10.7
Activity limitation	Impact of condition on functioning	18.5	4
Impairment	Impairment addressed	18.5	4
Environmental factors	Preventive measures of recurrence of health condition or complications related to condition	18	-1
Personal factors	Personal factors including mental and spiritual needs	16.5	6.5
Activity limitation	Functioning addressed	16.5	4.5
Environmental factors	Impact of environmental factors	14.5	4.5
Environmental factors	Health condition and diagnosis	9.5	2.5
Health condition	Environmental factors addressed	9.5	6
Demographic information	Discharge date	9	3.5
Health condition	Symptoms	7	5
Impairment	Assessment of impairment	5.5	11.5
Demographic information	Marital status	3.6	-10.7
Demographic information	Gender	3.5	-2.5
Demographic information	Address	1	3.5
Demographic information	Name	0.5	0
Demographic information	Age	0.5	0.5
Demographic information	Medical Aid/ No medical aid	0.5	3
Demographic information	Education	0.5	0
Demographic information	Admission Date	0.5	0.5
Demographic information	Record Number	0	0

Green colour: low frequency, Yellow colour: moderate frequency, Red colour: highest frequency

7.4.2 Comparison across wards

As can be seen in Figure 29, in the control hospitals, the scores in the paediatric wards were lower and the CIs did not overlap with those of the medical wards either at baseline or two months. In contrast, there was no difference between the scores of the wards in the experimental group, either at baseline or at two months. In the experimental group the medical ward patients' records showed the greatest improvement.

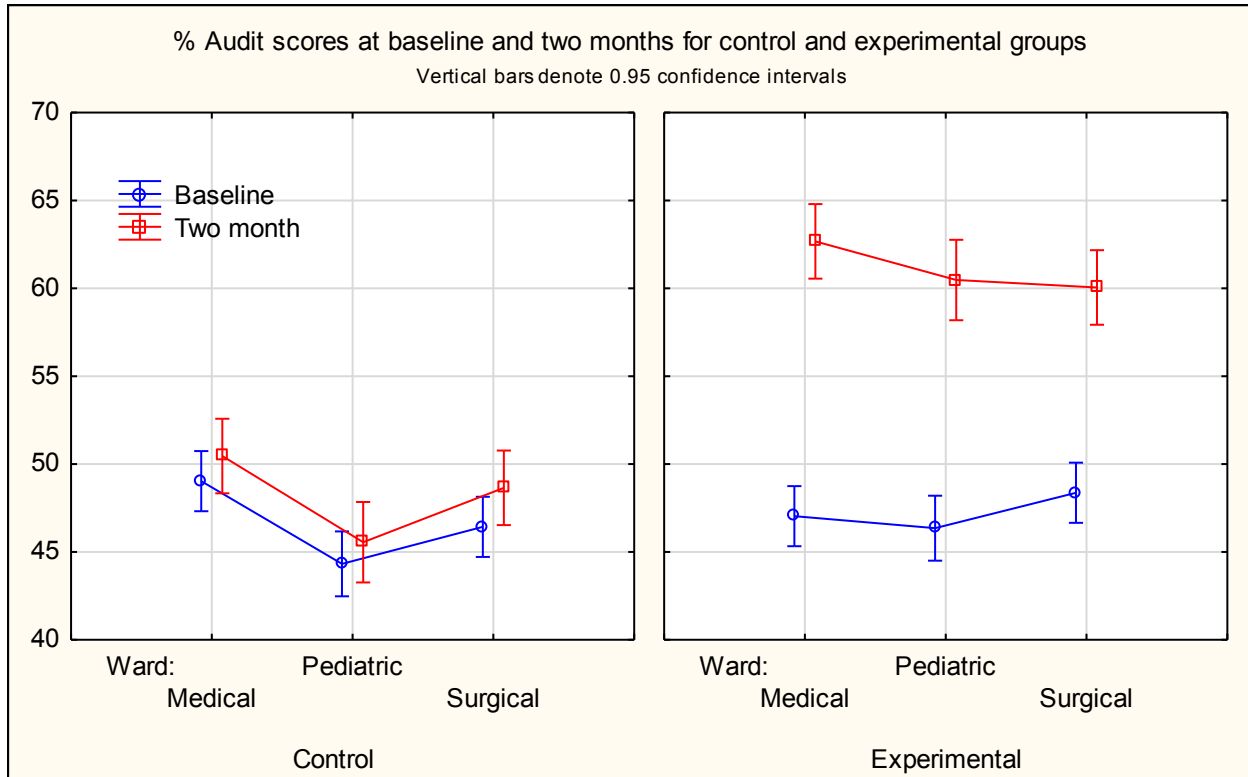


Figure 29: Comparison of audit scores across the wards

7.5 Performance related to health condition

Figure 30 below illustrates the comparison of health condition scores across the groups. The experimental group scored better in metabolic and neurological conditions, whereas the control group scored the same in all conditions (all CIs overlapped). The experimental group scored higher in malaria, metabolic disorders, mental disorder, wounds and musculoskeletal disorders.

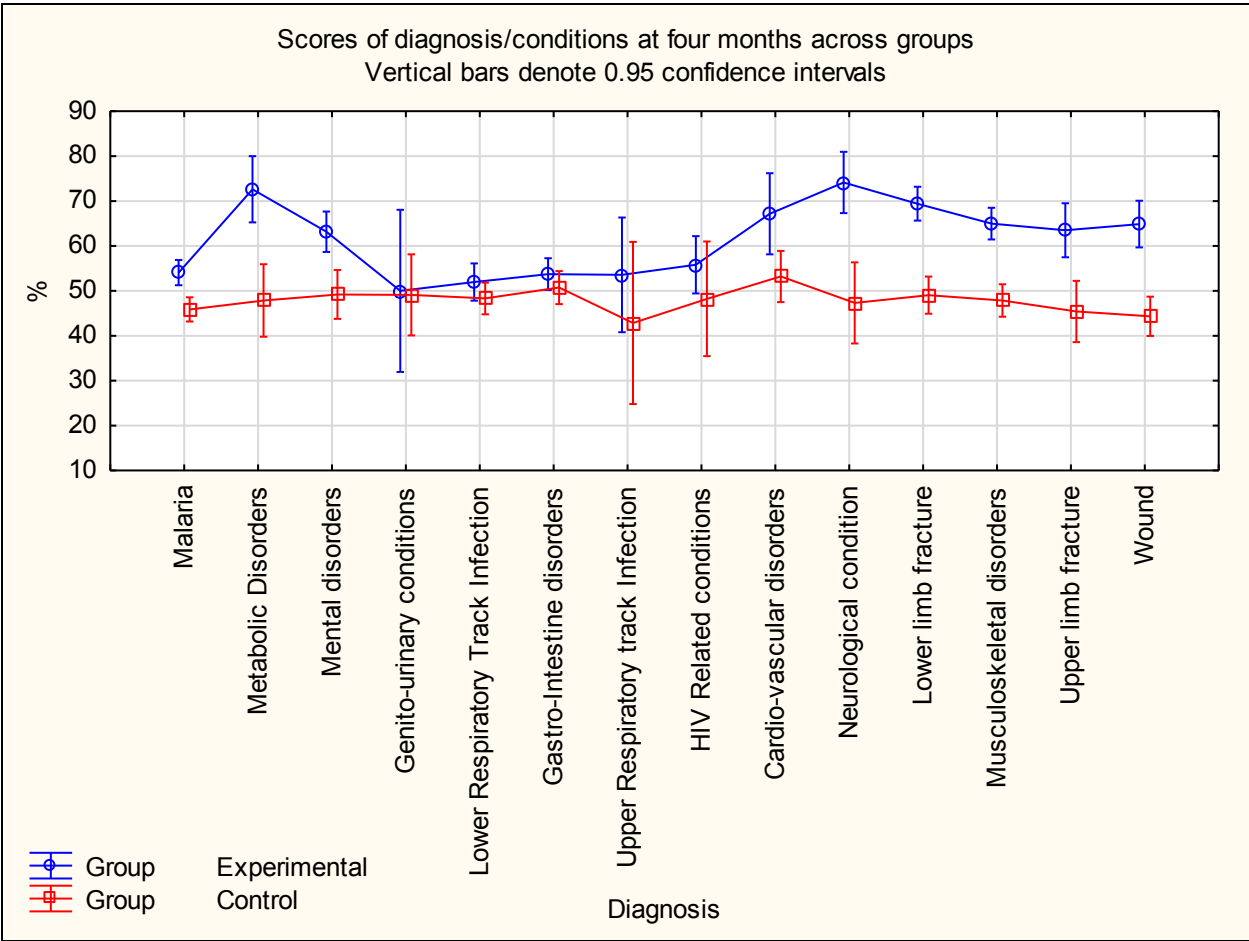


Figure 30: Comparison of scores of health conditions between groups

7.6 Longitudinal results

7.6.1 Comparison of groups

Repeated measures ANOVA was done to compare the scores across the different time periods at the four sites. These were significantly different ($F(9, 1188) = 20.444, p > .001$) (Figure 31). The post-hoc Tukey test indicated that there was no difference in baseline measures ($p = .990$) but the difference between the groups was significant at $p < .001$ level for every post-intervention score at 2, 4 and 6 months.

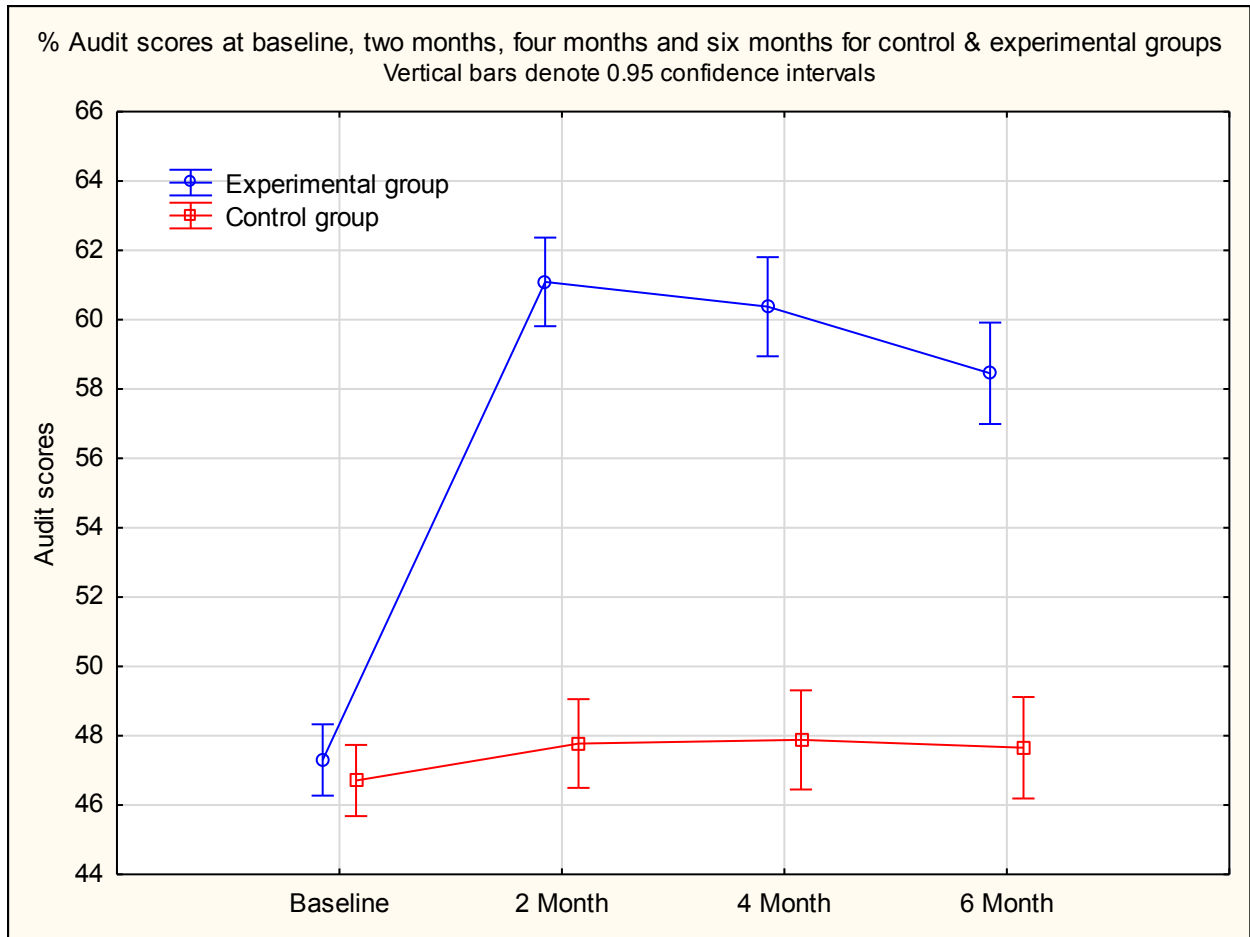


Figure 31: Audit of scores of experimental and control group at different occasions

7.6.2 Comparison across the four sites

When the different sites were compared using ANOVA, the difference was also significant ($p < .001$) (Figure 32).

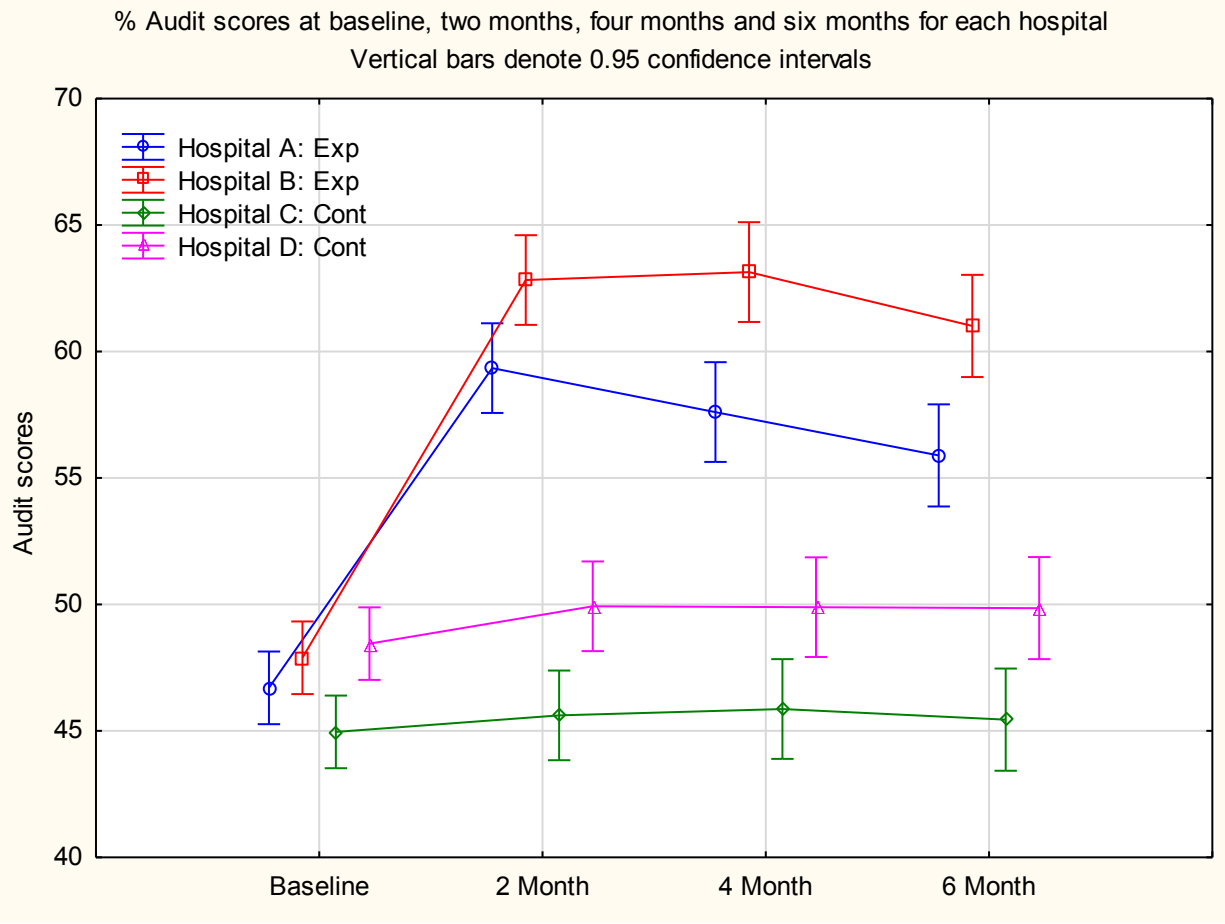


Figure 32: Scores across the different time periods at the four hospitals

A post hoc Tukey indicated that at baseline there was no difference between the scores at the four sites. The two control groups remained at the same level and there was no difference in their scores over time; however, from the 2-month assessment they were significantly lower than the experimental group. The comparison of the two experimental groups is given in Table 41 below. There were no differences at 2 months; however, Hospital A appeared to retain the improved performance better than Hospital B as there was a significant difference between the four and the six month scores.

Table 41: Comparison of performance between two experimental groups: p values

Site	%	A Baseline	A 2month	A 4month	A 6month			
A Baseline	48.7							
A 2month	59.4	<.001						
A 4month	57.6	<.001	0.970					
A 6month	55.9	<.001	0.110	0.970				
		B Baseline	B 2month	B 4month	A Baseline	A 2month	A 4month	A 6month
B Baseline	47.9				1.000			
B 2month	62.8	<.001			<.001	0.350		
B 4month	63.1	<.001	1.000		<.001		<.001	
B 6month	61.0	<.001	0.960	0.860	<.001			<.001

7.7 Discussion

In summary, the experimental group hospitals showed a large improvement in the number of items documented in the records, particularly in the domain of interprofessional practice and the ICF components. This improvement was retained for six months, although the one experimental group hospital showed more decay in performance than the other. The improvement in scores was highest for conditions likely to need rehabilitation, such as fractures and neurological disorders.

7.7.1 Samples

As the retention of participants throughout the study is essential for the retention of improved knowledge and practice (Crofts et al., 2013), it was encouraging to note that only four of those who had received baseline training did not attend the two month session. This may reflect continuing interest in and support for interprofessional practice and holistic patient management. The relatively low attrition over the six months of the health professionals who were recruited at baseline (less than 8% in both experimental and control groups) is a reflection of the low staff turnover in the district hospitals. The attrition rate was low compared to the study conducted by Green and Curry (2014) where only 60% of the medical doctors completed the three month follow up after a one day simulation training on haemorrhage management. It was also lower than in the study conducted by Crofts et al. (2013) where

70% of participants completed the study after 12 months post training on interprofessional obstetric emergency; and Smith et al. (2015) in hands off training for medical students where only 61% completed the follow up after the intervention. As discussed in the concluding chapter, this high compliance may be a reflection of the endorsement of the study by the Health Ministry authorities.

This is important as it indicates that not only were the same personnel responsible for patient management over this period but also that, in the long term, similar training programmes would not need to be repeated more than on an annual basis.

With regard to the patient record samples, the homogeneity of the district hospitals ensured that the stratified random sampling resulted in two samples which were equivalent in most respects, apart from gender, which was unlikely to influence the results. Generally, apart from the City of Kigali, all district hospitals in Rwanda have similar services or departments and the admission capacity is almost the same. According to the Rwanda Ministry of Health (2013), district hospitals had an average capacity of around 160 beds.

The sample of this study was somewhat smaller than the retrospective patients' records audit conducted by Pourasghar, Malekafzali, Ellenius and Fors (2008) who used a random sample of 300 records in one hospital, and that of Baines, Bruijne, Langelaan and Wagner (2013) who employed a stratified sampling technique in 20 hospitals in Netherlands, where 200 records were included. The samples used in these studies were larger possibly due to the large population and the long period of data collection. However, the sample used by Langelaan, Baines, Bruijne and Wagner (2017) in their study on association of admission and patient characteristics with quality of discharge letter similarly accessed the discharge records of 100 randomly selected patients. Considering the bed capacity, and the discharge rate at each hospital, it is likely that the current sample was an adequate representation of the patient records in the district hospitals.

All age ranges were represented but the mean age was younger and there were a larger proportion of children compared to other studies. Sommella et al. (2014) reported a mean age of 60 (SD=19) in a study based in an Italian acute hospital and only 0.6% were children and Baines et al. (2013) in retrospective patients' records in a Dutch hospital reported a mean age of 60 years (SD=20.7). As 40% of the

population of Rwanda is under 14 year of age (Index Mundi, 2016), it is not surprising that the age of the current sample was less than that reported in other countries.

The conditions were likewise representative of the Rwanda health situation. The predominant health condition was malaria in all hospitals. This was not surprising because this study was conducted during the period when malaria was endemic in the Rwandan health sector. According to USAID (2016) malaria accounted for 76% of cases received in Rwanda district hospitals, especially in the Eastern province from which two hospitals that participated in this study were drawn (one experimental and one control).

7.7.2 Immediate impact of training on behaviour

The primary outcome of this section of the study was improved interprofessional practice within the district hospitals and comprehensiveness of the patients' records. It can be concluded that the one-day training in ICF and interprofessional collaborative practice improved the practice as demonstrated by the increased number of correct responses categorised by the ICF domain. The weakness of the study is that it was assumed that improved documentation would reflect improved practice. Whereas this is a pragmatic solution to the problem of monitoring clinical performance, which may only be validly measured through observation of clinical practice, it could be that the practice remained the same but only the documentation improved in the experimental group hospitals.

However, it is clear that the documentation of all aspects of patient care did not improve in a uniform manner. For instance, the items more associated with the medical model of care, i.e. demographic information such as gender, age, medical conditions and, to a lesser extent, impairments remained more or less constant or improved slightly. This is likely to be a reflection of the use of a standardised patient record which was designed to harmonise the assessment and management across the county. The demographic information and vital signs were routinely taken by nurses on admission before the patient was examined by a medical doctor, so these items might have demonstrated a ceiling effect as they were taken frequently even before intervention. Similarly, the items related to health condition and impairment (to a lesser extent) are important within the medical model which was mostly used in the Rwandan health system. These items did not demonstrate as much improvement as they were also documented frequently before intervention.

The items in which the greatest improvement was noted in the experimental group were related to interprofessional practice, followed by environmental factors, participation and activity limitations. The items related to activity limitation and participation restriction demonstrated a considerable positive change after intervention, not only in the assessment of the impact of the health condition on functioning but also in the management of functional problems. There was also a greater awareness of environmental factor information, the need for education to prevent recurrence of health conditions and complications, and health condition management. This rather impressive improvement can be attributed to several factors. The programme was well received and the participants were actively engaged in identifying methods to improve practice.

One of the methods was to include discipline-specific notes in the patients' records, including physiotherapy. This resulted in the physiotherapy assessment of functioning being included in the ward records, which would have improved the scores for the items related to functioning. In addition, it might have raised the awareness of all team members of the impact of the different health conditions on functioning. The influence of rehabilitation input may also explain why the conditions that are most likely to need rehabilitation, such as fractures, musculoskeletal conditions and neurological conditions, showed the highest scores post-intervention. In addition, these conditions are the most likely to need more holistic care.

It was disappointing to note that the management of patients living with HIV (PLWH) conditions did not show a large improvement. This is in agreement with the study conducted by Kagwiza (2014) who reported a large range of functional limitations associated with other problems which are not taken into account during management of PLWH in Rwanda. Although Kagwiza's study exclusively addressed the problems faced by PLWH in an out-patient setting, it appears as if the situation has not improved for those admitted with associated illnesses.

The most improved items relating to interprofessional practice included documentation of referral to other services, discharge notes, referral to other disciplines, case managed by different professionals, and identification of the health professional team treating the patient. Based on these findings, one may suggest that the interdisciplinary/interprofessional approach was infrequently used in Rwandan district hospitals and was improved by a one-day ICF and interprofessional training. This situation was noted by

Kagwiza (2014) who highlighted the need to promote interprofessional collaboration based on a bio-psychosocial approach to reinforce referral within the hospital system in the Rwanda district hospitals.

Various studies have been carried out which also displayed positive effect of training on behaviour or skills of health professionals in the workplace. A study conducted by Ammentorp et al. (2007) demonstrated that a 34-hour training in communication skills improved nurses' and doctors' ability to successfully handle communication tasks that they face in their everyday practice and improved collaborative practice. Other studies supporting improved interprofessional collaborative behaviour post intervention were conducted by Fernandez-Olano et al. (2008) and Creutzfeldt, Hedman and Felländer-tsai (2012) among medical students, and Perron et al. (2014) among clinical supervisors from different professions. The adoption of interprofessional collaborative practice in Rwandan district hospitals would enhance a bio-psychosocial approach to patient care, which falls under the mission of the Rwanda Ministry of Health by providing preventive, curative and rehabilitative health care (Rwanda Ministry of Health, 2014). Although the dissemination of a pamphlet on the ICF and a short lecture did not result in any change in behaviour, it is gratifying that a training period of such a short duration can assist in meeting these goals.

Comparing the scores of the experimental and control groups before and after intervention across the wards, it was found that the paediatric wards scored lower than the medical and surgical wards at baseline in both experimental and control groups. This implies that interprofessional collaboration was poor in paediatric wards before the intervention. It may be that the length of stay in paediatric wards is mostly shorter than the surgical and medical wards as respiratory and gastro-intestinal disorders, such as diarrhoea, are common in this age group. Alternatively it might be that the medical model is mostly dominant in paediatric rather than adult care. Although there may be fewer functional limitations in the paediatric ward, the effect of environmental conditions may not be adequately addressed. In future training sessions, it might be useful to emphasise the need for interprofessional teamwork in the management of children and PLWH specifically.

The greatest improvement was evident in the medical wards post-intervention. It may be that medical wards admit patients with a diversity of complex health conditions, including co-morbid chronic conditions and neurological deficits, which are likely to require interprofessional collaborative practice

for optimum management. Apart from the inclusion of therapy notes in the main folders, the improvement may also be attributed to the large number of health care professionals from medical wards, especially nurses. This is borne out by Figure 29 which illustrates that the improvement in scores was highest in the medical wards (37 participants), followed by the paediatric wards (29) and the surgical wards (20).

7.7.3 Retention of desirable behaviour at 4-month and 6-month

It was clear that the experimental group improved remarkably after the intervention, but Figure 31 illustrates that the good behaviour demonstrated by scores at two-month declined gradually at four-months and, more so, between four and six months. Further analysis by site indicated a difference in the pattern of retention between the two experimental group hospitals. The two-month refresher course offered to the experimental group appeared to prevent the decay in Hospital B and, in fact, increased performance slightly for the following two months. In Hospital A, on the other hand, the refresher course did not slow decay of performance, which decreased linearly and was significantly below Hospital B at four and six months. It is apparent that the training on its own is insufficient to maintain improved behaviour and that there are contextual issues, which were not explored in this study, which also need to be addressed. These might include support from the management, the personal characteristics of the personnel involved (possibly medical doctors particularly), work load and general morale in the hospital.

The retention of improvement up to six months has been reported previously by Ammentorp et al. (2007) in their RCT assessing the effect of training in communication skills among nurses and medical doctors and Olsen et al. (2015) in the quasi-experimental trial among physiotherapists in clinical placement. However, these studies employed questionnaires which focussed on knowledge retention rather than skills which may be maintained for a longer period. Our study was unique in testing observable behaviour and the decline noted in Hospital B indicated that skills may need more refresher courses and consistent field training over time. It has been noted previously that performance in skills gradually decline after months following intervention (Smith et al., 2015). This implies that ongoing training should be emphasised in order to maintain the gained skills after the initial training in a workplace.

7.8 *Study strengths and limitations*

The selection of both the districts that were to participate and the allocation to either experimental or control group used random sampling which increases the external validity of the study. In addition, a stratified random sampling was used to select patients' records in paediatric, surgical and medical wards in order to minimise bias and the groups were equivalent at baseline. This study used a sample which was sufficient to measure all the variables of interest. All measures were marked and entered by a research assistant who was blinded to group allocation.

A concern was that random selection of patients' records was not directly proportional to the total number of the available patients' records in the ward as the number of beds in each department could not be determined and standardised prior to the study. The proportion was thus estimated based on the researcher's experience that medical and surgical wards tend to be slightly larger than the paediatric wards. However, the sample size of this study was larger than expected to prevent Type II errors from occurring due to various confounding factors.

Another concern was the lack of testing for stability (test-retest) of the knowledge questionnaire. However, the inter-rater reliability was employed by two markers, independently, entered the responses from the selected questionnaires filled by participants in order to determine the correlation between the observers. A big concern in this questionnaire was to test if the answers can be marked in the same way by different people, because these were open-ended questions whereby every correct answer was given one mark. The Intra-class correlation for absolute agreement indicated excellent agreement. The internal consistency was also calculated and the questionnaire displayed an acceptable internal consistency.

The major weakness, as discussed above, was the assumption that documentation in the records was a valid reflection of the behaviour of the health personnel with regard to interprofessional teamwork and holistic care. The auditing patient record checklist used in this study was developed using a rigorous methodology and displayed excellent content validity and good internal consistency or reliability. However, the construct validity could not be tested as there was no "gold standard" by which to measure the instrument. Although it is a reasonable assumption that improved documentation reflects improved practice, this may not be the case. Further studies could include patient interviews or

observation of clinical practice, such as included in the RCT by Boulton et al. (2008), both of which, however, could present logistical and ethical difficulties.

7.9 Conclusions

The main objective of this part of the study was met and the training sessions were found to improve the behaviour of health care professionals working in selected district hospitals in Rwanda in terms of comprehension patients' records. In addition, the improved documentation was retained for up to six months. However, the impact of the training was different between different patient groups and between the two hospitals that participated in the study. Patient groups which did not appear to benefit included, worryingly, both PLWH and paediatric patients. The one hospital clearly demonstrated a greater improvement and retention of improved practice and the reasons for this are unclear but would need further investigation.

It is concluded that a one day training on IPP based on sound educational principles and using the ICF conceptual framework, followed up at two months with a refresher course, was effective in improving interprofessional practice and holistic care in Rwandan district hospitals for up to six months. It is thus suggested that the training be rolled out to district hospitals and that the ICF conceptual framework could be introduced as a model for IPP at training institutions.

CHAPTER 8. CONCLUSION AND RECOMMENDATIONS

8.1 *Summary of thesis*

The Lancet Global Independent Commission identified the need for health care reform which should be based on “interprofessional education that breaks down professional silos while enhancing collaborative and non-hierarchical relationships in effective teams” (Frenk et al., 2010, p.1950). The ICF has been found to be a useful potential framework to facilitate interprofessional collaborative practice by providing a common language (Kohler et al., 2013). Therefore, ICF was utilised in this study as a theoretical framework to inform interprofessional collaborative practice.

This study consisted of two phase. The first consisted of a feasibility study and the second was a Cluster Randomised Control Trial (CRCT). The feasibility study aimed at developing and examining the validity and reliability of the outcome instruments responsive to changes in knowledge, attitudes of health care professionals, and changes in behaviour as demonstrated in comprehensive patients’ records; and determining whether it would be possible to run the intervention programme as planned. The CRCT aimed at determining whether training using the ICF to inform interprofessional assessment and management within hospital settings in Rwanda would result in improved knowledge, attitudes and behaviour with regard to interprofessional practice and the holistic provision of care. This is the first time, to the knowledge of the authors, that the effectiveness of this approach has been tested empirically in a rural hospital setting.

We set out to answer different questions and the conclusions relating to each of these are discussed below:

8.2 *Research questions*

- *“What instruments would be valid and reliable in terms of monitoring change in knowledge, attitudes and behaviour with regard to implementation of interprofessional practice?”*

Measures were developed to monitor changes in knowledge and attitude, to gauge the satisfaction with the training programme and to determine changes in behaviour as demonstrated by more comprehensive documentation in patient records. One of the strengths of the study was the rigor with which all these instruments were modified, validated and subsequently translated. They were all

developed after an extensive literature review and the content validity was established with the support of international panels of experts. The psychometric properties were determined during the feasibility study and amendments were made as needed. In addition, the inter-rater reliability of the audit checklist was high. The outcome measures to be used in the main study demonstrated content validity and varying degrees of internal consistency or reliability. The final versions were used in the RCT after reformatting according to the comments given by experts or deleting the items with poor CVI, IC and ICC. In addition, the outcome measures showed stability and consistency across wards in the control group on pre- and post-testing (not specifically tested but evident in the ANOVA graphs) and responsiveness to change in the experimental group. This study suggests that the developed and modified measures to monitor knowledge, attitudes and for the clinical audit can thus be used with confidence in similar studies and settings. The training satisfaction questionnaire is generic and could be used to obtain feedback on health professional training programmes.

- *“What would be an appropriate and effective manner in which to train medical personnel in the use of the ICF to inform interprofessional practice (IPP)?”*

The training programme was developed through a process of extensive literature review, consultation with educational experts, which included establishing the content validity of the training, and pilot testing followed by cognitive debriefing of the participants. It was established prior to the initiation of the RCCT that the programme, as amended following input from the pilot study participants, would be acceptable to all levels of health professionals. The content was acceptable but the length of time was decreased to one day and the course was to be offered twice in each experimental group hospital to accommodate the work load of the participants.

A feasibility study was carried out at a district hospital prior to the main study. It yielded convincing evidence that the intended intervention was appropriate for further study. This phase answered the first question “Can this study be done?” strongly in the affirmative. It was concluded that the time needed to collect and analyse data, willingness to participate, availability and suitability of data, duration of training, and testing the validity and responsiveness of the outcome measures were appropriate. The feasibility study was also to determine if patients’ records could be accessed and whether the audit tool was reliable.

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- *“Would training in the value and practice of IPP, using the ICF as a guiding framework result in an improvement in the knowledge, attitudes and practice of health care workers in district hospitals in Rwanda?”*

The main objective of this part of the study was to investigate whether the training would improve the knowledge and attitudes, but most importantly, the interprofessional practice in randomly selected district hospitals in Rwanda. The intervention proved to be effective and was well received by the participants. Based on the findings of this study, it is clear that knowledge on ICF and IPP was lacking among health care professionals working in district hospitals in Rwanda at baseline but these improved significantly after training. The ICF was found to be an appropriate channel for communication and collaboration among health professionals.

In addition, there is promising evidence that interprofessional and practice and more holistic care (addressing functional problems and contextual factors) can be facilitated within district hospitals through a relatively inexpensive and short intervention. Eventually, biopsychosocial or holistic care might supersede the medical model of care if functional problems and environmental factors are consistently taken into account during assessment and management of all patients. Actually, IPP occurs when health professionals from different disciplines with different backgrounds provide patient care together and work closely with each other to deliver the optimum health care (World Health Organization, 2010a).

- *“If an improvement in practice does occur following a training programme, does retention occur after two months? Is the good practice sustained if a two-month follow-up training session is offered? Is this good practice sustained up to six months after the initial training?”*

At six months, the experimental group members were still performing significantly better than the control group but the difference between the two experimental group hospitals became more apparent. This indicates that, although the training may be effective, contextual factors also play a role in continued compliance. The barriers to IPP need to be further investigated and addressed. As there was some evidence of decay in performance in both groups, annual training programmes may be necessary to maintain an acceptable level of practice.

8.3 Overall strengths and weaknesses

One of the strengths of the study was the rigour with which the outcome measures were developed and their psychometric properties tested. The pilot testing and feasibility study also contributed to the success of the intervention. The Cochrane Review noted the lack of “preliminary studies to optimise the IPE interventions and evaluation strategies. IPE interventions are complex, multifaceted interventions in which the components may act both independently and interdependently. Guidance on the development and testing of complex interventions stresses the importance of stepwise work to understand the context for the intervention fully, and optimise the design and implementation of the intervention and evaluation before proceeding to a trial” (Reeves et al., 2013, p.15). In the current research, the feasibility study did lead to important changes in the design and outcome measures of the main RCCT.

As noted previously, more diverse measures of behaviour change could have been incorporated, including patient interview and other more clinical measures, such as length of stay and morbidity outcome. In future studies these should be included.

8.4 Recommendations

Due to the homogeneous nature of the district hospitals in Rwanda and the demographics and nature of the health conditions, it is suggested that the results can be generalised to all district hospitals and possibly central hospitals in Rwanda. Thus the primary recommendation arising from this study, and supported by the feedback from the participants, is that the ICF principles and framework be integrated into clinical practice, research, and education of health care professional to inform interprofessional collaborative practice. It is anticipated that this could well lead to the adaptation of the bio-psycho-social model of health care and a more holistic approach to care in Rwanda and other middle and low income countries, as demonstrated in this study.

It is unclear, however, whether a similar intervention would have such positive results in a different cultural and socio-economic context. Rwanda is a relatively small country with strong central control over the health care system. The endorsement of the study by the health authorities is likely to have contributed considerably to the success of the programme. In a less centralised, more market driven health sector, such as those of some HIC, the intervention may not have as large an impact on the

practice of health professionals. It is therefore recommended that piloting of the programme take place before it is rolled out on a large scale.

8.4.1 Recommendations for clinical practice

- The training programme should be rolled out to all district hospitals in Rwanda. This should consist of an introductory one-day programme and follow up or ongoing training sessions should be incorporated into the programme as a decline of knowledge and good behaviour can be expected over time.
- The biopsychosocial or holistic approach should inform routine assessment and management of patients in district hospitals in Rwanda. The ICF appears to be a suitable framework to address this holistic approach providing the information regarding functioning as a result of patient condition and his/her contextual factors.
- The ICF and interprofessional based training should be integrated, not only in district hospitals but also in referral hospitals in order to attain holistic care in Rwanda.
- Interprofessional teams should be formed and supported at every hospital for sustainability of interprofessional collaborative practice.

8.4.2 Recommendations for education

- The ICF should be included in the training of all levels of health professionals, not only rehabilitation professionals as is currently the situation in Rwanda.
- Interprofessional education should be introduced early during healthcare education to promote collaboration and understanding between healthcare professionals before going into practice.
- Interprofessional training should also be provided to those who teach in medical and allied health education.

8.4.3 Recommendations for research

- This protocol needs to be tested within referral hospitals in Rwanda.
- Longitudinal studies need to be done to determine the scheduling of the introductory training (annually or less often) and the optimum timing of the refresher course, based on the retention patterns of improved practice. These should also include monitoring the retention of improved knowledge and attitudes.

-
- Alternate methods of assessing the impact of practice should be explored. It might be that documentation is not a valid measure of practice and studies should be done to establish the construct validity of this measure using the “gold standard” measure of patient report and possibly observation of clinical encounters. Methods of determining patient satisfaction could include the instruments developed by Boulton et al. (2008) and the instruments validated by Hojat et al. (2011).
 - Study is needed to assess the readiness of health care professionals to implement new skills in terms of interprofessional collaborative practice.

8.4.4 Recommendations for policy

1. Strategies which strengthen interprofessional collaborative practice should be available in the Rwanda health system in order to optimally use the limited resources available.
2. The interprofessional collaborative practice approach should be implemented among health care associations and councils, teaching institutions and service providers.

8.5 Conclusion

In order to attain the mission of Rwanda Ministry of Health and to ensure affordable, universal health care coverage, health care reform is necessary. The introduction of the ICF as the framework to inform interprofessional assessment and management in Rwanda could result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. Effective collaboration between health care professionals may enhance team members’ awareness of each other’s knowledge and skills, leading to continued improvement in management towards better patient outcomes. It is, therefore, hoped that the findings of this study may contribute to improving health care delivery in Rwandan district hospitals and the health system at large.

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CHAPTER 10. APPENDICES

Appendix i: Table of Individual studies used in interprofessional literature

The contents of this table are drawn from the abstracts of the studies used in the narrative literature and the conclusions are quoted verbatim. They include epidemiological and ethnographic studies. The following databases were searched: PubMed (which includes Medline), Cochrane library, EBSCO, Cumulative Index of Nursing and Allied Health Literature (CINAHL - via EBSCOhost), Google, Web of Science and Scopus (which indexes Embase). The search terms used were “Interprofession*” OR “inter-profession*” OR “interdisciplin*” OR “inter-disciplin*” OR “interoccupation*” OR “inter-occupation*” OR “multiprofession*” OR “multi-profession*” OR “multidisciplin*” OR “mult-disciplin*” OR “multioccupation*” OR “multi-occupation*” OR “transprofession*” OR “trans-profession*” OR “transdisciplin*” OR “trans-disciplin*” OR “transoccupation*” OR “trans-occupation*” OR “team-based” OR “team based” AND “education*” OR “learning” OR “training” OR “practice” OR “Care” OR “management” OR “care” AND “collaboration” OR “cooperation” OR “communication”. Hand searched (pearling) and grey literature were also sourced to enrich the review.

Note that **Green** denotes positive results, **Orange** denotes a negative result and **Yellow** indicates that the results are inconclusive and further studies need to be done.

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
Leonard, Graham, & Bonacum (2004)	Non-profit American health system.		Describing the experience with human factors training focusing on teamwork and communication			Team work showed great promise in both enhancing the safety of care and improving the work environment for clinicians.
Greenberg et al. (2007)	Acute care hospital (academic and non-academic) and outpatient facilities	21,000 physicians and 390 outpatient facilities	Malpractice Insurers' Medical Error Prevention Study (MIMEPS)	Review of study cases		Serious communication breakdowns occur across the continuum of care, typically result from a failure in verbal communication between a surgical attending and another caregiver, and often involve ambiguity about responsibilities.
Zwarenstein et	20 clinical teaching	Between 200 and 300	Multi-centre mixed-	1. The Discharge	A four-step	Opportunities for interprofessional

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
al. (2007)	teams (CTTs) in general internal medicine (GIM) divisions of five Toronto tertiary-care hospitals.	staff and students	methods cluster randomized controlled trial	Abstract Database (DAD) 2. Staff members' perceptions of interprofessional collaboration questionnaire 3. Patient satisfaction survey 4. Paging activity 5. Prescription drug therapy 6. Interview guide and observational notes	collaborative communication protocol, a quasi-script for face-to-face, collaborative interprofessional interaction	collaborative communication can be initiated by professionals. Many times they occur during informal, unplanned interactions, outside of formal structured meetings such as working day, usually to obtain information from another professional who is sharing responsibility for the same patient, and/or to impart information to him or her about the patient. This study has shown that three core elements of communication are typically absent from such encounters: named self-introduction and description of role with respect to the patient under discussion; sharing of planned activities for the patient; and elicitation of the counterpart's point of view. Based on the findings, it is needed to design an intervention for creating a culture of interprofessional communication where the fundamentals of collaboration are a routine and normalized part of opportunistic, informal encounters.
Boult et al. (2008)	Primary care practices in 3 health care delivery systems in the Baltimore–Washington DC area: Johns Hopkins Community Physicians, Kaiser- Permanente, and MedStar.	Only 8 participants were eligible	A Cluster Randomised Control trial (CRCT)	Demographic information and follow-up interviews inquired about patients' health and functional status, quality of health care, and satisfaction with health care	Case-based, interactive seminars and workshops, supplemented by readings and brief recorded lectures, and simulated patients	Early data from this cluster-randomized controlled trial support our hypothesis that, within 6 months, guided care improves several important aspects of the quality of the complex health care required by multi-morbid older persons: goal setting (in which patients' goals help guide their health care), coordination (in which professional and community providers work together for the patient's benefit), and decision support (in which health information informs patients' behaviours) and patient satisfaction.
Baxter & Markle-Reid (2009).	Hamilton Niagara Haldimand Brant Community Care Access Center, Mississauga Halton Community Care Access Center, Halton	9 participants	Qualitative design		Four focus groups (2 per team) 60–90 minutes in length were conducted at two points in time (6 and 9 months following group formation).	This study revealed several themes which included, team capacity, practitioner competencies, perceived outcomes, support and time. Overall, care providers were positive about their experiences and felt that through an interprofessional approach benefits could be experienced

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
	Region Health Department, Community Rehabilitation, Canada					by both the provider and the patient and his/her family. Findings from this study suggest that research needs to be conducted to further explore the issues faced by this group of care providers and potential client outcomes.
Hallin, Kiessling, Waldner, & Henriksson (2009)	Real clinical work Place: Karolinska Institutet, Danderyd University Hospital, Stockholm, Sweden	616 students from undergraduate (Medicine, Nursing, Physiotherapy, Occupation Therapy)	Pre-post design	Student evaluation questionnaire	Interprofessional training	All student groups increased their perceived interprofessional competence. Occupational therapy and medical students had the greatest achievements. -Active patient based learning by working together in a real ward context seemed to be an effective means to increase collaborative and professional competence.
Mirjam (2010)	German medical rehabilitation clinics	18 head physicians or psychotherapists in the clinics and their complete rehabilitation teams (N=824).	A cross-sectional study with a descriptive–explorative design.	An interview guide and questionnaires	None	Teamwork and team effectiveness are higher in teams working with the interdisciplinary team approach.
Bridges, Davidson, Odegard, Maki, & Tomkowiak (2011)	University of Florida and University of Washington	480 first year students	Models represent a didactic program, a community-based experience and interprofessional-simulation experience.	collaborative approach to patient-centered care, with emphasis on team interaction, communication, service learning, evidence-based practice, and quality improvement	A one-credit-hour interprofessional training	-Interprofessional teams were formed each year -Improved knowledge and attitudes of students regarding collaboration, teamwork, social responsibility, and diversity
Truong et al. (2012)	Meharry Medical College	IP team included 3 pharmacists, 2 physicians, 2 nurses, 1 clinic administrator, 1 director and 1 community pharmacy coordinator, 4 residents and 20 students over two years	Integration of IPP	Organizational changes and full implementation of medication therapy management service.	Establishing interprofessional collaborative model for MTM service during a six-month pilot followed by full implementation for over two years.	The interprofessional collaborative model within a Health Resources and Services Administration Patient Safety and Clinical Pharmacy Services Collaborative safety net clinic has improved access to health care, specifically medication management, and demonstrated initial improvements in clinical outcomes for an under-served population with high-risk, high-cost and complex patients.
Dajczman et al. (2013)	Patients followed by the COPD nurse navigator between 2010 and 2011 at the Jewish	202 patients	A quality assurance, pre-post intervention study examining the impact	The primary outcomes were number of all-cause emergency department (ED) visits	Integrated interdisciplinary program,	This quality assurance study indicated that the implementation of an integrated interdisciplinary program for the care of patients with COPD can improve patient

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
	General Hospital (JGH), Montreal, Quebec		of an integrated interdisciplinary program for COPD on health care utilisation	and admissions, as well as all-cause total hospital days. Secondary outcomes were the number of respiratory-cause ED visits and admissions as well as respiratory-cause total hospital days.		outcomes despite the tendency of COPD to worsen over time.
Zwarenstein et al.(2013)	General Internal Medicine (GIM) wards of two urban teaching hospitals in Canada	with physicians, nurses, and allied health professionals	Qualitative study	Observation and one-on-one shadowing, ethnographic and semi-structured interviews		Physicians in GIM wards communicated with other professions mainly in structured rounds. Good interaction was also observed among nurses and allied health profession, but poor with physicians.
Vanderwielen et al. (2014)	Alliance at Virginia Commonwealth University	8 students	Case study	Developing core benefits of interdisciplinary collaboration	Participatory action research	Knowledge and skills competencies, interprofessional networks, professional competence, and role clarity.
Matziou et al. (2014)	Two large public hospitals in Athens, Greece.	93 physicians and 197 nurses	Descriptive design	A self-administered questionnaire survey		The findings suggest that nurses and physicians do not share the same views concerning the effectiveness of their communication and nurses' role in the decision-making process of the patients' care.
Borenstein et al. (2016)	A large academic medical centre in Western United States	Nurses patients from the 10 units	The evaluation included a cluster randomized controlled trial and intention-to-treat analysis of all patients meeting risk screening criteria.	SPICES is a 6-item risk screening tool including identification of skin integrity, problems eating, incontinence, confusion, evidence of falls, and sleep disturbance	Training on the use of the Fulmer "SPICES" criteria in their admission assessment.	Reorganizing general medical/surgical units to provide interprofessional care can improve outcomes among hospitalized older adults.

Appendix ii: Table of individual studies which examined the effect of Interprofessional Collaboration Literature

These include experimental studies to determine the impact of intervention aimed at improving interprofessional teamwork and practice. The following databases were searched: PubMed (which includes Medline), Cochrane library, EBSCO, Cumulative Index of Nursing and Allied Health Literature (CINAHL - via EBSCOhost), Google, Web of Science and Scopus (which indexes Embase). The search terms used were “Interprofession*” OR “inter-profession*” OR “interdisciplin*” OR “inter-disciplin*” OR “interoccupation*” OR “inter-occupation*” OR “multiprofession*” OR “multi-profession*” OR “multidisciplin*” OR “mult-disciplin*” OR “multioccupation*” OR “multi-occupation*” OR “transprofession*” OR “trans-profession*” OR “transdisciplin*” OR “trans-disciplin*” OR “transoccupation*” OR “trans-occupation*” OR “team-based” OR “team based” “AND “education*” OR “learning” OR “training” OR “practice” OR “Care” OR “management” OR “care” AND “collaboration” OR “cooperation” OR “communication”. Hand searched (pearling) and grey literature were also sourced to enrich the review.

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
Barrett (2007)	Canadian Health Services Research Foundation		Synthesis review			The synthesis review suggests there is evidence to support positive provider, system and patient outcomes as a result of enhanced interprofessional collaboration
Boult et al. (2008)	Primary care practices in 3 health care delivery systems in the Baltimore–Washington DC area: Johns Hopkins Community Physicians, Kaiser- Permanente, and MedStar.	Only 8 participants were eligible	A cluster Randomised Control trial (CRCT)	Demographic information and follow-up interviews inquired about patients’ health and functional status, quality of health care, and satisfaction with health care	Case-based, interactive seminars and workshops, supplemented by readings and brief recorded lectures and Simulated patients	Early data from this cluster-randomized controlled trial support our hypothesis that, within 6 months, GC improves several important aspects of the quality of the complex health care required by multi-morbid older persons: goal setting (in which patients’ goals help guide their health care), coordination (in which professional and community providers work together for the patient’s benefit), and decision support (in which health information informs patients’ behaviours) and patient satisfaction.
Baxter & Markle-Reid (2009).	Hamilton Niagara Haldimand Brant	9 participants	Qualitative design		Four focus groups (2 per team) 60–90 minutes in length were	This study revealed several themes which included, team capacity, practitioner competencies, perceived outcomes,

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
	Community Care Access Center, Mississauga Halton Community Care Access Center, Halton Region Health Department, Community Rehabilitation, Canada				conducted at two points in time (6 and 9 months following group formation).	support and time. Overall, care providers were positive about their experiences and felt that through an interprofessional approach benefits could be experienced by both the provider and the patient and his/her family. Findings from this study suggest that research needs to be conducted to further explore the issues faced by this group of care providers and potential client outcomes.
Hojat et al. (2011)	Jefferson's Department of Family and Community Medicine	535 patients aged between 18 and 75 years	Mailed survey	Patient satisfaction questionnaire and patient perception questionnaire		Empirical evidence supported the validity and reliability of a brief patient satisfaction scale that has utility in the assessments of educational programs aimed at improving patient satisfaction, medical services, and patient outcomes in primary care settings
Truong et al. (2012)	Meharry Medical College	IP team included 3 pharmacists, 2 physicians, 2 nurses, 1 clinic administrator, 1 director and 1 community pharmacy coordinator, 4 residents and 20 students over two years	Integration of IPP	Organizational changes and full implementation of medication therapy management service.	Establishing interprofessional collaborative model for MTM service during a six-month pilot followed by full implementation for over two years.	The interprofessional collaborative model within a Health Resources and Services Administration Patient Safety and Clinical Pharmacy Services Collaborative safety net clinic has improved access to health care, specifically medication management, and demonstrated initial improvements in clinical outcomes for an underserved population with high-risk, high-cost and complex patients
Dajczman et al. (2013)	Patients followed by the COPD nurse navigator between 2010 and 2011 at the Jewish General Hospital (JGH), Montreal, Quebec	202 patients	A quality assurance, pre-post intervention study examining the impact of an integrated interdisciplinary program for COPD on health care utilisation	The primary outcomes were number of all-cause emergency department (ED) visits and admissions, as well as all-cause total hospital days. Secondary outcomes were the number of respiratory-cause ED visits and admissions as well as respiratory-cause total hospital days.	Integrated interdisciplinary program,	This quality assurance study indicated that the implementation of an integrated interdisciplinary programme for the care of patients with COPD can improve patient outcomes despite the tendency of COPD to worsen over time.
Vanderwielen et al. (2014)	Alliance at Virginia Commonwealth University	8 students	Case study	Developing core benefits of interdisciplinary	Participatory action research	Knowledge and skills competencies, interprofessional networks, professional competence, and role clarity.

Authors (year)	Setting	Population/Sample (sample size)	Study design	Outcome measures	Intervention	Results
				collaboration		
Borenstein et al. (2016)	A large academic medical centre in western United States	Nurses patients from the 10 units	The evaluation included a cluster randomized controlled trial and intention-to-treat analysis of all patients meeting risk screening criteria.	SPICES is a 6-item risk screening tool including identification of skin integrity, problems eating, incontinence, confusion, evidence of falls, and sleep disturbance	Training on the use of the Fulmer "SPICES" criteria in their admission assessment.	Reorganizing general medical/surgical units to provide interprofessional care can improve outcomes among hospitalized older adults.

Appendix iii: Table of systematic Reviews used in Effect of Interprofessional Collaboration Literature

Authors (year)	Population	Studies included	Outcome measures	Conclusions
Zwarenstein, Barr, Hammick, Koppel & Reeves (1999)	510 abstracts from Medline, 552 from CINAHL.	Not indicated	Not indicated	No rigorous quantitative evidence exists on the effects of interprofessional education
Lemieux-charles and McGuire (2004)	34 empirical studies and selected 33 as representing the current state of knowledge in the field.	They included studies that were conducted in health care settings, that used measures of team effectiveness and that treated the team rather than the team member or the organization as the unit of analysis.	Not clear	This review shows that there is a great deal of activity and interest in studying team effectiveness in the health care arena. Unfortunately, taken as a whole, published studies do not provide clear direction on how to create or maintain high-functioning teams.
Barrett (2007)	Canadian Health Services Research Foundation	Synthesis review		The synthesis review suggests there is evidence to support positive provider, system and patient outcomes as a result of enhanced interprofessional collaboration
Xyrichis & Lowton (2008)	10 articles with seven studies conducted in the UK and one study each in Canada, USA, and Republic of Ireland	<ol style="list-style-type: none"> 1. Wiles and Robinson (1994) 2. Field and West (1995) 3. Poulton and West (1999) 4. Borrill et al. (2000) 5. Cook et al. (2001) 6. Molyneux (2001) 7. Hanafin and Cowley (2003) 8. Cashman et al. (2004) 9. Dieleman et al. (2004) 10. Rutherford and McArthur (2004) 	<ol style="list-style-type: none"> 1. Qualitative study based on interviews using a semi-structured questionnaire 2. Qualitative study using semi-structured interviews 3. Survey approach using postal questionnaires 4. Questionnaire survey as part of a larger study 5. Action research using focus groups and interviews 6. Qualitative study using semi-structured interviews 7. Survey approach using a postal questionnaire as part of a two-phase case study 8. Longitudinal study utilising SYMLOG 9. Pre- and post-test design using questionnaires 10. A qualitative phenomenological approach using focus groups 	Interprofessional collaborative practice is still complex due to various factors. Team working is ongoing, but there is a need for much emphasis on organisation and team level for improving quality healthcare.
Boutwell & Hwu, (2009)	158 articles	PubMed search of the published literature to find evidence of the effectiveness of interventions to improve transitions of care and reduce rehospitalisations: Articles published fewer than 10 years from September 2008),	Evidence for effective interventions to reduce rehospitalisations across patient populations and settings of care.	<p>4 categories of interventions to reduce rehospitalisations:</p> <ol style="list-style-type: none"> 1) enhanced care and support at transitions 2) improved patient education and self-management support 3) multidisciplinary team management 4) patient-centered care planning at the end of life

Authors (year)	Population	Studies included	Outcome measures	Conclusions
Martin, Ummenhofer, Manser and Spirig (2010)	All of the 14 RCTs were conducted in western countries: 9 from the USA 3 from Europe and 1 each from Australia and Canada	9 RCTs tested collaborative care management models against usual care within the elderly population; other studies focused on chronic diseases such as heart failure, multi-morbidity and Alzheimer's disease and paediatric asthma.	The most common outcome measures included mortality, clinical, functional and social outcomes, and utilisation of medical services. A majority of studies (n = 9) also involved patient-reported outcomes such as quality of life, activities in daily living and satisfaction with care.	Although the studies included reported mixed results, all but one study identified at least one positive and statistically significant effect of the collaborative care models tested.
Ivers et al. (2012)	40 studies for this review.	RCTs of studies involving postgraduate training	The study focused on objectively measured provider performance in a healthcare setting or patient health outcomes. It abstracted outcomes from the longest available follow-up interval in the original publication.	The results of this review suggest that feedback may be more effective when baseline performance is low, when the source is a supervisor or senior colleague, when it is provided more than once, when it is provided both verbally and written, and when it includes both measurable targets and an action plan.
Nancarrow et al. (2013)	A total of 153 studies, including 11 systematic reviews or meta-analysis, were reviewed and analysed.	Quantitative studies; in particular randomised controlled trials (RCTs) published and unpublished between 1994 and 2009, that evaluated the process and outcomes of different interprofessional staffing models.		Interdisciplinary health care teams face a set of challenges. These challenges include the contentious nature of sharing professional roles and expertise, planning and decision-making, while delivering quality patient care within complex contexts.
Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013a)	15 studies	Randomised controlled trials (RCTs), controlled before and after (CBA) studies and interrupted time series (ITS) studies. Health and social care professionals (e.g. chiropodists/podiatrists, complementary therapists, dentists, dieticians, doctors/physicians, hygienists, psychologists, psychotherapists, midwives, nurses, pharmacists, physiotherapists, occupational therapists, radiographers, speech therapists and social workers).	Objectively measured or self reported (validated instrument) patient/client outcomes in the following areas: health status measures; disease incidence, duration or cure rates; mortality; complication rates; readmission rates; adherence rates; satisfaction; continuity of care; use of resources (e.g. cost-benefit analyses). 2. Objectively measured or self reported (validated instrument) healthcare process measures (e.g. skills development, changes in practice style, interprofessional collaboration,)	Although these studies reported a range of positive outcomes, the heterogeneity of IPE interventions means it is not possible to draw generalisable inferences for the effects of IPE. To improve the quality of evidence relating to IPE and patient outcomes or healthcare process outcomes, the following three gaps will need to be filled: first, studies that assess the effectiveness of IPE interventions compared to separate, profession-specific interventions; second, RCT, CBA or ITS studies with qualitative strands examining processes relating to the IPE and practice changes; third, cost-benefit analyses.
Epstein (2014)	Review			Multiple articles across diverse disciplines incorporate a variety of concepts of "teamwork" for staff covering emergency rooms (ERs), hospital wards, intensive care units (ICUs), and most critically, operating rooms (ORs). Cohesive teamwork improved communication between different levels of healthcare workers, and limited adverse events, improved outcomes, decreased the length of stay (LOS), and yielded greater patient "staff" satisfaction.

Authors (year)	Population	Studies included	Outcome measures	Conclusions
Zwarenstein, Goldman & Reeves (2014)	5 studies met the inclusion criteria; 2 studies examined interprofessional rounds, 2 studies examined interprofessional meetings, and 1 study examined externally facilitated interprofessional audit.	Studies which aim to improve collaboration between any types of health and social care professionals.	Outcome of interest: objectively measured or patient/client health measures (such as mortality, disease incidence, duration, or cure rates), quality of life measures and complication rates; and/or healthcare process outcomes, such as readmission rates, adherence rates, continuity of care, use of resources (i.e. cost-benefit analyses) and/or patient or family satisfaction.	The review suggests that practice-based IPC interventions can improve healthcare processes and outcomes, but due to the limitations in terms of the small number of studies, sample sizes, problems with conceptualising and measuring collaboration, and heterogeneity of interventions and settings, it is difficult to draw generalisable inferences about the key elements of IPC and its effectiveness.
Wen & Schulman (2014).	26 trials with a total of 15,526 participants	Eligible studies reported (1) a randomised controlled trial, (2) interventions including both interprofessional care and non-interprofessional care (or usual care), and (3) outcomes including an assessment of patient satisfaction.		Evidence showed that interprofessional care is better than usual care in improving patient satisfaction. However, considering the pooling result of continuous data, along with the suboptimal quality of included trials, further large-scale and high-quality randomized controlled trials comparing interprofessional care and usual care are needed.
Mahdizadeh, Heydari & Karimi Moonaghi (2015)	15 full articles were evaluated. Participants were nurses and other disciplines including doctors, social workers, physiotherapists, psychiatrists, psychologists that performed care and treatment of patients as a clinical discipline.	All qualitative studies which had presented a model or framework in the field of clinical interdisciplinary collaboration between nurses and other disciplinary were evaluated.	Research question: 1. what are the backgrounds and consequences of models and frameworks for interdisciplinary collaboration in clinical nursing? 2. What are the similarities and differences between the model and frameworks of interdisciplinary collaboration of clinical nursing?	Models and frameworks had different structures, backgrounds, and conditions, but the outcomes were similar. Organizational structure, culture and social factors are important aspects of clinical collaboration. So it is necessary to improve the quality and effectiveness of clinical collaboration these factors to be considered.
Pannick et al. (2015)	The 30 studies included 66 548 patients with a mean age of 63 years and a variety of primary diagnoses	-20 studies that addressed interdisciplinary team Composition. -10 studies investigated interdisciplinary team practice, often using interdisciplinary rounds	Studies compared an interdisciplinary team care intervention with usual care. The outcomes were: length of stay, readmission, or mortality rate,	Interdisciplinary team care interventions on general medical wards have little effect on traditional measures of health care quality. Future study should clarify how best to implement interdisciplinary team care interventions and establish quality metrics that are credible to both health care professionals and patients.

Authors (year)	Population	Studies included	Outcome measures	Conclusions
Tsakitzidis, Timmermans, Callewaert and Verhoeven (2017)	Overall, 689 studies references were identified by the search, of which 57 were eligible on the basis of their title and abstract. Finally, 29 publications met the inclusion criteria after critical appraisal	A systematic search was performed for articles published between 2007 and June 2014.	Professional satisfaction, patient satisfaction, quality of health care, patient outcome level, fall incidence, pain, quality of life, ...	Overall, outcome indicators of interprofessional collaboration for elderly with a significant effect can be summarized in three main categories: 'collaboration', 'patient level' and 'costs'.
Reeves et al. (2017).	9 studies with 6540 participants	Six cluster-randomised trials and three individual randomised trials (1 study randomised clinicians, 1 randomised patients, and 1 randomised clinicians and patients).	-Primary outcome measures: Patient health outcomes (objectively measured or self-reported, using a validated instrument) and Clinical process or efficiency outcomes. -Secondary outcome measures: Collaborative behaviour (objective or self-reported outcomes, using a validated instrument)	The findings suggested that interventions aimed at improving interprofessional collaboration through practice changes may slightly improve clinical process/efficiency and patient health outcomes compared to usual care or an alternative intervention.

Appendix iv: Knowledge of Health Care Professionals on interprofessional practice and ICF

Health professional <input checked="" type="checkbox"/> 1. Medical doctor <input type="checkbox"/> 2. Physiotherapist <input type="checkbox"/> 3. Nurses <input type="checkbox"/> 4. Social worker <input type="checkbox"/> 5. Mental health nurse <input type="checkbox"/> 6. Clinical psychologist <input type="checkbox"/> 7. Nutritionist/Dietetic <input type="checkbox"/>	Department/Ward <input checked="" type="checkbox"/> 1. Medical <input type="checkbox"/> 2. Surgical <input type="checkbox"/> 3. Paediatric <input type="checkbox"/> 4. Physiotherapy <input type="checkbox"/> 5. Mental health <input type="checkbox"/> 6. Social <input type="checkbox"/> 7. Nutrition <input type="checkbox"/>	Level of education <input checked="" type="checkbox"/> 1. A2 <input type="checkbox"/> 2. A1 <input type="checkbox"/> 3. A0 <input type="checkbox"/> 4. Masters <input type="checkbox"/> 5. Other: <input type="checkbox"/> Specify:.....	Gender <input checked="" type="checkbox"/> 1. Male <input type="checkbox"/> 2. Female <input type="checkbox"/> Age:Years Years of Experience:Years
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Case study: Mr M.G is a 45 years old man, who is overweight and has type II diabetic patient. He is receiving insulin. He was admitted to the surgical ward four weeks ago, with an open mid-shaft fracture of the right femur caused by a road traffic accident. Mr M.G is cooperative under transtibial traction and wound dressing. His occupation is a driver and he is married, with four children. Mr M.G is very concerned about the condition because he is not sure if he will go back to his job in order to support his family and to involve in church activities. The hospital has a shortage of bed adjustable available to assist him in some bed activities, consequently, due to difficulty in bed mobility, he cannot wash, dress, feed himself, and has problem with toileting. His wife is taking care of their children, so he does not have a caregiver to help in all activities of daily living which is a requirement for in-patients in hospitals. Therefore, it is difficult to get the food. Members of the community visit him once a week to help in washing, changing dress, and bringing food. Mr M.G used to smoke 20 cigarettes a day and has developed pressure sores on his buttocks, limited right leg muscle strength and knee motion, and pain on fracture site. However, he is fortunate to have a medical insurance which helps in accessing all prescribed treatment.

Based on the above case study, please complete the following table. Indicate which problems described in fall under impairments, activity limitations or participation restrictions and environmental barriers or facilitators. You should also indicate the professionals who should take responsibility for managing these problems, personal and environmental factors underlying M.G’s problems in the 2nd column. Finally you need to describe the probable management of this problem in the 3rd column.

Health condition	Profession	Management
Impairment	Profession	Management
Activity limitation (Current problems)	Profession	Management

Activity limitation (Problems anticipated on discharge)	Profession	Management
Participation restriction	Profession	Management
Personal factors (Positive)	Profession	Management
Personal factors (Negative)	Profession	Management
Environmental factors (Facilitators)		
Environmental factors (Barriers)	Profession	Management

Thank you very much for taking part in this research

Appendix v: Attitudes towards interprofessional practice questionnaire

Health professional <input checked="" type="checkbox"/> 1. Medical doctor <input type="checkbox"/> 2. Physiotherapist <input type="checkbox"/> 3. Nurses <input type="checkbox"/> 4. Social worker <input type="checkbox"/> 5. Mental health nurse <input type="checkbox"/> 6. Clinical psychologist <input type="checkbox"/> 7. Nutritionist/Dietetic <input type="checkbox"/>	Department/Ward <input checked="" type="checkbox"/> 1. Medical <input type="checkbox"/> 2. Surgical <input type="checkbox"/> 3. Paediatric <input type="checkbox"/> 4. Physiotherapy <input type="checkbox"/> 5. Mental health <input type="checkbox"/> 6. Social <input type="checkbox"/> 7. Nutrition <input type="checkbox"/>	Level of education <input checked="" type="checkbox"/> 1. A2 <input type="checkbox"/> 2. A1 <input type="checkbox"/> 3. A0 <input type="checkbox"/> 4. Masters <input type="checkbox"/> 5. Other: <input type="checkbox"/> Specify:.....	Gender <input checked="" type="checkbox"/> 1. Male <input type="checkbox"/> 2. Female <input type="checkbox"/> Age:Years Years of experience:Years
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We would like to know about your attitudes toward interprofessional health care teams and the team approach to care. By interprofessional health care team, we mean three or more health professionals (e.g., nurse, physician, social worker, physiotherapist) who work together and meet regularly to plan and coordinate treatment for a specific patient population. Use the scale: **strongly disagree; disagree; neutral; agree; strongly agree**. You will mark with a symbol in appropriate box (only **one (1)** answer per statement).

"IN MY OPINION":	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Working in teams unnecessarily complicates things most of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The team approach improves the quality of care to patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Team meetings foster communication among team members from different disciplines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Patients receiving team care are more likely than other patients to be treated as whole persons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. A team's primary purpose is to assist physicians in achieving treatment goals for patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Working on a team keeps most health professionals enthusiastic and interested in their jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Patients are less satisfied with their care when it is provided by a team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Developing a patient care plan with other team members avoids errors in delivering care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Developing an interprofessional patient care plan is excessively time consuming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. The give and take among team members help them make better patient care decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. In most instances, the time required for team meetings could be better spent in other ways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The physician has the ultimate legal responsibility for decisions made by the team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Hospital patients who receive team care are better prepared for discharge than other patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. The team approach makes the delivery of care more efficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. The team approach permits health professionals to meet the needs of family caregivers as well as patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Having to report observations to the team helps team members better understand the work of other health professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you very much for taking part in this research

Appendix vi: Health Care Professionals Satisfaction with ICF training questionnaire

Health professional <input checked="" type="checkbox"/> 1. Medical doctor <input type="checkbox"/> 2. Physiotherapist <input type="checkbox"/> 3. Nurses <input type="checkbox"/> 4. Social worker <input type="checkbox"/> 5. Mental health nurse <input type="checkbox"/> 6. Clinical psychologist <input type="checkbox"/> 7. Nutritionist/Dietetic <input type="checkbox"/>	Department/Ward <input checked="" type="checkbox"/> 1. Medical <input type="checkbox"/> 2. Surgical <input type="checkbox"/> 3. Paediatric <input type="checkbox"/> 4. Physiotherapy <input type="checkbox"/> 5. Mental health <input type="checkbox"/> 6. Social <input type="checkbox"/> 7. Nutrition <input type="checkbox"/>	Level of education <input checked="" type="checkbox"/> 1. A2 <input type="checkbox"/> 2. A1 <input type="checkbox"/> 3. A0 <input type="checkbox"/> 4. Masters <input type="checkbox"/> 5. Other: <input type="checkbox"/> Specify:.....	Gender <input checked="" type="checkbox"/> 1. Male <input type="checkbox"/> 2. Female <input type="checkbox"/> Age:Years Years of Experience:Years
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Please evaluate the training in terms of the succeeding sections. Your evaluations should reflect your experience and as honestly as possible. The purpose of the evaluation is to improve future training. Mark with a in the block that represents your opinion or feeling the best for each statement (only **one** (1) answer per statement). Rating scale options: 1 = **strongly disagree**; 2 = **disagree**; 3 = **unsure**; 4 = **agree**; 5 = **strongly Agree**.

A. Overall Experience of the Programme	strongly disagree	disagree	unsure	agree	Strongly Agree
1. The purpose of the training programme was explained to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The training programme captured my interest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The training was helpful to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. In general, I'm satisfied with the training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I will recommend someone else to this training programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. Content and Organisation	strongly disagree	disagree	unsure	agree	Strongly Agree
6. The content was appropriate and practical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. It was introduced in the manner with good transitions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The training package was stimulating and exciting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. The training met my expectation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I've learned something that is of value to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. The relevance of the training with clinical work	strongly disagree	disagree	unsure	agree	Strongly Agree
11. I will apply the gained knowledge in my clinical work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I expect the difference in the daily work because of this training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The training was important to bring change in clinical practice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. This training will improve the patient outcome.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. This training will improve my service delivery.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. What was your most useful part of the training?

E. What was your least useful part of the training?

F. What are the facilitating means to implement the knowledge from the training?

G. What are the barriers to implement the knowledge from this training?

H. Any other suggestion, comment or addition to the training?

Thank you very much for taking part in this research

Appendix vii: Auditing patients' records checklist

One form will be completed for each patient record. Please place a sign in the box to indicate a positive response (only **one (1)** answer per statement).

	Yes	No	N/A
A. Patient's demographic information			
Patient record number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient's name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient's gender	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of birth/ Age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Address	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marital status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical aid/No medical aid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient occupation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Level of education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Admit date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discharge date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Comprehensive assessment			
Health condition and diagnosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assessment of impairment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact of condition on functioning (Use ICF checklist. If yes, put the number of functioning addressed in the box).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact of environmental factors (Use ICF Checklist. If yes, put the number of Environmental factors addressed in the box).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Holistic intervention			
Health condition managed in context	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal factors including mental and spiritual needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impairment addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Functioning addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental factors addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Continuum of care and discharge			
Preventive measures of recurrence of health condition or complications related to condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Referral to other services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discharge note	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Inter-professional practice			
Referrals to other disciplines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case managed by different professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health professional team identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health professionals treating the patient have documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix viii: Expert opinion on content and face validity of the instruments

Section A: Knowledge of Health care Professionals on Interprofessional Practice and ICF

After going through this instrument, you will kindly answer these questions:

1. Are all important aspects covered (content validity)? Yes No
2. Are all the questions clear and related to the topic (face validity)? Yes No

The following scales will be used under each question. Please use the scale **1 = irrelevant; 2 = somewhat relevant; 3 = Quite relevant; 4 = extremely relevant**. You will mark with a symbol(**X**) in appropriate box.

Health condition	Profession	Management	1	2	3	4	Suggestion
1.Type II diabetes	1.Medical Doctor 2. Nurse 3.Nutritionist	1.Prescribe insulin 2.Administering insulin 3.Nutritional advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.Open mid-shaft fracture of the right femur	1.Medical Doctor 2.Nurse	1.Fracture reduction 2.Administering drugs and dressings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Impairment	Profession	Management					
1.Limited range of knee motion	1.Physiotherapist	1.Joint mobilisation/exercise to improve range of motion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Limited muscle strength	1.Physiotherapist	1. Strengthening exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Pain	1. Medical Doctor 2.Nurse	1.Prescribe drugs and control bone alignment 2. Administering drugs and dressings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Pressure sores on his buttocks	1.Medical Doctor 2. Nurse 3.Physiotherapist	1. Prescribe drugs 2. Dressing and changing position 3. Changing position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Activity limitation (Current problems)	Profession	Management					
1.Difficulty in bed mobility	1.Physiotherapist	1.Mobility training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.Difficulty in washing	1.Nurse 2.Physiotherapist	1.Washing patient 2. Helping in mobility training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.Difficulty in dressing	1.Nurse 2.Physiotherapist	1.Dress the patient 2. Helping in mobility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

		training					
4. Difficulty in feeding	1.Nurse 2.Physiotherapist	1. Help in feeding the patient 2.Helping in mobility training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Difficulty with toileting	1. Nurse 2.Physiotherapist	1. Help the patient in toileting 2. Mobility training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Activity limitation (Problems anticipated on discharge)	Profession	Management					
1.Difficulty with standing and walking	1.Physiotherapist	1.Standing and gait training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.Difficulty with squatting to go to the toilet	1.Physiotherapist	1. Strengthening exercises 2.Exercise to increase knee joint range of motion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.Difficulty with using the affected limb to drive	1.Physiotherapist	1. Proprioception exercises 2. Strengthening exercises 3. Exercise to increase knee joint range of motion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Participation restriction	Profession	Management					
1.No longer able to drive in order to support his family	1.Psychologist 2.Physiotherapist 3.Medical Doctor 4.Social worker 5.Nutritionist	1. Psychological counselling 2. Strengthening exercises and exercise to increase knee joint range of motion to prepare return to work 3. Appropriate reduction and immobilisation to prepare return to work 4. Social support 5. Adequate nutrition to accelerate healing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. To involve in church activities	1.Psychologist 2.Physiotherapist 3.Medical Doctor 4.Social worker 5.Nutritionist	1. Psychological counselling 2. Strengthening exercises and exercise to increase knee joint range of motion to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

		prepare return to church activities 3. Appropriate reduction and immobilisation to prepare return to church activities 4. Social support 5. Adequate nutrition to accelerate healing					
Personal factors (Positive)	Profession	Management					
1. A 45 old man	1.Psychologist 2.Physiotherapist 3.Medical Doctor 4.Social worker 5.Nutritionist	This will help all Health Professionals in achieving the aim of management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Cooperative patient who is keen to get better as quickly as possible	1.Psychologist 2.Physiotherapist 3.Medical Doctor 4.Social worker 5.Nutritionist	Same as above	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Personal Factors (Negative)	Profession	Management					
1.Overweight	1.Nutritionist 2.Physiotherapist	1.Nutritional advice 2.Exercises to reduce and control weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.Concerned about his condition	1.Psychologist	1. Psychological support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.Smokes 20 cigarettes a day	1.Social worker 2.Psychologist	1.Advice to reduce smoking 2.Advice to reduce smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Environmental Factors (Facilitators)							
1.Community members visit	1.Nurse 2.Social Worker 3.Psychologist	1.Washing , feeding, and dressing patient 2. Social support 3. Psychological support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.Medical insurance	1.Medical Doctor 2.Nurse 3.Physiotherapist 4.Psychologist	This will help Health Professionals in prescribing treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Environmental Factors (Barriers)	Profession	Management					

1.No caregiver to help in all activities of daily living	1.Social worker 2.Nurse 3.Physiotherapist	1.Social support 2.Help in activities of daily living 3.Train the patient to perform all the activities as independent as possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Shortage of adjustable beds which makes bed activities more difficult	1.Physiotherapist 2.Nurse	1. Training patient in bed mobility 2. Help the patient to perform bed activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Difficulty in getting food	1. Social worker 2. Nutritionist	1. Help the patient to get the food. 2. Help in selecting appropriate food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SECTION B: ATTITUDES TOWARDS INTERPROFESSIONAL PRACTICE QUESTIONNAIRE

For assessors: After going through this instrument, you will kindly answer these questions:

1. Are all important aspects covered (content validity)? Yes No
2. Are all the questions clear and related to the topic (face validity)? Yes No

The following scales will be used under each question. Please use the scale **1 = irrelevant; 2 = somewhat relevant; 3 = Quite relevant; 4 = extremely relevant**. You will mark with a symbol(**X**) in appropriate box.

Index of Content Validity (ICV)				
"IN MY OPINION":	1	2	3	4
1. Working in teams unnecessarily complicates things most of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The team approach improves the quality of care to patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Team meetings foster communication among team members from different disciplines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Physicians have the right to alter patient care plans developed by the team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Patients receiving team care are more likely than other patients to be treated as whole persons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. A team's primary purpose is to assist physicians in achieving treatment goals for patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Working on a team keeps most health professionals enthusiastic and interested in their jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Patients are less satisfied with their care when it is provided by a team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Developing a patient care plan with other team members avoids errors in delivering care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. When developing interprofessional patient care plans, much time is wasted translating jargon from other disciplines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Developing an interprofessional patient care plan is excessively time consuming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The physician should not always have the final word in decisions made by health care teams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The give and take among team members help them make better patient care decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. In most instances, the time required for team meetings could be better spent in other ways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. The physician has the ultimate legal responsibility for decisions made by the team collapse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Hospital patients who receive team care are better prepared for discharge than other patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Physicians are natural team leaders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. The team approach makes the delivery of care more efficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The team approach permits health professionals to meet the needs of family caregivers as well as patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Having to report observations to the team helps team members better understand the work of other health professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION C: Health Care Professionals' Satisfaction with ICF training questionnaire

After going through this instrument, you will kindly answer these questions:

1. Are all important aspects covered (content validity)? Yes No
2. Are all the questions clear and related to the topic (face validity)? Yes No

The following scales will be used under each question. Please use the scale **1 = irrelevant; 2 = somewhat relevant; 3 = Quite relevant; 4 = extremely relevant**. You will mark with a symbol(**X**) in appropriate box.

Index of Content Validity (ICV)				
A. Overall Experience of the Programme				
	1	2	3	4
1. The purpose of the training programme was explained to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The training programme captured my interest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The training was helpful to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. In general, I'm satisfied with the training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I will recommend someone else to this training programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Content and Organisation				
	1	2	3	4
6. The content was appropriate and practical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. It was introduced in the manner with good transitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The training package was stimulating and exciting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. The training met my expectation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I've learned something that is of value to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. The relevance of the training with clinical work				
	1	2	3	4
11. I will apply the gained knowledge in my clinical work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I expect a difference in my daily work because of this training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. The training was important to bring change in clinical practice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. This training will improve patient outcomes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. This training will improve my service delivery.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. How much of the training was:				
	1	2	3	4

	1. Some	2. All	3. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not relevant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. What was your most useful part of the training?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. What was your least useful part of the training?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. What are the facilitators to implement the knowledge from the training?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. What are the barriers to implement the knowledge from this training?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Any other suggestion or comment to help us to improve the future training?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. What, if anything, would you add to the training				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION D: CHECKLIST FOR AUDITING PATIENTS' RECORDS CHECKLIST

After going through this instrument, you will kindly answer these questions:

1. Are all important aspects covered (content validity)? Yes No
2. Are all the questions clear and related to the topic (face validity)? Yes No

The following scales will be used under each question. Please use the scale **1 = irrelevant; 2 = somewhat relevant; 3 = Quite relevant; 4 = extremely relevant**. You will mark with a symbol(**X**) in appropriate box.

Content Validity Index (CVI)				
	1	2	3	4
A. Informed consent				
1. The patient's consent is documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The patient's consent is signed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Patient's demographic information				
3. Patient record number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Patient's name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Patient's gender	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Date of birth/ Age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Address	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Marital status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Medical aid/No medical aid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Patient occupation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Level of education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Admit date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Discharge date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Comprehensive assessment				
14. Health condition and diagnosis (If yes, put the number of health conditions in the box).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Assessment of impairment (If yes, put the number of impairments assessed).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Impact of condition on functioning (Use ICF checklist. If yes, put the number of functioning addressed in the box).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Impact of environmental factors (Use ICF Checklist. If yes, put the number of environmental factors addressed in the box).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Holistic intervention				
19. Health condition managed in context	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Personal factors including mental and spiritual needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Impairment addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Functioning addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Environmental factors addressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Continuum of care and discharge				
24. Preventive measures of recurrence of health condition or complications related to condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Referral to other services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Discharge note	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Inter-professional practice				
27. Referrals to other disciplines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Case managed by different professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. Health professional team identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Health professionals treating the patient have documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix ix: Letter to the expert panellist to participate in reviewing the study instrument for CVI



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
School of Health and Rehabilitation Sciences
Divisions of



Communication Sciences and Disorders, Nursing and Midwifery, Occupational Therapy, Physiotherapy

F45 Old Main Building, Groote Schuur Hospital, Observatory, 7925. Tel: +27 (0) 21 406 62505 Fax: +27 (0) 21 406 6323 _____

Letter to expert panellist to participate in reviewing the study instrument for CVI

I'm Jean Baptiste Sagahutu, a Physiotherapist PhD student at University of Cape Town, South Africa. Under supervision of Professor Jennifer, I'm conducting the research entitled *"Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial"*. The aim of this study is to determine whether the ICF can be used as a framework to inform interprofessional assessment and management within hospital settings in Rwanda and whether its use will result in improved service delivery. Due to a lack of standardised instruments which can measure the expected outcome of this study, we have developed the following instruments to assess:

1. The knowledge of health professionals on inter-professional practice and ICF.
2. Satisfaction of health profession with the ICF training
3. Checklist to audit patient records.
4. The attitudes of health professionals towards inter-professional practice was validated in education setting, but need to be validated in hospital settings.

I therefore, request you to kindly review these four instruments and report in the separate expert opinion Content Validity Index.

The questionnaires will be given to Health Professionals working in District Hospitals of Rwanda under study (Medical Doctors, Physiotherapists, Nurses, Social Workers, Clinical Psychologists/Mental Health Nurses, and Nutritionists/Dietetics) who will be trained on the interprofessional practice using International Classification of Functioning, Disability and Health (ICF).

The knowledge and Attitudes will be assessed before and after training. The Satisfaction with the training will be assessed after training. Checklist for auditing patients' records together with ICF checklist will audit the patients' records in district hospitals of Rwanda before and after training session.

The summary of this study is with the attached study synopsis. The questionnaires to be validated are also attached with separate form of questionnaire for the content validity index to be filled by the panel of experts.

Yours sincerely,

Jean Baptiste Sagahutu

Appendix x: Marker guide for knowledge of HP in interprofessional practice and ICF

Questionnaire of Knowledge of Health Care Professionals on Interprofessional Practice and ICF

<p>Health professional <input checked="" type="checkbox"/></p> <p>1. Medical doctor <input type="checkbox"/></p> <p>2. Physiotherapist <input type="checkbox"/></p> <p>3. Nurses <input type="checkbox"/></p> <p>4. Social worker <input type="checkbox"/></p> <p>5. Mental health nurse <input type="checkbox"/></p> <p>6. Clinical psychologist <input type="checkbox"/></p> <p>7. Nutritionist/Dietetic <input type="checkbox"/></p>	<p>Department/Ward <input checked="" type="checkbox"/></p> <p>1. Medical <input type="checkbox"/></p> <p>2. Surgical <input type="checkbox"/></p> <p>3. Pediatric <input type="checkbox"/></p> <p>4. Physiotherapy <input type="checkbox"/></p> <p>5. Mental health <input type="checkbox"/></p> <p>6. Social <input type="checkbox"/></p> <p>7. Nutrition <input type="checkbox"/></p>	<p>Level of education <input checked="" type="checkbox"/></p> <p>1. A2 <input type="checkbox"/></p> <p>2. A1 <input type="checkbox"/></p> <p>3. A0 <input type="checkbox"/></p> <p>4. Masters <input type="checkbox"/></p> <p>5. Other: <input type="checkbox"/></p> <p>Specify:.....</p> <p>...</p>	<p>Gender <input checked="" type="checkbox"/></p> <p>1. Male <input type="checkbox"/> 2. Female <input type="checkbox"/></p> <p>Age:Years</p> <p>Years of experience:</p> <p>.....Years</p>
--	--	---	---

Case study: Mr M.G is a 45 years old man, who is overweight and is a type II diabetic patient. He is receiving insulin. He was admitted to the surgical ward four weeks ago, with an open mid-shaft fracture of the right femur caused by a road traffic accident. Mr M.G is being treated with transtibial traction and wound dressing. His occupation is a driver and he is married, with four children. Mr M.G is very concerned about his condition because he is not sure if he will be able to go back to his job and be able to support his family. He is also a keen church goer and is afraid that he may not be able to continue being involved in church activities. The hospital has a shortage of adjustable beds which makes bed activities more difficult. He has poor bed mobility, he cannot wash, dress, feed himself, and has a problem with toileting. His wife is taking care of their children, and hence cannot act as his hospital care-giver which is a requirement for in-patients in hospitals. Therefore, it is difficult for him to get food. Members of the community visit him once a week to help in washing, changing bed clothes, and bringing food. Mr M.G used to smoke 20 cigarettes a day and has developed pressure sores on his buttocks, limited right leg muscle strength and knee motion, and pain on fracture site. However, he is fortunate to have a medical insurance which helps in accessing all prescribed treatment. He is a cooperative patient who is keen to get better as quickly as possible.

Based on the above case study, please complete the following table. Indicate which problems described fall under impairments, activity limitations or participation restrictions and environmental barriers or facilitators. You should also indicate the professional who should take responsibility for managing these problems, personal and environmental factors underlying M.G problems in the 2nd column. Finally you need to describe the probable management of this problem in the 3rd column. (For assessors: Please find the expected answers of each block. One mark will be given per correct answer in each block which makes a total of 144).

Health condition [12 Marks]	Profession	Management
1.Type II diabetes	1. Medical doctor 2. Nurse 3. Nutritionist	1. Prescribe insulin 2. Administering insulin 3. Nutritional advice
2. Open mid-shaft fracture of the right femur	1. Medical doctor 2. Nurse	1. Fracture reduction 2. Administering drugs and dressings

Impairment [18 Marks]	Profession	Management
1.Limited range of knee motion	1.Physiotherapist	1.Joint mobilisation/exercise to improve range of motion
2. Limited muscle strength	1.Physiotherapist	1. Strengthening exercises
3. Pain	1. Medical doctor 2.Nurse	1.Prescribe drugs and control bone alignment 2. Administering drugs and dressings
4. Pressure sores on his buttocks	1.Medical Doctor 2. Nurse 3.Physiotherapist	1. Prescribe drugs 2. Dressing and changing position 3. Changing position
Activity limitation (Current problems) [23 Marks]	Profession	Management
1.Difficulty in bed mobility	1.Physiotherapist	1.Mobility training
2.Difficulty in washing	1.Nurse 2.Physiotherapist	1.Washing patient 2. Helping in mobility training
3.Difficulty in dressing	1.Nurse 2.Physiotherapist	1.Dress the patient 2. Helping in mobility training
4. Difficulty in feeding	1.Nurse 2.Physiotherapist	1. Help in feeding the patient 2.Helping in mobility training
5. Difficulty with toileting	1. Nurse 2.Physiotherapist	1. Help the patient in toileting 2. Mobility training
Activity limitation (Problems anticipated on discharge) [12 Marks]	Profession	Management
1.Difficulty with standing and walking	1.Physiotherapist	1.Standing and gait training
2.Difficulty with squatting to go to the toilet	1.Physiotherapist	1. Strengthening exercises 2.Exercise to increase knee joint range of motion
3.Difficulty with using the affected limb to drive	1.Physiotherapist	1. Proprioception exercises 2. Strengthening exercises 3. Exercise to increase knee joint range of motion
Participation restriction [22 Marks]	Profession	Management
1.No longer able to drive in order to support his family	1.Psychologist 2.Physiotherapist 3.Medical doctor 4.Social worker 5.Nutritionist	1. Psychological counselling 2. Strengthening exercises and exercise to increase knee joint range of motion to prepare return to work 3. Appropriate reduction and immobilisation to prepare return to work 4. Social support 5. Adequate nutrition to accelerate

		healing
2. To involve in church activities	1. Psychologist 2. Physiotherapist 3. Medical doctor 4. Social worker 5. Nutritionist	1. Psychological counselling 2. Strengthening exercises and exercise to increase knee joint range of motion to prepare return to church activities 3. Appropriate reduction and immobilisation to prepare return to church activities 4. Social support 5. Adequate nutrition to accelerate healing
Personal factors (Positive) [14 Marks]		
	Profession	Management
1. A 45 old man	1. Psychologist 2. Physiotherapist 3. Medical doctor 4. Social worker 5. Nutritionist	This will help all Health Professionals in achieving the aim of management
2. Cooperative patient who is keen to get better as quickly as possible	1. Psychologist 2. Physiotherapist 3. Medical doctor 4. Social worker 5. Nutritionist	Same as above
Personal Factors (Negative) [13 Marks]		
	Profession	Management
1. Overweight	1. Nutritionist 2. Physiotherapist	1. Nutritional advice 2. Exercises to reduce and control weight
2. Concerned about his condition	1. Psychologist	1. Psychological support
3. Smokes 20 cigarettes a day	1. Social worker 2. Psychologist	1. Advice to reduce smoking 2. Advice to reduce smoking
Environmental Factors (Facilitators) [13 Marks]		
1. Community members visit	1. Nurse 2. Social worker 3. Psychologist	1. Washing, feeding, and dressing patient 2. Social support 3. Psychological support
2. Medical insurance	1. Medical doctor 2. Nurse 3. Physiotherapist 4. Psychologist	This will help health professionals in prescribing treatment
Environmental Factors (Barriers) [17 Marks]		
	Profession	Management
1. No caregiver to help in all activities of daily	1. Social worker	1. Social support

living	2.Nurse 3.Physiotherapist	2.Help in activities of daily living 3.Train the patient to perform all the activities as independent as possible
2. Shortage of adjustable beds which makes bed activities more difficult	1.Physiotherapist 2.Nurse	1. Training patient in bed mobility 2. Help the patient to perform bed activities
3. Difficulty in getting food	1. Social worker 2. Nutritionist	1. Help the patient to get the food. 2. Help in selecting appropriate food

Thank you very much for taking part in this research



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room E52-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492 • Facsimile [021] 406 6411
Email: Smayah.ariefdien@uct.ac.za
Website: www.health.uct.ac.za/fhs/ese/arch/humanethics/forms

12 February 2015

HREC/REF: 085/2015

Prof J Jelsma
Division of Physiotherapy
Health & Rehabilitation Sciences
F-45-OMB

Dear Prof Jelsma

Project Title: USE OF INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF) AS A THEORETICAL FRAMEWORK TO INFORM INTERPROFESSIONAL ASSESSMENT AND MANAGEMENT BY HEALTH CARE PROFESSIONALS IN RWANDA: A CLUSTER RANDOMISED CONTROL TRIAL (PhD-candidate-J Sagahutu)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) for review.

It is a pleasure to inform you that the HREC has **formally approved** the above mentioned study.

Approval is granted for one year until the 28 February 2016.

Please submit a progress form, using the standardised Annual Report Form, if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

We acknowledge that the following student:-Jean-Baptise Sagahutu is also involved in this project.

Please note that the on-going ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the HREC REF in all your correspondence.

Yours sincerely

**PROFESSOR M BLOCKMAN
CHAIRPERSON, HSF HUMAN ETHICS**

Hrec/ref:085/2015

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP) and Declaration of Helsinki guidelines.

The Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

REPUBLIC OF RWANDA



MINISTRY OF HEALTH
P O Box 84 KIGALI
Website: www.moh.gov.rw

NOTE OF COLLABORATION

Dear Chairperson of the National Health Research Committee (NHRC),

I, Dr Theophile DUSHIME, Director General of Clinical and Public Health Services in Ministry of Health, hereby confirm that I have been informed of a research entitled “*Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial*”, whose the Principal Investigator (PI) is Jean Baptiste Sagahutu who is a lecturer at University of Rwanda, College of Medicine and Health Sciences, School of Health Sciences. The research is the framework of his PhD Studies and might be beneficial for health sector. Clinical Services General Directorate is ready to collaborate with the study team. The present is delivered to Mr. Jean Baptiste Sagahutu to serve to whom it may concern.

Dr Theophile DUSHIME,
Director General of Clinical and Public Health Services



National Health Research Committee
Ref: NHRC/2015/PROT/016

To: Jean Baptiste Sagahutu
Principal Investigator

Scientific Review Approval Notice

With reference to your request for approval of the Research Protocol entitled: "Use of international Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to Inform Interprofessional Assessment and management by Health Care Professionals in Rwanda: A Cluster Randomised Control trial". We are pleased to inform you that, following a thorough review and critical analysis of your proposal (NHRC/2015/PROT/016), your Research Protocol has been approved by National Health Research Committee.

However,

- 1) Changes/amendments on approach and methodology must be submitted to the NHRC for review and approval to validate the changes.
- 2) A submission of quarterly progress report is mandatory
- 3) Submission to NHRC of final results before publication is mandatory
- 4) Failure to fulfil the above requirements will result in termination of study

Once again National Health Research Committee appreciates your interest in research and requests you to submit this proposal to the National Ethics Committee or IRB and then share a copy of the approval letter from them.

Your final approval reference number is **NHRC/2015/PROT/016**.

Sincerely,

Dr. Parfait (WARIRAYE)
Chairperson of NHRC
Signature: 
Date: 06/04/16

REPUBLIC OF RWANDA/REPUBLIQUE DU RWANDA



NATIONAL ETHICS COMMITTEE / COMITE NATIONAL D'ETHIQUE

Telephone: (250) 2 55 10 78 84

E-mail: info@rncrwanda.org

Web site: www.rncrwanda.org

Ministry of Health

P.O. Box. 84

Kigali, Rwanda.

FWA Assurance No. 00001973

IRB 00001497 of IORG0001100

May 26, 2015

No.145/RNEC/2015

Mr Jean Baptiste SAGAHUTU

Principal Investigator

(A student).

Your Project title **"Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial"** has been evaluated by the Rwanda National Ethics committee.

Name	Institute	Involved in the decision		
		Yes	No (Reason)	
			Absent	Withdrawn from the proceeding
Dr.Jean-Baptiste MAZARATI	Biomedical Services (BIOS)		X	
Prof. Eugène RUTEMBESA	University of Rwanda	X		
Dr.Laetitia NYIRAZINYOYE	University of Rwanda (school of public Health)	X		
Prof.Alexandre LYAMBABAJE	University of Rwanda		X	
Ms.Françoise UWINGABIYE	Lawyer at Musanze	X		
Dr. Egide KAYITARE	University of Rwanda	X		
Sr.Domitilla MUKANTABANA	Kabgayi Nursing and Midwife school	X		

Mr. David K. TUMUSIIME	Kigali Health institute	X		
Dr. Lisine TUYISENGE	Kigali Teaching Hospital	X		
Dr. Claude MUVUNYI	Biomedical Services (BIOS)		X	

After reviewing your protocol during the RNEC meeting of May 09, 2015 where quorum was met, and revisions made on the advice of the RNEC submitted on 26 May 2015, **Approval letter has been granted to your study.**

Please note that approval of the protocol and consent form is valid for **12 months**. You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrollment of participants
3. All consent forms signed by subjects should be retained on file. The RNEC may conduct audits of all study records, and consent documentation may be part of such audits.
4. A continuing review application must be submitted to the RNEC in a timely fashion and before expiry of this approval.
5. Failure to submit a continuing review application will result in termination of the study.
6. Notify the Rwanda National Ethics committee once the study is finished.

Sincerely,



Dr. Jean- Baptiste MAZARATI
Chairperson, Rwanda National Ethics Committee.



Date of Approval: May 26, 2015

Expiration date: May 25, 2016

C.C.

- Hon. Minister of Health.
- The Permanent Secretary, Ministry of Health.

REPUBLIC OF RWANDA



MINISTRY OF EDUCATION
P.O.BOX 622 KIGALI

Kigali, 08/07/2015
N°... 12.00/2015



Re: Permission to Carry out Research in Rwanda - No: MINEDUC/S&T/318/2015

The Permission is hereby granted to **Mr. Jean Baptiste Sagahutu**, Ph.D student in Physiotherapy at the University of Cape Town, South Africa, to carry out research on: **“Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial”**.

The research will be carried out in District Hospitals of Kayonza, Kamonyi, Rulindo, Nyanza, Ruhango, Gatsibo, Bugesera, Gakenke and Gicumbi Districts. During the research activities, the researcher will need access to medical records of the above mentioned Districts. He will need to interview Health Professionals working in the listed district hospitals.

The period of research is from **7th July, 2015 to 6th July, 2016**. It may be renewed if necessary, in which case a new permission will be sought by the researcher.

Please allow the **above mentioned researcher**, any help and support he might require to conduct this research.

Yours sincerely,

Marie-Christine GASINGIRWA, Ph.D
Director General of Science, Technology and Research
Ministry of Education





UNIVERSITY OF CAPE TOWN

Faculty of Health Sciences

School of Health and Rehabilitation Sciences

Divisions of



Communication Sciences and Disorders, Nursing and Midwifery, Occupational Therapy, Physiotherapy
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(0) 21 406

Feasibility hospital superintendent Information Letter

Name of the project: Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial.

My name is Jean Baptiste Sagahutu and I am a postgraduate PhD student, in the Physiotherapy Department at the University of Cape Town, Cape Town, South Africa. I am currently conducting a study on the **“Use of the International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda”**. I’m conducting this study for the requirement to fulfil a PhD degree in Physiotherapy. My supervisors are Professor J Jelsma, a member of the World Health Organisation Functional and Disability Reference Committee and Associate Professor Francois Cilliers, an expert in the training and education of health professionals. The ICF, which was developed by the World Health Organisation as a member of the Family of International Classifications, is intended to complement the universally utilised Internal Classification of Diseases. It not only provides a classification of functional ability but also a framework within which to explore the inter-relationship between the environment, the health condition and the functional abilities of patients. The introduction of the ICF, as the framework of patient management may result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. It is anticipated that this study would come up with the recommendations of the best ways of adopting an interprofessional collaboration between health care professionals in Rwanda. This hospital is invited to participate because it fulfils the entire requirement of this study.

This study is divided into two parts: a feasibility study and intervention study. Your hospital has been selected to conduct a feasibility study. During the feasibility study, a two days training of health professionals working in this hospital will include comprehensive assessment, holistic intervention, continuum of care, and interprofessional practice. Eight hours maximum per day will be used during training.

Baseline and post test data will be collected to determine the knowledge, attitudes and behaviour of health professionals regarding interprofessional practice and holistic care of patients. This will take around 20 minutes to fill the questionnaires. The retrospective data will also be gathered from the discharged patients' records.

During the ICF training, 5,000 FRW sitting allowance per day will be provided. Participation in the study will be voluntary, and the freedom to withdraw from the study at any time without penalty or loss of benefits will be granted. All provided information will be kept private and confidential. The participant's name, the name of the hospital and hospital records of their patients will not be included in the report. All these will not be named at any stage for the purpose of confidentiality. Moreover, all the data collected will be kept in password protected computer files and the hard copies will be locked away.

There are no known risks associated with participating in this study. However, the participant reserves the right to withdraw from the study at any time and this will not have any effect on the participant's every day work.

Please read and sign the attached consent form if you agree that your hospital participate in this study. You are free to ask questions before or during the study and you will be answered. If you require further information please feel free to contact me through my contact details below.

Thank you for your consideration.

Yours sincerely

Physiotherapist and principal researcher Kigali/Rwanda

Jean Baptiste Sagahutu

Tel: (250)0788800152

Email: jeanbaptigol@gmail.com

Supervisor

Jennifer Jelsma

Tel: +270846116681

Email: jennifer.jelsma@uct.ac.za

<p>The UCT FHS Human Research Ethics Committee can be contacted on +27021 406 6338 in case participants have any questions regarding their rights and welfare as research subjects on the study.</p>
--

Appendix xvii: Experimental and control hospital superintendent Information letter



UNIVERSITY OF CAPE TOWN

Faculty of Health Sciences

School of Health and Rehabilitation Sciences

Divisions of



Communication Sciences and Disorders, Nursing and Midwifery, Occupational Therapy, Physiotherapy
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(0) 21 406 6323

Hospital Superintendent Information Letter

Name of the project: Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial.

My name is Jean Baptiste Sagahutu and I am a postgraduate PhD student, in the Physiotherapy Department at the University of Cape Town, Cape Town, South Africa. I am currently conducting a study on the **“Use of the International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda”**. I’m conducting this study for the requirement to fulfil a PhD degree in Physiotherapy. My supervisors are Professor J Jelsma, a member of the World Health Organisation Functional and Disability Reference Committee and Associate Professor Francois Cilliers, an expert in the training and education of health professionals. The ICF, which was developed by the World Health Organisation as a member of the Family of International Classifications, is intended to complement the universally utilised Internal Classification of Diseases. It not only provides a classification of functional ability but also a framework within which to explore the inter-relationship between the environment, the health condition and the functional abilities of patients. The introduction of the ICF, as the framework of patient management may result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. It is anticipated that this study would come up with the recommendations of the best ways of adopting an interprofessional collaboration between health care professionals in Rwanda. This hospital is invited to participate because it fulfils the entire requirement of this study.

There will be two arms to the study. The experimental arm will receive a more comprehensive ICF training, whereas the control arm will receive a once off introduction to ICF. The experimental arm will receive two days training of health professionals working in district hospital which will include comprehensive assessment, holistic intervention, continuum of care, and interprofessional practice. Eight hours maximum per day will be used during training. For the control arm, the ICF introduction session will take only 2 hours.

A Cluster Randomised Control Trial will be used to select the hospital under study. This design is appropriate to compare the outcome of the intervention between the experimental and control group. A blinded person will randomly allocate the hospitals in either experimental or control arm. Therefore, based on random allocation, your hospital will be allocated to either the experimental or the control arm. Baseline and post test data will be collected to determine the knowledge, attitudes and behaviour of health professionals in Rwanda regarding interprofessional practice and holistic care of patients. This will take around 20 minutes to fill the questionnaires. After one month, three months, and five months follow up will be performed for the experimental arm, but no follow up for control arm. Two months, four months, and six months data collection will be performed for both arms. Two hours sitting will be expected during each follow up meeting. The retrospective data will also be gathered from the discharged patients' records.

During the ICF training 5,000 FRW sitting allowance per day will be provided to those in the experimental arm. No money will be provided for the control arm. Participation in the study will be voluntary, and the freedom to withdraw from the study at any time without penalty or loss of benefits will be granted. All provided information will be kept private and confidential. The participant's name, the name of the hospital and hospital records of their patients will not be included in the report. All these will not be named at any stage for the purpose of confidentiality. Moreover, all the data collected will be kept in password protected computer files and the hard copies will be locked away.

There are no known risks associated with participating in this study. However, the participant reserve the right to withdraw from the study at any time and this will not have any effect on participant's every day work. If your hospital is selected to be a control hospital and the programme is found to be effective, you will have the option of requesting a similar programme to be run at your hospital.

Please read and sign the attached consent form if you agree that your hospital participate in this study. You are free to ask questions before or during the study and you will be answered. If you require further information please feel free to contact me through my contact details below.

Thank you for your consideration.

Yours sincerely

Physiotherapist and principal researcher Kigali/Rwanda

Jean Baptiste Sagahutu

Tel: (250)0788800152

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Appendix xviii: Hospital Superintendent Informed Consent Form



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
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Hospital Superintendent Informed Consent Form

Name of the project: Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial.

I _____ have read the Information Sheet. I understand what is required of me and I have had all my questions answered. I do not feel that I am forced to take part in this study and I am doing so of my own free will. I know that I can withdraw at any time if I so wish and that it will have no bad consequences for me.

Signed:

Participant Date and place

Researcher Date and place

Appendix xix: Feasibility Hospital Participant Information Letter



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(0) 21 406 6323

Feasibility Hospital Participant Information Letter

Name of the project: Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial.

My name is Jean Baptiste Sagahutu and I am a postgraduate PhD student, in the Physiotherapy Department at the University of Cape Town, Cape Town, South Africa. I am currently conducting a study on the **“use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda”**. I’m conducting this study for the requirement to fulfil a PhD degree in Physiotherapy. The ICF, which was developed by the World Health Organisation as a member of the Family of International Classifications, is intended to complement the universally utilised Internal Classification of Diseases. It not only provides a classification of functional ability but also a framework within which to explore the inter-relationship between the environment, the health condition and the functional abilities of patients. The introduction of the ICF as the framework of patient management may result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. It is anticipated that this study would come up with the recommendations of the best ways of adopting an interprofessional collaboration between health care professionals in Rwanda. You are invited to participate because you fulfil the entire requirement of this study.

This study is divided into two parts: a feasibility study and intervention study. This hospital has been selected to conduct a feasibility study. This study will involve two days training of health professionals working in district hospital which will include comprehensive assessment, holistic intervention, continuum of care, and interprofessional practice. Eight hours maximum per day will be used during training. Baseline and post test data will also be collected to determine the knowledge, attitudes and behaviour of health professionals in Rwanda regarding interprofessional practice and holistic care of patients. This will take around 20 minutes to fill the questionnaires. During the training session, 5,000 FRW sitting allowance per day will be provided. Participation in the study will be voluntary, and you will be free to withdraw from the study at any time without penalty or loss of benefits. All the information you provide will be kept private and confidential. Your name, the name of your hospital and hospital records of their patients will not be included in the report for confidentiality purpose

There are no known risks associated with participating in this study. There may be no direct benefit to participants taking part in this study. However, you reserve the right to withdraw from the study at any time and this will not have any effect on your everyday work.

Please read and sign the attached consent form if you agree to participate. You are free to ask questions before or during the study and you will be answered. If you require further information please feel free to contact me through my contact details below.

Yours sincerely

Physiotherapist and principal researcher Kigali/Rwanda

Jean Baptiste Sagahutu

Tel: (250)0788800152

Email: jeanbaptigol@gmail.com

Supervisor

Jennifer Jelsma

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Appendix xx: Experimental Hospital Participant Information Letter



UNIVERSITY OF CAPE TOWN
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(0) 21 406 6323

(Experimental) Hospital Participant Information Letter

Name of the project: Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial.

My name is Jean Baptiste Sagahutu and I am a postgraduate PhD student, in the Physiotherapy Department at the University of Cape Town, Cape Town, South Africa. I am currently conducting a study on the **“use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda”**. I’m conducting this study for the requirement to fulfil a PhD degree in Physiotherapy. The ICF, which was developed by the World Health Organisation as a member of the Family of International Classifications, is intended to complement the universally utilised Internal Classification of Diseases. It not only provides a classification of functional ability but also a framework within which to explore the inter-relationship between the environment, the health condition and the functional abilities of patients. The introduction of the ICF as the framework of patient management may result in the adaptation of the bio-psycho-social model of health care and a more holistic approach to care. It is anticipated that this study would come up with the recommendations of the best ways of adopting an interprofessional collaboration between health care professionals in Rwanda. You are invited to participate because you fulfil the entire requirement of this study.

This study will involve two days training of health professionals working in district hospital which will include comprehensive assessment, holistic intervention, continuum of care, and interprofessional practice. Eight hours maximum per day will be used during training. A Cluster Randomised Control Trial has been used to select the hospital under study. This design is appropriate to compare the outcome of the intervention between the experimental and control group. A blinded person has randomly allocated the hospitals to either an experimental or control arm. Therefore, based on random allocation you have been allocated in **experimental arm**. Baseline and post test data will also be collected to determine the

knowledge, attitudes and behaviour of health professionals in Rwanda regarding interprofessional practice and holistic care of patients, and patient records will be audited. This will take around 20 minutes to fill the questionnaires. After one month, three month, five month follow up; and two months, four months, and six months data collection will be performed. Two hours sitting will be expected during each follow up meeting. The follow up sessions will involve refreshing the participants and discuss on some problems encountered during the implementation.

During the training session 5,000 FRW sitting allowance per day will be provided. Participation in the study will be voluntary, and you will be free to withdraw from the study at any time without penalty or loss of benefits. Refusing to take part or withdrawing from the study will not affect your current or future employment at the hospital, or with the Health sector in Rwanda. All the information you provide will be kept private and confidential. Your name, the name of your hospital and hospital records of their patients will not be included in the report for confidentiality purpose

There are no known risks associated with participating in this study. However, you reserve the right to withdraw from the study at any time and this will not have any effect on your everyday work. There may be no direct benefit to participants taking part in this study. As this is a pragmatic study, even if you will not agree to take part of this study, the hospital records of patients that you might have treated will be included in the study as other staff members will also be treating these patients.

Please read and sign the attached consent form if you agree to participate. You are free to ask questions before or during the study and you will be answered. If you require further information please feel free to contact me through my contact details below.

Yours sincerely

Physiotherapist and principal researcher Kigali/Rwanda

Jean Baptiste Sagahutu

Tel: (250)0788800152

Email: jeanbaptigol@gmail.com

Supervisor

Jennifer Jelsma

Tel: +270846116681

Email: jennifer.jelsma@uct.ac.za

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Appendix xxi: Control Hospital Participant Information Letter



UNIVERSITY OF CAPE TOWN

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School of Health and Rehabilitation Sciences



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A Cluster Randomised Control Trial has been used to select the hospital under study. There will be two arms to the study. The experimental arm will receive a more comprehensive ICF training whereas the control arm will receive a once off introduction to ICF. This design is appropriate to compare the outcome of the intervention between the experimental and control group. A blinded person has been randomly allocate the hospitals in either experimental or control arm. Therefore, based on random allocation you have been allocated in **control arm**. Baseline data will be collected to determine

the knowledge, attitudes and behaviour of health professionals in Rwanda regarding interprofessional practice and holistic care of patients. This will take around 20 minutes to fill the questionnaires. After one two months, four months, and six months data collection will be performed. The retrospective data will also be gathered from the discharged patients' records.

The ICF introduction session will take only 2 hours. No money will be provided for participating in this session, but some drinks will be provided. Participation in the study will be voluntary, and the freedom to withdraw from the study at any time without penalty or loss of benefits will be granted. Refusing to take part or withdrawing from the study will not affect your current or future employment at the hospital, or with the Health sector in Rwanda. All provided information will be kept private and confidential. Your name, the name of the hospital and hospital records of their patients will not be included in the report. All these will not be named at any stage for confidentiality purpose. Moreover, all the data collected will be kept in password protected computer files and the hard copies will be locked away.

There are no known risks associated with participating in this study. However, you reserve the right to withdraw from the study at any time and this will not have any effect on participant's every day work. There may be no direct benefit to participants taking part in this study. As this is a pragmatic study, even if you will not agree to take part of this study, the hospital records of patients that you might have treated will be included in the study as other staff members will also be treating these patients.

If the intervention is found to be effective, we will provide the intensive training to all those in the control group who wish to participate.

Please read and sign the attached consent form if you agree to participate. You are free to ask questions before or during the study and you will be answered. If you require further information please feel free to contact me through my contact details below.

Yours sincerely

Physiotherapist and principal researcher Kigali/Rwanda

Jean Baptiste Sagahutu

Tel: (250)0788800152

Email: jeanbaptigol@gmail.com

Supervisor

Jennifer Jelsma

Tel: +270846116681

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Appendix xxii: Participant Informed consent form



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Participant Informed Consent Form

Name of the project: Use of International Classification of Functioning, Disability and Health (ICF) as a Theoretical Framework to inform Interprofessional Assessment and Management by Health Care Professionals in Rwanda: A Cluster Randomised Control Trial.

I _____ have read the Information Sheet. I understand what is required of me and I have had all my questions answered. I do not feel that I am forced to take part in this study and I am doing so of my own free will. I know that I can withdraw at any time if I so wish and that it will have no bad consequences for me. I know that if I refuse to take part or withdraw from the study it will not affect my current or future employment at the hospital, or with the health sector in Rwanda.

Signed:

Participant Date and place

Researcher Date and place

Appendix xxiii: Patient information Player

IMPORTANT PATIENT INFORMATION

A research study is being conducted in this ward.

The research is being done by Jean Baptiste Sagahutu, a PhD student at the University of Cape Town, South Africa.

Why is this research study being done?

The purpose of this study is to determine whether the International Classification of Functioning, Disability and Health can be used as a framework to inform interprofessional assessment and management within hospital settings in Rwanda and whether its use will result in improved service delivery. The study is taking place over the next few months in wards in this hospital, and other hospitals in the Rwanda.

Why are we telling you about this study?

As part of the study, we need to look at patient clinical notes to see how the patient information is recorded, what care was given and who delivered care to the patients. The patient notes will be chosen randomly (i.e. by chance/similar to a flip of a coin) at the end of the study, once all patients in the study wards have been discharged. Your notes may therefore be included in this study.

Will this study affect my care while I am in hospital?

No. You will still receive the same care while you are in hospital.

Will my name or any personal details be recorded in this study?

No. Your name and personal details will not be recorded as part of this study. All information from the notes will be kept strictly confidential.

Are there any risks or benefits for taking part in this study?

No. There are no risks or direct benefits to you for taking part in this study.

Do I have to take part?

No. Please let the sister-in-charge know that you do not want to take part and she will leave a note in your folder. We will then not include your folder.

Who should I contact if I have any questions or concerns?

Please contact Jean Baptiste Sagahutu on 0788800152 or Dr Jeanne Kagwiza on 250788755364

If you have questions about your rights or welfare as a research participant, please contact the UCT Faculty of Health Sciences Human Research Ethics Committee on 021 406 6338.

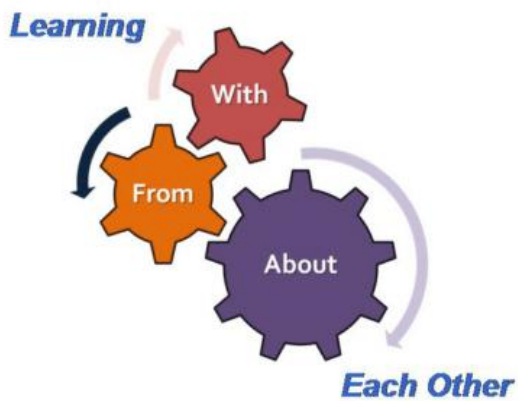
Appendix xxiv: Form to be signed by patient who does not want to take part in the study

Form to be signed by patient who does not want to take part in the study

I,.....do not wish to have my folder included in the research project aiming at determining whether the International Classification of Functioning, Disability and Health can be used as a framework to inform interprofessional assessment and management within hospital settings in Rwanda and whether its use will result in improved service delivery.

Signature: _____ Date and place: _____

**Use of International Classification of Functioning, Disability and Health (ICF) as a
Theoretical Framework to inform Inter-professional Assessment and
Management by Health Care Professionals in Rwanda**



**TRAINING PACKAGE OF HEALTH CARE PROFESSIONALS WORKING IN DISTRICT
HOSPITALS IN RWANDA**

Aim of the training

To enable the Health Professionals to understand the utility of Interprofessional Practice towards patient centered care.

Learning outcomes

During the training of health professionals, it is envisaged that the trainees will make great progress in the process of mastering the six competency domains for interprofessional collaborative practice, namely:

Role clarification: Health professionals understand their own role and the roles of those in other professions, and use this knowledge appropriately to establish and achieve patient/client/family and community goals.

Patient/client/family/community-centred care: Health professionals apply the ICF as interprofessional collaboration and care framework in designing and implementing care/services.

Team functioning: Health professionals understand the principles of team work dynamics and group/team processes to enable effective interprofessional collaboration, including referrals to other disciplines, coordination of different services, case discussions and interprofessional treatment planning, integrated interprofessional ward rounds, task sharing and shifting.

Collaborative leadership: Health professionals understand and can apply leadership principles that support a collaborative practice model.

Interprofessional communication: Health professionals from different professions communicate with each other in a collaborative, responsive and responsible manner.

Interprofessional conflict resolution: Health professional actively engage self and others, including the client/patient/family, in positively and constructively addressing disagreements as they arise.

Introduction

The overall goal of interprofessional collaborative practice is to provide health system users with improved health outcomes. Interprofessional collaboration (IPC) occurs when practitioners, patients/clients/families and communities develop and maintain interprofessional working relationships that enable optimal health outcomes. A clear understanding of the characteristics of the ideal collaborative practitioner is required to enlighten professional practice for interprofessional *collaboration*(Canadian Interprofessional Health Collaborative, 2010a).

Interprofessional collaboration is the process of developing and maintaining effective interprofessional working relationships with practitioners, patients/clients/ families and communities to enable optimal health outcomes. Elements of collaboration include respect, trust, shared decision making, and partnerships. For interprofessional teams of practitioners to work collaboratively, the integration of role clarification, team functioning, collaborative leadership, and a patient/client/ family/community-centered focus to care/services is supported through interprofessional communication. Effective interprofessional communication is dependent on the ability of teams to deal with conflicting viewpoints and reach reasonable compromises.

Patient/client/family/community-centred care includes

- a. **Comprehensive assessment:** Health condition and diagnosis seen in ICF context, Personal factors including mental and spiritual needs, Assessment of impairment, Assessment of functioning, Assessment of environmental factors.
- b. **Holistic intervention:** Health condition managed in context, Personal factors including mental and spiritual needs, Impairment addressed, Functioning addressed, Environmental factors addressed
- c. **Continuum of care:** Prevention of recurrence of health condition or complications related to condition, Referral to community services, Liaison with community based services
- d. **Inter-professional practice:** Referrals to other discipline, Coordination of different services, Case discussion and interprofessional treatment planning, integrated interprofessional ward rounds, Task sharing and shifting.

Role clarification and team functioning

Role clarification occurs when health professional understand their own professional roles and those in other professions, and use this knowledge appropriately in order to become change agents who effectively establish and achieve holistic person-centred goals within the community in which they participate



LEARNING OUTCOMES

At the end of these activities health professional should be able to demonstrate role clarification and team functioning by:

Developing a set of principles for working together that respects the ethical values of members

Describing their own profession's role and that of other professions

Recognizing the diversity of other professions' roles, responsibilities, and competencies

Communicating roles, knowledge, skills and attitudes using appropriate language

Actively listening respectfully to other professionals to identify where unique knowledge and skills are held and where shared knowledge and skills occur.

Describing your own profession's role and that of other professions

Activity: During this activity you will be exploring the roles and responsibilities of different professions.

Step1: What do you understand of each profession's role?

Go to Table 2. Each group member will represent a profession other than his/her own. Write down your perceptions of the roles and duties of the profession you "represent". Rotate the sheets amongst the members at your table. Each one is only to write down new items in order to avoid duplication.

TAKE NOTE: *Do not talk about your own profession or make corrections! We are getting to correct any misconceptions!*

For this exercise we are focusing on the following professions:

- Nurse
- Physiotherapist
- Medical doctor
- Mental health nurse/ Clinical psychologist
- Social worker
- Nutritionist/dietician

To make things more concrete use the following conditions to guide you in determining the various roles of each profession (don't go into detail of each of the conditions listed below – only use it as guide to list your idea of what the role of each profession is).

- Cerebrovascular accident (Stroke)
- Femoral fracture
- Malaria
- Chronic lung disease
- Osteomyelitis
- Diabetes
- Meningitis

Make changes to your (represented) profession according to the panel discussion (do this in the right hand column of the page for each profession).

Figure 1: What we have in common and the unique roles of the various professions

Applying the ICF in goal setting



LEARNING OUTCOMES

At the end of this session health professionals will be able to:

Access other professionals' skills and knowledge appropriately through collaboration within an interprofessional team.

Consider the roles of other professionals in determining your own professional and interprofessional roles.

Integrate your own professional roles in the development of holistic person-centred goals as part of the interprofessional care plan, according to the domains of the ICF.

Background on the ICF

The International Classification of Functioning, Disability and Health (ICF) is a framework for organising and documenting information on functioning and disability. It conceptualises functioning as a 'dynamic interaction between a person's health condition, environmental factors and personal factors.' The ICF was approved for use by the World Health Assembly in 2001 (WHO, 2001).

The aims of the ICF (WHO, 2001) are to:

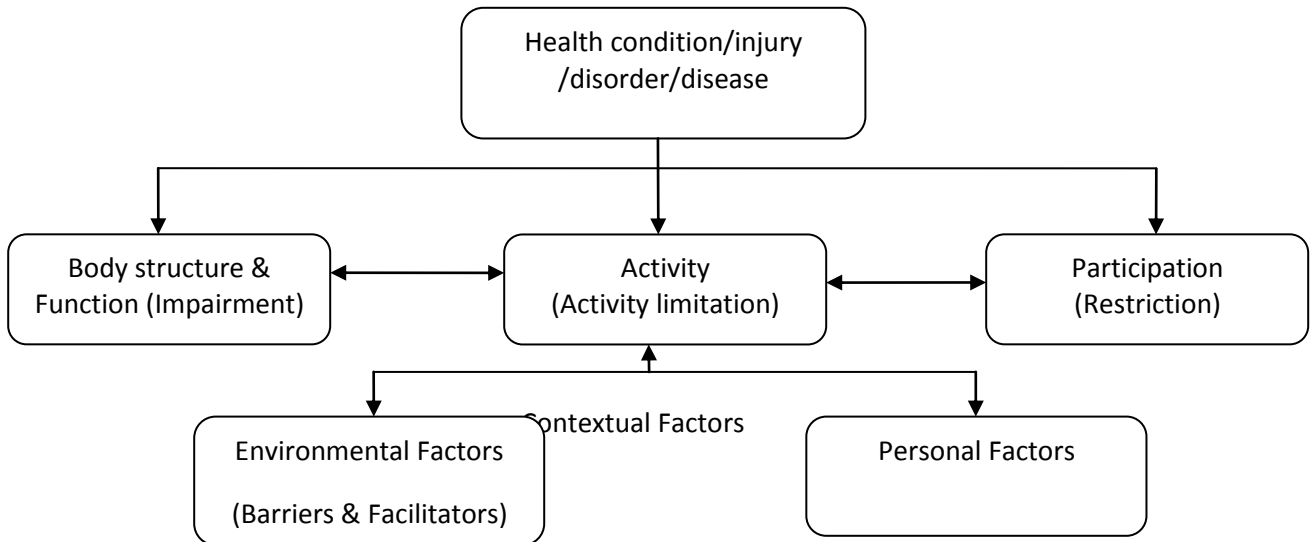
- Provide a scientific basis for understanding and studying health and health-related states, outcomes, determinants, and changes in health status and functioning;
- Establish a common language for describing health and health-related states;
- Permit comparison of data across countries, health care disciplines, services and time; and
- Provide a systematic coding scheme for health information systems.

ICF provides a standard language and conceptual basis for interprofessional collaborative practice and for the definition and measurement of disability, and it provides classifications and codes. It integrates the major models of disability - the medical model and the social model - as a "bio-psycho-social synthesis". It recognises the role of environmental factors in the creation of disability, as well as the role of health conditions.

Functioning and disability are understood as umbrella terms denoting the positive and negative aspects of functioning from a biological, individual and social perspective. The ICF therefore provides a multi-perspective, bio-psychosocial/spiritual approach which is reflected in the multidimensional model.

Definitions and categories in the ICF are worded in neutral language wherever possible so that the classification can be used to record both the positive and negative aspects of functioning.

In classifying functioning and disability, there is not an explicit or implicit distinction between different health conditions. Disability is not differentiated by aetiology. ICF clarifies that we cannot, for instance, infer participation in everyday life from medical diagnosis alone. In this sense ICF is aetiology-neutral: if a person cannot walk or go to work it may be related to any one of a number of different health conditions. By shifting the focus from health condition to functioning, the ICF places all health conditions on an equal footing, allowing them to be compared in terms of their related functioning via a common framework.



ICF Conceptual Framework (WHO, 2001)

Case study to practice ICF in clinical settings

Make small group of 2 to 3 people and work on the following case studies. Preferably, a mixed group of different health professionals should be used.

Case study

Kalisa is a 45-year-old male who was diagnosed with pulmonary tuberculosis 2 weeks ago. He is under medication and isolated in a medical ward. Kalisa is married with 4 children but has no caregiver during his hospital stay. His current occupation is a driver, but since 4 months he cannot drive. As his hobbies, he likes having fun with friends and church activities. He has lost 15 kg and looks depressed. Sometimes Kalisa complain of sweating and high fever with a productive cough at night. Chest X-ray indicates consolidations and cavities especially in right lung. Though Kalisa can walk, he likes to stay in his bed and has generalized body weakness with respiratory failure. He is reporting to be tired to stay in hospital.

On physical examination, Kalisa demonstrated decreased passive and active range of motion in bilateral knee extension as well as bilateral shoulder flexion and abduction, the right being worse than the left. He shows a slight thoracic kyphosis in both sitting and standing posture which can be almost completely corrected with manual assist. He shows decreased active and passive range of motion in trunk extension, rotation and side bending. He also shows decreased in chest expansion and poor breathing pattern. He also has some crepitating sound by auscultation. In addition, Kalisa has dizziness while standing and trying to walk around the bed.

Activity:

Step 1:

- a) Small group team up in 2-3. Each group will plot Kalisa's case according to one of these domains on the ICF and identify areas that should be assessed further:
 - Health condition and impairments
 - Activity limitations and participation restrictions
 - Contextual factors: Environmental and personal factors
- b) The group will now discuss the answers – make adjustments to your framework according to the discussion.

Step 2:

- As a group put it all together on the empty framework sheet of paper that will be distributed.
- As a group consult with the representatives from the various professions in order to draw up an interprofessional management plan.

Interprofessional care framework for continuous interprofessional care

IMPAIRMENT	WHO	MANAGEMENT
ACTIVITY LIMITATION	WHO	MANAGEMENT
PARTICIPATION RESTRICTION	WHO	MANAGEMENT
PERSONAL FACTORS	WHO	MANAGEMENT
Positive		
Negative		
ENVIRONMENTAL FACTORS	WHO	MANAGEMENT
Facilitator		
Barrier		

Reviewing the real patient record from the hospital

Depending on the number of participants make 1 or 2 groups and make sure that every discipline is represented in the group.

Activity 1:

Step 1: Identification of patient records in orthopaedic, medical or paediatric ward.

Step 2: In groups, read and discuss the folder comparing it with the ICF framework.

Step 3: Using the interprofessional framework for continuous interprofessional care, identify the problems that were addressed and probable problems that were not addressed.

Step 4: Each group will present their case.

Activity 2:

Step 1: In a large group, based on the discussed patients' records, what are the facilitators and barriers to implementing the interprofessional practice in your hospital by next week?

Step 2: -How can you use those facilitators for implementation?

-How can you address those barriers to implementation?

Step 3: What changes may be planned to implement in your facility?

Expected changes to be implemented in the facility

	Next week	Over next 3 weeks
Personally		
Team		
Institution		

END OF TRAINING

THANK YOU!!!!

Introduction to ICF

The International Classification of Functioning, Disability and Health (ICF) is among the WHO family of classification and it is a framework for organizing and documenting information on health, functioning, and disability. It conceptualizes functioning as a 'dynamic interaction between a person's health condition, environmental factors and personal factors.' The ICF was approved for use by the World Health Assembly in 2001 (WHO, 2001).

The aims of the ICF (WHO, 2001) are to:

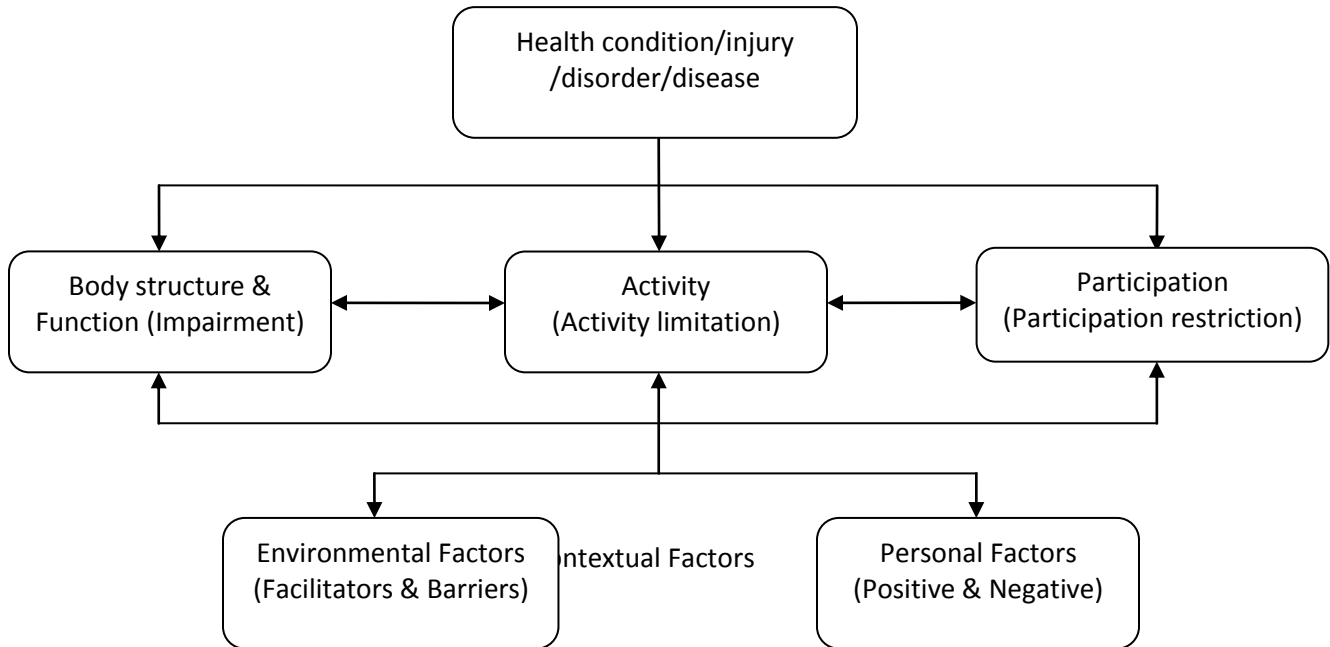
- Provide a scientific basis for understanding and studying health and health-related states, outcomes, determinants, and changes in health status and functioning;
- Establish a common language for describing health and health-related states;
- Permit comparison of data across countries, health care disciplines, services and time; and
- Provide a systematic coding scheme for health information systems.

ICF provides a standard language and conceptual basis for interprofessional collaborative practice and for the definition and measurement of disability, and it provides classifications and codes. It integrates the major models of disability - the medical model and the social model - as a "bio-psycho-social synthesis". It recognises the role of environmental factors in the creation of disability, as well as the role of health conditions.

Functioning and disability are understood as umbrella terms denoting the positive and negative aspects of functioning from a biological, individual and social perspective. The ICF therefore provides a multi-perspective, bio-psychosocial/spiritual approach which is reflected in the multidimensional model. Definitions and categories in the ICF are worded in neutral language wherever possible so that the classification can be used to record both the positive and negative aspects of functioning.

In classifying functioning and disability, there is not an explicit or implicit distinction between different health conditions. Disability is not differentiated by aetiology. ICF clarifies that we cannot, for instance, infer participation in everyday life from medical diagnosis alone. In this sense ICF is aetiology-neutral: if a person cannot walk or go to work it may be related to any one of a number of different health conditions. By shifting the focus from health condition to functioning, the ICF places all health conditions

on an equal footing, allowing them to be compared, in terms of their related functioning, via a common framework.



ICF Conceptual framework (WHO, 2001)

Appendix xxvii: Follow-up training guide

1. Introduction and aim of the meeting		
2. Brief recall to ICF and IPP: ICF framework and interprofessional care framework for continuous interprofessional care (based on ICF) were used.		
3. Participants' views:	Comments	Action taken
Has the training you received been helpful in your daily work?		
-Do you think that the way you are working with other professionals has changed? -Can you give some specific examples?		
What changes would help you to implement the interprofessional practice better?		
What has been helpful or made easier?		
What do you like to be reminded of?		
What would you like to discuss that I have not mentioned?		
Any question/suggestion/comment?		

Appendix xxviii: Health professionals' training time table

Time	Agenda
08:00 – 08:30	Arrival of participants
08:30 – 08:40	Welcoming participants and introduction to the training
08:40 – 09:00	Participants information sheets and signing consents
09:00 – 09:30	Pre-test
09:30 – 09:40	Training rules and regulations
09:40 – 10:10	Aim of the training & learning outcome
10:10 – 10:30	Break
10:30 – 10:50	Role classification and team functioning
10:50 – 11:20	Describing everyone's professional and responsibilities of different professionals
11:20 – 12:00	Small group activities (case study)
12:00 – 12:30	Clearing misconceptions
12:30 – 13:30	Lunch
13:30 – 14:00	Applying ICF in the goal setting
14:00 – 14:40	Small group activities (Patients' records)
14:40 – 15:30	Group presentations using interprofessional care framework for continuous IP care
15:30 – 16:00	<p>In plenary:</p> <ul style="list-style-type: none"> -What are the facilitators and barriers to implementing the interprofessional practice in your hospital? -How can you use those facilitators for implementation? -How can you address those barriers to implementation? -What changes may be planned to implement in your facility as an individual, as a group, as an institution?
16:00 – 16:50	-Post test on knowledge and attitudes + training satisfaction questionnaires
16:50 – 17:00	Closing the training

Appendix xxix: Interprofessional care framework for continuous interprofessional care (based on ICF)

Patient sticker	Diagnosis:	
	Admission date:	
Impairment	By who	Management
Activity limitation	By who	Management
Participation restriction	By who	Management
Personal factors	By who	Management
Positive		
Negative		
Environmental factors	By who	Management
Facilitator		
Barrier		