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The effect of a community based pulmonary rehabilitation programme on the quality of life of patients with pulmonary tuberculosis

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it for any degree or examination at any university. This study has been approved by the research ResearchEthics Committee of the Health SciencesFaculty, University of Cape Town, record reference 251/2009.

Signed by: _____

Date:_____

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DEDICATION

This thesis is dedicated to all those who assisted in this journey.

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GLOSSARY

PTB: Pulmonary Tuberculosis

PTB/HIV: Co-infection of the Human Immunodeficiency Virus and Pulmonary Tuberculosis

MDG: Millennium Development Goals

HIV/AIDS: Human Immunodeficiency Virus/ AcquiredImmune-Deficiency Syndrome

MDR-TB: Multi-Drug Resistant Tuberculosis

DOTS: Directly Observed Treatment Strategy

PR: Pulmonary Rehabilitation

HRQoL: Health Related Quality of Life

NTCP: National TB Control Plan

TB: Tuberculosis

LTBI: Latent Tuberculosis Infection

COPD: Chronic Obstructive Pulmonary Disease

CASE DETECTION: newly diagnosed PTB case are reported to the national surveillance system

INCIDENCE RATE: The rate of newly diagnosed cases of a particular disease in a specific population over a defined time period

CLINICAL IMPROVEMENT: Parameters that were tested did not show statistical significance at the end of the six week period but did have a positive effect on the clinical presentation of the participant.

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ABSTRACT:

PURPOSE: To determine whether a community based rehabilitation exercise programme had an effect on pulmonary function, exercise tolerance and Health Related Quality of Life (HRQoL) in patients diagnosed with Pulmonary Tuberculosis (PTB).**RELEVANCE:**The prevalence of PTB in South Africa is one of the highest in the African continent. Assessing the effectiveness of the programme could provide further methods in improving compliance to pharmaceutical medication as well as an improvement in the morbidity experienced after diagnosis of PTB.**PARTICIPANTS:**Randomly selected participants with the confirmed diagnosis of PTB in the absence of additional lung disease, cardiac and ambulatory problems were included into study at a PTB clinic situated in Khayelitsha, Cape Town. **METHODS:**The study was conducted using a randomized control trial. The intervention group was given a home based pulmonary rehabilitation programme for the duration of six weeks while the control group was given a self designed information leaflet with no intervention. **ANALYSIS:**Means and standard deviations were calculated where applicable. Normally distributed data between the control and intervention group were analyzed using the Pearson's Chi-Square and Fisher's exact tests. Data that was not normally distributed was analyzed using the Two-sample Wilcoxon rank-sum (Mann-Whitney test). Correlation were also investigated in the intervention and control groups**.RESULTS:**Although not statistically significant, clinical improvement was greater in the HRQoL of the intervention group. At the end of the sixth week, the reading for FEV_1 was statistically significant ($p>0.02$) in the intervention group. **CONCLUSION**:Clinical improvement was seen in the intervention group over the six week period with the control group showing only slight improvements in the areas tested. It can be concluded that a home based pulmonary rehabilitation programme does have a clinical impact on lung function, exercise tolerance and HRQoL. **KEYWORDS:**Pulmonary Tuberculosis, Home Based Pulmonary Rehabilitation.**FUNDING ACKNOWLEDGEMENTS:**National Research Foundation, University of Cape Town

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CHAPTER ONE

INTRODUCTION

1.1) Prevalence of Pulmonary Tuberculosis globally and nationally

South Africa today is ranked 5th in the world for the number of new cases of Pulmonary Tuberculosis (PTB) in conjunction with Human Immunodeficiency Virus/Acquired Immune-Deficiency Syndrome (HIV/AIDS) (WHO, 2007a). Several systems and strategies have been identified and incorporated into many health systems to aid in the management of the disease as well as to improve the wellbeing of the affected patients. The eight Millennium Development Goals (MDG) were developed by the World Health Organisation (WHO) in 2001 to provide countries around the world with a framework for national development; and set targets to be achieved in allocated timeframes by which progress can be measured (WHO, 2006a).

The 6th target of the MDG set out to halt and reverse the incidence of diseases such as PTB as well as HIV/AIDS and malaria. This specific goal aims to achieve a smear-positive case detection rate of approximately 70%, and up to 85% of successful treatment by 2015 (WHO, 2007b). In 2002, the total number of PTB cases registered in South Africa was 54 364 compared to 46 368 in 2001, which indicated a 15% increase in a year (SA Department of Health, 2005). In the report published by WHO (2007), the total number of newly diagnosed PTB cases was found to be 490 per 100 000 population, showing an increase in the number of new cases from 2000, which was 482 per 100 000 population, excluding the patients diagnosed with co-morbidity of HIV/AIDS in the Southern Africa region.

According to statistics published in 2008, PTB was one of the five leading causes of death in South Africa and the leading cause of death within the age groups 15-49 years and 50-64 years (Stats SA, 2008). The report published by the City of Cape Town in conjunction with the Metropole District Municipalities and the Provinicial Government of the Western Cape (2003), found that the 24,075 cases that were recognized in the City of Cape Town during 2002 were

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found in the Khayelitsha (20%), Nyanga (16%) and Oostenberg (12%) areas. These areasconstitute almost half of the burden in the Metropole region. Nationally, the number of patients that were newly diagnosed with PTB was the highest in the district of the Overberg Region (86.6%) of the Western Cape, and the lowest in the district of Alfred Nzo (40.7%) of the Eastern Cape (Health Systems Trust 08/09).

The target set for 2015 for the achievement of the MDGs will most likely not be met due to the number of patients undiagnosed with PTB, the co-infection of PTB/HIV as well as the occurrence of MDR-TB (SA Department of Health, 2005). Interventions for patients diagnosed with PTB have focused on micro-bacterial cure with no long term plan implemented to address the morbidities experienced as a result of the disease. This can be seen as a potential problem in the near future as patients will continue to suffer from the effects of the disease should an intervention not be implemented to combat the increase in morbidity even though a micro-bacterial cure has been achieved.

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1.2)Challenges encountered in the management of Pulmonary Tuberculosis

Despite the number of resources that has gone into the management of PTB, not enough attention has been given to the physical, emotional and financial effects that most patients experience as a result of being diagnosed with the disease and the medication used as part of the treatment regimen (Maguire et al, 2009). Pulmonary Tuberculosis not only affects the physical attributes of the patient but recent studies have shown that the disease affects patients socially, emotionally as well as financially (Dhuria et al, 2008). Multiple challenges have been encountered in the management of PTB in the country. The report published by the South African Department of Health (2004) highlighted the main challenges experienced in PTB control, namely delayed health seeking behaviour in patients that present with PTB symptoms to primary health care facilities, delayed case detection of PTB, and high incidence of non-compliance to PTB treatment. For the purpose of this thesis, three main challenges encountered in the management of PTB are discussed below.

1.2.1)Adherence to treatment

Biomedical and psycho-socio-economic factors as highlighted by Ukpe (2007) affects adherence to the prescribed treatment regimen. Non-adherence in turn increasesprobability of the occurrence of MDR-TB which will only further increase a continually growing incidence rate. According to Grimwood et al (2006), who conducted a survey by the South African Medical Research Council in 2001/2002, found that there was a strong connection between patients who had previously failed to complete the required treatment, non-compliance to the prescribed medication and the development of MDR-TB.

South Africa is one of 27 countries with a high burden of MDR-TB with a prevalence of 1.6% in newly diagnosed PTB patients and 6.6% in patients that have defaulted from treatment (Grimwood et al, 2006).

In another South African study conducted by Loveday et al (2007) which looked at the factors that might play a contributing role to the non-compliance of the essential medication, reports that poor diet as a result of low income, overcrowding in the informal settlements as well as substance abuse could contribute to the spread of PTB. The majority of the patients diagnosed with PTB are in the working class population of the community (Geetharamani et al, 2001) and the resultant loss of income would cause delay in diagnosis and treatment. The loss of income would affect the family as a whole and thus contribute to the already escalated non-compliance of the PTB medication (Geetharamani et al, 2001).

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1.2.2)Implementation of programmes

The incorporation of the Directly Observed Treatment Strategy (DOTS) into the management of patients undergoing treatment for PTB is expected to lower the growing number of new cases detected, but factors such as unemployment, poverty, a lack of proper housing and non-compliance have a significantly negative impact on the success of the programme (SA Department of Health, 2007). Other factors such as a lack of trained staff in the management of TB patients, lack of resources, inadequate political assistance, poor laboratory services, inadequate management of patients diagnosed with Multi-drug Resistant Tuberculosis (MDR-TB) and patients diagnosed with co-morbidity of PTB and HIV/AIDS have a major impact on the

successful execution of the DOTS programme as well as the achievement of the MDG's by 2015 (WHO, 2005). Although the establishment of the MDGs has set an international standard which each country has been encouraged to meet in the prescribed time, the aforementioned factors may well contribute to rendering the 2015 6th MDG unachievable.

1.2.3)Community involvement in the management of Pulmonary Tuberculosis

The MDGs not only place emphasis on the detection and cure rate, but the "Stop TB Strategy" (2006b) implemented by WHO in 2006 incorporates the involvement of the community in the management of patients diagnosed with PTB. Health systems have incorporated community support structures in community based centres to assist in high burdened areas that are low in resources and to assist in the compliance of patients to the treatment regimen. The National Tuberculosis Strategic Plan for South Africa (2007-2011) drawn up by the SA Department of Health, highlighted the importance of community participation in the movement to increase awareness of the growing problem of the spread of PTB.

Community support includes trained members from the community assisting in the execution of the DOTS programme as well as providing a support structure to those patients on treatment (Dick et al, 1996). Community and patient empowerment are considered central to a human rights approach to the care for PTB patients as well as the ultimate prevention of PTB (WHO, 2006b). The empowerment of PTB patients should improve their capacity to better control their own health, their ability to assist other PTB patients in improving their own lives, as well as their ability to assist healthcare professionals involved in PTB control programmes thus improving their QoL (WHO, 2006b). Not only should the community according to Man et al (2004) be able to play a role in the management of patients while on the DOTS system but community members should be able to make a difference in the health status of those in the community after PTB treatment. This is in line with the report of Sagbakken et al (2008) who identified barriers and enablers in the management of TB treatment in Ethiopia.

Globally, an increasing degree of awareness has been placed on the morbidities experienced during and after PTB treatment (Guo et al, 2009; Dhuria et al, 2008; Corless et al, 2006) and

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the possible implementation of physiotherapy related interventions to address the increasing degree of morbidity (Ghosh et al, 2006). In South Africa, there has been little focus on physiotherapy related interventions, especially at community level.

1.3)Role of physiotherapy

Post treatment sequelae of PTB patients have included abnormal pulmonary functions affecting, among others, forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), and the ratio of FEV_1 to FVC (Singla et al, 2009). It was therefore recommended that the post-treatment pulmonary rehabilitation of TB patients should be an integral part of PTB management program to improve the impact of the program in the community. Literature has reported that physiotherapy in the form of exercise training is an important component in the rehabilitation of patients with PTB (Yoshida et al, 2006). Pulmonary Rehabilitation is reported to be the most accepted method of non-pharmacological treatment in patients with PTB (Ciobanu et al, 2007; Ries, 2008; Ries et al 2007). Recent studies report that PR not only assists the patient with management of the symptoms characterized by the disease but also improves functional activities (Ries, 2008). Earlier studies confirmed what Ries (2008) had stated with regards to an improvement in the exercise tolerance and HRQoL being shown after undergoing an intervention in the form of a pulmonary home programme for patients diagnosed with pulmonary disease (Cambach et al, 1997). Pulmonary rehabilitation inclusive of upper and lower limb exercise was shown to be the most beneficial to patients suffering from lung disease (Lake et al, 1990). The inclusion of isolated peripheral muscle conditioning in a home based rehabilitation programme proved to be accepted by patients in the home environment and improved conditions of breathlessness and ventilation during exertion (Clark et al, 1996).

1.4) Significance of the Study

The prevalence of PTB in South Africa is one of the highest in the African continent. Assessing the effectiveness of the home based pulmonary rehabilitation programme in patients diagnosed with PTB could provide further methods in improving compliance to pharmaceutical medication as well as an improvement in the morbidity experienced after diagnosis of PTB.

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1.5)Aim of the study

The intention of this study was to determine whether a home based pulmonary rehabilitation programme, consisting of physiotherapy interventions, would assist in the improvement of HRQoL, lung function as well as exercise tolerance after undergoing a6 week rehabilitation programme designed for the patient to execute at home, in line with the recommendation of Griffiths et al (2000) that an ideal length of a rehabilitation program is 6-8 weeks.

1.5.1)Objectives of the study

The objectives formulated from the aim of the study were structured to establish a relationship between the possible improvements in the patients' ability by compliance with the home based exercise programme. The objectives are listed as follows:

- To describe the demographic profile of the participants included into the study
- To determine the baseline HRQoL, pulmonary functions and exercise tolerance among PTB participants.
- To determine whether adherence to a six-week home based rehabilitation programme improves the functional ability of the participants as measured by a six-minute walk test.
- To determine whether an improvement in the HRQoL could be attributed to his/her compliance with a six week home-based pulmonary rehabilitation programme measured by a HRQoL questionnaire.
- To establish whether compliance to a six week home-based pulmonary rehabilitation programme would show improvements in baseline measurements of lung function parameters.

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CHAPTER 2:

LITERATURE REVIEW

2.1)Incidence of PTB Globally:

The United Nations (2007) estimated that 8.8 million new cases of Pulmonary Tuberculosis (PTB) had been registered in 2005 of which a staggering 7.3 million were reported in sub-Saharan Africa as well as in four Asian countries. As indicated in the MDG Report by the United Nations (2007) as many as 1.6 million people died of PTB of which 195,000 people were infected with HIV in 2005.

Alarming figures published by World Health Organization(WHO) (2007(b)) excluding patients diagnosed with the co-infection of PTB/HIV were 255 per 100 000 new cases of PTB that were registered in developing regions across the globe; which is a great difference compared to 16 per 100 000 in developed regions in 2005 (United Nations, 2007).

According to the WHO report published in 2003, thefollowing reasons could be attributed to the global increase in the burden of PTB:

- The disregard of accurate case detection and the proper cure of the patients diagnosed with TB by national and international governments.
- The widening socio-economic gap in selected developing countries and the associated poverty that can be attributed to the marginalized income brackets.
- The effects of the HIV pandemic and the disintegration of the health system in countries that have been subjected to severe economic emergency or civil unrest.

2.2)Incidence of PTB nationally:

Statistics South Africa (2008) found that between the year 1997 and 2002 the main contributor to the increase in the mortality rate was tuberculosis (TB), and specifically Pulmonary Tuberculosis (PTB). According to the statistics obtained during the sameperiod, individuals

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with the common infection of PTB, experienced an increase in the number of deaths from 20 364 in 1997 to 54 364 deaths in 2002 SA Department of Health, 2005).

Since the implementation of the National TB Control Programme (NTCP) in 1995, the number of reported PTB cases in South Africa has steadily increased. The implementation of the NTCP provided a means by which to identify PTB cases that have not been diagnosed hence the increase in case numbers (SA Department of Health, 2005).

Almost 14 000 newly registered PTB cases were reported in Cape Town alone, which increased to 26 754 cases in 2005. The incidence rate of PTB also had a similar trend with numbers that dramatically increased from 521/100 000 in 1997 to 874/100 000 in 2005 (Western Cape Department of Health, 2006).

2. 3)Challenges in the management of PTB

Numerous factors can be attributed to the steady increase in the incidence of PTB, namely: poverty among individuals in the lower income bracket, immigration from countries with a high prevalence of PTB, inadequate health care infrastructure to manage individuals diagnosed with PTB and the co-infection of PTB and HIV (Maher andRaviglione, 2005; Loveday et al, 2007).

A greater degree of morbidity and mortality is experienced by individuals with the co-infection of PTB/HIV which results in a delay in seeking medical management (Meintjies et al, 2008). The health seeking behaviour of PTB suspected patients and those suffering from the co-infection of PTB/HIV are negatively affected by the current poor health care infrastructure in South Africa. Delay in seeking medical treatment due to the stigmatization of PTB with HIV, inevitably results in hospitalization (Loveday et al, 2007). Defined primarily as a disease of poverty, PTB is responsible for the increase in morbidity compared to any other communicable disease other than HIV/AIDS (WHO, 2006b). In a study conducted by Loveday et al (2007) in Kwa-Zulu Natal, it was found that 65% of the respondents in the evaluation of the National Tuberculosis Control Plan (NTCP) walked to the nearest treatment centre with an average time of 45 minutes taken to get to the clinic. A further 36% were too ill to walk to adhere to medical

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appointments at the clinic. This would affect the compliance to any programme, and especially the Directly Observed Treatment Strategy(DOTS) as patients are required to visit clinic daily. If they are too ill and have to travel far distances, as well as spend long times waiting at the health care centre for medical management, theymight end up not going (Loveday et al, 2007).

Another South African study conducted in Limpopo found that patients diagnosed with MDR-TB had severe lung dysfunction even after the completion of treatment (De Valliere and Barker, 2004). Similarly, De Valliere and Barker (2004) reported that patients experienced a decrease in lung function and were not able to cope with activities that were previously performed on a daily basis. The aforementioned authors concluded therefore that management inclusive of diagnostic investigations and pharmaceutical management needed to focus more on the long term prospect of morbidity. Morbidity as a result of PTB, often leads to a vicious cycle of slow recovery and a loss of income, contributing to additional dependency on family and government structures for support (Sagbakken et al, 2008).

Pulmonary Tuberculosis more commonly seen where poverty prevails, populations suffer from malnutrition, low access to medical facilities and overcrowding (Sanchez-Perez et al, 2001), will continue to contribute to the increasing degree of morbidity (Sanchez-Perez et al, 2001). Morbidities of PTB diagnosed patients include decreased HRQoL (Marra et al, 2004; Guo et al, 2009 Maguire et al, 2009), impaired lung function (Chamla, 2004; Pasipanodya et al, 2007; Chang et al, 1999; Maguire et al, 2009) and impaired exercise tolerance (Phillips et al, 1989; Maguire et al, 2009).In light of the information provided by Loveday et al (2007) and Sanchez-Perez et al (2001), an intervention that will address the physical and emotional needs of patients without the additional medical costs will be vital in combating the poor medical management experienced by some of the patients at the clinic which would result in defaulting from treatment. In providing poor medical management, health care facilities aid in the unrelenting burden of PTB as well as the development of Multi-Drug Resistant Tuberculosis (MDR-TB) (Singh et al, 2007).

According to Statistics South Africa (2008), the diagnosis of PTB inclusive of MDR-TB was the leading cause of death in the age groups 15-49 and 50-64. The age-group of 15-49 had the

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highest number of individuals who were diagnosed with MDR-TB (n=509) as the cause of death (Stats SA, 2008). The eligible work force comprise of individuals who fall into the 15-60 age group (Mahery andProudlock, 2008) which in light of the high mortality rate published by Statistics South Africa (2008) would have a serious economical and social impact on the working population as well as the financial income of the nucleus family (Sumartojo, 1993; Dye, 2006). Individuals who are included into the eligible work force usually have to prioritize between taking the prescribed medication and staying in employment to provide an income for the family (Portwig andCouper, 2006). According to the study conducted by Portwig andCouper (2006), providing an income usually takes priority over adhering to the medication. This inevitably leads to non-adherence to the treatment regimen, resulting in the development of MDR-TB and the increase of morbidity. "*The impact of the diagnosis of PTB has a negative effect on the ability to work and the execution of activities of daily living while on treatment as well as once treatment has been completed*." (Chamla, 2004). Grimwood et al (2006) supported the established link between patients that had previously failed to complete the treatment, non-compliance to the prescribed medication and the development of MDR-TB as described by Portwig andCouper (2006).

When discharged, patients were not physically able to get to the clinic to receive further medical management, too weak to access hospital services and did not have the strength to remain at the clinic waiting for medical attention (Loveday et al, 2007).

2.4)Current management of Pulmonary Tuberculosis

The historically used methods of diagnosis have often resulted in patient care delay with the dangerous possibility of the increase in the possible spread of PTB in the household as well as the community (Meintjes et al, 2008; Dheda et al, 2010). The conventional use ofdiagnostic methods including sputum smear staining (WHO, 2008; Western Cape Department of Health, 2006) and culture testing (De Villiers and Toms, 2005) have been replaced with more advanced diagnostic tests that enable the clinician to receive results more rapidly with the added assurance of increased sensitivity and accurate case detection (Nyendak et al, 2009; Nwokedi andJahun, 2008; Dheda et al, 2010).

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Although diagnostic testing and drug therapy have been changed and adapted to the management of the rapidly advancing disease, the pharmaceutical management has however not addressed the impact on the long term management of patients diagnosed with either PTB or MDR-TB.Therefore additional interventions should be included that would address the morbidities experienced by the infected patients after the prescribed medication (Ghosh et al, 2006).

Interventions besides the pharmaceutical therapy incorporated into the compulsory management of patients diagnosed with PTB is the DOTS implemented by the NTCP in 1995 (SA Department of Health, 2005). Many international initiatives implemented globally such as "The Stop TB Strategy", implemented by WHO in 2006b, highlights the key treatment aspects that needs to be achieved for the successful integration of the MDGs (WHO, 2009). The MDGs consist of eight goals to be achieved by 2015 that address the chief global developmental challenges. The sixth goal specifically highlights the proportionof PTB to be decreased in relation to detection rate and the cure rate of patients suffering from tuberculosis under the Directly Observed Treatment Strategy (DOTS). Concerns have been expressed that this goal may not be reached in Sub-Saharan Africa by 2015 as proposed(SA Department of Health, 2005)

The DOTS programme does not merely ensure the compliance of the patient on medication; it builds a relationship and understanding between the care provider and the patient as well as focuses on the importance of adherence to medication and a sense of duty to the community (FriedenandMunsiff, 2005). Wood et al (2007) evaluated the effectiveness of the DOTS control programme in a high burdened HIV and PTB community within sub-Saharan Africa. The study found untreated PTB in 9% of the study population of which 5% were previously undiagnosed. In conjunction with the lack of resources, poor managerial skills and a lengthened period of exposure in the high burdened area especially among HIV-positive individuals, the DOTS control programme was reported to be ineffective without the incorporation of an additional intervention.

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2.5)Holistic Management

According to Hansel et al (2004), the primary aim regarding the management of PTB has been to decrease the prevalence of the disease. Historically research conducted focused on the pathology of PTB, with minimal focus on the impact the disease had on patients' HRQOL. More recently there has been a paradigm shift in research towards focusing on the morbidity and other side-effects experienced by patients diagnosed with PTB (Guo et al, 2009; Dhuria et al, 2008; Corless et al, 2006).

Patients that undergo treatment for the diagnosis of PTB, often experience severe side-effects that compromise the compliance to medication for the recommended six to eight month duration of the treatment regimen (Zaleskis, 2006). Known side-effects of the essential anti-TB drugs include peripheral neuropathy, sleepiness, lethargy, various gastro-intestinal, vestibular and reticular conditions (Zaleskis, 2006); and decreased lung volumes (Plit et al, 1998).

Hnizdoet al (2000) found that PTB causes chronic lung impairment after contraction of the disease with a steady increase in the severity with each re-current episode. Lung dysfunction was found in 96.8 % in patients and with 90.3% experiencing negative changes in lung volumes and capacities with the diagnosis of chronic fibrocavernous tuberculosis (Nefedov et al, 2008). Patients diagnosed with a respiratory deteriorating disease often present with increased work of breathing, muscular atrophy, despair and dietary alterations that play a part in the continuous cycle of inactivity and the physiological decline that could even be experienced at rest (Prabhudesi, 2009). Pulmonary Tuberculosis patients without the co-infection of HIV are suspected to have vast lung destruction, cavitationsand upper lobe involvement as seen in the chest radiograph (Harries et al, 2001).

A recent study conducted by Pasipandoya et al (2007) compared the impairments suffered by patients diagnosed with Latent Tuberculosis Infection (LTBI) and patients diagnosed with PTBthat had already undergone 20 weeks of treatment. The aim of the study was to determine the extent to which patients with PTB suffered as a result of the disease and how it could be attributed to the primary diagnosis of PTB. Objective measurements that were used to measure the pulmonary function were Forced Vital Capacity (FVC), Forced Expiratory Volume

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in one second (FEV) and the FVC/FEV1 ratio. In the study, patients diagnosed with PTB did indeed have a greater pulmonary impairment as measured by the FEV_1,FVC readings and FEV_1/FVC ratiocompared to the group with LTBI. The data collected among patients with PTB suggested that due to the possible development of a future debilitating lung disease, life expectancy and the quality of life could be negatively affected (De Valliere and Baker, 2004).

2.5.1)Health related Quality of Life

Although subsequent research in the area has identified numerous issues which impact on the PTB sufferer's HRQOL, research into implementing these factors have been slow (Marra et al, 2004). This has been partially due to the difficulty in a standardized definition of Quality of Life (QoL) (Patrick and Erikson, 1993; Bach andMcDaniel 1994). Ferrans (1992) divided the broadly used term QoL into five different domains that would encompass the definition of QoL. The domains include:

- The ability to socially connect with individuals in the work environment as well as the home environment.
- Overall emotional state of well-being.
- Contentment with the progress made in life with regards to the work environment and social environment.
- The accomplishment of personal goals obtained.
- The comparison of life currently compared to previous illness or disability experienced.

To decrease the broad spectrum of QoL, Wood-Dauphinee andKuchler (1992) suggested that aspects of QoL be limited to areas that encompass the health of the patient being assessed. According to WHOQOL (1995), the concept of HRQoL can be measured by the effect illness or disability has on the patients' activities of daily living, behaviour, the way they feel about their own health and limitations experienced by the illness or disability. Morbidities expressed in QoL do not sufficiently accommodate the limitations experienced in activities of daily living

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and over-all welfare.Therefore the evaluation using HRQoL would shed better light on those particular areas of interest (Guo et al, 2009).

O'Connell et al (2003) found that with regards to patients with the co-infection of PTB/HIV, women, older age groups and individuals who have a lower education level, had a lower QoL as a result of their inability to obtain their previous level of function. Similarly a study conducted by Deribew et al (2009)which assessed the QoL of patients with the co-infection of PTB/HIV supported the suggestion of O'Connell et al (2003) who stated that depression due to the inability to function optimally and falling into the lower income bracket were contributors to the decrease in the domains of physical health, social and environmental sectors. Those individuals that fall into the lower income bracket often do not have the means by which to seek further medical help for the morbidities experienced (Sanchez-Perez et al, 2001).

The need to incorporate the measurement of the HRQoL into the management of PTB need to be established due to the concept of determining health status beyond the normal indicators of mortality and morbidity (The WHOQOL GROUP, 1995; Chamla, 2004). The HRQoL should be the focus point for health care professionals (Lohr, 1988; Greenfield and Nelson, 1992; Wilson and Cleary, 1995).

In the study conducted by Dhingra and Rajpal (2003), patients diagnosed with PTB and extra-pulmonary tuberculosis were recruited into a study that evaluated the efficacy of a HRQoL questionnaire especially designed for tuberculosis patients. This was the first questionnaire to be specifically designed for the assessment of QoL in tuberculosis patients. The EQ-5D which was developed by WHO in 1990,is a standardized assessment tool for the assessment of HRQoL. The instrument has been validated in different countries including South Africa (Jelsma et al, 2003b).The EQ-5D assesses how the patient feels about their own health with regard to functioning ability under the following sub-headings: mobility, self-care, usual activities, pain/discomfort and anxiety/depression.

For the duration of the prescribed treatment, patients suffering from the diagnosis of PTB have to deal with many psychological, emotional and financial circumstances which would affect their well-being during the course of their illness (Dhingraand Rajpal, 2003). A study conducted

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by Muniyandi et al (2007)in the developing country of India,evaluated the HRQoL among PTB patients after completing the prescribed treatment to be clinically curedand found that the physical well-being score was significantly lower in participants aged 45 years and older (P<0.05), participants who did not have any formal education (P<0.01) and those who were unemployed (P<0.01). The study conducted by Muniyandi et al (2007) study may be an indication for studies that focus on holistic management of PTB patients which includes their long term rehabilitation.

2.5.2)Inclusion ofPulmonary Rehabilitation

The morbidity experienced by the PTB patients not only extends to the emotional aspect but has a greater negative influence on the physical aspect as supported by Chamla (2004) who found that patients' diagnosed with PTB in comparison to a control group had a lower HRQoL with the physical components being more affected than the mental components of the assessment. The author attributed the decrease in the physical components to the effect PTB has on the physical health of the patients. Pulmonary Tuberculosis patientswho underwent a thoracoplasty experienced a greater limitation in exercise capacity than patients diagnosed with fibrosingalveolitis, chronic bronchitis and scoliosis(Phillips et al,1989). The authors noted that the patients were limited in both dynamic lung volumes and respiratory frequency due to a decrease in their ventilatory capacity, thus affecting their exercise ability. The co-infection of PTB/HIV however also had a huge negative effect on the physical functioning of PTB diagnosed patients (Loveday et al, 2008).

According to Aggarwal (2010), the incorporation of non-pharmaceutical interventions into the management of patients diagnosed with PTB could result in an improved functional health status without the preceding physiologic improvements. Numerous authors recommended physiotherapy in the form of exercise training and pulmonary rehabilitation as the most accepted method of non-pharmacological treatment in patients with post-pulmonary tuberculosis sequelae (Yoshida et al, 2006;Pesut et al, 2008Ries, 2008; Ries et al 2007).

"The aim of the rehabilitation programme administered by the Physiotherapy profession for patients suffering from lung disease is to incorporate change by which patients are able to

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make lifestyle adjustments that will be maintained for a long period of time" (Evans & Morgan, 2007).

Physiotherapists according to Garrod (2003), play an important role in the administration, prescription, execution and maintenance of a pulmonary rehabilitation programme. The pulmonary rehabilitation programme not only includes all the medical disciplines in the care of patients that have been diagnosed with a respiratory disease, it involves administering an intervention programme tailored and designed to improve physical and social well-being as well as independence (Man et al, 2004).

Benefits seen in patients who have undergone pulmonary rehabilitation included a decrease in the utilization of the medical health services as well as the morbidity probability (British Thoracic Society Statement, 2001; Man et al, 2004) while improvements in exercise tolerance, HRQoL, dyspnoea, the health condition of the patient and activities of daily living are experienced (Evans and Morgan, 2007).

Pulmonary rehabilitation since its inception in 1895 by Charles Denison, has largely focused on the rehabilitation of the patients diagnosed with COPD as mentioned by Cambach et al (1997). Cambach et al (1997) evaluated the efficacy of a 3 month rehabilitative intervention programme inclusive of pharmaceutical management with the control group only receiving the pharmaceutical management. The rehabilitation programme that was prescribed to the patients included components such as breathing techniques, clearance of mucus, exercises that included work for both the upper and lower limbs, recreational activities that would prove essential in the maintenance of the results obtained after the rehabilitation programme, relaxation techniques incorporated into activities of daily living and education of the patient. The Cambach et al (1997) study found that both asthmatic and COPD patients improved in the exercise tolerance and QoL after undergoing a rehabilitation programme that consisted of components focusing on each section of a rehabilitation programme.

Several pioneering studies have mentioned the impact of early mobilization on the HRQoL and health status of the patient diagnosed with PTB. Other treatment techniques utilized in the management of the patients include education of the disease, ambulatory rehabilitation,

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pulmonary rehabilitation in the form of breathing techniques and incorporation of effective clearance of sputum techniques (Goldberg and Berner, 1953; Nacman and Dressler, 1961; Cohen and Blacker, 1962; Paley et al, 1956).

In another early study pertaining to pulmonary rehabilitation, patients diagnosed with COPD were recruited to test the impact of a low intensity peripheral muscle conditioning rehabilitation programme to be performed in the home environment (Clark et al, 1996). The authors' rationale behind selecting a low impact programme for the rehabilitation was to minimize the need for equipment so that the exercises could be performed at home and to enable the execution of the exercises to be incorporated into the activities of daily living. The programme consisted of low impact exercises for the lower limbs, upper limbs, abdominals and a component of endurance training was also included. The home programme given to the intervention group was completed on a daily basis with a training log to be kept while the control group did not receive a programme to do but were requested to continue with their daily routines. The study found that the intervention group had greater improvements in endurance of specific muscles as well as conditioning as a whole.

A study conducted by Ando et al (2003) researched the difference that pulmonary rehabilitation made in patients diagnosed with post-tuberculosis lung disorder and COPD. The outcome measures that the researcher used were the 6 min-walk test, the Medical Research Council dyspnoea grade, activity score and the transition dyspnoea score. The pulmonary rehabilitation programme consisted of breathing exercises which included pursed lipped breathing, slow-breathing in the supine and sitting positions, and re-education of the breathing technique with relaxation. The pulmonary rehabilitation programme also consisted of exercise training for the upper and lower extremities for 30 minutes and daily level walking for 15 minutes. The lung function results showed similar improvement in both the post-tuberculosis group and the COPD group after pulmonary intervention in the lung function testing as well as the results from the 6 minute-walk test. As a result of the improvement noted in both the post-tuberculosis and COPD group, it was concluded that intervention in the management of lung disorders other than that of COPD, is indeed beneficial.

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A study conducted by Niederman et al (1991) the effect of a pulmonary rehabilitation programme was evaluated on thirty-three patients with known chronic lung disease and a decreased ability to exercise due to dyspnoea. They found that significant improvements were noted in the exercise endurance and the decline in the ventilatory equivalent for oxygen consumption (VE/VO2 max) during maximal exercise after the study was conducted. The study concluded that an improvement was noted in the FEV1 reading of 17 out of the 33 patients recruited into the study and that a rehabilitation programme would benefit patients diagnosed with respiratory lung disease with the expectation of seeing results.

Lisboa et al (1997) investigated the effect of inspiratory muscle training on exercise capacity in chronic airflow limitation. The researchers hypothesized that by recruiting the inspiratory muscles an improvement will be noted in the exercise performance of the patients. Those patients working under 30% of peak maximal pressure showed the most improvement in the performance of daily living, relief of dyspnoea and an improvement of exercise capacity as measured in the 6 minute-walk test. Although Lisboa et al (1997) used recruitment of the inspiratory muscles and Clark et al (1996) used a programme that consisted of low impact exercises, the two researchers used different physical components to set up a rehabilitation programme in which the goals that were met were similar in relation to an improvement in the ability to perform activities of daily living, breathlessness and exercise capacity.

While Lisboa et al (1997) investigated the effects of inspiratory muscle recruitment, Wijkstra et al (1995) combined the recruitment of the inspiratory muscles, upper limb training, breathing training, relaxation techniques and exercise training into a home rehabilitation programme for 43 patients diagnosed with severe airflow obstruction. Outcome measures included baseline lung function testing, quality of life questionnaire and a cycle ergometer test. A combination of the two rehabilitation components, namely exercise training and pulmonary rehabilitation produced similar results to the studies conducted by Lisboa et al (1997) and Clark et al (1996). Although patients do benefit from the execution of a pulmonary rehabilitation programme, Wijkstra (1996a) brought to light the expenses incurred by the patient during hospitalization.

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According to Wijkstra (1996a) it would therefore be more beneficial to the patient to undergo rehabilitation in the home or community setting.

2.5.3)Community Based Rehabilitation

Rehabilitation of patients has shifted from the in-patient and out-patient setting to the incorporation of the home environment because of limited space in the hospital rehabilitation setting,family and friends support, rehabilitation cost being cheaper, and the option of integrating the pulmonary rehabilitation programme into activities of daily living (Wijkstra et al, 1996b). Factors such as discharge, distance from the hospital and the cost of treatment sessions play a positive role in patients participating in home based pulmonary rehabilitation programmes (Garrod, 2003). By decreasing the dependency on the medical health system, support from the community and family in the home setting becomes important in assisting the patient to adhere to the pulmonary rehabilitation programme in the community or home setting (Garrod, 2003; Ries et al, 1995).

The effectiveness of the home based pulmonary rehabilitation translated into significant changes in QoL, exercise tolerance (Wijkstra et al, 1994; Ries et al, 1995; Goldstein et al, 1994), rate of perceived breathlessness after performing household chores, muscle fatigue after performing activities and being able to walk long distances independently (Ries et al, 1995). Loveday et al (2008) further went on to say that the use of efficient home based care with the involvement of the community in the management of patients diagnosed with PTB could have important health benefits to the patient as well as the family and the community as a whole.

Community and patient empowerment are considered central to a human rights approach to care for PTB patients as well as the prevention of TB (WHO, 2008). The Community Involvement in Tuberculosis Care and Prevention Document (WHO, 2008) highlights the important role family, friends and care-providers play in the foremost administrators of health care as well as the essential role in health promotion in the patients and in the community itself as a long term goal for the duration of PTB patients.

The long term effects of a home rehabilitation programme were further evaluated by Wijkstraet al (1995) who found that QoL was sustained for 18 months, with monthly

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physiotherapy visits after discharge from the hospital. The improvement of the QoL were attributed to the responsibility the patients took upon themselves to perform the home rehabilitation programme. According to Wijkstra (1996b) patients should be made less dependent on health professionals for the execution of rehabilitative services in management of chronic diseases and made to be more self-reliant and include those closest to the patient to assist in the management process. Ghosh et al (2006) supported the view of a non-pharmaceutical management programme in the form of physiotherapy to aid in the alleviation of morbidities in PTB diagnosed patients.

By involving the community in the treatment and management of PTB, it allows the community to develop as a unit by addressing the morbidities experienced by PTB patients, finding solutions and rehabilitating patients diagnosed with PTB to alleviate the long term burden of the PTB epidemic. Alleviationnot only for the community but for the PTB patient as well (City of Cape Town PTB Control Programme, 1997-2002).

2.6) Conclusion

In reviewing the literature, similarities are found in the medical management of patients with the PTB disease. Management includes prompt diagnosis, pharmaceutical management and discharge of the patient into amaintenance plan incorporated by the DOTS programme. The long term management of the patientsis however unsubstantial even though evidence has been found that HRQoL, lung function and exercise toleranceare negatively affected post treatment. Treatment strategies need to be implemented to address the morbidities experienced by patients with PTB to improve the long term implications of the disease and thereby allow for a continuum of health care post chemotherapy and to improve the current health system.

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CHAPTER 3:

METHODOLOGY

3.1)Research setting:

The primary research setting wasKhayelitsha, a suburb in Cape Town. It has one of the highest prevalence of PTB and HIV infection on a national as well as on international scale (MSF TB Report, 2009).

The Community Health Centre (CHC) situated in the area of Khayelitsha, Site B opened a PTB clinic that constantly monitors the management and progress of PTB patients admitted or referred to the unit from the CHC or neighbouring health care facilities. The area has one of the highest incidences of PTB in the Western Cape, which is a direct result of the living conditions and high density of inhabitants living in the district. Three main sections make up the healthcare complex known as the Site B Khayelitsha Day Hospital, namely the Community Health Centre (CHC), the maternity unit, and the Ubuntu PTB and HIV clinic. On a daily basis the clinic is filled with patients receiving medication for PTB and anti-retroviral medication for the treatment of Human Immunodeficiency Virus (HIV). Patients who attend the clinic do not receive any form of physiotherapy while undergoing treatment for the diagnosis of PTB. The Ubuntu Clinic situated in the informal settlement ofKhayelitsha was chosen as the research setting because of the high prevalence of PTB in the area.

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3.2)Aim of the study:

The aim of the study was to determine whether adherence to a six-week home based pulmonary rehabilitation programme(PRP) improved the baseline measurements of HRQoL,lung function and exercise tolerance in patients suffering from PTB.

3.3)Study design:

A single, blinded randomized control study design (Wedzicha et al, 1998) was used to assess the effectiveness of the home based PRP on HRQoL, pulmonary function and exercise tolerance.

3.4)Recruitment of participants:

All patients attending the Ubuntu Clinic, Site B for a consecutive 4 month period with confirmed laboratory test of active PTB were eligible to participate in the study. The student, being the primary researcher, had the help of two assistants, namely: The Independent Primary Research Assistant (IPRA) and Independent Secondary Research Assistant (ISRA), each of which had their own responsibilities to fulfil.

The ISRA, a previous attendee of the clinic had knowledge of the administrative infrastructure as well as the programme that each participant had to undertake and complete. The ISRA was responsible for the recruitment of the participants from the treatment area where all the participants remained until attended to by the nursing staff. The ISRA gave a brief introduction and description of the study and what would be required of the participant. If the participant agreed to participate in the study, the ISRA led the participant to the IPRA for further management. The IPRA had a clear understanding of the procedure of the study as well as the objectives that had to be met.

The IPRA assessed whether the participant was eligible to be included in the study. The total number of participants assessed for eligibility was 130 of which only 102 participants gave consent to participate in the study. For participants who met the inclusion criteria, a detailed explanation of the study and procedure was provided before the informed consent document (Appendix A) that required the participants to disclose medical and personal information was signed. The IPRA was responsible for randomly allocating the participants into either the intervention or the control group, making the follow-up appointments, explaining the exercise programme for the duration of the six weeks as well as answering any questions that the participants might have about the study.

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3.4.1)Process of group allocation

The IPRA randomly allocated the participants into either the intervention or control groups by selecting a folded coloured piece of paper from a box. Each colour represented either the control or intervention group into which the participant would be allocated. The participants

that were allocated into either the intervention or control group were recorded and listed on a separate document (Appendix B) kept by the IPRA.

Once the participants had been randomly allocated, both the intervention and control groups had 51 participants respectively. All participants in the intervention and control groups received the allocated treatment protocol that had been set out for the group. During the course of the six week programme, some participants in the control group (n=18) and the intervention group (n=17) were lost to follow-up and discontinued intervention due to various reasons (See Fig 4.1). In the control group nine participants were lost to follow-up appointments and could not be telephonically contacted during the weeks between follow-up appointments. Nine participants discontinued the intervention for numerous reasons, including being admitted to other CHC's because of accessibility and transfer to a secondary hospital for further management. The intervention group lost one participant to follow-up appointments being missed and 16 participants discontinued the intervention for reasons including admission to CHC's that were more accessible, transfer to a secondary hospital for further management, time constraints due to work and personal problems and having to relocate to the Eastern Cape for an undisclosed amount of time. Thus the control group had 33 participants and the intervention group had 34 participants who completed the prescribed intervention for each group.

3.4.2)Instrumentations:

The information required to draw up the demographic profile of the participants was recorded on a self-developed demographic questionnaire (Appendix C). The demographic information collected included age, gender and race. Other information also in the questionnaire were included years of formal education, occupation, marital status, diagnoses and treatment regimens.

Data pertaining to HRQoL was collected using the EQ-5D Questionnaire (Appendix D). The questionnaire was used to measure HRQoL at baseline, week three and week six. The EQ-5D included a self-evaluation of the participants perceived health on that particular day with regard to five different domains, namely: mobility, self-care, usual activities, pain/discomfort

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and anxiety/depression (Jelsma et al, 2003a). The five different domains are subdivided into categories, namely: no problems, some problems and difficulty performing the activity (Jelsma et al, 2003a).

Data obtained with regard to pulmonary function, exercise tolerance, rate of perceived exertion, and the necessary information with regards to the follow-up appointments were recorded on a self-developed data capture sheet (Appendix E). Each participant had a separate data capture sheet that was used to record measurements from baseline to the sixth week.

Before the participant commenced the testing procedure and performed the exercise programme, the Physical Activity Readiness Questionnaire(Par-Q) (Appendix F) was used to measure the ability of the participant to perform physical activity without the presence of cardiac problems.

An automotive desktop spirometer (MINATO AUTOSPIRO-model no. AZ-505) was used to measure the forced expiratory volume in one second (FEV1) and Forced Vital capacity (FVC) of participants included in the study. Pulmonary function testing was performed at baseline, week three and week six (Yoshida et al, 2006). The spirometer had been calibrated before the commencement of the study. To ensure the participants were compliant to the exercise programme given to them, a Xhosa checklist (Appendix G) and a English checklist (Appendix H) was attached to the exercise programme, which they marked off on a daily basis the activities they carried out for the day. The participants were required to present the checklist at the follow-up appointments to determine how compliant they were to the exercise programme.

The exercise programme (Appendix I) was designed to incorporate cardiovascular, low-impact activities and pulmonary rehabilitation components in a manner that would be easy for the participants to understand and execute. The component of cardiovascular training in the form of walking was to be done on a daily basis for a period of 15 minutes. The participants were instructed to initially perform the walking component at their own pace and gradually increase the pace each day. The participants were required to perform the activities independently as far as they could manage. The participant was then required to perform low-impact activities that would recruit the upper and lower limb muscles followed by pulmonary rehabilitation

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activities that would aid in lung expansion, effective expectoration of sputum, recruitment of respiratory muscles and initiation of controlled breathing. Postural correction was also incorporated into the exercise programme.

3.4.3)Pilot Study:

The procedure was tested in the setting of the secondary hospital for a period of two weeks. The reliability and the validity of the selected instruments was assessed as well as the procedure at the secondary hospital. Reliability of the selected instruments was determined by testing the instrument on different patients (n=20) over the two week period, following the same procedure for each individual who was recruited. The scores were assessed to determine whether a correlation was found over the two week period. The instruments used in the study were found to be both reliable and valid for the procedure. The pilot study was performed prior to the data collection period to additionally ascertain the following:

- Whether the self-developed demographic questionnaire was appropriate with regards to the population being assessed.
- Whether the prescribed exercise programme and check list were understood by the participants recruited into the study.
- The effectiveness of participants using a spirometer to measure the lung function capability.
- The effectiveness of the six-minute walk test to determine exercise tolerance of the participants.
- The duration of the initial assessment of the participants with regard to completion of the EQ-5D Questionnaire and collecting of the baseline functions.
- On completion of the pilot study the following conclusions were drawn from the information obtained:

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- During the piloting of the exercise programme, it was identified that the exercise programme needed to be translated and explained in the participants preferred language.
- Illustrations needed to be included in the PRP in order to remember the exercises that had been explained as well as link the text to the illustration that would be shown.
- The data capture sheet needed additional questions to complete the profile of the participants.

The following questions were included in the demographic questionnaire to complete the profile of the participants:

- Additional questions were included into the demographic questionnaire with regards to:
- The primary diagnosis and co-morbidity of each participant
- The treatment regimen being received by the participant

3.5)Testing Procedures:

In the section below, a detailed explanation of the procedures for collecting the data with regards to testing of HRQoL,lung function and exercise tolerance.

3.5.1)Completion of the Physical Activity Readiness Questionnaire (Par-Q):

All participants who completed the demographic data sheet and the Par-Q and were found to be eligible were included into the study.

3.5.2)Group allocation:

Group allocation was performed after the participants had signed the informed consent sheet and the purpose of the study had been explained. The IPRA randomly allocated the participants into either the intervention or control groups by selecting a folded coloured piece

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of paper from a box. Each colour represented either the control or intervention group into which the participant would be allocated. The participants that were allocated into either the intervention or control group were recorded and listed on a separate document kept by the IPRA.

The IPRA marked each data capture sheet of the participants with the colour that was selected during the recruitment process that would separate the participants into the intervention group and the control group. The blinded primary researcher was responsible for the testing of each participant at the baseline reading through to the sixth week of testing.

The procedures that were performed for the HRQoL, exercise tolerance and lung function assessments are outlined in detail below.

3.5.3)Completion of Health Related Quality of Life Questionnaire

Once the informed consent sheet and the demographic data had been completed, the IPRA and the participant were seated at a table with the questionnaire between them.

The overview of the questionnaire including the reason why the questionnaire had to be completed, the type of questions that would be asked and the information that the questionnaire would require the participant to disclose was thoroughly explained to each participant. The questionnaire was made available in three different languages namely; English, Afrikaans and Xhosa. Most of the participants preferred the questionnaire in Xhosa.

The duration for the completion of the questionnaire took approximately 8-10 minutes depending on the understanding of the participant with regard to the questions asked.

The HRQoL was repeated at the 3rd and 6th week of the study for each individual participant at the follow-up appointments.

3.5.4)Pulmonary Function:

The procedure of the lung function testing was done in a well ventilated area within the clinic complex. The lung function testing of all the participants recruited into the study was performed using a spirometer, MINATO AUTOSPIRO- model AZ-505. The individual participants

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were seated opposite the primary researcher with a table which contained the data capture sheet of the participant, the spirometer that would be used and a stopwatch.

Firstly, the procedure of the lung function testing was explained to the participant before the researcher gave a demonstration of the necessary mechanics of the test. Disposable mouth pieces were used to ensure the hygiene of the test and the safety of the participants undergoing the lung function test. The participant practiced the mechanics of breathing in deeply and then forcibly expiring in the absence of the spirometer. Instruction to the participant when performing the test was to inhale deeply and exhale with as much force as possible into the mouthpiece keeping a tight seal around the mouthpiece with their lips. When the action was performed correctly, the participant repeated the procedure thrice with the spirometer. A nose-clip was utilized to ensure the participants did not exhale through the nose. Postural correction was performed in the sitting position to ensure maximum effort from the participant and the necessary safety precautions to protect the primary researcher. Once the lung function testing procedure was completed, the mouthpiece was taken off the spirometer and placed in a disposable bag which was disposed of at the end of each testing day at the CHC.The three readings of the lung function test were recorded and the mean calculated at a later stage.

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3.5.5)Exercise tolerance assessed by the 6-min walk test

The exercise testing was performed after the procedure of the lung function testing. A break of 5 minutes was allowed for rest while the procedure for the pre-exercise testing vitals was explained to the participant.

Vitals taken by the primary researcher included resting Heart Rate (HR), resting Respiratory Rate (RR). Manual techniques assessing HR and RR were utilized before and after the exercise tolerance testing procedure. Resting HR was assessed by palpating the radial pulse, measuring the rate of the HR in 30 seconds and multiplying by two to obtain the HR in one minute. The resting RR was assessed by palpating the chest wall and measuring the number of breaths taken in one minute to obtain the resting RR. Once the resting HR and the resting RR were obtained, the exercise tolerance procedure was explained to the participant allowing a rest

period of five minutes to normalize the HR and RR before starting the exercise tolerance testing procedure.

3.5.5i)Distance allocation:

A distance of 25 meters (m) marked off where the participants performed the walk test. A starting point had been clearly marked off along the walking path as well as a turnaround point where the 25m mark was placed. One circuit was counted as 50m, with the participants returning to the starting point. Yellow cones were used to mark where the participant would start the walk test and where the turnaround point was. In between the starting point and the 25m mark, each 5m was marked with duct tape to indicate where the participants had stopped on the 50 m circuit once the six minutes had expired.

3.5.5.2ii)Explanation of the procedure to the participant:

The instruction to the participants at the starting point was to walk to the marker at the end of the track and back again as many times as possible in the six minutes allocated for the test. The participant was told that if at any stage s/he started feeling unwell, the test would be stopped immediately and medical advice would be sought in the trauma unit. The primary researcher was placed at the start of the walking circuit to record how many times the participant completed a 50m course in six minutes. Once the test had been started, the primary researcher gave continuous encouragement to the participant to keep walking the 50m circuit and informed the participant how much time was left for the completion of the test.

3.5.5iii)Recording of distance and vitals post exercise tolerance testing:

While the participant was completing the exercise testing, the primary researcher kept a continuous count on the distance covered by the participant until the allocated time was finished. Once the allocated time for the exercise test was completed, the primary researcher was able to immediately seat the participant and take the post exercise HR and RR because the distance had been recorded while the participant had been walking.

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The intensity of the walking segment of the exercise programme was to be calculated from 60-75% of the reserve heart rate. When the concept was explained to the participants, many did not understand how to adjust their walking speed accordingly. Adjustments then had to be made to the explanation of the participant. Participants were then instructed to walk faster every day when doing the walking component of the exercise programme.

3.5.5iv)Borg Scale Reading:

The participants were given a resting period of two minutes to recover from the walking test to complete the Visual Analogue Scale using the 15-Grade Modified Borg Scale (Appendix J) to assess the difficulty of the exercise tolerance procedure. The participant chose a number which best suited their exertion level while performing the testing procedure. The grading was recorded on the data capture sheet and stored.

3.9)Home Based Pulmonary Rehabilitation Programme:

When all the baseline parameters where obtained and the participant had received adequate rest after the 6-min walk test, the participant went back to the IPRA for the home based PRP to be explained if they were included into the intervention group. If the participants were included into the control group, the information leaflet (Appendix K) was given to the participants with a follow-up date.

The exercise programme was made available in English, Xhosa and Afrikaans. The English and Xhosa versions of the exercise programmes were most requested when the programmes were explained.

The exercise programmes included a diagram of the exercises that needed to be completed as well as instructions on repetitions, sets and duration. The IPRA demonstrated the activity required of them and made sure the participants understood each exercise.

3.9.1)Recording of daily activities:

Attached to the exercise programme was a check list of the exercises that the participants had to complete on a daily basis. Once the participant had completed the exercise activity as stipulated on the handout given to the participants included into the intervention group, the

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exercise was to be marked off for that particular day in the allocated section. The check list made provision for the two weeks that the participant was required to monitor and execute the exercise programme independently in the home environment. When the participant returned for follow-up appointments, the check-list was re-evaluated to see how the participant had progressed with the programme and if any problems had been encountered by the participant during the time that the exercise programme had to be done.

3.10)Statistical analysis:

The data was entered in Excel and analyzed in SPSS Version 10.1.3.Descriptive statistics were used to present the demographic information. The relationship between two different sets of data was analyzed using the following statistical techniques:

The comparison of the baseline measurements and follow-up measurements of the exercise capacity and the lung function parameters were measured by using Wilcoxon signed-rank test for the duration of the six week period. Spearman's rank correlation coefficients were calculated to assess the possibility of a relationship between exercise training and the HRQoL of the participant after the intervention period. Utility weights were assigned to each domain for the assessment of the HRQoL. Assessment of the Visual Analogue Scale (Modified Borg Scale) was assessed in the same manner as the HRQoL. The final data being normally distributed, an independent t-test was used to compare the HRQoL data of the intervention and the control groups. The Mann Whitney U Test was used to assess the final data of the HRQoL if it was not normally distributed for comparison of the two groups. Level of significance was set at $p<0.05$ for all the tests that were performed.

3.11)Ethical considerations:

Ethical approval(Appendix L) from the Faculty of Health Sciences, Research Ethics Committee of the University of Cape Town was obtained prior to the commencement of the study. Permission from the Ubuntu Clinic as well as the City Health Council was also obtained. All information obtained from the data capture sheet and the demographic questionnaire was stored in a secure place so that no one other than the research team was able to view the information obtained. All information obtained was treated with the strictest confidentiality.

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To ensure anonymity, a coding system was implemented by administering each participant with a number which correlated to the baseline and follow-up information.

CHAPTER 4:

RESULTS

4.1)Introduction

The data collected was analyzed using SPSS version 18 which included the demographic data, HRQoL Questionnaire, Lung function parameters, exercise tolerance and Borg Scale. Stata (Version 11.1) was used to perform further statistical analysis (Refer to chapter 3) . The results will be reported in two main sections (a) description of the demographics of the total sample and (b) differences of the control and intervention groups with regard to HRQoL, pulmonary function and exercise tolerance. The data will be displayed using tables and graph. Baseline readings will be compared to the findings of the sixth week only with regard to HRQoL, lung function and exercise tolerance.The total number of patients recruited was 102. Of the total number of patients recruited (n=102) only 67 patients remained for the completion of the six week exercise programme. Five patients were transferred to secondary hospitals and inpatient facilities to have further investigation done. Nine patients were recruited into the study but did not return due to being admitted to other CHC's that were more accessible to their new place of residency. Three patients discontinued the exercise programme due to a difficult time schedule with regards to time constraints in travelling to the clinic and then to work. Eight patients did not complete the six week exercise programme due to personal problems and relocation to the Eastern Cape. Ten participants did not return and were unable to be reached telephonically to provide a valid reason for their disappearance. Thus the total sample that completed the study was 67 participants. See Consort flow chart (fig 4.1)

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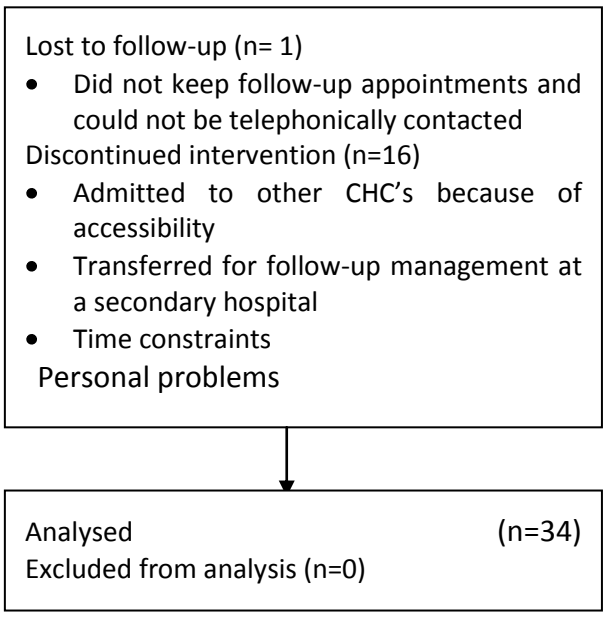

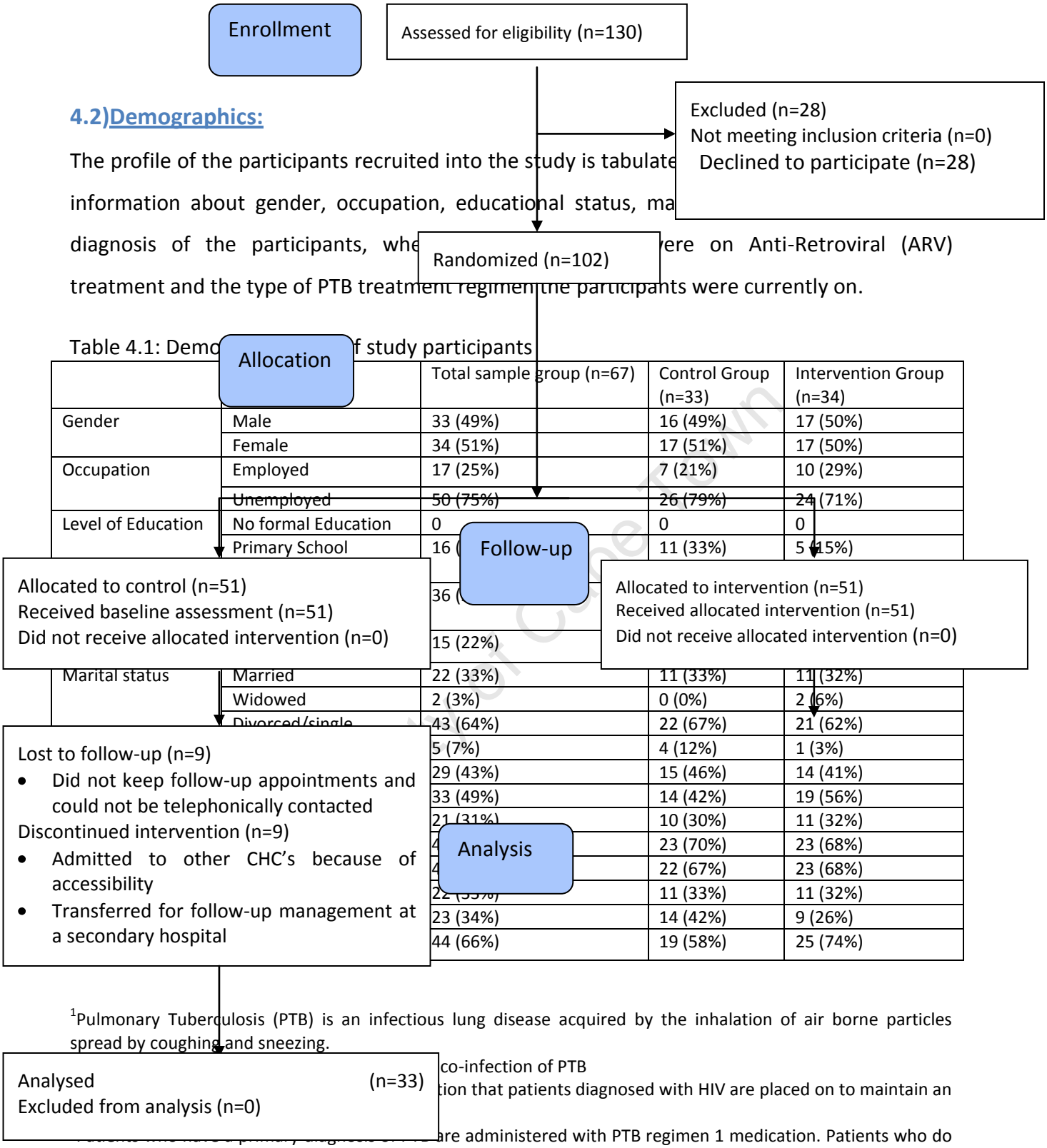

4.2)Demographics:

The profile of the participants recruited into the study is tabulate information about gender, occupation, educational status, ma diagnosis of the participants, whe ere on Anti-Retroviral (ARV) treatment and the type of PTB treatment regimen the participants were currently on.

Table 4.1: Demo f study participants

		Total sample group (n=67)	Control Group (n=33)	Intervention Group (n=34)
Gender	Male	33 (49%)	16 (49%)	17 (50%)
	Female	34 (51%)	17 (51%)	17 (50%)
Occupation	Employed	17 (25%)	7 (21%)	10 (29%)
	Unemployed	50 (75%)	26 (79%)	24 (71%)
Level of Education	No formal Education	0	0	0
	Primary School	16 (	11 (33%)	5 (15%)
		36 (		
		15 (22%)		
Marital status	Married	22 (33%)	11 (33%)	11 (32%)
	Widowed	2 (3%)	0 (0%)	2 (6%)
	Divorced/single	43 (64%)	22 (67%)	21 (62%)
		5 (7%)	4 (12%)	1 (3%)
		29 (43%)	15 (46%)	14 (41%)
		33 (49%)	14 (42%)	19 (56%)
		21 (31%)	10 (30%)	11 (32%)
		4	23 (70%)	23 (68%)
		4	22 (67%)	23 (68%)
		22 (33%)	11 (33%)	11 (32%)
		23 (34%)	14 (42%)	9 (26%)
		44 (66%)	19 (58%)	25 (74%)

[1]Pulmonary Tuberculosis (PTB) is an infectious lung disease acquired by the inhalation of air borne particles spread by coughing and sneezing.

co-infection of PTB

tion that patients diagnosed with HIV are placed on to maintain an

are administered with PTB regimen 1 medication. Patients who do not respond to treatment are prescribed different medication

Fig: 4.1 Consort Flow

With regard to gender the total sample size had minimal difference between male (n=33) and females participants (n=34). Nearly 75% of the participants were unemployed with less than 25% of them having completed their formal education. Almost a quarter (24%) of the total population size had only completed their primary school level education while 54% dropped out of school before matriculating. A third (31%) of the participants were diagnosed as having PTB in the absence of HIV as a co-morbidity. Of the remaining participants who were diagnosed with PTB and HIV, all but one participant was receiving ARV treatment. The majority of patients (66%) in the study received PTB regimen 2 which is associated with Multi-Drug Resistant PTB (MDR-TB).

When comparing the demographic data of the control and intervention groups, there were similarities in all the categories except that of the type of PTB regimen with the intervention group having a higher percentage (74%) of regimen 2 (Fig 4.2). Although this finding was not statistically significant (p> 0.05), it is of clinical significance.

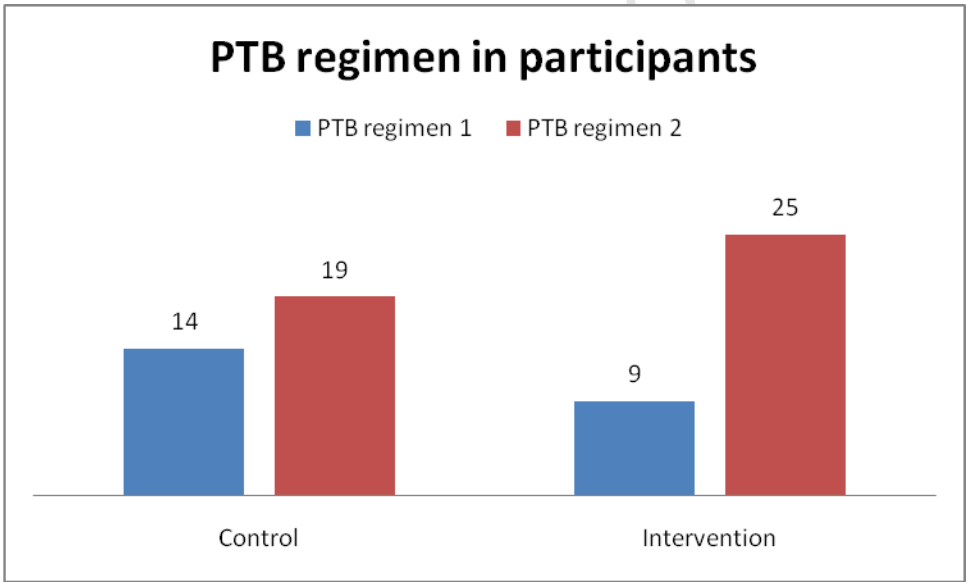

Fig 4.2: Comparison of the PTB regimen in the intervention and control groups.

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4.3)Health Related Quality of Life (HRQoL)

In this section, HRQoL will be reported in the following sequence:HRQoL of all the participants in the total sample size, HRQoL of PTB-only diagnosed participants in the control and intervention groups, HRQoL of participants with the co-infection of HIV in the control and intervention groups, HRQoL of participants pertaining to PTB regimen.

4.3.1)HRQoL of all participants

A decrease in the domains of mobility, self-care and activities and an improvement in pain, anxiety and VAS were seen in the control and intervention groups (Refer table 4.2). In the sixth week of testing, the ability to perform activities was easier in the control group (15.10%) compared to the intervention group (19.25%). The intervention group however showed a greater percentage improvement from baseline to the sixth week in the domains of pain (20.56 %), anxiety (14.49 %) and VAS% (20.6 %) when compared to the control group.

Table 4.2: HRQoL in relation to the control and intervention groups

	Control group (n=33)			Intervention group (n=34)		
	Mean	Range	Std.Dev	Mean	Range	Std.Dev
Mobility	1.48	1-2	0.51	1.44	1-2	0.50
Self-care	1.18	1-2	0.39	1.18	1-2	0.39
Activities	1.39	1-3	0.56	1.35	1-2	0.49
Pain	1.52	1-2	0.51	1.41	1-2	0.50
Anxiety	1.45	1-2	0.51	1.38	1-3	0.60
VAS%	84.24	50-100	13.47	79.26	30-100	18.51
EQ-5D WEEK 6						
Mobility	1.15	1-2	0.36	1.15	1-2	0.36
Self-care	1.03	1-2	0.17	1.03	1-2	0.17
Usual Activities	1.18	1-3	0.47	1.09	1-2	0.29
Pain/discomfort	1.21	1-2	0.42	1.12	1-2	0.33
Anxiety/depression	1.24	1-3	0.56	1.18	1-3	0.46
VAS%	94.24	60-100	8.30	95.59	70-100	6.83

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The level of education as assessed in the EQ-5D found that the intervention group had a higher number of participants with formal education after the minimum school leaving Grade 7 (n=22). The intervention group also had more participants with a degree or diploma (n=3). The aforementioned difference was statistically significant ($p<0.03$).

The frequency of participants experiencing problems and no problems in the respective domains is presented in Table 4.3. The frequency of reported problems as measured by the EQ-5D indicated minimal changes between the intervention and control groups and was not statistically significant for the domains of mobility, self-care, activities, pain and anxiety ($p>0.05$) at the sixth week of testing.

Table4.3: Frequency of reported problems in the Intervention and Control Groups

		Intervention Group		Control Group	
EQ-5D Domains		Baseline	Week 6	Baseline	Week 6
Mobility	No Problems	19	29	17	28
	Problems	15	5	16	5
Self-care	No Problems	28	33	27	32
	Problems	6	1	6	1
Usual Activities	No Problems	22	31	11	28
	Problems	12	3	12	5
Pain	No Problems	20	30	16	26
	Problems	14	4	17	7
Anxiety	No Problems	23	29	18	27
	Problems	11	5	15	6

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4.3.2)Health Related Quality of Life in relation to the diagnosis of PTB-only

A third of the participants (30%) in the control group were diagnosed with PTB-only and the intervention group had a similar proportion (32%). Both the control and intervention groups showed similar changes in the domain of mobility (23.9% vs. 20%). The intervention group showed further improvements in the domains of self-care (15.30% vs. 9.1%) and activities (14.20% vs. 8.30%) while the control group however showed improvements in the domains of pain (20% vs. 13.2%) and anxiety (16.7% vs. 0%) at the end of the sixth week.

Table 4.4: HRQoL in relation to the diagnosis of PTB-only

	Control group PTB-only (n=10)			Intervention group PTB-only (n=11)		
Diagnosis	Mean[5]	Range	Std. Dev	Mean	Range	Std. Dev
Mobility	1.50	1-2	0.53	1.55	1-2	0.52
Self-care	1.10	1-2	0.32	1.18	1-2	0.41
Activities	1.20	1-2	0.42	1.27	1-2	0.47
Pain	1.50	1-2	0.53	1.36	1-2	0.51
Anxiety	1.20	1-2	0.42	1.18	1-2	0.41
Vas%[6]	85.00	50-100	15.81	84.09	45-100	12.08
Week 6						
Mobility	1.20	1-2	0.42	1.18	1-2	0.41
Self-care	1.10	1-2	0.32	1.00	1-1	0.00
Activities	1.30	1-3	0.68	1.09	1-2	0.30
Pain	1.20	1-2	0.42	1.18	1-2	0.41
Anxiety	1.00	1-2	0.00	1.18	1-2	0.41
Vas%	90.50	60-100	12.57	95.45	80-100	6.87

[5]Mean was calculated to show a decrease or improvement in each domain the control and intervention groups respectively

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[6]Visual Analogue Scale (VAS) is a subjective measure to assess how the participant feels about their health on that particular day

4.3.3)Health Related Quality of Life in relation to PTB/HIV diagnosis

Participants in the control group (34%) and intervention groups (34%) diagnosed with PTB/HIV had similar increases in the domains through the six week period. Although not statistically significant (p>0.05), the intervention group improved the most in the domain of VAS during the sixth week (24.29% vs. 14.30%). The control group however, experienced improvements in the domains of mobility (23.60%) and self-care (18.00%) (Table 4.5.).

Table 4.5: Health Related Quality of Life in relation to PTB/HIV diagnosis

	Control group PTB/HIV (n=23)			Intervention group PTB/HIV (n=23)		
Diagnosis	Mean	Range	Std. Dev	Mean	Range	Std. Dev
Mobility	1.48	1-2	0.51	1.39	1-2	0.50
Self-care	1.22	1-2	0.42	1.17	1-2	0.39
Activities	1.48	1-3	0.59	1.39	1-2	0.50
Pain	1.52	1-3	0.51	1.43	1-2	0.51
Anxiety	1.57	1-2	0.51	1.48	1-3	0.67
Vas%	83.91	50-100	12.70	76.96	30-100	18.20
Week 6						
Mobility	1.13	1-2	0.34	1.13	1-2	0.34
Self-care	1.00	1-1	0.00	1.04	1-2	0.21
Activities	1.13	1-2	0.34	1.09	1-2	0.29
Pain	1.22	1-2	0.42	1.09	1-2	0.29
Anxiety	1.35	1-3	0.65	1.17	1-3	0.49
Vas%	95.87	85-100	5.15	95.65	70-100	6.96

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4.3.4)Health Related Quality of Life in relation to PTB regimen 1

The control and intervention groups were further divided into participants undergoing PTB treatment regimen 1 and 2. This paragraph reports on the information obtained from participants in treatment regimen 1 (Table 4.6). The control group had more participants undergoing PTB regimen 1 treatment (42%) than the intervention group (26%). After the sixth week testing, the intervention group dramatically increased in the domain of mobility (87.64%), activities (22.92%), as well as the VAS (22.30%).

Table 4.6: Health Related Quality of Life in relation to PTB regimen 1

	Control group Regimen 1(n=14)			Intervention group Regimen 1(n=9)		
Diagnosis	Mean	Range	Std. Dev	Mean	Range	Std.Dev
Mobility	1.50	1-2	0.52	1.78	1-2	0.44
Self-care	1.07	1-2	0.27	1.11	1-2	0.33
Activities	1.14	1-2	0.36	1.44	1-2	0.53
Pain	1.29	1-2	0.47	1.56	1-2	0.53
Anxiety	1.57	1-2	0.51	1.56	1-3	0.73
Vas%	91.43	70-100	9.49	77.22	45-100	18.89
Week 6						
Mobility	1.14	1-2	0.36	1.22	1-2	0.44
Self-care	1.07	1-2	0.27	1.00	1-1	0.00
Activities	1.21	1-3	0.58	1.11	1-2	0.33
Pain	1.14	1-2	0.36	1.22	1-2	0.44
Anxiety	1.00	1-2	0.00	1.11	1-2	0.33
Vas%	92.50	60-100	11.22	94.44	80-100	7.27

4.3.5)Health Related Quality of Life in relation to PTB treatment regimen 2

A large percentage of participants in the intervention group (74%) were undergoing PTB treatment regimen 2. The intervention group had no significant improvement in any of the domains after the six week period although the control group did show a slightly higher degree of improvement in the domains of mobility (21.09%), self-care (20.64%) and activities (26.58%) after the sixth week (Table 4.7). Other than the minimal improvement of the control group in the domain of anxiety (4.40%), comparison between the values of the control and intervention groups for each domain were similar.

Table 4.7: Health Related Quality of Life in relation to PTB treatment regimen 2

	Control group PTB treatment Regimen 2 (n=19)			Intervention group PTB treatment Regimen 2 (n=25)		
Diagnosis	Mean	Range	Std.Dev	Mean	Range	Std.Dev
Mobility	1.47	1-2	0.51	1.32	1-2	0.48
Self-care	1.26	1-2	0.45	1.20	1-2	0.41
Activities	1.58	1-3	0.61	1.32	1-2	0.48
Pain	1.68	1-2	0.48	1.36	1-2	0.49

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Anxiety	1.37	1-2	0.50	1.32	1-3	0.56
Vas%	78.95	50-100	13.90	80.00	30-100	18.71
Week 6						
Mobility	1.16	1-2	0.38	1.12	1-2	0.33
Self-care	1.00	1-1	0.00	1.04	1-2	0.20
Activities	1.16	1-2	0.38	1.08	1-2	0.28
Pain	1.26	1-2	0.45	1.08	1-2	0.28
Anxiety	1.43	1-3	0.69	1.20	1-3	0.50
Vas%	95.53	85-100	5.24	96.00	70-100	6.77

4.4) Lung Function:

The lung function of the participants in the control and intervention groups were measured by assessing the parameters of Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC) and the ratio of FEV1/FVC (Refer to Table 4.8). At the end of the sixth week of testing, the value of FEV1 was statistically significant ($p<0.02$) for the intervention group. Continued improvements in the intervention group were noted from baseline testing to the sixth week with regard to the lung parameters of FEV1 (10.63%) and FVC (10.71%). The control group however had lower readings in the aforementioned parameters of FEV1 and FVC after the sixth week of testing in comparison to the intervention group(Table 4.8).

Table 4.8: Lung function readings of the control and intervention group

	Control group (n=33)			Intervention group (n=34)		
	Mean	Range	Std.Dev	Mean	Range	Std.Dev
FEV_1 (L)	1.47	0.50-4.15	0.70	1.60	0.82-3.11	0.56
FVC (L)	1.54	0.53-4.19	0.71	1.68	0.94-3.32	0.57
FEV_1/FVC	0.95	0.72-1.00	0.07	0.96	0.77-1.00	0.06
Week 6						
FEV_1 (L)	1.54	0.45-4.10	0.66	1.77	1.07-2.99	0.54
FVC (L)	1.64	0.54-4.12	0.68	1.86	1.07-3.30	0.58
FEV_1/FVC	0.94	0.64-1.00	0.07	0.96	0.79-1.00	0.06

4.4.1)Lung function parameters according to the diagnosis of PTB-only

From the table below (table 4.9), which represents the PTB-only subgroup within the intervention and control groups, a greater improvement was seen in the intervention group

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after the six week testing. At the end of the sixth week of testing, the intervention group continued to improve in the values of FEV_1 (18.60%) and FVC (22.20%) while the control group experienced a decrease in lung parameter values.

Table 4.9: Lung function readings of PTB-only participants

	Control group PTB-only (n=10)			Intervention group PTB-only (n=11)		
Parameters	Mean	Range	Std.Dev	Mean	Range	Std.Dev
FEV_1	1.49	0.87-2.24	0.50	1.67	0.87-3.11	0.66
FVC	1.60	0.89-2.53	0.57	1.71	0.94-3.32	0.70
FEV_1/FVC	0.94	0.78-1.00	0.75	0.98	0.93-1.00	0.03
Week 6						
FEV_1	1.28	0.45-2.41	0.62	1.98	1.23-2.95	0.65
FVC	1.39	0.54-2.42	0.62	2.09	1.25-3.17	0.69
FEV_1/FVC	0.91	0.64-1.00	0.11	0.95	0.79-1.00	0.08

4.4.2) Lung function parameters of PTB/HIV participants

Minimal improvement was seen in the intervention group in the values of (FEV_1, 10.70%;FVC, 9.5%) and the control group (FEV_1, 13.00%; FVC, 15.90%) after the sixth week of testing (table 4.10).

Table 4.10: Lung function parameters of PTB/HIV participants

	Control group PTB/HIV (n=23)			Intervention group PTB/HIV (n=23)		
Parameters	Mean	Range	Std.Dev	Mean	Range	Std.Dev
FEV_1	1.46	0.50-4.15	0.78	1.50	0.82-2.93	0.51
FVC	1.51	0.53-4.19	0.78	1.58	1.02-3.03	0.51
FEV_1/FVC	0.96	0.72-1.00	0.07	0.95	0.77-1.00	0.07
Week 6						
FEV_1	1.65	0.93-4.10	0.65	1.66	1.07-2.99	0.45
FVC	1.75	0.96-4.12	0.68	1.73	1.07-3.30	0.48
FEV_1/FVC	0.95	0.80-0.99	0.04	0.96	0.87-1.00	0.04

4.4.3)Lung function Parameters in participants undergoing PTB treatment Regimen 1

The percentage of participants undergoing PTB treatment regimen 1 were less in the intervention group (13%) in comparison to the control group (21%). The readings in the

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intervention group for FEV_1 (25.97%) and FVC (31.84%) (Fig 4.16) for this subgroup showed a greater improvement, although not statistically significant (p>0.05), at completion of the sixth week when compared to the control group (Table 4.11).

Table 4.11: Lung Parameters in participants undergoing PTB treatment Regimen 1

	Control group PTB treatment Regimen 1 (n=14)			Intervention group PTB treatment Regimen 1(n=9)		
Parameters	Mean	Range	Std.Dev	Mean	Range	Std.Dev
FEV_1	1.67	0.83-4.15	0.85	1.54	0.87-2.23	0.48
FVC	1.73	0.83-4.19	0.88	1.57	0.94-2.27	0.47
FEV_1/FVC	0.97	0.86-1.00	0.05	0.98	0.93-1.00	0.02
Week 6						
FEV_1	1.39	0.45-2.41	0.58	1.94	1.23-2.95	0.70
FVC	1.53	0.54-2.78	0.64	2.07	1.25-3.17	0.76
FEV_1/FVC	0.91	0.64-1.00	0.10	0.94	0.79-1.00	0.08

4.4.4)Lung function parameters of participants undergoing PTB treatment regimen 2

More than a third (37%) of the participants in the intervention group was undergoing PTB treatment regimen 2 compared to the control group (28%) (Table 4.12). The intervention group showed slight improvements in the parameters of FEV1 (4.27%) and FVC (12.82%) from baseline to the sixth week of testing. Although the control group had a greater improvement in the parameters of FEV_1 (25%) and FVC (22.86%), they were not statistically significant (P>0.05).

Table 4.12: Lung function testing of participants undergoing PTB treatment regimen 2

	Control group PTB Regimen 2 (n=19)			Intervention group PTB Regimen 2 (n=25)		
Parameters	Mean	Range	Std.Dev	Mean	Range	Std.Dev
FEV_1	1.32	0.50-2.48	0.55	1.56	0.82-3.11	0.59
FVC	1.40	0.53-2.49	0.54	1.64	1.02-3.32	0.61
FEV_1/FVC	0.94	0.72-1.00	0.09	0.95	0.77-1.00	0.07
Week 6						
FEV_1	1.65	0.93-4.10	0.70	1.76[7]	1.07-2.99	0.47
FVC	1.72	0.96-4.12	0.71	1.71	1.07-3.30	0.49
FEV_1/FVC	0.95	0.89-0.99	0.03	0.97	0.87-1.00	0.04

[7]Statistically significant value of FEV_1 (p<0.02)

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4.5)Exercise Toleranceand Borg Scale reading

The physical ability of the participants recruited into the study as well as the rate of perceived exertion, measured by a Modified Borg Scale (table 4.13) provides information with regard to the distance covered by the participants and the perceived difficulty of the exercise tolerance test after completion.

The difference of the distance covered by the intervention and control group had statistical significance ($p<0.02$) at the baseline reading but the improvement of the control group and intervention group at the end of the sixth week was not statistically significant ($p>0.7$). After the sixth week of testing, the intervention had covered a greater mean distance (411.03m) although the control group had a higher percentage improvement from baseline to the sixth week of testing (Table 4.13). The intervention group had a lower reading of the Borg Scale (10.35) indicating a better perceived exertion of the exercise tolerance test in comparison to the control group (11.24) at the sixth week of testing.

Table 4.13: Exercise tolerance and Borg scale reading for the Intervention and Control group

	Control Group (n=33)			Intervention group (n=34)		
	Mean	Range	Std.Dev	Mean	Range	Std.Dev
Distance (m)	340.00	160-680	104.67	401.18	200-600	96.13
Borg Scale reading	11.42	7-15	1.64	10.06	7-15	2.32
WEEK 6						
Distance (m)	356.97	190-520	78.72	411.03	235-580	79.79
Borg Scale reading	11.24	7-15	1.48	10.35	7-13	1.82

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4.5.1)Exercise tolerance and Borg Scale reading of participants diagnosed with PTB-only

PTB-only diagnosed participants in the intervention group were able to cover a greater mean distance (445.45m) than the control group (322m) at the baseline measurement (Refer to Table 4.14) although after the sixth week of testing the intervention group decreased in the

mean distance covered (442.73m) while the control group improved (367.00m). Although the intervention group PTB-only participants had a lower Borg scale (10.27) compared to the control group (11.60) reading at baseline, the intervention group continued to show greater improvements after the sixth week testing.

Table 4.14: Distance of the participants diagnosed with PTB-only

	Control PTB-only (n=10)			Intervention PTB-only (n=11)		
Parameters	Mean	Range	Std. Dev	Mean	Range	Std. Dev
Distance(m)	322.00	200-450	96.47	445.45	330-550	65.17
Borg scale	11.60	7-15	2.12	10.27	7-13	2.24
Week 6						
Distance(m)	367.00	280-500	73.64	442.73	330-580	71.29
Borg scale	11.00	7-13	1.63	9.55	7-11	2.02

4.5.2)Exercise tolerance and Borg Scale reading of participants diagnosed with PTB/HIV

Both the intervention and control groups had the same number of participants diagnosed with PTB/HIV (n=23). Covering a greater distance at baseline (380m), the intervention group had a greater improvement (395.87m) in the sixth week of testing compared to the control group (352.61) (Table 4.15). With the Intervention group increasing the value of the Borg Scale reading from baseline (9.96) to the sixth week (10.74), the control group showed no change from baseline (11.35) to the sixth week (11.35).

Table 4.15: Distance covered by participants diagnosed with PTB/HIV

	Control PTB/HIV (n=23)			Intervention PTB/HIV (n=23)		
Parameters	Mean	Range	Std. Dev	Mean	Range	Std. Dev
Distance (m)	347.83	160-680	109.17	380.00	200-600	102.38
Borg scale	11.35	7-15	1.43	9.96	7-15	2.40
Week 6						
Distance (m)	352.61	190-520	82.03	395.87	235-500	80.60
Borg scale	11.35	7-15	1.43	10.74	7-13	1.63

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4.5.3)Exercise tolerance and Borg Scale reading of participants undergoing PTB treatment regimen 1

Although the intervention group had covered a greater distance at baseline (426.67) in comparison to the control group (372.14), similar trends were seen in both groups with regards to a decrease in the distance covered after the sixth week testing (Refer to table 4.16). Similarly, in the Borg Scale reading, the intervention group had a lower reading (9.67) than the control group (11.29) and continued to show a greater improvement in the Borg scale reading after the sixth week (9.22).

Table 4.16: Distance and Borg Scale of participants undergoing PTB treatment regimen 1

	Control PTB Regimen 1 (n=14)			Intervention PTB Regimen 1 (n=9)		
Parameters	Mean	Range	Std. Dev	Mean	Range	Std. Dev
Distance (m)	372.14	200-680	128.55	426.67	340-550	63.84
Borg scale	11.29	7-15	1.72	9.67	7-13	2.65
Week 6						
Distance (m)	369.29	240-500	76.71	438.89	330-580	78.97
Borg scale	11.00	7-15	2.08	9.22	7-11	2.11

4.5.4)Exercise tolerance and Borg Scale reading of participants undergoing PTB treatment regimen 2

Minimal improvement was achieved with the intervention group with regards to the distance covered from baseline (392m) to the sixth week of testing (401m) whereas the control group had a greater improvement in the sixth week (347.89m) (Table 4.17). Although the Borg Scale reading for the intervention group had increased from baseline (10.20) to the sixth week (10.76), the reading was still lower than that of the control group in the sixth week (11.42).

Table 4.17: Distance and Borg Scale of participants undergoing PTB treatment regimen 2

	Control group PTB Regimen 2 (n=19)			Intervention group PTB Regimen 2 (n=25)		
	MEAN	RANGE	STD.DEV	MEAN	RANGE	STD.DEV
Distance (m)	316.32	160-470	78.40	392.00	200-600	104.96
Borg scale	11.53	7-15	1.61	10.20	7-15	2.24
Week 6						
Distance (m)	347.89	190-520	81.01	401.00	235-500	79.24
Borg scale	11.42	11-13	0.84	10.76	7-13	1.56

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4.6) Conclusion

Similar changes were seen in the intervention and the control groups over the six week period. Although not statistically significant, clinical improvement was greater in the HRQoL of the intervention group. HRQoL domains included anxiety and pain in which the intervention group had a greater improvement over the six week period. At the end of the sixth week, the reading for FEV_1 was statistically significant ($p>0.02$) in the intervention group.

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CHAPTER 5:

DISCUSSION

5.1)Introduction

Pulmonary Tuberculosis (PTB) still poses a major health challenge in South Africa. The reality of the current PTB epidemic internationally and nationally is overwhelming and often demoralizing to the health professionals assisting in the management process of the patients diagnosed with PTB. The situation is worsened by the co-infection of almost half the population infected with PTB and HIV as these patients suffer greater morbidities (Loveday et al, 2007). Evidence, in the literature, has identified strategies to address the occurrence and impact that the disease has on the population. However, long term management of patients with PTB has not been adequately addressed, especially when the patients are discharged from hospitals back into their homes and communities. The aforementioned are possible contributing factors as to why the Millennium Development Goals (MDGs) of eradicating PTB by 2015 may not be achievable (SA Department of Health, 2007-2011). This study was therefore developed to determine the effect of a home based pulmonary rehabilitation programme on HRQoL, lung function and exercise tolerance among patients with PTB. This six week programme included breathing exercises, walking in the community as well as strengthening exercises for both the upper and lower limbs.

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5.2)Profile of Participants

The characteristics of the participants were similar to information obtained in current literature (PortwigandCouper, 2006; Loveday et al, 2007; Kourbatova et al; 2006). The level of unemployment and incomplete formal education in the total population of the current study participants were also consistent with literature. Participants were mostly unemployed (n=50) with a high number of participants havingincomplete high school education (n=52). Formal education not only plays a major role in providing the correct thinking processes to cope with

everyday situations, it also provides the means to process information, as in the case of the current study, the disease process in the diagnosis of PTB . Education to newly diagnosed and previously diagnosed patients has fallen to the medical staff with fewer individuals being informed by television and public radio (Mesfin et al, 2005). Loss of patients in the health care system could thus result in patients not receiving treatment resulting in the increased morbidity and mortality experienced (Loveday et al, 2007).

The statistical value of education between the intervention and control groups in the current study was significant ($p<0.03$). The assessment of current support strategies for patients with PTB in Kwazulu-Natal conducted by Lutge et al (2009) found that there was a statistical significance between the educational level and the non-adherence of patients to the prescribed medication ($p=0.039$). Participants who had no formal education were more likely to default off the treatment, followed by those with primary and then secondary education(Lutge et al, 2009). The view that the higher literacy level of individuals will result in better compliance to medication compared to lower literate individuals is supported by Kalichman (1999).

Factors affecting non-adherence in PTB diagnosed patients' have been evaluated by many authors (Liam et al, 1999; Ukpe, 2007; Balbay et al, 2005; PortwigandCouper, 2006). The high degree of non-adherence, specifically to PTB medication, is evident in the current study where a total of 66% of the total population were currently on PTB treatment regimen 2 which is associated with multi-drug resistant PTB (MDR-TB). Ukpe (2007) supports this view in stating that by defaulting off the prescribed medication, ineffective management of PTB is experienced and adds extra strain to the already over burdened TB control programmes.

The community, from which the participants for this study were selected, is reported to have a high prevalence of co-infection of PTB and HIV individuals (MSF TB Report, 2009). This in itself poses a challenge in the management of the patients due to the added morbidity associated with the HIV disease. For a long time, a great degree of stigma has surrounded the diagnosis of PTB as it is associated with the co-infection of HIV. According to Loveday et al (2007) this

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stigmatization plays a significant role in non-adherence to PTB medication which results in further morbidity and even eventual mortality.

5.3)Health Related Quality of Life

Historically management of PTB patients has focused on the microbiological cure of the disease. In the last decade the focus has shifted to incorporate the measurement of HRQoL in the management of morbidity in patients suffering from PTB (Chamla, 2004; WHOQOL Group, 1995). Although the total sample size did not show marked improvements in all the domains within the EQ-5D over the six week period, the sub-groups of PTB/HIV and PTB regimen 1 in the intervention group, showed the greatest clinical improvements in the domains of pain and anxiety respectively. The sub-group of participants diagnosed with PTB/HIV in the intervention group, experienced a decrease of 23.80% in the domain of pain after the six week period. With the decrease of pain in patients with the PTB/HIV diagnosis, the resultant relief could address the joint and muscular pain (Larue et al, 1997) that plays a part in the limitation of functional movement and the execution of activities of daily living (McCormack et al, 1993). Limitation in functional movement and the execution of activities of daily living could translate to the non-compliance of clinical appointments due to the physical inability to get to the health care facility (Loveday et al, 2007). Pain according to Holzemer (1998) is the main contributor to the decrease in the Quality of Life (QoL) in patients diagnosed with HIV/AIDS. As supported by Ghosh et al (2006), the incorporation of a rehabilitation programme for patients with co-infection is not only needed to address morbidities but to improve the HRQoL of patients diagnosed with PTB (Ciccolo et al, 2004).

Participants undergoing PTB regimen 1 in the intervention group showed a clinical improvement of 28.85% in the HRQoL domain of anxiety. Although HRQoL is often marginally improved after treatment (Chamla, 2004) patients with the diagnosis of PTB suffer from poor emotional quality of life even after microbiological cure (Rajeswari et al, 2005; Dhingra andRajpal, 2003). The seriousness of the anxiety experienced by the patient diagnosed with PTB has been largely overlooked (Husain et al, 2008) with the subsequent effect of poor compliance to PTB medication and decreased HRQoL. It has become evident thus that the

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microbiological cure of PTB is no longer sufficient to ensure the overall well-being of the patient after treatment (Rajeswari et al, 2005). The informationobtained in the current study is vital in defining the role that physiotherapy can play in the management of patients with PTB. The concept of rehabilitation should no longer only extend to the physical management of patients but be inclusive of the emotional management of patients especially the long term care of PTB patients.

5.4)Lung Function

Even after microbiological cure at the end of the pharmaceutical management, lung function impairment as a result of the PTB diagnosis has been described as a long term disability which not only has a negative impact on the socio-economic status of the individual (Portwig andCouper, 2006) but has even greater limitation in the execution of functional activities on a daily basis (Maguire et al, 2009).

While literature reflects that improvement in lung function may be attributed to the effect of the medication as illustrated by Plit et al (1998), the current study found a statistically significant improvement ($p<0.02$) in the reading of FEV_1 in the intervention group over the six week period. This particular finding is important to the management of PTB patients because according to the findings of Ghosh et al (2006), PTB patients were still symptomatic after completion of the prescribed PTB medication with an even greater degree of radiological abnormalities after treatment. The findings of the current study however were supported by Tada et al (2002) who found that pulmonary rehabilitation resulted in significant improvements of lung function in patients with PTB sequelae. This justifies the need identified by Ghosh et al (2006) for the inclusion of physiotherapy management of PTB patients, to address the increasing morbidity associated with the disease.Taking into account the magnitude of PTB , individual management of each patient diagnosed with PTB could be difficult, therefore the current study aimed to rehabilitate individuals in the community and the home environment.

Furthermore the subgroup of PTB/Regimen 1 within the intervention group also reflected improvements in FEV_1 (25.97%) and FVC (31.84%) albeit not statistically significant ($p>0.05$). A

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plausible reason for the clinical improvement noted in this sub-group could be attributed to the early case detection (Kourbatova et al ; 2006) of untreated PTB because delays inPTB diagnosis have been linked to the severity of pulmonary impairment, the increased number of co-morbidities, as well as the negative impact on the well-being of the patient (Yaksic et al, 2003). Al-Hajjaj (2002) identified treatment compliance to the medication as a factor that may affect the lung function after treatment which De Valliere and Barker (2004) supported by stating that individuals who have previously defaulted off first line drug treatment subsequently have a greater degree of lung function impairment. Thus the sub-group of PTB treatment regimen 1 individuals showed the greatest percentage of improvement in the lung parameters assessed. By assessing the results found in the study, the role of physiotherapists in the management of PTB patients leans not only to rehabilitation of the pulmonary morbidities experienced in these patients but providing the information and education for self-management.

5.5)Exercise Tolerance and Borg Scale Reading

As a result of the impaired ability to maintain effective gaseous exchange patients experience an inability to perform activities of daily living (Sivaranjini andVanamail, 2010).

In the total sample size, neither statistical nor clinical significance was found in the category of exercise tolerance and the perceived rate of exertion as measured by the Modified Borg Scale over the six week period. The need for an appropriate intervention has been established with the findings of numerous international studies that have identified a decrease in exercise tolerance of patients diagnosed with PTB (Sivaranjini andVanamail, 2010; Adedoyin et al, 2010; Yoshida et al, 2006). Pulmonary rehabilitation has been the main treatment modality in the management of Chronic Obstructive Pulmonary Disease (Adedoyin et al, 2010; Yoshida et al, 2006) but it has been proven that patients with PTB do benefit from the effects of a pulmonary rehabilitation programme inclusive of exercise training (Ando et al, 2003; Yoshida et al, 2006). The absence of an improvement in the exercise tolerance component of the program may be attributed to the side effects of the HIV medication which include fatigue, nausea, anxiety and depression which a high percentage (67%) of the study population were taking in

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conjunction with PTB medication (Ciccolo et al, 2004). In light of many physically incompetent patients having to walk to the health care facility to receive treatment (Loveday et al, 2007; Maguire et al, 2009), the required exercise training will not be performed due to the physical disability experienced by the patients (Ando et al, 2003) thus limiting the statistical and clinical improvement of exercise tolerance.

The sub-group of patients undergoing PTB treatment regimen 1 had a greater improvement in the distance covered (2.9%) in the 6-min walk test and the rate of perceived exertion (4.65%) at the end of the sixth week in comparison to any other sub-groups within the intervention group. The sub-group PTB treatment regimen 1 was the only group to show a clinical improvement in both the lung parameters tested (refer to section 5.5) and exercise tolerance. This result is supported by Kokkola (2009) who also found a similar trend in the correlation of lung function and exercise tolerance in patients diagnosed with PTB. The trend between the lung function and exercise tolerance as described by Yoshida et al (2006) can be seen as a positive indication of the benefits of exercise training as part of a pulmonary rehabilitation programme.

5.6)Conclusion

This study set out to ascertain whether a home based pulmonary rehabilitation program would bring about positive effects of HRQOL, pulmonary function and exercise tolerance.

Although the home-based pulmonary rehabilitation program in its entirety, as laid out in this study, did not yield statistical significance, it did show improvements in some of the parameters of HRQOL and Pulmonary function. To this end, the research conducted is a positive outcome as these patients would otherwise not have been exposed to any intervention other than pharmacological management, to address the morbidity caused by PTB.

Pulmonary rehabilitation with regards to the management of patients diagnosed with PTB is beneficial as it not only addresses factors such as lung impairment, social and emotional disability but provides a means by which to overcome the aforementioned impairments.

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Physiotherapists should re-evaluate the current management of patients suffering from PTB as well as those with the co-infection of HIV/AIDS. By treating the patient holistically and addressing the areas covered in the current study, the goal of achieving the MDG's will be attainable if management of these patients are effectively executed. The clinical implications of the current study highlight that there is definitely a strong need in the active role of Physiotherapists in the long term care and management of patients with PTB.

Short term management is no longer efficient in the care of patients in the care of patients with PTB. Physiotherapy as a profession now has the responsibility to get involved in the holistic management of these patients. Holistic management could possibly include the active involvement of physiotherapists in the community by making group treatments available to patients that have been diagnosed with PTB.

Education to patients with PTB would be vital in the role that physiotherapists could play in the self-management of patients. These patients will then be able to take better care of themselves emotionally as well as physically.

Assessing the information gathered in the current study, physiotherapist do have a vital role to play in the management and treatment of patients diagnosed with PTB and undergoing treatment.

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5.7)Limitations and Recommendations

5.7.1)Sample size

The current study's sample size although calculated to obtain statistical significance could have been larger to allow generalization. The high number of patients that dropped out after meeting initial inclusion criteria also contributed to the small sample size as well asthe impact of co-infection of HIV in the current study population could have impacted on the program and the parameters which were evaluated.Furthermore only one health care facility was used to conduct the study and could also have impacted on sample size.

5.7.2)Data Capture sheet

The researcher developed the data capture sheet herself and although it was piloted some areas could have been included to better explain the findings. One such area should have been that of the patients HIV/AIDS status. Although not the focus or an objective of the current study to ascertain the impact of HIV on PTB, it is probable that it negatively impacted on the study findings.

5.8)Recommendations.

5.8.1)Sample Size

Future studies should ensure a larger sample size by recruiting for a longer period, at least 6 months. Use of multiple health care facilities may ensure a larger population and also allow generalization of findings.

5.8.2)Data Capture Sheet

Data pertaining to HIV/AIDS status namely, CD4 count, viral load, anti-retroviral treatment medication as well as how long the patient was on medication prior to being diagnosed and commencing PTB treatment should be included in the future studies' data capture sheet as a high co-infection of HIV with PTB is a reality in the current era.

5.8.3) Future Research

Future research assessing the impact that physiotherapy has on other areas of management of patients with PTB should be initiated. It is also recommended that the current research be expanded with regards to the sample size and clinical setting.

5.8.4) Clinical Practice

The role of physiotherapists in the management of patients with PTB can be greatly utilized in the care and treatment these patients. It would be highly recommended that physiotherapists provide the resources by implementing programmes which would facilitate continued management of patients with PTB at a community level. Lastly the researcher recommends that the area of wellness with regard to patients suffering from PTB be addressed holistically

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and not just on the pathogen. Pulmonary rehabilitation programs could well be the vehicle needed to ensure better outcomes for these patients.

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Appendix A: Informed consent information

THE INVESTIGATION OF THE EFFECT OF A HOME BASED PULMONARY REHABILITATION PROGRAMME ON THE HEALTH RELATED QUALITY OF LIFE OF PATIENTS WITH PULMONARY TUBERCULOSIS.

You are invited to participate in a study that will determine whether a home based exercise programme will have a positive effect on your ability to exercise, the functioning of your lungs and how you feel about the health related quality of your life. Pulmonary Tuberculosis (PTB) is an air-borne disease that affects the lungs of people that contract the disease. The study will give a better understanding of the factors that affect people diagnosed with PTB. Factors such as how people with PTB cope in the home environment and how their attitude to their quality of life is changed after undergoing a rehabilitation programme based at home. You have been selected to participate in the study because of your admission to GF Jooste and the diagnosis of PTB. Should you participate in the study, you will be expected to be part of the study for the duration of 6 weeks. The study will include randomly selecting patients into two groups. One group will receive a rehabilitation programme to do at home and the other group will receive a information leaflet about PTB in addition to the normal medical treatment provided by the hospital. The group that did not receive a rehabilitation programme to do at home will receive the programme once the 6 weeks of the study have been completed. If you are in the group that receives the programme, you will be required to perform the rehabilitation programme at home for the duration of 6 weeks. You will be required to visit the hospital on the 3rd and 6th week for follow-up testing. A date and time will be arranged for telephonic follow-ups that will take place in weeks 1, 2, 4 and 5 to check on your progress with the rehabilitation programme and the continuation of the medication.

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Procedure:

The first step will be to complete a questionnaire. You will then perform a simple test with the researcher that will test your lung function. The last test that you will have to perform will be a walk test that will measure how far you can walk in six minutes. All the tests will be performed in a private area. When you are discharged home, you will need to perform an rehabilitation programme for six weeks if you are in that particular group. Should you not receive a rehabilitation programme in the first 6 weeks, the researcher will issue you with one after 6 weeks when the study has been completed.

Risks and Benefits:

In doing the walk test, you might experience tiredness, breathlessness and muscle stiffness. If any of the problems that you do experience get worse, a doctor will be on call to assist you.

In participating in the study, you will aid us in finding out whether the home rehabilitation programme improves your ability to function at home, improves the way you feel about things in your life and the functioning of your

lungs after being diagnosed with PTB. Improvement of the management of PTB in the Western Cape needs to be addressed and by participating in the study, you will assist in finding ways to enhance the treatment of people diagnosed with PTB in the home environment and change the attitude of those people to their health related quality of life.

Confidentiality

The information obtained from your folder will only be reviewed by the researcher in addition to the staff that works at the hospital. The results of the test will also be kept confidential and reviewed only by the researcher. The treatment that you will receive from the hospital will not be changed if you do not agree to participate in the study.

Contacts and Questions

Contact details of the researcher:

Name: Donna de Grass (masters' student)

Contact number: 076 3797828

If you have any further queries you are welcome to contact my supervisor Mrs. Shamila Manie on (021) 4066628/4066992.

Research Office: (021) 650 4015 ; Web: www.researchoffice.uct.ac.za:

If you decide to participate in this study, you are free to withdraw at any time without having it affect your stay in hospital or the treatment you receive.

You will be given a copy of this form to keep for your records.

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Statement of Consent

I have read the above information. I have asked questions and have received answers. I understand the meaning of confidentiality; I understand that I have the right to withdraw from the study at any time. I consent to participate in the study.

Signature_____ Date _____

Signature of Investigator or Person Obtaining Consent_____
Date _____

Signature of independent witness_____Date:_____

List of Participants and correlating numbers

No:	Folder Number	Phone Number	Colour
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
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42			

APPENDIX C: DATA CAPTURE SHEET

Demographics Data

Folder number: _____

Gender: Male [ ] Female [ ]

Date of Birth:

Body weight: _____ kg Height: _____ Metres

Residential Address:

Population group:

Black	[ ]	Coloured	[ ]	Asian	[ ]
White	[ ]	Indian	[ ]		

Years of formal education:

None	[ ]	University	[ ]
Grade 7	[ ]	other	[ ]
Grade 12	[ ]		

Occupation:

Paid employment	[ ]	Retired	[ ]
Self-employed	[ ]	pensioner	[ ]
Non-paid work (volunteer)	[ ]	unemployed (health reason)	[ ]
Student	[ ]	Unemployed (other reason)	[ ]
Domestic	[ ]	Other	[ ]

Marital Status:

Never married	[ ]	Divorced	[ ]
Currently married	[ ]	Widowed	[ ]
Separated	[ ]	Cohabiting	[ ]

Co-morbidities:

Hypertention	[ ]	COPD	[ ]
Diabetes	[ ]	Current smoker	[ ]
Ischaemic heart disease	[ ]	HIV/AIDS	[ ]
Cholesterol	[ ]	Other (specify)_____	

Management:

Surgical	[ ]	Physiotherapy	[ ]
Pharmacuetical	[ ]		

Admission data

Date of admission: _____

Admission diagnosis: _____

Confirmed diagnosis: _____

Date of discharge: _____

APPENDIX A: DATA CAPTURE SHEET

Demographics Data

Folder number: _____ Date of admission

Gender: Male [ ] Female [ ] Date of discharge

Date of Birth:

Address:

Body weight: _____kg Height: _____ Metres

Years of formal education:

None	[ ]	University	[ ]
Grade 7	[ ]	other	[ ]
Grade 12	[ ]		

Occupation:

Paid employment	[ ]	Retired	[ ]
Self-employed	[ ]	pensioner	[ ]
Non-paid work (volunteer)	[ ]	unemployed (health reason)	[ ]
Student	[ ]	Unemployed (other reason)	[ ]
Domestic	[ ]	Other	[ ]
		(Please specify) _____	

Marital Status:

Never married	[ ]	Divorced	[ ]
Currently married	[ ]	Widowed	[ ]
Separated	[ ]	Cohabiting	[ ]

Co-morbidities:

Hypertention	[ ]	COPD	[ ]
Diabetes	[ ]	Current smoker	[ ]
Ischaemic heart disease	[ ]	Cholesterol	[ ]

Other (specify)_____

Admission data

Date of admission: _____

Admission diagnosis: _____

Confirmed diagnosis: _____

Date of discharge: _____

EQ - 5D

Iphepha lemibuzo ngezempilo

(*Inguqulelo yesiXhosa saseMzantsi Afrika*)
(Xhosa version)

(best available)

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Beka uphawu kwibhokisi ibenye kwiqela ngalinye echaza imeko yempilo yakho namhlanje, kwezi bhokisi zilandelayo.

Musa ukuphawula ngaphezulu kwebhokisi enye kwiqela ngalinye.

Ukuhamba

Andinangxaki zokuhamba ❑

Ndinazo ingxakana zokuhamba ❑

Ndingumlwelwe obopheleleke ebhedini ❑

Ukuzinonophela isiqu

Andinangxaki zokuzinonophela ❑

Ndinazo ingxakana zokuhlamba okanye ukuzinxibisa ❑

Andikwazi ukuzihlamba okanye ukuzinxibisa ❑

Izinto zesiqhelo (Umsebenzi, Ukufunda izifundo
Umsebenzi wasekhaya, Usapho, Ezolonwabo*)*

Andinangxaki nokuzenzela izinto zesiqhelo ❑

Ndinazo iingxakana zokuzenzela izinto zesiqhelo ❑

Andikwazi kuzenzela izinto zesiqhelo ❑

Iintlungu / Ukungaziva kakuhle

Andinazintlungu okanye ukungaziva kakuhle ❑

Ndinentlungwana okanye ukungaziva kakuhle okungephi ❑

Ndinentlungu ezigqithileyo okanye ukungaziva kakuhle okugqithileyo ❑

Ukuxhalaba / Ukudakumba

Andinaxhala okanye andidakumbanga ❑

Ndibuxhalaba okanye ndibudakumba ❑

Ndixhalabe gqitha okanye ndidakumbe gqitha ❑

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Ukunceda abantu ukuze baxele okokuba imeko yabo yempilo intle okanye imandundu na sizobe isikali (esifana nethemometha). Eyona meko entle yempilo iphawulwe ngo-100, eyona meko imandundu iphawulwe ngo-0.

Singathanda ubonise kwesi sikali ngokoluvo lwakho ukuba impilo yakho intle okanye imandundu kangakanani namhlanje.
Nceda wenze oku ngokuzoba umgca osuka ebhokisini engezantsi ukuya kulo ndawo esikalini ibonisa ukuba imeko yempilo yakho intle okanye imbi kangakanani namhlanje.

Imeko yempilo yakho namhlanje

Ibhokisi

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Eyona meko entle yempilo onokuyiqikelela

Eyona meko imandundu yempilo onokuyiqikelela

Njemgoko kunganyanzelekanga ukuba ubhale igama lakho, kodwa ke kuyakunsinceda siqonde ngcono iimpemdulo ukuba sinolwazana lwemvelaphi kulowo nalowo umntu njengoko zichatshazelwe kule mibuzo ilandelayo

1. Ukhe wabanamava okugula kakhulu na?

	Ewe	Hayi
Wena	❑	❑
Kusapho lwakho	❑	❑
Xa ukhathalele abanye	❑	❑

Phawula iibhokisana ezifanelekileyo

2. Mingaphi iminyaka yakho? [ ]

3. U-

Yindoda	Libhinqa
❑	❑

Phawula ibhokisana efanelekileyo

4. Uyatshaya ❑
Wawutshaya ❑
Ungumntu ongazange atshaye ❑

Phawula ibhokisana efanelekileyo

5. Usebenza, okanye ukhe wasebenza kwiinkonzo zezempilo okanye ezentlalontle?

Ewe	Hayi
❑	❑

Phawula ibhokisana efanelekileyo

Ubusenzani?.....

6. Koku kulandelayo kokuphi okuchaza ngcono okwenzayo?

Uyaphangela okanye uyazisebenzela ❑
Udla umhlalaphantsi ❑
Umsebenzi wasekhaya ❑
Umfundi ❑
Ufuna umsebenzi ❑
Okunye (Chaza) ❑

Phawula ibhokisana efanelekileyo

7. Leliphi ibanga ofikelele kulo esikolweni?……..

8. Unesidanga okanye i-diploma

Ewe	Hayi
❑	❑

Phawula ibhokisana efanelekileyo

9. Ukuba uyayazi ikhowudi yeposi yakho nceda uyibhale apha [ ]

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EQ - 5D

Health Questionnaire

(South African English version)

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By placing a tick in one box in each group below, please indicate which statements best describe your own state of health TODAY.

Mobility

I have no problems in walking about ❑

I have some problems in walking about ❑

I am confined to bed ❑

Self-Care

I have no problems with self-care ❑

I have some problems washing or dressing myself ❑

I am unable to wash or dress myself ❑

Usual Activities (*e.g. work, study, housework, family or leisure activities)*

I have no problems with performing my usual activities ❑

I have some problems with performing my usual activities ❑

I am unable to perform my usual activities ❑

Pain/Discomfort

I have no pain or discomfort ❑

I have moderate pain or discomfort ❑

I have extreme pain or discomfort ❑

Anxiety/Depression

I am not anxious or depressed ❑

I am moderately anxious or depressed ❑

I am extremely anxious or depressed ❑

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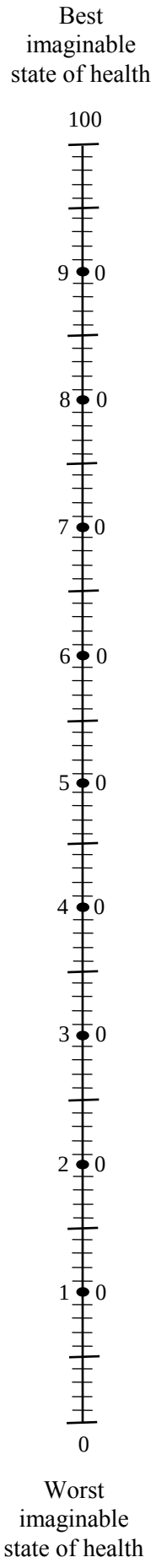
To help people say how good or bad their state of health is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale, in your opinion, how good or bad your own health is today. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your state of health is today.

Your own state of health today



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Because all replies are anonymous, it will help us to understand your answers better if we have a little background data from everyone, as covered in the following questions.

1. Have you experienced serious illness?

	Yes	No
yourself	❑	❑
in your family	❑	❑
while caring for others	❑	❑

PLEASE TICK APPROPRIATE BOXES

2. What is your age in years ? ☐

	Male	Female
3. Are you:	❑	❑

PLEASE TICK APPROPRIATE BOX

4. Are you:

a current smoker	❑
an ex-smoker	❑
a person who has never smoked	❑

PLEASE TICK APPROPRIATE BOX

5. Do you now, or did you ever, work in health services or social welfare?

Yes	No
❑	❑

PLEASE TICK APPROPRIATE BOX

If so, in what capacity? .....

6. Which of the following best describes your main activity?

in employment or self employment	❑
retired	❑
housework	❑
student	❑
seeking work	❑
other (please specify)	❑ .....

PLEASE TICK APPROPRIATE BOX

7. Did your education continue after the minimum school leaving age (15 years / grade 9 / standard 7)?

Yes	No
❑	❑

PLEASE TICK APPROPRIATE BOX

	Yes	No
8. Do you have a degree or a diploma?	❑	❑

PLEASE TICK APPROPRIATE BOX

9. If you know your postal code, would you please write it here ☐

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APPENDIX : DATA CAPTURE SHEET OF BASELINE AND FOLLOW-UP PARAMETERS

Lung parameters	baseline	Wk 3	Wk 6
FEV1 Mean calculation			
FVC Mean calculation			
FEV1/FVC Mean calculation			

6 Minute walk	baseline	Wk 3	Wk 6
RR at rest			
Maximal RR			
HR at rest			
Maximal heart rates			
Borg scale rating (RPE)			
Distance covered			
Walking Intensity			

Telephonic follow-ups	Week one	Week two	Week four	Week five
Date				
Time				
Comments:				

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their physician before they start becoming more physically active. ***Please complete this form as accurately and completely as possible.***

PAR-Q FORM

Please mark YES or No to the following:	**YES**	**NO**
Has your doctor ever said that you have a heart condition and recommended only medically supervised physical activity?	___	___
Do you frequently have pains in your chest when you perform physical activity?	___	___
Have you had chest pain when you were not doing physical activity?	___	___
Have you had a stroke?	___	___
Do you lose your balance due to dizziness or do you ever lose consciousness?	___	___
Do you have a bone, joint or any other health problem that causes you pain or limitations that must be addressed when developing an exercise program (i.e. diabetes, osteoporosis, high blood pressure, high cholesterol, arthritis, anorexia, bulimia, anemia, epilepsy, respiratory ailments, back problems, etc.)?	___	___
Are you pregnant now or have given birth within the last 6 months?	___	___
Do you have asthma or exercise induced asthma?	___	___
Do you have low blood sugar levels (hypoglycemia)?	___	___
Do you have diabetes?	___	___
Have you had a recent surgery?	___	___

If you have marked YES to any of the above, please elaborate below:

_____

_____

_____

Do you take any medications, either prescription or non-prescription, on a regular basis? Yes/No

What is the medication for? _____

How does this medication affect your ability to exercise or achieve your fitness goals?

_____
_____
_____

Please note: If your health changes such that you could then answer YES to any of the above questions, tell your trainer/coach. Ask whether you should change your physical activity plan.

I have read, understood, and completed the questionnaire. Any questions I had were answered to my full satisfaction.

Print Name: _____Signature: _____

Date: _____

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Home Based Rehab Programme- Check List

IVEKI YOKUQALA

Imiglalo Yokuzilolonga	Iphindwa Ka	sets	Mvulo	Iwesibini	Lwesithathu	Lwesine	Lwesihlanu
1. Ukuhamba hamba makwenziwe yonke imihla							
2. Ingqa Zamagxa	10	3					
3. Izangqa Zengalo	10	3					
4. Izangqa Ezinkulu Nezincinci	10	5					
5. Thyala Idonga	10	3					
6. Phakamisa Iziquluba	15	3					
7. Ukolula Izihlunu zamathanga	10	4					
8. Hlala Phantsi umana uphakama	20	4					
9. Ukujiwuzisa Imilenze	10	4					
10. Jiwuzisa Imilenze Emacaleni	10	2					
11. Ukuphefumla Ngomlomo Oquthiweyo							
12. Ukuphefumla Ngesifuba	10	2					
13. Phemfumla Uhleli Phantsi	10	2					
14. Uhleli Phantsi	2						
15. Umile	2						
16. Ukuvuthele ngamandla	5						
17. Khohlela	5						
	10	3					

ULANDELO NGOMXEBA:
UMHLA:
IXESHA:

IVEKI YESIBINI

Imiolalo Yokuzilolonga	Iphindwa Ka	sets	Mvulo	Iwesibini	Lwesithathu	Lwesine	Lwesihlanu
1. Ukuhamba hamba makwenziwe yonke imihla							
2. Ingqa Zamagxa	10	3					
3. Izangqa Zengalo	10	3					
4. Izangqa Ezinkulu Nezincinci	10	5					
5. Thyala Idonga	10	3					
6. Phakamisa Iziquluba	15	3					
7. Ukolula Izihlunu zamathanga	10	4					
8. Hlala Phantsi umana uphakama	20	4					
9. Ukujiwuzisa Imilenze	10	4					
10. Jiwuzisa Imilenze Emacaleni	10	2					
11. Ukuphefumla Ngomlomo Oquthiweyo							
12. Ukuphefumla Ngesifuba	10	2					
13. Phemfumla Uhleli Phantsi	10	2					
14. Uhleli Phantsi	2						
15. Umile	2						
16. Ukuvuthele ngamandla	5						
17. Khohlela	5						
	10	3					

ULANDELO NGOMXEBA:
UMHLA:
IXESHA:

Appendix H: Home Based Rehab Programme- Check List

WEEK ONE

Exercises	Repetitions	sets	Monday	Tuesday	Wednesday	Thursday	Friday
Walking							
Shoulder circles	10	3					
Arm circles	10	3					
Big and small circles	10	5					
Wall press-ups	10	3					
Calf raises	15	3					
Thigh muscle exercising	10	4					
Leg swinging	20	4					
Step side-to-side	10	4					
Pursed lipped breathing	10	2					
Diaphragmatic breathing (in lying)	10	2					
Diaphragmatic breathing (sitting)	10	2					
Postural correction (sitting)	2						
Postural correction (standing)	2						
Coughing	5						
huffing	5						
Sit- to – stand	10	3					

TELEPHONIC FOLLOW-UP:
DATE:
TIME:

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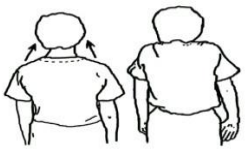
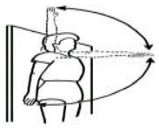
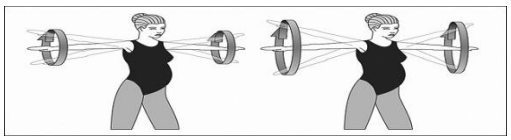
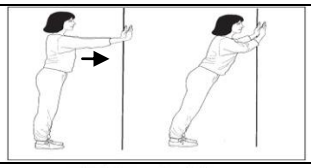
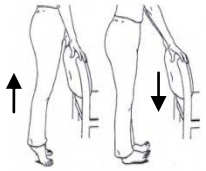
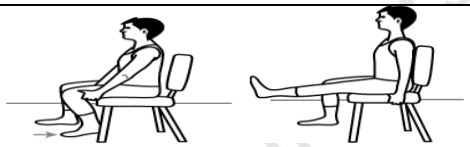
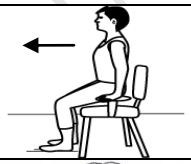
WEEK TWO

Exercises	Repetitions	sets	Monday	Tuesday	Wednesday	Thursday	Friday
Walking							
Shoulder circles	10	3					
Arm circles	10	3					
Big and small circles	10	5					
Wall press-ups	10	3					
Calf raises	15	3					
Thigh muscle exercising	10	4					
Leg swinging	20	4					
Step side-to-side	10	4					
Pursed lipped breathing	10	2					
Diaphragmatic breathing (in lying)	10	2					
Diaphragmatic breathing (sitting)	10	2					
Postural correction (sitting)	2						
Postural correction (standing)	2						
Coughing	5						
huffing	5						
Sit- to – stand	10	3					

TELEPHONIC FOLLOW-UP
DATE:
TIME:

	**WALKING must be done daily** 15 min walking on a level surface should be done everyday
	**SHOULDER CIRCLES (3x10 rest for 30 counts)** Without moving the arm, move the shoulder in circles, trying to brush the ear. Repeat with the opposite arm
	**ARM CIRCLES (3x10, rest for 30 counts)** Now using the whole arm, move the arm in circles, trying to brush the ear with the arm Repeat with the other arm
	**BIG AND SMALL CIRCLES (10x5 times per arm, rest for 30 counts)** The arms will be placed at shoulder level with the arms moving from that position to make big circles for 10 counts, from that position make smaller circles for 10 counts Repeat with the other arm.
	**WALL PRESS-UPS(3x10, rest for 30 counts)** Stand half arms length away from the wall with hands on the wall, feet shoulder width apart. Do a push up against the wall with the back straight, using just the arms.
	**CALF RAISES (15x3, rest for 30 counts)** Stand with feet shoulder width apart, go up onto your toes, balance for 5 counts then return to the starting position. You can hold onto the wall for support
	**THIGH MUSCLE EXERCISING (4 times, rest for 30 sec)** Sit in a chair with both legs bent at the knee. Bend one leg till its straight and keep for 10 counts. Return to the starting position. Repeat with the other leg
	**SITTING TO STANDING (10x3, rest for 30 counts)** Sit on a chair with both feet on the ground, move from sitting to standing 10 times
	**LEG SWINGING (20x4 times each leg, rest for 30 counts)** Use a table for support with one hand on the table; swing the opposite leg forwards and backwards. Perform 20 times and then change sides. Repeat four times
	**STEP SIDE TO SIDE (10x4 times, rest for 30 counts)** Standing on a level surface, step to the left and bring feet together, step to the right and bring feet together.

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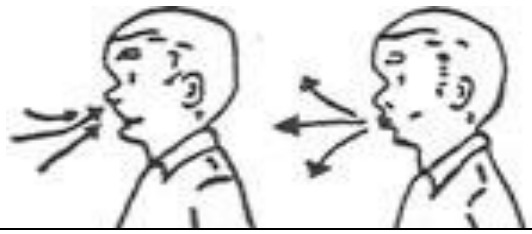
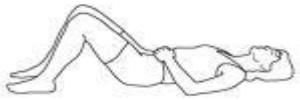
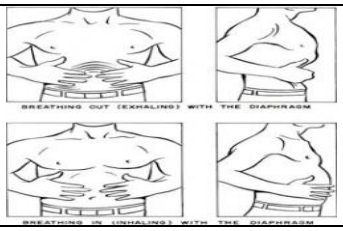
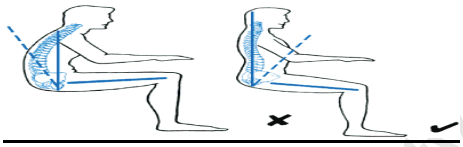
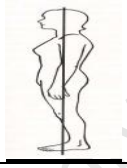
Pulmonary Rehabilitation:

	**PURSED LIPPED BREATHING (10 times, 20 sec rest)** Sitting in a comfortable position, arms either next to your side or in your lap pretend you will be blowing bubbles into the space before you. Breathe all your air out until you can't do it anymore and breathe in. rest for 10 counts and perform the exercise 10 times
DIAPHRAGMATIC BREATHING (WITH FACILITATION)	
	**Laying on your stomach (perform 10 times)** Place your hands on your stomach feeling how you breathe from your stomach and not from your chest. Repeat the exercise 10 times
	**In sitting: (perform 10 times)** Perform the same breathing exercise in sitting with your hands on your stomach and breathe in and out for ten counts
POSTURAL CORRECTION	
	**In sitting (perform twice)** Check that your chin is not poking forward, shoulders are pushed back, chest is pushed forward and you can feel your sitting bones on the chair
	**In standing (perform twice)** Check that your chin is not poking forward, your shoulders are pushed back, back is straight and hips are level.
COUGHING AND HUFFING	
	**Huffing (repeat 5 times)** Place hands on your stomach in sitting, breathe from your stomach for 3 counts and then breathe out very hard, forcing the air out of your lungs
	**Coughing (repeat 5 times)** Place hands on your stomach, breathe from your stomach till the count of 3 and cough hard from your stomach as you have been practicing with the breathing

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Appendix I: Exercise Programme

The exercise programme prescribed to the participants included into the intervention group for the period of six weeks and thereafter for the control group to complete at the end of the intervention period. The exercise programme comprised of four components, was designed to meet the needs of the patients diagnosed with Pulmonary Tuberculosis (PTB). The four components namely: (1) Cardiovascular (2) Upper limb strengthening (3) Lower limb strengthening (4) Pulmonary rehabilitation. The exercises incorporated into the programme were all low impact exercises that enabled the participant to perform the exercises with minimal strain on the participants who experienced severe side-effects from the PTB and ARV medication (Loveday et al, 2007). The exercise programme was translated into Xhosa as well as Afrikaans which was tested during the pilot study to ensure the patients understood the exercise they were required to perform. Below a detailed explanation of each exercise will be given as well as the prescribed administration of each activity.

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1. Cardiovascular Component:

Wedzicha (1998) and Yoshida (2006) recommended rehabilitation programmes should have a cardiovascular component when implementing a rehabilitation programme. The participants were required to walk for a duration of 15 minutes on a daily basis. The intensity was set at 60-75% of the reserve heart rate. The majority of the participants did not understand the concept increasing their measured Heart Rate (HR) accordingly. The instruction to the participant was then changed to increasing the speed of their walking each day.

2. Upper limb strengthening

The addition of upper limb exercises into the exercise programme aimed to improve the participants ability to perform activities of daily living (ADL) within the household and at work if employed.

(a) Shoulder Circles

Sets: 3; Repetitions: 10; Resting Period: 30 seconds

The participant was required to perform circles with the shoulders without moving the arms. The instruction to the participant was to try to brush the ear with the shoulder. The same action was required to be performed with the opposite arm for the same number of sets and repetitions

(b) Arm Circles

Sets: 3; Repetitions: 10; Resting Period: 30 seconds

The participant was required to move the arm in the full Range of Motion (ROM) through flexion into extension according to the prescribed number of sets and repetitions

(c) Big and Small Circles

Sets: 5; Repetitions: 10; Resting Period: 30 seconds

The arm was required to be placed at shoulder level with small circles being performed for 10 counts. The participant was then required to increase the width of the circle to perform the same action with a bigger circle for the same number of counts. This was counted as one set. The same had to be repeated with the opposite arm.

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(d) Wall press-ups

Sets: 3; Repetitions: 10; Resting period: 30 seconds

The participant was required to make use of a wall to perform the activity. They were required to stand half a arms length from the wall and perform a press-up against the wall for the prescribed number of sets and repetitions

3. Lower limb strengthening

The addition of lower limb strengthening activities aimed to improve the participants walking ability and improve any problems that might be associated with the component of walking and general mobility

(a) Calf Raises

(Sets: 3; Repetitions: 15; Resting Period: 30 seconds)

The participant was required to use a chair or walk as a support to perform the activity. It was required that the participant stand with the feet shoulder width apart and raise up as far as possible onto the toes. The position had to maintained for 5 seconds and then return to the starting position. This had to be done according to the prescribed number of sets and repetitions

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(b) Quadriceps Strengthening

(Sets: 4; Holding Period: 10 seconds; Resting Period: 30 seconds).

The participant was required to sit in a chair with both legs bent at 90 degrees at the knee. The participant was then required to straighten the knee till the knee was straight and hold it there for the holding period of 10 counts. The same had to be repeated for the opposite limb.

(c) Sitting to Standing

Sets: 3; Repetitions: 10; Resting period: 30 seconds

The participant was required to be seated in a chair that would enable the participant to have the knees bent at 90 degrees. The motion moving from sitting to the standing position had to be performed in a slow controlled manner and back to the starting position. The action incorporated all the lower limb muscles as well as postural muscles in moving from sitting to standing.

(d) Leg Swinging

Sets: 4; Repetitions: 20; Resting period: 30 seconds

A table or chair was required to provide the participant with the necessary support while performing the activity. One hand was used for support on the table or chair while the leg furthest away from the supporting structure was moved backward and forward in a controlled manner for the prescribed number of sets and repetitions. The same was repeated for the opposite limb.

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(e) Leg swinging from side to side

Sets:4; Repetitions: 10; Resting period: 30 seconds

The same movement was required from the participant as described in Leg Swinging (Point d) with the participant now facing the supporting structure. The starting point was in the center of the supporting structure. The participant was required to abduct the moving limb in a controlled manner till the limb was not able to move any further. The participant was required to perform the activity for the prescribed number of sets and repetitions and repeat the activity for the opposite limb.

Pulmonary Rehabilitation:

(a) Pursed Lipped Breathing

Sets:1; Repetitions: 10; Resting period: 20 seconds.

The participant had to seated in a comfortable position with arms on either side of the trunk or placed in the lap. Inhalation was to be performed through the nostrils. The instruction given to the participant for exhalation with pursed lips: Imagine blowing bubbles into the air until all the air in your lungs is finished. Exhalation was to continue until the participant could no longer perform the task

(b) Diaphragmatic breathing with facilitation

Diaphragmatic breathing was illustrated to each participant recruited into the intervention group. The breathing activity was to be performed in the lying position as well as in sitting. Facilitation was performed with the hands placed on either side of the diaphragm,

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performing the activity as demonstrated by the therapist. The activity was to be repeated lying and sitting for 10 repetitions.

(c) Postural Correction

Poor posture was demonstrated to participants included into the study and the posture of each participant was corrected in both sitting and standing. The participant was then instructed how to correct the incorrect posture on a daily basis.

(d) Coughing and Huffing:

Diaphragmatic breathing was incorporated into the activity of huffing as well as coughing. When huffing, the participant was instructed to force the air out of the stomach while performing diaphragmatic breathing for three counts. The same instruction was given when performing the coughing component. Precautions were given to the participant to be in a well ventilated area when performing the breathing activities.

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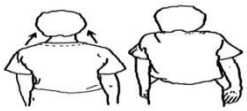
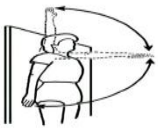
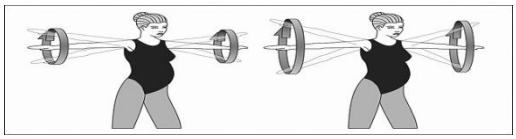
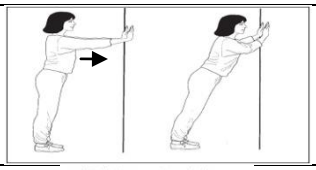
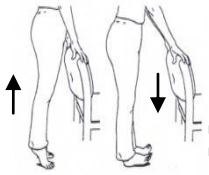
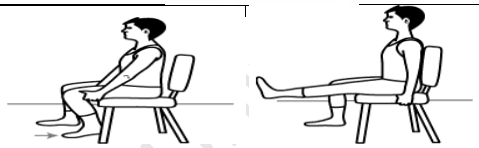
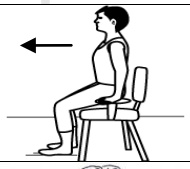
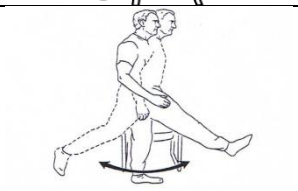
	**Ukuhamba Hamba Makwenziwe Yonke Imihla** Ukuhamba hamba kwindawo emthebelele makwenziwe yonke imihla kangange mizuzu elishumi elinesihlanu
	**Izangqa Zamagxa (Bala amashumi amathathu uphumle ngokubala uyokufika kumashumi amathathu)** Yenza Izangqa ngamagxa, ungazishukumisi ingalo, uzame ukukrweca undlebe ngamagwa. Yenza kwicala ngalinye icala ubelinge ngexesha ulandelise ngelinge
	**Izangqa zengalo (Bala amashumi amathathu uphumle ngokubala uyokufika kumashumi amathathu)** Sebenzisa ingalo yonke. Jikelezisa ingalo yonke uzame ukukrweca indleble. Ingalo Kufuneka uyikhupne ecaleni ime nqo ibengathi ukhombe ecaleni. Yenzanjalo nakwelinye icala
	**Izangqa Ezinkulu Nezincinci (Bala uyokufika kwishumi kahlanu kwingalo nganye, uphumle ngokubala uyokufika kumashumi amathathu)** Misa ingalo ilingane ncligxa wenze izangqa ezinkulu ubale kalisshumi. Emvakoko bala kalishumi usenza izangqa ezincinci. Yenza njalo nakwelinye icala
	**Thyala Idonga (Thyala kathathu ubala kalishumi ngexesha. Phumla ngokubala uphele kumashumi amathathu yima phambi kodonga)** Ingqiniba zakho zibesema caleni izandla zibesedongeni. Vula imilenze ilingane namagxa yima nqo uthyale nqezandla zodwa
	**Phakamisa iziquluba (Phakamisa Kathathu ubala kalishumi ngexesha elinye. Phumla ngokubala uyokufika kumashumi amathathu)** Vula imilenze ilingane namagxa, ngcotsha ubale kahlanu uyeke. Ungabambelela nasedongeni ukuba uyoyisakala.
	**Ukolula Izihlunu Zamathanga (Yenza kane uphumle ngokubala uyokufika kumashumi amathathu)** Hlala phantsi esitulweni ugobe amadolo zide inyawo zinyathele phantsi. Phakamisa umlenze ubemnye ume nqo, bala kalishumi uhleli njalo. Wubeke phantsi wenze omnye umlenze
	**Hlala Phantsi Umana Uphakama (Yenza kathathu ubala kalishumi ngexesha phumla ngokubala uphele kumashumi amathathu)** Hlala phantsi esitulweni inyawu zakho zingajingi, mana uphakama uphinde uhlale phantsi kalishumi
	**Ukujiwuzisa Imilenze (Yenza kane ubala uyokuma kumashumi amabini ngexesha kumlenze ngamnye, phumla ngokubala uyokuma kumashumi amathathu)** Funa indawo yokubambelela nokuba yitafile. Bambelela ngesandla esinye. Jiwuzisa umlenze (uwuse phambili nangasemva) Bala kangangamashumi amabini. Tshintsha wenze ngomaye umlenze
	**Jiwuzisa Imilinze Emacaleni (Yenza kane ubala amashumi amabini ngexesha elinye phumla ngokubala iyokuma kumahumi amathathu)** Yima, phakamisa umlenze wasekhohlo uwuse ecaleni uwubuyise emva koko uwubeka phamtsi. Wenze njalo nakumlenze wasekunene

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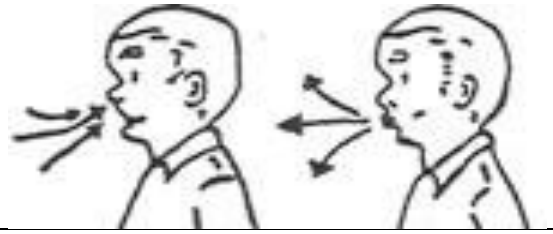
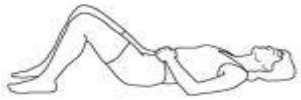
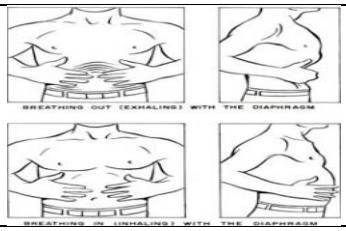
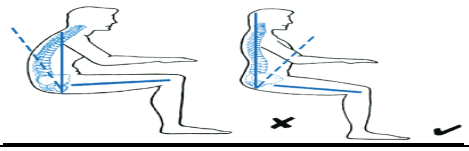
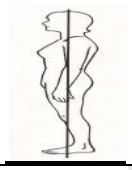
	**Ukuphefumla ngomlomo oguthiweyo (Yenza kalishumi uphumle ngokubala uyokuma kumashumi amabini)** Hlala ngendlela ekwanelisayo, ingalo emacaleni okanye phezu kwakho, yenza ngathi uzukuvuthela amaqam emoyeni, phefumla wonke umoya onawo de ungakwazi ukuphefumla, bizela umphefumlo. Phumla ngokubala kalishumi uphinde uvuthele njengasekuqaleni. Phinda phinda kude kubelishumi
UKUPHEFUMAL NGESIFUBA (LONGA INDLELA OPHEFUMLA NGAYO)	
	**Lala ngomgolo (Yenza kalishumi)** Beka izandla zakho esuswini umamele ukuba uphefumla njani ngesisu, hayi ngesifuba. Phinda kalishumi
	**Phefumla Uhleli Phantsi (Yenza Kalishumi)** Yenza ngalendlela yokuphemfumla ngesisu. Hlala phantsi beka izandla zakho esiswini phefumla ngokubizela umoya phinde uwukhuphe. Yenza kalishumi
UKULUNGISO INDLELA YOKUMLALA OKANYE YOKUMA	
	**Uhleli Phantsi (Yenza Kabini)** Isilevu sakho masingayi phambili, amagxa makaye ngemva isifuba siyephambili
	**Umile (Yenza Kabini)** Isilevu sakho masingayi phambili, amagxa akho dyengemva umqolo wakho ubenqo namathanga alingane
UKUKHOHLELA/ UKUVUTHELA NGAMANDLA	
	**Ukuvuthele ngamandla (Phunda Kahlanu)** Beka izandla zakho esisiwini uhleli phantsi. Phefumla ngesisu ubale kathathu, phemfumla/ vuthela ngamandla unyanzela umoya uphume kumaphaphu akho
	**Khohlela (Phinda Kahlanu)** Beka izandla esisiwini, phefumla ngesisu ubale kathathu khohlela ngamandla ngesisu njengoka ubuphefumla ngesisu

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Appendix J: 15-Grade Borg scale

15-Grade Borg scale for rating perceived exertion:

6	No exertion at all
7	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Very hard
18	
19	Extremely hard
20	Maximal exertion

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15-Amabanga Okutshintsha Khesikali iBorg

Amabonga atshintseleyo esikali seborg ejonga imisebenzi yomzimba nengqondo ecingelwayo

6	Akukho Mahluko
7	Umahluko Umncinci Kakhulu
8	
9	Umahluko umnanci
10	
11	Umahluko awaumncincananga kangako
12	
13	Ubunzinyana
14	
15	Ubunzima
16	
17	Ubunzima Kakhulu
18	
19	Ubunganyamezeleki ubukwelona nqanaba
20	Liphezulu lobundzima

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Information for patients with Pulmonary Tuberculosis (PTB)

Background:

Pulmonary Tuberculosis (PTB) is a bacterial infection. It is spread by inhaling tiny droplets of saliva from the coughs or sneezes of a person that already has PTB. Mycobacterium tuberculosis is the bacteria responsible for TB. It is very slow moving, so a person may not experience any symptoms for many months, or even years, after becoming infected. TB primarily affects the lungs (pulmonary TB). However, the infection is capable of spreading to many different parts of the body, such as the bones or nervous system.

Symptoms:

Tuberculosis (TB) will not cause any symptoms until the infection has reached the lungs. As the bacteria are very slow moving, the symptoms might not begin for many years after the initial exposure to the bacteria has taken place. Symptoms of pulmonary tuberculosis include:

- a persistent cough that brings up phlegm (thick mucus), which may be bloody
- breathlessness: difficulty breathing get worse
- weight loss
- loss of appetite
- fever: a temperature of 38°C or above
- feeling of always being tired
- a general sense of not feeling well

Diagnosis:

A diagnosis of PTB can usually be confirmed by carrying out a chest X-ray. If you have a PTB infection, there should be changes to the appearance of your lungs that will be visible on the X-ray. Samples of your mucus and phlegm (sputum samples) will also be taken and studied under a microscope for the presence of TB bacteria.

Treatment:

If you are diagnosed with active pulmonary tuberculosis (TB), you will be sent to a health care facility. A person that will supervise your medication, usually a nurse or a health visitor, will be your point of contact between you and the rest of the team and will help with the treatment process. It is very important that you take your medicines exactly as prescribed, and that you complete the whole course of antibiotics. If you stop the medication before you have completed the course, or if you skip a dose, the TB infection may become resistant to the medication. This is known as multi-drug resistant tuberculosis (MDR-TB) and it is potentially very serious, and can be challenging to treat.

Multi-Drug Resistant Tuberculosis:

However, there are an increasing number of cases where tuberculosis develops a resistance to two antibiotics. This is known as multi-drug resistance tuberculosis (MDR-TB), and tuberculosis develops a resistance to three or more antibiotics. This is known as extensive multi-drug resistance tuberculosis (XDR-TB). MDR-TB and XDR-TB will usually require between 18 and 24 months of treatment, using a combination of four different antibiotics. If you have one of these conditions, you may be referred to a specialist TB clinic for treatment and monitoring as they are harder to treat.

Preventing the spread of infection:

- Always cover your mouth when coughing, sneezing or laughing.
- Carefully dispose of any used tissues in a sealed plastic bag.
- Open windows when possible to ensure a good supply of fresh air.
- Stay away from work, school or college until your TB treatment team advises you that it is safe for you to return.
- Avoid sleeping in the same room as other people because you could cough or sneeze in your sleep without realizing it.

References:

Campbell IA, Bah-Sow O. Pulmonary tuberculosis: diagnosis and treatment. *BMJ* 2006; 332:1194-1197, doi: 10.1136/bmj.332.7551.1194

WHO. WHO Report 2008, *Global tuberculosis control - surveillance, planning, financing* 2008

University of Cape Town

Incukacha yezigulane ezinesifo sephepha yemithambo

Isifo sephepha yemithambo siyintsholongwane eyosulelayo sisasazeka ngokuphefumla(bizela) amaqabaza amathe asuka kumntu ose esuleleke sisifo sephepha ngokuthi akhohlele okanye athimle. Isifo sephepha esibizwa mycobacterium siyintsholongwane abangela isifp sephepha. Impawo zesisifo zithatha ixesha elide ukuqapheleka ingazi nyanga okanye iminyaka. Esisifo siqala ngokuhlasels kodwa siyakwazi ukunwenwela emathankjeni okanye Inervous system.

Impawu

Isifo sephepha asibonakalisi zimpawo de sihlasele imiphunga. Impawu zesisifp zivela kade kuba intsholongwane ithatha ixesha elide ukubonakala emva kokuda umntu esulelwe ngesisifo. Nazi ezinye impawu zesisifo:

- Ukukhohlela ixesha elide elinezikhohlela ezinegazi ngamanye amaxesha
- Ukuphefumla nzima ubengathi uphelelwa ngumoya
- Ukuhla emzimbeni
- Xa amaqondo obushushu bomzima engaphezu ko 38'C
- Ukuziva udiniwe maxesha onke
- Ukungaziva mnandi ibengathi uyagula

Ufunyaniso Lwesigulo

Ixilingo lwesifuba ngesizobo I x-ray luyinqginiseko lokufunyanwa kwesifo sephepha. Xa ufunyanwe unesisifu, imiphunga yakho ibanotshintsho xa ijongwe kwi x-ray. Kuye kuthathwe imifinya okanye izikhohlela zakho ziyokujongwa zifundwe phantsi kwemicroscope kujongwa ubukho balentsholongwane yesifo sephepha.

Amayeza Anceda Esisifo

Ukuba ufunyaniswe unesisifo sephepha siphila kuwe uye uthunyelwe kwindawo ekhathaleze impilo. Uye unikwe unompilo okanye umongikazi qzakukonga ukuba uyawatya amayeza akho akunxulumanise nezinye izigulane ezinesisifo ukwenza ukuphila kubengcono kubaluleke kakhulu ukuba uwathathe ngenolela ubuyalelwe ngayo amayeza akho ugqibe nexesha ubulinikiwe lokuwasebenzisa lamayeza ubuwanikiwe. Ukuba akuligqibanga ithuba ubulinikiwe lokusela amayeza okanye umana uqakatha intsuku esisifo sephepha siye siwanyamezele/ siwalwe amayeza. Lento ke iye ibizwe imulti-drug resistant TB: le MDR-TB inobunzima kwaye inobuzaza ekuyinyangeni.

MDR-TB:

Amanani aya ngokwenyuka apho kufunanyiswa ukuba iTB ilwa ukunyangwa kwi i-antibiotics ezimbini. Kwaye lento ibizwa i MDR-TB. Esisifo siyakwazi ukulwa sinyamezele ukunyangwa ngeantibiotics ezintathu nanga phezulu, lena ke ibizwa XDR-TB. Kwaye ifuna unyango oluthatha inyanga eziushumi elinesibhozo ukuya kumashumi amabini anesine kusetyenziswa iantibiotics ezine ezahlukileyo. Ukuba ufunyaniswe uphantis kwenye yezimeko uye uthunyelwe ikliniki ekhethelwe bucala ukuphilisa ukwenza ngcono nokujonga impilo yakso kuba inobuzaz ukukuphilisa kubu ukwelinye lenqanaba lokosuleleka.

Ukunqanda ukosuleleka Kwesisifo

- Beka isandla emlonyeni ngamaxesha onke xa ukhohlela, uthimla okanye uhleka
- Amaphepha okufinya/okosula asebenzileyp funeka

Uwafake kwisingxobo seplastiki esivalekayo ngononophelo

- Ifestile funeka zivuliwe xa kunyanzelekile kuzokufumaneka impepho efunekayo
- Hlukana nokuya emsebenzini esikolweni okanye esikolweni semfundo ephakamileyo de amcebisi wakho ngonyango akucebise ukuba ungabuyela
- Zama (Baleka) ngandlela zonke ungalau kwigumbi lokulala elinye nabanye abantu kuba kungenzeka ukhohlele okanye uthimle ulele

University of Cape Town

Isiqinisekiso:
Campbell IA, Bah-Sow O. Pulmonary tuberculosis: diagnosis and treatment. *BMJ* 2006; 332:1194-1197, doi: 10.1136/bmj.332.7551.1194
WHO. WHO Report 2008, *Global tuberculosis control - surveillance, planning, financing* 2008

CITY OF CAPE TOWN | ISIXEKO SASEKAPA | STAD KAAPSTAD

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Filename: \\cbd-civic-039\Home$\egeorge\My Documents\EGeorge\Research Projects\DdgrassSmanie.docx

CITY HEALTH — City Health

2009-10-23

re: Research Proposal: The effect of a home based pulmonary rehabilitation program on cardiovascular fitness and exercise tolerance of patients diagnosed with pulmonary tuberculosis (ID No: 10154)

Dear Ms Manie

Your email dated 16/10/2009 refers.

Permission is hereby granted for Ms De Grass to conduct the research as set out in the protocol at Ubuntu Clinic in Khayelitsha.

Contact People: Khayelitsha Sub District
Dr V de Azevedo: Sub District Manager
Tel/Cell: (021) 360-125 / 083 629 3344

Mr T Mhlubulwana: PHC & Programme Manager
Tel/Cell: (021) 360-1153 / 082 715 0147

Please note the following:

1. All individual patient information obtained must be kept confidential.
2. Access to the clinic and its patients must be arranged with the relevant Managers such that normal activities are not disrupted.
3. A copy of the final report must be sent to City Health Head Office (P. O. Box 2815, Cape Town 8001) within 3 months of its completion and feedback must also be given to the clinic involved.
4. Your project has been given an ID number (10154). Please use this in any future correspondence with us.

Thank you for your co-operation and contact me if you require further assistance.

Yours sincerely

signature removed

Dr G H Visser
Manager: Specialised Health

cc Dr de Azevedo & Mr Mhlubulwana
Dr Jennings
Ms Caldwell

UNIVERSITY OF CAPE TOWN

Health Sciences Faculty
Research Ethics Committee
Room E52-24 Groote Schuur Hospital Old Main Building
Observatory 7925
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e-mail: sumayah.ariefdien@uct.ac.za

15 July 2009

REC REF: 251/2009

Ms D DE Grass
School of Health & Rehab

Dear Ms De Grass

PROJECT TITLE: THE EFFECTS OF A HOME BASED PULMONARY REHABILITATION PROGRAMME ON CARDIOVASCULAR FUNCTION AND EXERCISE TOLERANCE OF PATIENTS DIAGNOSED WITH TUBERCULOSIS

Thank you for submitting your study to the Research Ethics Committee for review.

It is a pleasure to inform you that the Ethics Committee has **formally approved** the above-mentioned study.

Approval is granted for one year till the 20th July 2010.

Please submit an annual progress report if the research continues beyond the expiry date. Please submit a brief summary of findings if you complete the study within the approval period so that we can close our file.

Please note one minor correction: please provide the contact details for the Human Research Ethics Committee (Professor Marc Blockman:021 4066338)rather than those of the Research Office.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the REC. REF in all your correspondence.

Yours sincerely

PROFESSOR M BLOCKMAN signature removed
CHAIRPERSON, HSF HUMAN ETHICS

Federal Wide Assurance Number: FWA00001637.
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.

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