



**A South African perspective: audiologists' and otologists'
orientation to, and use of evidence-based practice with
reference to benign paroxysmal positional vertigo**

by

TANAYA ELLEN RAVI NAIDOO

NDXTAN007

SUBMITTED TO THE UNIVERSITY OF CAPE TOWN

In partial fulfilment of the requirements for the degree

MSc in Audiology

Faculty of Health Sciences

UNIVERSITY OF CAPE TOWN

Date of Submission: 03 March 2021

Supervisor: Dr Christine Rogers

**Department of Health and Rehabilitation Sciences, Division of Communication
Sciences and Disorders**

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

DECLARATION

I, Tanaya Ellen Ravi Naidoo, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

I empower the university to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Signature:

Signed by candidate

Date:

March 03, 2021

Acknowledgements

To my mental, emotional, and spiritual support system,

Mom, Dad, Tegan and Kaity.

Thank you for *always* being in my corner.

All your love, encouragement, and wisdom has led me here,

and I would never wish to be anywhere else.

I would not trade either of you for all the stars in the sky.

I would like to thank my supervisor,

Dr. Christine Rogers.

For whom without,

this quality of academic research would not have been attainable.

I am glad to have completed my project under your expert supervision.

~~I will not misuse an apostrophe again.~~

I hope to work with you again.

Thank you to the readers

for providing me with the platform to share with you what I have learned.

“All good writing begins with terrible first efforts.

You need to start somewhere.”

Best Wishes,

Tanaya Ellen Ravi Naidoo

Abstract

Evidence-based practice, whose roots emanate from the mid-1960s, aims to provide fair, high-quality, and soundly researched health care with patients' best interests as a priority. Clinical practice guidelines are evidence-based and designed to assist clinicians with sound decision making. Despite the importance of evidence-based practice and the efforts invested into its development and dissemination, its uptake and implementation are poor. The disconnect between evidence-based practice and its translation into clinical practice was previously reported in low-to-middle income countries. This study investigated South African audiologists' and otorhinolaryngologists' (ear, nose and throat specialists') self-reported orientation to evidence-based practice. Second, adherence to evidence-based clinical practice guidelines was assessed with reference to the diagnosis and management of benign paroxysmal positional vertigo, a common vestibular condition for which a firm evidence base supporting treatment exists.

A two-part quantitative approach was adopted. Part one surveyed South African audiologists and otorhinolaryngologists with the Evidence-Based Practice Profile Questionnaire and an additional researcher-developed questionnaire pertaining to the diagnosis and management of benign paroxysmal positional vertigo. A total of 130 survey responses were included in this study. Independent sample t-tests, one-way ANOVAs and Fisher's Exact tests were used to analyse the survey data. Part two used a retrospective record review at a tertiary academic hospital in the Western Cape of South Africa. Medical folders of patients diagnosed with benign paroxysmal positional vertigo, between 2010 – 2018 ($n = 80$), were analysed. The diagnosis and management strategies were recorded and compared against a gold standard evidence-based guideline for congruence. Descriptive statistics were used to analyse and understand the data.

Survey scores showed a positive association between increased years of experience and healthcare professionals' knowledge ($p = .008$) and confidence ($p = .003$) in evidence-based practice. Otorhinolaryngologists might be more knowledgeable than audiologists in evidence-based practice due to their

increased training and exposure to evidence-based practice in their specialising years. Findings from the retrospective record review suggested adherence to the clinical practice guidelines in the diagnosis and management of posterior semicircular canal benign paroxysmal positional vertigo.

The study outcomes propose that evidence-based clinical practice guidelines developed in the Global North may not be appropriate for the different health contexts that exist in low-to-middle income South Africa (e.g., rural settings). However, the benign paroxysmal positional vertigo clinical practice guidelines were adhered to at a tertiary, academic hospital in Cape Town. The results also support the notion that increased exposure to evidence-based practice reinforces its approach. Outcomes from this study raise implications for the development and dissemination of context-appropriate, evidence-based clinical practice guidelines.

Keywords: evidence-based practice, evidence-based practice in a developing context, clinical practice guidelines, benign paroxysmal positional vertigo, audiology, otology, otorhinolaryngology, Evidence-Based Practice-Profile Questionnaire.

Contents

Acknowledgements	3
Abstract	4
List of Tables	10
List of Figures	10
List of Abbreviations	11
Glossary	13
Chapter 1 Literature Review	18
Introduction	18
Evidence Based Practice (EBP)	20
The history of evidence-based practice.	20
Defining EBP	20
Clinical practice guidelines (CPGs)	21
Slow Uptake of EBP in the Global North	24
Providing Context of the Research Setting	25
Healthcare in South Africa.	25
The private healthcare sector	27
Otorhinolaryngologists and audiologists in South Africa.	28
Otorhinolaryngologists and Audiologists in Vestibular Practice	32
Benign Paroxysmal Positional Vertigo (BPPV)	35
Posterior semicircular canal BPPV (p-BPPV).	36
Subclinical BPPV.	41
Further management for BPPV	42
Horizontal semicircular canal BPPV (h-BPPV)	43
The Evidence-Based Practice Profile Questionnaire (EBP ² Q)	44
Rationale for the Study	46
Chapter 2 Methodology	47
Research Aim	47

Research Objectives	47
Study Design.....	48
Part one: survey of HCPs' orientation towards EBP	48
Part two: retrospective record review.....	48
Participants	49
Inclusion and Exclusion Criteria	49
Part one: inclusion criteria.....	49
Part one: exclusion criteria.....	50
Part two: inclusion criteria.	50
Part two: exclusion criteria.	50
Recruitment.....	50
Part one.	50
Part two.....	51
Sampling Strategy: Part One.....	51
Sample Size	52
Part one.	52
Part two.....	52
Materials.....	52
Procedure.....	54
Data Management.....	54
Data Analysis	55
Part one.	55
Part two.....	56
Reliability and Validity	56
Ethical Considerations	61
Risks and Benefits for Participants.....	63
Benefits of the Study	63

Chapter 3 Results.....	64
Part One: Survey Results.....	64
Section A.	64
Section B.	69
Part Two: Retrospective Record Review.....	78
Referrals.	79
Chapter 4 Discussion	80
Introduction	80
Part One: The EBP ² Q	81
Contextual influencing factors.....	81
Practitioner variables	85
Section B.....	91
Part Two – The Retrospective Record Review.....	94
The diagnosis and management of p-BPPV.....	95
h-BPPV.....	97
Subclinical BPPV.....	97
Poor documenting practices.....	99
Referrals.....	100
The Translation of Subjective EBP Orientations into Clinical Practice with Reference to BPPV	101
Study Limitations.....	102
Part one.....	102
Part two.....	104
Implications for Training and Clinical Practice.....	104
Recommendations for Future Research	105
Conclusion	106
References	108

Appendix A The Relationship of Guideline Key Action Statements for BPPV (Bhattacharyya et al., 2017)	134
Appendix B Evidence Based Practice Profile Questionnaire	135
Appendix C Continuation of Questionnaire, Questions Adapted According to the 2017 BPPV CPG (Bhattacharyya et al., 2017)	142
Appendix D Recruitment Advertisement (Part One)	147
Appendix E Demographic Questionnaire.....	148
Appendix F Data Collection Spreadsheet.....	150
Appendix G Human Research Ethics Committee Approval.....	151
Appendix H Letter of Consent to the Superintendent of Groote Schuur Hospital	152
Appendix I Letter of Consent to the Audiology Head of Department at Groote Schuur Hospital	156
Appendix J Singapore Declaration	160
Appendix K Information Sheet.....	161

List of Tables

Table 1 <i>Overview of the Domains, Definitions, Item Number and Range of Scores for the EBP²Q</i>	45
Table 2 <i>Threats and Solutions to Reliability and Validity</i>	57
Table 3 <i>Independent Sample T-Tests that Examined Otorhinolaryngologists' and Audiologists' Scores for Each Domain on the EBP²Q</i>	65
Table 4 <i>A Series of One-Way ANOVAs that Compared Overall Domain Scores from the EBP²Q (Otorhinolaryngologists and Audiologists Combined) with Years of Experience</i>	66
Table 5 <i>A Series of One-way ANOVAs that Compared Overall Domain Scores from the EBP²Q (Otorhinolaryngologists and Audiologists Combined) with HCPs' Primary Employer</i>	68
Table 6 <i>Independent Sample T-Tests that Compared Overall Domain Scores from the EBP²Q (Otorhinolaryngologists and Audiologists Combined) with Facility Location (i.e., Urban versus Rural)</i>	69
Table 7 <i>Results from Fisher's Exact Tests that Analysed Section B Questionnaire Scores with Regards to Profession (Otorhinolaryngologist versus Audiologist)</i>	71
Table 8 <i>The Comparison of Section B Questionnaire Scores against Years of Experience</i>	72
Table 9 <i>Results from Fisher's Exact Tests that Analysed Section B Questionnaire Scores with Regards to Primary Employer and Facility Location</i>	73
Table 10 <i>Between Group Scores for Symptom Knowledge of BPPV as well as Knowledge of Clinical Guidelines with Regards to BPPV</i>	75
Table 11 <i>Questionnaire Scores Pertaining to the Assessment of Horizontal Canal BPPV with Regards to (i) Profession, (ii) Years of Experience, (iii) Facility Location, and (iv) Type of Facility</i>	77

List of Figures

Figure 1 <i>The Five Steps of EBP</i>	21
---	----

List of Abbreviations

Abbreviation Explanation

AAO-HNS American Academy of Otolaryngology-Head and Neck Surgery

BPPV Benign Paroxysmal Positional Vertigo

CPD Continuing Professional Development

CPG Clinical Practice Guideline

CRP Canalith Repositioning Procedure

DHM Dix-Hallpike Manoeuvre

DoH Department of Health

EBP Evidence-Based Practice

EBP²Q Evidence-Based Practice Profile Questionnaire

ELO Exit Level Outcome(s)

GIN Guideline International Network

HCP Healthcare Practitioner

h-BPPV Horizontal Semicircular Canal Benign Paroxysmal Positional Vertigo

HIV Human Immunodeficiency Virus

<i>HoD</i>	Head of Department
<i>HPCSA</i>	Health Professions Council of South Africa
<i>HREC</i>	Human Research Ethics Committee
<i>LMIC</i>	Low-to-Middle Income Countries
<i>p-BPPV</i>	Posterior Semicircular Canal Benign Paroxysmal Positional Vertigo
<i>PHC</i>	Primary Healthcare
<i>SLT</i>	Speech-Language Therapist
<i>SLT/A</i>	Speech-Language Therapist + Audiologist
<i>SSI</i>	Semi-Structured Interviews
<i>UK</i>	United Kingdom
<i>VRT</i>	Vestibular Rehabilitation Therapy

Glossary

Term	Explanation
<i>Benign Paroxysmal Positional Vertigo (BPPV)</i>	A disorder of the inner ear characterized by a spinning sensation due to positional changes of the head which are relative to gravity. Patients may experience repeated episodes (Bhattacharyya et al., 2017). BPPV is caused by displaced, free-floating otoconia in one of the semicircular canals (canalithiasis) or in the cupulae (cupulolithiasis) (Ciorba et al., 2019), which are located in the inner ear (Kerber, 2015). The semicircular canal or the cupula then becomes gravity dependent and generates false sensory signals of motion, resulting in vertigo (You et al., 2019) and eliciting nystagmus (Ciorba et al., 2019; Liu et al., 2017). There are five variants of BPPV: posterior semicircular canal BPPV (p-BPPV), lateral semicircular canal (horizontal canal BPPV), anterior semicircular canal BPPV, multi-canal BPPV, and bilateral multi-canal BPPV (Bhattacharyya et al., 2017). Classically, gravity-dependent head movements may trigger an episode such as turning over in bed, looking upwards to hang clothes on the line, rising after bending over or reaching (Bhattacharyya et al., 2017; Hornibrook, 2011; Guo, 2011). Other symptoms may include nausea and vomiting (You et al., 2019) and disorientation and/or disequilibrium between episodes (Bhattacharyya et al., 2017). Although there are other forms of positional vertigo, BPPV is the focus for this study.
<i>Brandt-Daroff exercises</i>	An exercised-based intervention developed to settle BPPV by loosening and dispersing otolith debris within the semicircular canal to their rightful place (Bhattacharyya et al., 2017) the utricle (Hall, Ruby & McClure, 1979).

Canalith Repositioning Procedure (CRP) The CRP aims to remove otolith debris from the semicircular canal or the cupula and liberate its movement towards the utricle; this is done through positional head changes (You et al., 2019). The CRP is also known as the Particle Repositioning Manoeuvre, and incorrectly described as the Epley procedure; a true Epley procedure involves the use of sedation, mastoid vibration, and repeated repositioning within the same session (Epley, 1992). The CRP is evidence-based and considered the management of choice for p-BPPV (Bhattacharyya et al., 2017).

Characteristic nystagmus of horizontal semicircular canal BPPV (h-BPPV) Characteristic nystagmus of horizontal semicircular canal BPPV (h-BPPV) is (1) its typically shorter latency of onset, (2) a duration of nystagmus that typically lasts longer than one minute, (3) horizontal beating nystagmus which changes in direction respective to changes in head position, and (4) the unlikeliness of fatigue (You, et al., 2019).

Characteristic nystagmus of posterior semicircular canal BPPV (p-BPPV) In order to confirm a positive DHM, characteristic nystagmus must be elicited upon performing a DHM. Characteristic nystagmus of p-BPPV is, (1) a latency of onset of nystagmus between two and five seconds, (2) duration of nystagmus that typically lasts less than one minute, (3) torsional and upwards beating nystagmus (directionality), and (4) the fatigability of nystagmus (You et al., 2019).

Contraindications of the Dix-Hallpike The DHM should not be performed on patients who also present with cervical stenosis, severe kyphoscoliosis, cervical related issues, Down's syndrome, severe rheumatoid arthritis, Paget's disease, ankylosing

<i>Manoeuvre (DHM)</i>	spondylitis, spinal cord injuries, cerebrovascular conditions and the morbidly obese. In these cases, specialist referral is advised (Bhattacharyya et al., 2017).
<i>Dix-Hallpike Manoeuvre (DHM)</i>	In order to conduct the DHM, the patient is required to be seated. The clinician rotates the patient's head to a 45° angle prior to assisting the patient to lie supine. The head and upper body is rapidly shifted from an upright position to a supine position with the test ear facing downwards. With an extension of the neck, the HCP observes any signs of nystagmus (Bhattacharyya et al., 2017).
<i>Evidence-based practice (EBP)</i>	EBP is the culmination of the best researched evidence, clinical experience and expertise, and patient values (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996).
<i>Global North</i>	The economically developed regions of the world, including North America, Europe, and progressive parts of East Asia who disproportionately controls and enjoys global resources. Some southern region countries as well as the Oceania region are also regarded as part of the Global North due to their advanced infrastructure (Odeh, 2010).
<i>High-income country</i>	Economies with a gross national income (per capita), of \$12 375 or more (The World Bank, 2019).
<i>Low-to-middle income country (LMIC)</i>	Economies with a gross national income (per capita), of more than \$1026 but less than \$3996 (The World Bank, 2019). Although South Africa is a middle-income country, in terms of healthcare it reflects that of a low-income country (Ralston, Schatz, Naidoo & Kowal, 2018).

<i>Mastoid vibration</i>	Mastoid vibration attempts to disperse the otolith debris within the semicircular canals in assisting for repositioning procedures to be successful (Pérez-Vázquez & Franco-Gutiérrez, 2017). The use of mastoid vibration is thought to be useful in assisting with recurrent BPPV (Griech & Carroll, 2018), and resolving otolith debris build-up within the semi-circular canal (Faralli, Lapenna, Gambarcorta, Ricci & D'Ascanio, 2017). Mastoid vibration is noted in the BPPV clinical practice guideline however, it is not routinely recommended, and it is stated that further research needs to be conducted (Bhattacharyya et al., 2017).
<i>Subclinical BPPV</i>	A patient is suggested to have subclinical BPPV if the presenting symptoms are consistent with that of BPPV, yet there is no provocation of characteristic nystagmus after undergoing a DHM (Haynes et al., 2002).
<i>Supine roll test</i>	A supine roll test is the most common procedure for assessing the horizontal semicircular canals (Mandalà et al., 2013). The supine roll test requires the patient to be in supine position with the head directed upwards. The HCP rapidly rotates the head to a 90° angle and observes if there is a presence of nystagmus. If nystagmus is noted, the HCP is to wait for the termination of nystagmus prior to returning the head to the neutral, upward facing position. The head is then rapidly rotated 90° to the opposite side with the HCP observing for the presence of nystagmus (You et al., 2019; Guo, 2011).
<i>Vertigo</i>	A false or distorted sensation of self-motion when no self-motion is occurring or during normal head movements (Bisdorff, von Brevern, Lempert & Newman-Toker, 2009).

*Video-
nystagmography
(VNG)*

VNG is medical technology/equipment designed to trace and assess the function of the peripheral vestibular organs, the vestibulo-ocular pathways and oculomotor processes. VNG elicits involuntary eye movement as a result of positional changes or well-defined visual stimulation. VNG uses video goggles and digital technology to record, measure and analyse ocular responses (i.e., nystagmography) (Hathiram & Khattar, 2012).

Chapter 1

Literature Review

Introduction

Evidence-based practice (EBP), whose roots emanate from the mid-19th century, continues to be discussed by today's healthcare practitioners (HCPs) worldwide. The EBP philosophy requires HCPs to provide high-quality care through the use of rigorously researched, current evidence regarding patient-specific diagnoses that facilitates and assists in clinical decision making (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996). Over the last two decades, EBP is among the most significant developments that are shaping the thought processes and clinical behaviours of HCPs (Enuameh, 2016; Puustjarvi & Puustjarvi, 2015). The incorporation of EBP into different disciplines of healthcare has become the standard, and disciplines have to align their practices with evidence-based care (Alhaidary, 2020).

One of the cornerstones of EBP is the use of clinical practice guidelines. Due to the copious amounts of health science research and conflicting or contradicting outcomes published daily (Wallace & Vanhook, 2015), clinical practice guidelines (CPGs) facilitate EBP implementation in the clinical setting (Moodie et al., 2011). The development of CPGs is guided by expert opinion, research projects and their outcomes, policies, and cost analyses (Bhaumik, 2017). CPGs aim to reduce diagnostic error and variations in healthcare; improve the standard of care and encourage cost-efficiency in healthcare (Dizon et al., 2017; Hakkennes & Dodd, 2008; Qaseem et al., 2012).

Despite the benefits and promising outcomes associated with EBP, research suggests its slow uptake and implementation (Boisvert et al., 2017; Clay-Williams, Hounsgaard & Hollnagel, 2015). It is posited that audiologists do not rely on empirical research in clinical situations (Alhaidary, 2020; Boisvert et al., 2017; Moodie et al., 2011), yet the discipline of audiology does not lack CPGs (Shaw, 2012); for instance, regarding vestibular practice guidelines (Bhattacharyya et al., 2017; Bisdorff, von Brevern, Lempert, Newman-Toker, 2009; López-Escámez et al., 2015), ototoxicity monitoring (American Academy of Audiology, 2009), amplification and management guidelines for different

degrees of hearing loss (American Academy of Audiology, 2013), and guidelines for tinnitus (Tunkel et al., 2014) and cochlear implants (American Academy of Audiology, 2019). Among implementation studies and across different health professions, authors have suggested contributors to the inefficient uptake and implementation of EBP; a lack of time being among the most common (Boisvert et al., 2017; Duncombe, 2018; Harding, Porter, Thompson, Donley & Taylor, 2014; Majid et al., 2011; Scurlock-Evans, Upton & Upton, 2014; Tacia, Biskupski, Pheley, Lehto, 2015). However, the barriers to EBP implementation appear to be exacerbated in low-to-middle income countries (LMICs), such as South Africa (Buchanan, 2011; Dizon et al., 2017). Literature suggests that the CPGs being disseminated worldwide may not be appropriate for low-to-middle income contexts; as the research used to develop these guidelines is usually conducted in high-income countries (Birbeck et al., 2013; Spencer et al., 2013; Taba et al., 2012; Treweek et al., 2013), with little regard given to low-to-middle income contexts (Goyet et al., 2015). However, transference and translation of CPGs to LMICs is a growing endeavour (Guideline International Network [GIN], 2020; JBI [Joanna Briggs Institute], 2020).

The gap between EBP and its translation into the low-to-middle income clinical setting is apparent. Little is known about audiologists', in particular, application of clinical practice guidelines in a setting such as South Africa. Therefore, this study aimed *to explore South African audiologists' and otorhinolaryngologists' self-reported EBP orientations, as well as their adherence to CPGs in the diagnosis and management of benign paroxysmal positional vertigo (BPPV)* (Bhattacharyya et al., 2017). The outcomes of this project will contribute to the body of research relating to these professionals' evidence-based practices in low-to-middle income contexts.

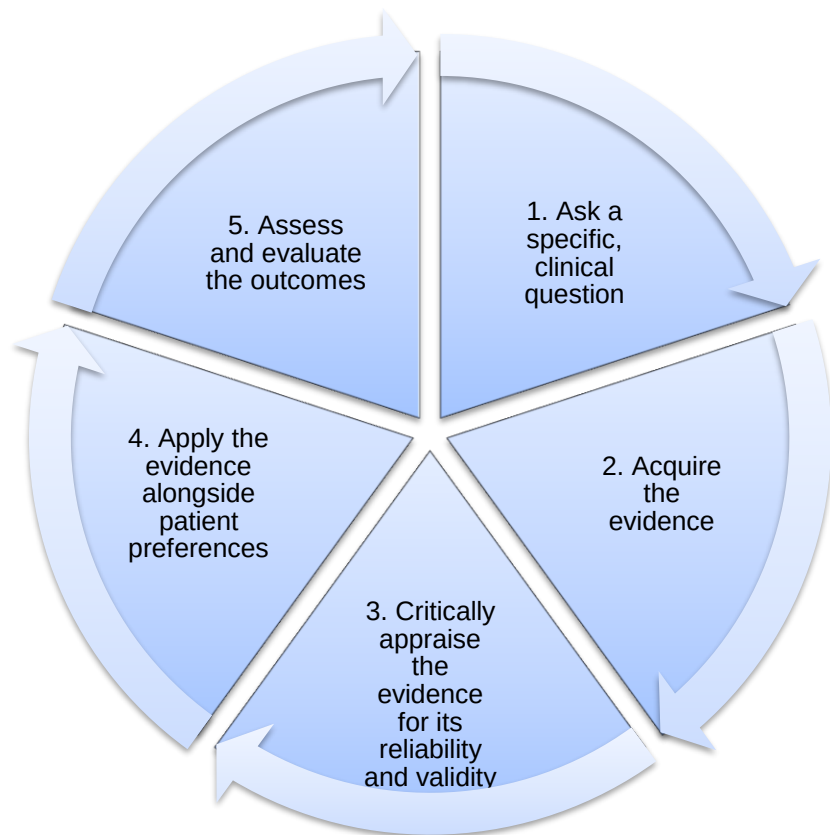
This chapter will review the literature relating to EBP, vestibular practices amongst audiologists and otologists as well as provide a reader with the context of this research. This chapter will close with a description of the rationale for this research.

Evidence Based Practice (EBP)

The history of evidence-based practice. Prior to the evolution of EBP, clinical decision making was dependent on (1) expert opinion, (2) clinician experience, and (3) clinical seniority (Sur & Dahm, 2011). After noting a deficit in the transition of biomedical studies into clinical practice, researchers in the early 1960s began pioneering a movement which aimed at applying evidence in practice (Daly, 2005). Alvin Feinstein, a mathematician turned physicist introduced statistics into medicine in an attempt to reduce the number, and consequences of uncertain clinical decisions (Sur & Dahm, 2011). In 1991, Guyatt introduced the novel term “*Evidence Based Medicine*” (Guyatt, 1991). This term was later extended to “*Evidence Based Practice/Management*” in order to include other health professional disciplines (Smith & Rennie, 2014). It appears that with the exponential evolution within healthcare (academically, technologically, and clinically), research and integration of EBP into the clinical setting have transcended previous boundaries (Elstein, 2004).

Defining EBP. Sackett et al. (1996, p. 71) defined EBP as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients”. The goal of EBP is to provide fair, high-quality health care which incorporates the best available clinical research, clinical expertise, and reflects patient values (Heydari, Mazlom, Ranjbar & Scurlock-Evans, 2014). However, the appropriate implementation of the best researched evidence is only one step in the EBP process. Due to the proliferation of evidence, it is imperative for HCPs to understand the concept and process of EBP (Wallace & Vanhook, 2015). The five step EBP process allows HCPs to identify a suitable question and use a formal system with which to answer the question and make evidence-based clinical decisions. Figure 1 illustrates the five steps of EBP.

Figure 1
The Five Steps of EBP



Clinical practice guidelines (CPGs). EBP has adapted and evolved into a dynamic philosophy (Elstein, 2004). The use of CPGs facilitates the implementation of EBP in the clinical setting (Moodie et al., 2011). The development of EBP in the form of CPGs is motivated by the need to decrease diagnostic error and thus medico-legal issues; improve efficiency, and reduce unnecessary tests and expensive procedures to encourage cost-effective healthcare (Dizon et al., 2017; Hakkennes & Dodd, 2008; Qaseem et al., 2012).

Literature shows that for successful diagnoses and favourable treatment outcomes it is imperative for HCPs to have access to reliable, trustworthy, transparent, and best researched, evidence-based CPGs (Laine, Taichman & Mulrow, 2011; Vandvik, et al., 2013). The development of these protocols is guided by rigorous research projects and their outcomes. Prior to the development and dissemination of CPGs, guideline panels analyse systematic reviews (qualitative and quantitative), performance and clinimetric properties of

diagnostic tests and interventions, prognostic markers, policies, and cost analyses to inform the guideline (Bhaumik, 2017). However, the evidence used to compile CPGs are usually adopted from high-income countries and distributed universally (Dizon et al., 2017).

EBP has long been a prerogative of the West (Birbeck et al., 2013; Spencer et al., 2013; Taba et al., 2012; Treweek et al., 2013). Therefore, LMICs importing EBP and CPGs from the Global North face a concern as these resources are not contextually engineered for the developing world (Al-Lawama, 2016; Brueton et al., 2010; Dizon et al., 2016; Dizon et al., 2017). The health care systems in emerging regions are burdened by challenges that make the accessibility to, and implementation of EBP arduous (Visagie, Scheffler & Schneider, 2013). Furthermore, diseases and conditions may be unique to culture, ethnic group, and geographical location (Al-Lawama, 2016).

In recent years, developing countries have been increasingly engaged and invested in the processes and operations of EBP (JBI, 2020). The vast differences between the Global North and low-to-middle income contexts drives the need for research to explore and understand the influences and uptake of EBP in both contexts. LMICs have limited resources (Hisham, Liew & Ng, 2018; Hlongwa & Sibiya, 2019; Lafuente-Lafuente et al., 2019; Lee, 2017; Visagie, et al., 2013) therefore, it is particularly essential to invest in healthcare that works.

There is paucity of research in communication sciences and disorders relating to decision making and the translation of EBP into clinical practice (Olswang and Prelock 2015; Tiffen, Corbridge & Slimmer, 2014). Although audiology is not lacking in CPG (and indeed, may make use of CPG emanating from other professions, such as vestibular guidelines), the evidence supporting these CPGs is often informed by clinician expertise as opposed to the more common, rigorous levels of evidence (Shaw, 2012). Randomised control trials which are among the strongest types of evidence and are the foundation of systematic reviews and meta-analysis, are rare in audiology (Shaw, 2012). The scarcity of these high levels of evidence may be attributed to the nature of the underpinning research; where it may be unethical to deprive participants of an intervention for the purposes of a control group (Shaw, 2012). The lack of high

levels of research results in the lack of rigorous evidence supporting the scientific development of CPGs. However, the guidelines that have been developed are still beneficial to patients (Shaw, 2012). Encouragingly, in more recent years there have been methodologies supporting more rigorous research designs; with sample populations of patients who have received interventions (intervention group) and patients who are on the waiting list (control group). These recent methods of research have been adopted to explore the audiological fields of tinnitus in the United States of America (Henry et al., 2016), rehabilitative interventions in Sweden (Thorén, Öberg, Wänström, Andersson & Lunner, 2014), and hearing aid programmes in the Netherlands (Vreeken, van Rensburg, Kramer, Knol & van Nispen, 2015). Considering the recent increase in randomised control trials, it is reasonable to expect the development of more systematic reviews, meta-analysis, and consequently, CPGs within the profession. It is also plausible that audiologists may be more inclined to comply with CPGs if they were derived from a strong body of evidence. The developments in academia drive the need for audiologists to (1) adopt more rigorous research methodologies whose outcomes contribute to the development of CPGs, and (2) conduct implementation research that encourages the rapid translation of evidence-based care into practice.

In 2010, the MarkeTrak VII study demonstrated that HCPs¹ who adhere to evidence-based practice have patients who are satisfied and experience the most benefit from their amplification devices (Kochkin et al., 2010). Therefore, deviation from EBP may be considered as sacrificing patient satisfaction, health service delivery and quality of life. In contrast, and in circumstances where patient preferences differ from CPGs, deviations from CPGs may be considered as holding the patient supreme as opposed to the evidence. Although patient preference remains important throughout the management process, a criticism of EBP is its lack of individualised care (Greenhalgh, 2019).

Despite the criticism surrounding EBPs' patient-centredness, favourable outcomes have been reported from the use of CPGs (Shaw, 2012). Raising

¹ In the MarkeTrak VII study, 61% of participants were fitted by audiologists and 31% by hearing instrument specialists (Kochkin et al., 2010).

concerns, Alhaidary (2020) and Shaw (2012) suggest that audiologists may not be complying with evidence-based research even though it is becoming more available. An earlier study by Moodie et al. (2011) suggested that audiologists may not be using empirical evidence effectively. This was confirmed by a more recent questionnaire study conducted on 96 audiologists who attended the World Congress of Audiology in 2014 (Boisvert et al., 2017). Boisvert et al. (2017) found that the participating audiologists prioritized the opinions and recommendations of colleagues as opposed to evidence-based resources (Boisvert et al., 2017). Audiologists reported that they regarded the diagnostic test result(s) as the most important and patient preferences, an integral principle of EBP, as less reliable (Boisvert et al., 2017). If information from participants' colleagues/peers contradicted each other, only then did participants access and review CPGs and peer-reviewed literature (Boisvert et al., 2017). Corroborating with Boisvert and co-workers, Lyons, Brown, Tseng, Casey and McDonald (2011) demonstrated that Australian paediatric occupational therapists relied more on colleagues and peers than empirical research in clinical decision making.

Despite the importance placed on EBP and CPGs, research continues to reflect the unpredictable and slow uptake of EBP and CPGs by clinicians in the Global North (Clay-Williams et al., 2015; Leone et al., 2012; Spencer et al., 2013). The next section will discuss the challenges concerning EBP uptake and practices.

Slow Uptake of EBP in the Global North

It is difficult to isolate the barriers which hinder the appropriate uptake and implementation of EBP however, implementation studies have highlighted possible contributors. Interestingly, not all the factors responsible for failing to embrace EBP are resource based, rather some are linked to behaviours, which of course are malleable. The greatest barriers suggested by literature are a lack of time, a lack of resources to apply evidence-based findings, a lack of managerial support, inadequate training and skills in the steps of EBP, and a lack of motivation and unwillingness to change practice behaviours (Boisvert et al., 2017; Duncombe, 2018; Harding et al., 2014; Majid et al., 2011; Scurlock-

Evans et al., 2014; Tacia et al., 2015). Furthermore, HCPs whose education predates the most current EBP do not always have access or the necessary skills to access the most effective and up-to-date information (Melnik, Fineout-Overholt, Stillwell & Williamson, 2010). Rogers and Darbyshire (2019) supported the notion of inaccessibility to EBP resources when they reported that HCPs generally lose access to university libraries and online databases upon graduation. Therefore, some HCPs might have limited access to reliable and up-to-date resources. However, certainly for vestibular guidelines, applicable to the participants in this study (Bhattacharyya et al., 2017), publications are open access, allowing anyone with internet access to obtain them. It is suggested that the challenges hindering EBP implementation and the belief that EBP and its translation into practice is limited may be discouraging and deprioritizing it in the clinical setting (Harding et al., 2014); possibly attributing to poor implementation rates.

It might be argued that the Global North's barriers relating to EBP implementation are no different to those reported in low-to-middle income contexts. However, these challenges may be exacerbated in LMIC due to resource constraints (Hisham et al., 2018; Hlongwa & Sibiya, 2019; Lafuente-Lafuente et al., 2019; Lee, 2017; Visagie, et al., 2013). The following section describes the context of a low-to-middle income setting such as South Africa.

Providing Context of the Research Setting

EBP implementation poses as a challenge in South Africa (Buchanan, 2011; Dizon et al., 2017). South Africa is faced with an array of unique contextual factors that may influence the dissemination, uptake, and implementation of EBP guidelines (Buchanan, 2011; Dizon et al., 2017). The status of healthcare in South Africa, levels of healthcare and, the public and private health sector will be discussed next to provide context for this report.

Healthcare in South Africa. South Africa is a middle-income country which, in terms of health care delivery for the majority, reflects as a low-income country (Ralston et al., 2018). South Africa faces high-income country issues, such as an increase in non-communicable diseases and an ageing population

(Pillay-van Wyk et al., 2016). Yet the country still grapples with issues such as child and maternal mortality, tuberculosis and faces infrastructural challenges prompted by a quadruple burden of diseases (Burger & Christian, 2020). The quadruple burden encompasses human immunodeficiency virus (HIV), chronic diseases (communicable), lifestyle-related diseases (non-communicable), pre-transitional diseases, violence and injuries (Burger & Christian, 2020); each of which are common in low-income settings (Pillay-Van Wyk et al., 2016). The multitude of health conditions that need to be addressed simultaneously places tension on an already resource constrained healthcare system (Maphumulo & Bhengu, 2019; Visagie et al., 2013). Thus, amplifying the need for, and implementation of appropriate, effective, cost-efficient, and evidence-based healthcare.

Due to the political history of the country, healthcare services are often inequitable and inaccessible (Burger & Christian, 2020; Maphumulo & Bhengu, 2019; Naledi, Barron & Schneider, 2011). The post-apartheid government has made efforts in improving accessibility to healthcare services (Burger, Bredenkamp, Grobler & van der Berg, 2012; Marten et al., 2014; van Rensburg, 2014). In efforts to expand availability and ensure accessibility to healthcare, the primary healthcare (PHC) philosophy was embraced (van Rensburg & Engelbrecht, 2012). Among other goals, PHC aims at ensuring the effective and efficient use of the health budget and scant resources (Department of Health [DoH], 1997). In efforts to further broaden healthcare service delivery and to address the unequal distribution of healthcare, posts at tertiary hospitals were redistributed to previously under-served locations (DoH, 2008) and compulsory community service programmes² were also instituted for new graduates in health sciences (Reid, 2002; Padarath, Ntuli & Berthiaume, 2004).

Despite the collective efforts made by the post-apartheid government, the South African healthcare system continues to struggle with the biased and unfair distribution of resources and funds (UNICEF, 2019). Operational inefficiency, poor quality patient care, low HCP-to-population ratios, a decline

² Community service, compulsory employment in a state institution prior to being permitted to practice independently, was instituted for doctors in 1998 (Reid, 2002) and for audiologists in 2003 (Padarath et al., 2004).

in HCP motivation, and poor leadership and management compound the challenges faced by the healthcare system (Khoza-Shangase, 2018). Many authors argue that the democratic government's address of the nation's healthcare challenges has been slow and largely ineffective (Burger & Christian, 2020; Honda, Ryan, Van Niekerk & McIntyre, 2015; Maphumulo & Bhengu, 2019). The report will now consider the private health sector and its contribution to a social divide.

The private healthcare sector. South Africa struggles with social divide that is evident within the health sector (Burger & Christian, 2020). The private health sector offers health services through HCPs running independent establishments or practicing at private hospitals. Private healthcare is mostly rendered in urban areas (Mahlati & Dhlamini, 2015). Patrons of the private sector are often affluent and educated individuals belonging to medical aid schemes (private health insurance) (Marten et al., 2014). Clients of the private sector have direct access to healthcare specialists. The philosophy that “the more you spend, the better care you receive” was annotated by a 2008 global comparison of quality healthcare study conducted on 48 developed and developing countries (Monitor Group, 2008). Monitor Group (2008) reported that South Africa's public healthcare ranked eighth from the bottom however, private healthcare was on par with developed countries, alongside Australia, Sweden, Belgium, Switzerland, Ireland.

The private health sector accommodates approximately 16% of the South African population, whilst the public health sector services the majority (84%), of the country's people (Pillay, Tiwari, Kathard & Chikte, 2020). The social divide between public and private health is further exacerbated by the inequities noted between rural and urban health facilities (Pillay et al., 2020). It is not unreasonable to suggest that HCPs employed at urban, private healthcare facilities may have internet access and thus, can access online databases and resources for EBP support. Thus, the technological divide may be exacerbating an already unequal healthcare system. The inaccessibility to evidence-based materials may result in variations of care depending on the facility type and location; meanwhile variation of care is what EBP aims to

overcome (Hakkennes & Dodd, 2008). From the above narrative outlining the state of healthcare in South Africa, it is evident that South Africa has a long transition ahead in order to bridge the gap of inequalities. The report will proceed to discuss otorhinolaryngologists' and audiologists' place in South African healthcare.

Otorhinolaryngologists and audiologists in South Africa. Audiology and otorhinolaryngology are relatively young professions (Shah, Preciado & Zalzal, 2013; Pascoe & Norman, 2011) and may not be comprehensively understood by other sectors or neighbouring health professions (Pascoe & Norman, 2011). Although South Africa's healthcare challenges are complex and dynamic, South Africa's health care services in otorhinolaryngology and audiology remain the most advanced throughout Africa (Peer, 2013).

Qualifying as an audiologist or otorhinolaryngologist. In South Africa, audiology is a growing profession. The first South African programme relating to communication sciences was implemented in 1938 (Swanepoel, 2006). Since then, the fields of communication sciences have evolved. In South Africa, to qualify as a professional audiologist who is registered with the Health Professions Council of South Africa (HPCSA) candidates must complete a four-year degree in audiology, accredited by one of five universities, and one year of community service (Swanepoel, 2006). Annual registration with the HPCSA as well as the accumulation of Continuing Professional Development (CPD) points (an attempt to foster current/updated knowledge essential to clinical practice) are mandated for audiologists to remain practicing (Swanepoel, 2006).

For medical doctors to further qualify as otorhinolaryngologists, it is required that they complete 12 years of educational and clinical training (ENT Society, 2020). The 12 years are comprised of six years of undergraduate training, one year of internship, and five years of further specialization as an otorhinolaryngologist at a university (MMed (Otol.) (ENT Society, 2020). The specialization years of an otorhinolaryngologist entails clinical specialty training, the submission of a dissertation, and the completion of a fellowship.

Once qualified, annual registration with the HPCSA and the attendance of CPD initiatives is required.

The representation of audiologists and otorhinolaryngologists in South African healthcare. In 2018, there were 642 audiologists in South Africa (HPCSA, 2019); approximately a third of these audiologists work in public hospitals. In 2015, there were approximately 246 practicing otorhinolaryngologists (Mulwafu, Ensink, Kuper & Fagan, 2017). Both audiologists and otorhinolaryngologists may be employed in the public or private health sector as well as non-governmental organizations. Otorhinolaryngologists and audiologists in the private sector may be employed at hospitals, private practices, rehabilitation centres and research institutions/universities. Audiologists employed by the public sector may be found at hospitals or within educational settings (i.e., Deaf schools or schools accommodating learners with special educational needs).

Audiologists and otorhinolaryngologists often work in support of each other. However, the South African public healthcare infrastructure is guided by a hierarchical referral pathway (KwaZulu-Natal DoH, 2014). Therefore, for patients attending public hospitals, direct access to specialist services (i.e., otorhinolaryngologists) is limited. Health facilities are categorized into four levels. Level one is considered the first point of contact for most patients; these facilities provide health support ranging from PHC to general health services. Audiologists may be employed at district hospitals which are regarded as level one facilities. As otorhinolaryngologists are considered specialists, their services are rendered at level two, level three and level four facilities and require an appropriate referral (KwaZulu-Natal DoH, 2014).

Otorhinolaryngologist and audiologist practitioner-to-population ratio. Within South Africa, the practitioner-to-population ratio is severely compromised. Pillay et al. (2020) described the nature of the workforce amongst audiologists, speech-language therapists (SLTs), and dual qualified

audiologists and SLTs (SLT/A)³. It was revealed that the practitioner-to-population ratio (combined professions) is 0.57 per 10 000, with rural provinces representing the lowest ratios. Pillay and colleagues (2020) pointed out an inverse relationship between practitioner-to-population and the proportion of persons with disability per province. Urban provinces with lower disability proportions (i.e., Western Cape and Gauteng at 5%) have among the highest practitioner-to-population ratios (10.5 and 0.97, respectively). Whilst rural provinces with high disability proportions (i.e., Free State and Northern Cape at 11%) have low practitioner-to-population ratios (0.25 and 0.35 per 10 000, respectively) (Pillay et al., 2020). It is assumed the audiology-to-population ratio may be less than 0.57 per 10 000 as only 18.9% of the total sample population in Pillay and co-workers' (2020) report were audiologists. Mulwafu, Ensink, Kuper and Fagan (2017) also evidenced the phenomenon that the audiologist-to-population ratio declines when moving away from major cities and showed a decrease in audiologists since 2009 (490) to 2015 (444). In addition, Pillay et al. (2020) reported on the sample's age distribution, suggesting that approximately 63.6% (i.e., audiologists, SLTs and SLT/As) were below the age of 40. The age distribution raises concerns, as information and knowledge from senior practitioners may not be imparted onto junior practitioners within the field. However, it is also reasonable to assume that more recent graduates may have had exposure to up-to-date EBP during university training as opposed to more experienced audiologists who may have graduated longer ago. Therefore, a youthful profession may be an advantage to EBP implementation.

Globally, audiology faces challenges due to its low priority within the health service regime of LMIC (Pascoe & Norman 2011; Fagan & Jacobs, 2009). In high-income contexts, rehabilitation care (i.e., audiology) is considered a highly specialised service. Due to this outlook, low-to-middle income contexts may find it difficult to prioritize rehabilitation healthcare and may even be tempted to overlook rehabilitation sciences due to its association with luxury healthcare (Stucki, Bickenbach, Gutenbrunner & Melvin 2017). The

³ There was a total sample size of 3266 HCPs comprised of SLT/As that accounted for 46.8% of the sample population, followed by SLTs with 33.3%, and finally audiologists accounted for 18.9% of the sample population.

association of rehabilitative care with luxury is worrisome and may act as a challenge in EBP implementation. Should individuals in managerial positions not encourage and prioritize evidence-based care, EBP may be seen as a frivolous task at the overburdened front line.

In 2009, it was established that South Africa fulfilled less than half of the required audiology service ratios when compared with the United Kingdom (UK) (Fagan & Jacobs 2009). Although the South African population may be similar to that of the UK, high-income countries such as the UK have a greater prevalence of an ageing population, linked to an increasing number of ageing related disabilities (e.g., hearing impairment) (Chatterji, Byles, Cutler, Seeman & Verdes, 2015). In contrast to the UK, South Africa has considerable poverty, and communicable diseases that may exacerbate the prevalence of hearing loss, such as tuberculosis (resulting in ototoxicity), ear infections and meningitis (Louw, Swanepoel, Eikelboom & Hugo, 2018). Therefore, direct comparisons are not possible. Nonetheless, the overall number of audiologists is sub-optimal, and their distribution would appear to be inequitable, mirroring many other services in the South African healthcare milieu.

Although high-income countries have a higher prevalence of an ageing population, it is predicted that LMIC will have a majority (80%) of the ageing population (>60 years) in the next 30 years (Chatterji et al., 2015). An ageing population along with the growing burden of diseases that South Africa faces may result in long-term limitation of sensory, motor and mobility functions. Chatterji et al. (2015) stated that there is an increase in the severity of disability with age, linked to an increase in number of co- or multi-morbidities. Therefore, ageing and the overall decline of health is associated with the increase of experiencing disability (e.g., hearing impairments) (Chatterji et al., 2015). The future epidemic of an ageing population in South Africa, may result in an increase of persons with hearing impairment. Although rehabilitation sciences may be regarded as a putative luxury, health sciences are obliged to respond to the needs of the population (United Nations, 2006). Stucki et al. (2017) raise a powerful argument for motivating and encouraging the investment of rehabilitation as a health strategy. By investing in evidence-based rehabilitation practices, South Africa will equip persons with disability(s) to contribute

productively to society; this will directly impact the economics of the South Africa.

Between 2009 and 2015 there were no improvements in the distribution of audiologists and otorhinolaryngologists, nor was there an improvement in otorhinolaryngology training opportunities (Fagan & Jacobs, 2009; Mulwafu et al., 2017). Fagan and Jacobs (2009) explained that in 2009, there were 200 otorhinolaryngologists practicing in South Africa attributing to 0.417 otorhinolaryngologists per 100 000 people. By 2015, there were 246 otorhinolaryngologists; therefore, 0.46 otorhinolaryngologists per 100 000 people compared to the UK with 2.36 otorhinolaryngologists per 100 000 people (Mulwafu et al., 2017). Although the total number of otorhinolaryngologists has slightly increased since 2009, after considering South Africa's population growth and two understaffed health professions the need for EBP implementation is of paramount importance.

Pillay et al. (2020) determined that the "gold standard" practitioner-to-population distribution should be 86 (43 speech-language therapists: 43 audiologists) per 10 million. Due to the resource-constrained healthcare system and poor practitioner-to-population ratios, audiologists and otorhinolaryngologists are expected to service large populations therefore, it is particularly essential to ensure what they practice is evidence-based and effective.

Thus far, this chapter has explained EBP, the necessity for EBP, and has provided the reader with a context on otological and audiological healthcare in South Africa. The report will proceed to provide insight on vestibular practices in South Africa and the evidence behind BPPV, a common vestibular condition treated by both professional groups.

Otorhinolaryngologists and Audiologists in Vestibular Practice

Audiologists and otorhinolaryngologists have been trained in, but not limited to, the prevention, identification and management of issues relating to the auditory and vestibular systems. Otorhinolaryngology and audiology are

intertwined disciplines who often work closely together (Hamid, 2010). However, until approximately 13 years ago, the theory behind vestibular practices was excluded from the undergraduate academic curriculum of audiology at South African training institutions (Seedat, Khoza-Shangase & Sebothoma, 2018). Audiologists graduating prior to the introduction of vestibular theory were required to obtain additional training and qualifications in order to consult patients presenting balance-related complaints (Seedat et al., 2018). The historical exclusion of vestibular practice in the audiology academic curriculum may be a contributing factor to the apparent gap reported by previous authors in the literature relating to vestibular conditions and the developing South African context (Hamman, 2015; Khoza-Shangase, Sebothoma & Seedat, 2020; Seedat et al., 2018). New graduates should have appropriate skills to diagnose and manage peripheral vestibular conditions however, with a novice workforce and likely older colleagues not having the necessary training, practicing EBP is a necessity.

Previous sections have highlighted the necessity of CPGs. However, EBP is particularly essential in LMICs where resources are limited. Evidence-based CPGs encourage appropriate and well-researched care to patients whilst ensuring the wise use of resources. There is scarcity of high levels of evidence in the field of audiology however, physiotherapy, whose scope of practice overlaps into vestibular practice (DoH, 1976), provides more available, rigorous research (Marsden et al., 2020; van Vugt et al., 2019; etc.). Thus, increased numbers of research reports and outcomes may aid in contextualising vestibular CPGs to LMIC.

For the benefit of HCPs in the field of vestibular practice, journals publish vestibular CPGs as open access. A product of professional societies like the Bárány Society and AAO-HNS publish CPGs. Significant overlap might exist between CPGs, as symptoms of dizziness transcend a number of professions (e.g., cardiology, neurology, psychiatry), all of whom have their own CPGs, meaning a plethora of resources exist. Although there is an abundance of vestibular-related CPGs, Allen and Harkins (2005) noted that a large number of available guidelines can be a hindrance to their implementation. Recommendations and information between different guidelines may contradict

therefore, it is particularly important for HCPs to understand the steps behind EBP and how to critically appraise academic research (Melnik, 2015). Although vestibular practice has clear-cut guidelines, there is very little knowledge regarding how audiologists and otorhinolaryngologists use these guidelines.

Globally, there is a high incidence of dizziness (including vertigo), dizziness affects between 15% and over 20% of adults yearly (Neuhauser, 2016). Vestibular associated vertigo accounts for at least a quarter of dizzy complaints (Neuhauser, 2016), arguably making patients suited for management by audiologists with expertise and training in the area. Vertiginous symptoms may have life-changing effects and may be responsible for increased fall risk, and psychological and emotional effects (e.g., anxiety, depression, fear, feeling incapacitated) (Socher, Socher & Azzi, 2012). Consequently, the onset of vestibular conditions and vertiginous symptoms is associated with a decline in quality of life (Hamman, 2015). Therefore, in order to be time and cost efficient, and to avoid long waiting lists for ologists, conditions like BPPV should be managed at lower levels of healthcare by audiologists (i.e., PHC or district facilities).

There is expense attached to acquiring tests of vestibular function (Phillips, Mallinson & Hamid, 2011). Due to the cost and expenditure challenges in South Africa, gaining access to tests of vestibular function may be challenging. The notion that vestibular equipment is expensive and may not be accessible to South African patients is evidenced by Seedat et al. (2018) who indicated that majority of the sample audiologists reported having no high-tech vestibular equipment at their respective facility. Among the many vestibular conditions that cause vertigo, BPPV is the most common, accounting for between 17% - 42% of dizzy complaints (Bhattacharyya et al., 2017). It is important to note that assessment and management of BPPV can be conducted without the use of costly, high-tech, and specialised vestibular equipment (Bhattacharyya et al., 2017). Thus, BPPV's evidence-based guideline is suitable for low-income contexts. Making EBP even more accessible to LMICs, Michael et al. (2019) demonstrated that chair-based BPPV assessment and management is possible, ruling out the need for a plinth.

Therefore, for the purposes of this research, BPPV is the vehicle for evaluating HCP's orientation towards EBP in a developing context such as South Africa. BPPV's clinical guidelines are clear and straightforward. For this study, the BPPV CPG considered as the gold standard has been authored by experts in the field of vestibular disorders, as well as funded and endorsed by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) Foundation (Bhattacharyya et al., 2017). Globally, AAO-HNS is considered to be a well-respected, peer-reviewed journal. The guideline has a lengthy history and provides a rationale for appropriate assessment and management from the point of entry into a consultation (see Appendix A). The CPG advises against inappropriate and often expensive treatment methods (e.g., the use of vestibular suppressants, radiographic imaging, etc.) and promotes the use of effective repositioning manoeuvre (Bhattacharyya et al., 2017). Despite Bhattacharyya et al.'s (2017) version being an update to previous guidelines (Bhattacharyya et al., 2008), literature continues to show its poor uptake and implementation (Ulyte et al., 2019; van Vugt et al., 2017).

The most commonly performed tests by South African audiologists are a Dix-Hallpike Manoeuvre (DHM) (BPPV assessment) and peripheral vestibular function tests, likely due to their clinical and thus not equipment-dependent nature (Seedat et al., 2018). The same cohort of audiologists indicate that canalith repositioning procedures (CRP)⁴ and vestibular rehabilitation therapy (VRT) were among the most common treatments offered (Seedat et al., 2018). Considering the high incidence of BPPV and BPPV manoeuvres being among the most commonly performed, it is particularly important for HCPs to be informed on the evidence surrounding BPPV. The following section will further explore BPPV.

Benign Paroxysmal Positional Vertigo (BPPV)

BPPV⁵ is the most common cause of peripheral vertigo (Hornibrook, 2011; Liu et al., 2017; You, Instrum & Parnes, 2019). In the United States, 5.6

⁴ BPPV management.

⁵ Refer to Glossary.

million patients visit clinics each year with the primary complaint of dizziness (Bhattacharyya et al., 2008). A sizable proportion (17% - 24%) receive a diagnosis of BPPV (Bhattacharyya et al., 2008). Patients presenting with BPPV may experience disabling symptoms and substantial psychological effects during the symptomatic periods (von Brevern et al., 2007). Up to one in four patients with BPPV stop driving a vehicle, one in three patients miss work, and most (>75%) seek medical help (von Brevern et al., 2007). Despite the body of evidence, at a CPG level, supporting the assessment and management for BPPV, the BPPV best-practice guidelines are underutilized (Ulyte et al., 2019; van Vugt et al., 2017; von Brevern et al., 2007).

Although emerging evidence is showing higher incidences of other semicircular canal or multicanal involvement upon clinical examination, posterior semicircular canal BPPV (p-BPPV) is the primary focus for this report. Horizontal semicircular canal BPPV (h-BPPV) is also briefly explored. p-BPPV is more frequent (Califano, Salafia, Mazzone, Melillo & Califano, 2014; Ciorba et al. 2019; Song, Kang & Yoo, 2015) than h-BPPV, and accounts for approximately 85% to 95% of BPPV variant diagnoses (Bhattacharyya et al., 2017).

Posterior semicircular canal BPPV (p-BPPV). A BPPV diagnosis requires a case history that is consistent with that of BPPV and is confirmed by a positive DHM⁶ (Bhattacharyya et al., 2017). The DHM is considered a gold standard, diagnostic assessment which elicits vertigo and characteristic nystagmus⁷ (Gaur et al., 2015). Even though Bhattacharyya and colleagues recommend the DHM as the primary method of assessment, caution is advised due to its low, varying sensitivity and specificity (Bhattacharyya et al., 2017). When performed at bedside, the DHM yields a sensitivity and specificity of 79% to 82% and 71% to 75%, respectively (Halker, Barrs, Wellik, Wingerchuk & Demaerschalk, 2008; López-Escámez et al., 2000). However, the yield of a DHM varies according to specialist and non-specialist HCPs, likely due to training and experience. Among specialised clinicians, a DHM yields a

⁶ Refer to Glossary.

⁷ Refer to Glossary.

sensitivity of 82% and a specificity of 71%. (López-Escámez et al., 2000). Although non-specialists may be trained in the diagnosis and management of BPPV, the impact of experience on DHM outcomes must be considered. Despite the reports suggesting its lack of sensitivity and specificity, the DHM is still considered the gold standard in the assessment and diagnosis of posterior (and anterior) semicircular canal BPPV due to (1) there being no alternative to the DHM and, (2) the natural course of the condition, it is not 100% sensitive (Ibekwe & Rogers, 2012). However, in certain circumstances the DHM should be avoided as there are contraindications⁸.

Clinicians in primary care did not fare as well as those in specialised setting in terms of assessing BPPV with the DHM. Although old, a 2002 study conducted in a PHC setting indicated a positive predictive value of 83% and a negative predictive value of 52% (Hanley & O'Dowd, 2002). The low negative predictive value may yield a false negative result and BPPV, potentially diagnostically missed. Therefore, in non-specialised or PHC settings, similar to that of many health facilities in South Africa, even if a clinician performs a DHM, there is a possibility that they may misinterpret the results and thus, provide inappropriate management. Furthermore, atypical presentations of BPPV may be misinterpreted or diagnostically missed in these settings. Given the perceived skills and equipment deficit of South African audiologists practising in the vestibular realm at least, findings such as Hanley and O'Dowd's might prompt the need for increased reliance on CPG to manage difficult to diagnose or unusual cases.

Interestingly, literature shows the slow uptake and implementation of best-practice BPPV processes in developed countries with well-established healthcare systems. In the United States, Polensek, Sterk and Tusa (2008) analysed 157 computerised medical records of patients receiving a diagnosis of dizziness⁹. Overall, Polensek et al. (2008) showed that 89% of HCPs did not perform a diagnostic BPPV assessment. Furthermore, 69% of HCPs requested a description of the patients' dizziness to determine its cause. In the case of

⁸ Refer to Glossary.

⁹ Including BPPV, Meniere's disease and vestibular hypofunction.

BPPV, a description of dizziness is less helpful, as performing a diagnostic assessment is the only way to make an accurate diagnosis (Bhattacharyya et al., 2017). In 2009, two American studies evidenced the use of high-tech diagnostic assessment¹⁰, including imaging, in the care process for BPPV (Polensek & Tusa, 2009; Polensek, Tusa & Sterk, 2009), these investigations are strongly recommended against in the CPG. In one study, it was reported that HCPs infrequently performed diagnostic bedside assessments (Polensek et al., 2009). From then until now, the 2008 BPPV CPG (Bhattacharyya et al., 2008) and its update (Bhattacharyya et al., 2017) have had time to disseminate; it is reasonable to assume that BPPV care processes may be more frequently implemented. However, a Lithuanian study on 324 physicians¹¹ indicated that 33% of otologists, 24% of neurologists, and 50% of general practitioners do not perform any diagnostic manoeuvres on patients with suspected BPPV (Ulyte et al., 2019). Although the BPPV CPG was developed in the Global North it is suitable for all contexts however, it appears that HCPs worldwide might not be implementing its recommendations.

Once diagnosed patients have a favourable prognosis; management is evidence-based, cost effective, poses a low-risk to the patient, and successful, particularly in the most common p-BPPV (Bhattacharyya et al., 2017). The report will now consider the management of p-BPPV in specialised and PHC facilities.

BPPV management is successful after the identification of the affected canal, administration of appropriate repositioning techniques and the conversion to a negative DHM (Bhattacharyya et al., 2017). The initial, or primary intervention in managing p-BPPV is canalith repositioning procedures (CRPs) (Bhattacharyya et al., 2017). CRPs resolve the disabling symptoms caused by BPPV thus, improving the patient's overall quality of life (Bhattacharyya et al., 2017). Mainstays of treatment are the particle repositioning manoeuvre, also known as the CRP¹², and the Semont manoeuvre (Bhattacharyya et al., 2017). Both the CRP and Semont manoeuvre

¹⁰ Neuroimaging, cardiac assessments, serologic testing, audiological assessments.

¹¹ Comprising of 97 neurologists, 85 otologists, and 142 general practitioners.

¹² Refer to Glossary.

are shown to have similar successful management outcomes (Hilton & Pinder, 2014). However, for the purposes of this study the CRP will be considered the primary treatment modality as (1) it is the most commonly performed in the management of p-BPPV in the outpatient setting (Bhattacharyya et al., 2017), and (2) it is recognised as the treatment of choice in South Africa¹³. Thus, it is anticipated that more audiologists and otorhinolaryngologists will be familiar with the evidence supporting the CRP in the study setting.

A Cochrane systematic review reported that a CRP is more effective, and the complete resolution of vertiginous symptoms is significantly higher upon performing a CRP when compared against patients who have received sham manoeuvres and control groups (OR, 4.42; 95% CI, 2.62 – 7.44) (Hilton & Pinder, 2014). In another systematic review Rodrigues, Ledesma, Oliveira and Junior (2018) confirmed the effectiveness of CRPs in the management of BPPV as well as the reduction rate of recurrence of BPPV in patients managed with a CRP.

This chapter has emphasised that there is a wealth of academic research and evidence-based resources emanating from high-income, developed contexts. However, Germany, a country with a sophisticated health infrastructure, has documented poor adherence to CPGs in the management of BPPV (von Brevern et al., 2007), albeit some time ago. von Brevern et al. (2007) demonstrated that only 8% of BPPV patients received appropriate and effective management, a significant cause for concern. A decade later, a Netherlands based survey ($n = 426$ general practitioners) reported that BPPV CRPs were performed by approximately half (57.3%) of all participants (van Vugt et al., 2017). The latter authors identified that the most common reason for not performing CRPs was the lack of knowledge regarding the appropriate technique (van Vugt et al., 2017). BPPV poses a significant risk to the patient (i.e., fall risks due to vertiginous symptoms) and it has substantial psychological effects (von Brevern et al., 2007). Despite BPPVs' impact, BPPV management

¹³ The South African Vestibular and Rehabilitation Therapy (VART) Course, which is the only national postgraduate training certification programme recommends the CRP as the primary treatment for p-BPPV.

is also low-cost and effective yet, HCPs from high income countries are still not adhering with CPGs. von Brevern et al. (2007) reported increased medical costs per BPPV patient due to the lack of adherence to CPGs, concerns echoed by Polensek et al. (2008). The lack of adherence in Germany and the Netherlands, countries rich in resources with an established health infrastructure, causes concern for developing, resource-constrained contexts who cannot afford added medical costs.

Bhattacharyya and co-workers (2017) advise consideration of the BPPV CPG due to the unpredictable outcomes of a CRP in the PHC setting (Munoz, Micklea, Howard, Springate & Kaczorowski, 2007). However, there is emerging research relating to the management of BPPV in the PHC setting. A clinical observational cohort study conducted on 359 patients attending a PHC facility in China demonstrated a 78.4% success rate after performing a CRP. The success rate was determined by a conversion to a negative DHM at one week after the initial consultation (Wang, Chan & Liu, 2019). In contrast to Wang et al. (2019) and despite the plethora of information indicating the ineffectiveness of pharmacotherapy as management for vestibular-related dizziness, a 2016 systematic review reported that prescribed medication is the most common form of dizziness management in the PHC setting (Grill, Penger & Kentala, 2016). Pharmacotherapy as a treatment strategy raises concern due to the relatively high incidence of BPPV among dizzy patients (17% - 24%); who may all be potentially missed due to the non-performance of a bedside vestibular assessment, and indeed, the impact of vestibular sedatives possibly obscuring responses (Bhattacharyya et al., 2017) should a DHM be conducted. Bhattacharyya et al. (2017) strongly advised against pharmacotherapy as it does not effectively manage BPPV. Pharmacotherapy may in fact prolong the timeframe from the onset of symptoms to the point at which the patient receives the appropriate BPPV management. Considering the psychological impact that vertiginous symptoms have (von Brevern et al., 2007), it is particularly important for HCPs to be aware of the appropriate assessment and management of a dizzy patient.

Dunlap, Khoja, Whitney and Freburger (2018) analysed 12 years' data (January 01, 2004 – December 31, 2015) regarding ambulatory care visits of

patients presenting with BPPV. The majority of Dunlap et al.'s (2018) patients were attended to by a PHC physician, rather than an otorhinolaryngologist or neurologist. In the earlier years (i.e., 2005 – 2006) Dunlap and colleagues reported poor adherence to BPPV CPGs (43.4%) by PHC physicians. Later (2013 – 2015), this value notably improved to a 79.5% adherence rate amongst PHC physicians; almost on par with otorhinolaryngologists and neurologists, which remained high through the 12 years (Dunlap et al., 2018). The impressive improvement of adherence amongst PHC physicians may be attributed to the proliferation of the 2008 BPPV CPG (Bhattacharyya et al., 2008) and its updates, promoting awareness of BPPV, its assessment and management recommendations. Although there has been interest in BPPV CPGs and the PHC setting, the emerging evidence is still controversial as there is little indication of adherence to, and effectiveness of the BPPV CPG in PHC establishment based in developing contexts.

Subclinical BPPV. The natural course of BPPV shows an active phase and a silent phase (Giannoni, Vannucchi & Pagnini, 2005). If a DHM is performed during the silent phase, patients may experience the episode and symptoms associated with BPPV yet there are no clinical or characteristic signs elicited (Giannoni et al., 2005; You et al. 2019). This is unconventionally termed as subclinical BPPV or subjective BPPV (Haynes et al., 2002; Nunez, Cass & Furman, 2000; You et al., 2019). Due to the precise criteria for the diagnosis of BPPV¹⁴, Bhattacharyya et al. (2017) do not consider subclinical BPPV as an accurate diagnosis.

Although Bhattacharyya and colleagues (2017) briefly recognised subclinical BPPV, the CPG suggests no further information. Therefore, its report on management is vague (Bhattacharyya et al., 2017). However, more recent literature has shown that a CRP has proven to be nearly as effective in patients who present as subclinical on the day of assessment (Balatsouras & Korres, 2012; Uz, Uz, Akdal & Celik, 2019). Contrary to authors suggesting possible management for subclinical BPPV, Ma et al. (2019), in collaboration

¹⁴ A case history that is consistent with that of BPPV and, a positive DHM or supine roll test resulting from the observation of characteristic nystagmus (Bhattacharyya et al., 2017).

with the Choosing Wisely Campaign, also advised against the management of BPPV in cases of a negative DHM. In cases with a repeated negative DHM, Ma and co-workers (2019) proposed the consideration of a less common variant of BPPV.

Further management for BPPV. According to the BPPV clinical guidelines (Bhattacharyya et al., 2017) HCPs may offer VRT in the management of BPPV. Bhattacharyya et al. (2017) described that in the case of BPPV, VRT is defined as any further treatment suggestions beyond a CRP. In healthy patients who are able to undergo a CRP, VRT should not be considered as a primary intervention option as it has the potential to delay the resolution of BPPV symptoms (Bhattacharyya et al., 2017). However, there are scenarios that warrant the use of VRT as primary intervention, i.e., (1) for patients who fail CRP attempts, (2) non-candidates for CRP, (3) patients who present with additional co-morbidities, and/or (4) patients who refuse a CRP (Bhattacharyya et al., 2017).

Brandt-Daroff¹⁵ exercises were created specifically for BPPV and are considered as an alternative management method in patients who cannot undergo a CRP (Bhattacharyya et al., 2017). Brandt-Daroff exercises are suggested in the BPPV CPG (Bhattacharyya et al., 2017), although literature reveals that it may not be as effective as CRPs. An older prospective study conducted by Soto Varela et al. (2001) showed that a single CRP has a successful treatment outcome rate of approximately 71% - 74% as compared to Brandt-Daroff exercises with a 24% successful treatment outcome rate. In 2012, the narrative was no different, Amor-Dorado et al. (2012) demonstrated that a single CRP is 10 times more effective than Brandt-Daroff exercises being performed three times daily. Despite Brandt-Daroff exercises' poor outcomes in primary management, research continues to produce outcomes that suggest the use of Brandt-Daroff exercises as adjunctive therapy as opposed to primary therapy (Bhattacharyya et al., 2017; Bressi et al., 2017). A CRP along with Brandt-Daroff exercises has shown positive long-term outcomes in patients who experience residual dizziness. The combination management of a CRP

¹⁵ Refer to Glossary.

and Brandt-Daroff exercises has proven to be effective and improve gait stability and balance performance in the geriatric population (Bressie et al., 2017; Ribeiro et al., 2017).

Horizontal semicircular canal BPPV (h-BPPV). h-BPPV warrants a brief mention due to its appearance in the data later on in this report. Symptoms of h-BPPV are almost indistinguishable from those of p-BPPV (Bhattacharyya et al., 2017). Therefore, if a patient's case history is compatible with that of BPPV and a DHM yields a negative result, a supine roll test is advised (Bhattacharyya et al., 2017). A supine roll test assists in the accurate and efficient diagnosis of h-BPPV, it prevents diagnostic error and misdiagnoses (Bhattacharyya et al., 2017). Similar to other variants of BPPV, the diagnosis of h-BPPV requires a case history consistent with that of BPPV and the visualisation or observation of characteristic nystagmus¹⁶ (Bhattacharyya et al., 2017). A barbecue roll manoeuvre or the Gufoni manoeuvre are considered the primary intervention(s) for horizontal canal BPPV and both can be performed at the bedside (Bhattacharyya et al., 2017). Previous authors have showed the effectiveness of both manoeuvres (Casani et al., 2011; Kim, Oh & Lee, 2012). Bhattacharyya et al. (2017) also reports that the barbecue roll manoeuvre and the Gufoni manoeuvre are moderately effective in the management of h-BPPV.

The literature analysed in this chapter has highlighted the poor adherence to the care processes of p-BPPV. Although there are well-established guidelines for the care processes of h-BPPV, it is the lesser common of the two variants. Based on this premise, it may be reasonable to believe that compliance to CPGs may be even poorer in the case of h-BPPV. So far, this chapter has reviewed literature that provides context and direction towards the rationale of the study. The following section will present the tool used to identify gaps within EBP orientations.

¹⁶ Refer to Glossary.

The Evidence-Based Practice Profile Questionnaire (EBP²Q)

There have been several tools developed in efforts to adequately analyse EBP orientations (i.e., attitudes, beliefs, and knowledge) however, the EBP²Q is suggested to be the most standardised and universal research tool in its field (Panczyk et al., 2017). Developed at the University of South Australia, the EBP²Q (McEvoy, Williams & Olds 2010a) (see Appendix B) analyses the knowledge, attitudes and beliefs, and exposure to EBP in HCPs from varied disciplines (McEvoy et al., 2010a). The EBP²Q proved to be reliable with an acceptable internal consistency (Cronbach's $\alpha = 0.96$) and test-retest reliability (intraclass correlation coefficients range 0.77 – 0.94) (McEvoy et al., 2010a). Convergent validity is also acceptable (Practice 0.66, Confidence, 0.80, and Sympathy 0.54) (McEvoy et al., 2010a). Apart from its psychometric stabilities, the EBP²Q is a self-reporting tool which can assess HCPs orientation to EBP as a whole, or individual aspects (domains) of EBP.

In recent years, the EBP²Q has been translated into Polish for the purpose of assessing nurses' and midwives' EBP profiles (Panczyk, 2017). The Polish version of the EBP²Q is considered the first standardised questionnaire that comprehensively assesses EBP orientations in Poland. Panczyk and co-workers (2017) confirmed the high-quality psychometric stabilities of the Polish EBP²Q, reliability and validity are comparable with the English version developed by McEvoy et al. (2010a). Similar to Panczyk et al. (2017), a Chinese translation of the EBP²Q, developed for nurses, yielded robust psychometric parameters however, the authors suggested further research in its validity as the factor structure differed from the English version (Hu et al., 2020). Table 1 below addresses the way each of the domains are scored for the English version of the EBP²Q:

Table 1*Overview of the Domains, Definitions, Item Number and Range of Scores for the EBP²Q*

DOMAIN	DEFINITION	ITEM NUMBERS	SCORING (min-max)
Relevance	Relevance refers to the value, emphasis, and importance of EBP.	1 - 14 (14 items)	14 - 70
Sympathy	Sympathy refers to the general outlook, perception, and compatibility of EBP with clinical work.	15 - 21 (7 items)	7 – 35 ^a
Terminology	Terminology refers to the understanding of research concepts.	22 - 38 (17 items)	17 - 85
Practice	Practice refers to the implementation of EBP in clinical situations.	39 - 47 (9 items)	9 - 45
Confidence	Confidence refers to the perception of an individual's abilities with EBP.	48 - 58 (11 items)	11 - 55

Note. Adapted from McEvoy, Williams, Olds, Lewis and Petkov (2011, p. 3).

^a For scoring, items 15-21 need to have Likert score reversed: 1-5, 2-4, 3-3, 4-2, 5-1.

In addition to probing overall orientation towards EBP, for this report, clinical guidelines for BPPV management (see Appendix A) were used to construct a questionnaire (Section B, see Appendix C) regarding local management of BPPV by responding practitioners. Section B was reviewed by relevant professionals, regarded as expert consultants/trainers, to ensure its appropriateness. Section B will be described further in the methodology. Participant responses from the questionnaire were compared to the “gold standard” clinical guidelines and gave the researcher an indicator of the extent of adherence to EBP.

Rationale for the Study

Despite the good efforts invested into the development and proliferation of EBP, literature shows the slow uptake and implementation of EBP on a global scale (Spencer et al., 2013). Therefore, in LMIC with dynamic health contexts, the accessibility and appropriate implementation of EBP may seem unattainable. For South Africa, the narrative is no different. Authors are yet to fully understand the dynamics of EBP in developing health context. Therefore, the researcher had noted a gap between the theory of EBP and the end-user.

Hence, the aim of this study was to explore audiologists' and otorhinolaryngologists' self-reported orientation towards EBP, as well as their adherence to evidence-based clinical practice guidelines in the diagnosis and management of BPPV. It is hoped that this report's outcomes contribute to the literature surrounding EBP in a low-to-middle income context.

Chapter 2

Methodology

Research Aim

The aim of this study was to examine the EBP orientations of relevant HCPs (audiologists and otorhinolaryngologists) who diagnose and manage BPPV. The aim was two-fold. First, relevant HCPs' general EBP orientations were assessed along with their knowledge and awareness of the diagnosis and management of BPPV. Second, a retrospective record audit explored the practice of clinical diagnosis and management of BPPV at a tertiary hospital with reference to gold standard BPPV CPG (Bhattacharyya et al., 2017).

Research Objectives

The objectives of this study were:

- To conduct an online survey on audiologists and otorhinolaryngologists across South Africa.
 - The EBP²Q (see Appendix B) explores the respective clinicians' orientation towards EBP and CPGs. Section B of the online survey included a questionnaire with carefully constructed questions surrounding the topic of BPPV and its management (see Appendix C).
 - To conduct statistical analyses on respondents' questionnaire mean outcome scores. The analysis of the questionnaire sought associations between (1) occupation (i.e., ENT or audiologist), (2) years of experience, (3) the facility location (i.e., rural vs. urban) and, (4) primary employer (i.e., DoH, private practice, or research institution/university).
- To conduct a retrospective record review of BPPV patients at a tertiary academic institution (Groote Schuur Hospital, Cape Town).
 - To draw and analyse a sample of medical records from the Groote Schuur Hospital records department. To record and compare the

diagnosis and management strategies against a gold standard evidence-based guideline for congruence.

Study Design

This quantitative study encompassed two research designs:

Part one: survey of HCPs' orientation towards EBP. The researcher selected an internet survey using the EBP²Q and additional questions regarding BPPV. Internet surveys are known to provide efficient (both time and cost) and easy access to the target population (Campbell, Venn, & Anderson, 2018; Pecáková, 2016), and allow for anonymous and frank responses (Kruger, Rogers, Stout, Burra & Richardson 2011). Survey designs facilitate the gathering of a large amount of data in a short period of time (Campbell et al., 2018). However, the convenience of internet surveys is accompanied by certain challenges. First, the low response rates may result in a small sample size (Campbell et al., 2018). Second the demand of data quality that academic research requires is often not met by internet surveys, which may impact the validity of the data (Pecáková, 2016). Furthermore, an online survey design study requires that the targeted population be sufficiently technologically (i.e., smart mobile phones and computers) literate and have access to the internet (Pecáková, 2016). With the use of smart mobile phones, the issue of internet access (through technology) was not a hindrance in this study however, in rural areas in South Africa the network service coverage may be poor (Bornman, 2015), thus affecting the accessibility of the survey.

Part two: retrospective record review. A retrospective record review was chosen as it is suitable to answer the research question. This study required pre-recorded, patient-focused, and diagnosis-specific data. The data were captured from patient records held at Groote Schuur Hospital in Cape Town, South Africa, to assist with further understanding HCPs' orientation and implementation of EBP with reference to BPPV and its CPG. Advantages to retrospective record reviews are affordability and time-efficiency (Terre Blanche, Durrheim & Painter, 2014). Furthermore, Groote Schuur Hospital was chosen as it offers a specialised service (otorhinolaryngology, audiology, and a

combined vestibular service), and the hospital already has an audit system in place. Limitations of this design pertaining to the current study included missing medical records, missing data from medical records which could not be located, and illegible handwriting (Jansen et al., 2005). Another common weakness associated with retrospective record reviews is poor documenting practices (Jansen et al., 2005). Furthermore, medical records must produce valid medical notes (Boyd, Pater, Ginsburg & Myers, 1979) and patients may be attended to by multiple HCPs over a period of time, each with subjective interpretations. As presented in Table 2 (p. 57), this posed a threat to reliability.

Study setting. Groote Schuur Hospital is a leading tertiary academic healthcare facility located in the Western Cape, South Africa. Groote Schuur Hospital is internationally renowned for service excellence and providing world class healthcare. Groote Schuur Hospital is partnered with the University of Cape Town Medical School and Faculty of Health Science, and thus considered the training ground for many of South Africa's best HCP's. In 2018, the Groote Schuur Hospital Facility Board (2018) declared that there were over 500 doctors, 1300 nurses, and 1600 allied workers. It is a 950-bed hospital (Mendelson et al., 2020) and serves approximately 50,000 inpatients and 350,000 outpatients. As mentioned above, and a part of its many accolades, Groote Schuur Hospital is home to the only specialised vestibular service in the province.

Participants

The survey was open to every qualified otorhinolaryngologist and audiologist working in any of the nine provinces in South Africa. Although not active participants in part two, records of adult (≥ 18 years of age) patients who visited the audiology department at Groote Schuur Hospital and were recorded as having been diagnosed with BPPV were perused.

Inclusion and Exclusion Criteria

Part one: inclusion criteria. Qualified audiologists and otorhinolaryngologists working in South Africa, both private practice and public

service were invited to partake in the study. All participants were required to have the appropriate technology (i.e., a mobile smart phone or computer) along with internet access in order to receive, access and complete the survey. All submitted surveys were included in the study.

Part one: exclusion criteria. Exclusions were minimised. Completed and partially completed survey responses were accepted so as to overcome the challenges of small sample sizes that accompany survey research (Machin & Campbell, 2005).

Part two: inclusion criteria. Medical records of all adult (>18 years of age) individuals/participants who were patients of the audiology department at Groote Schuur Hospital, Cape Town, South Africa, and who were recorded on the clinical audit system as diagnosed with BPPV, between 2010 and 2018. The first clinical practice guidelines created for BPPV were issued in 2008; an assumption was that this timeframe allowed for reasonable dissemination of the guidelines to South Africa.

Part two: exclusion criteria. The exclusion of medical records was due to (1) the absence of medical records, (2) missing data from medical records (i.e., clinical notes) and (3) illegible handwriting. Every effort was made to trace missing information.

Recruitment

Part one. According to the ENT Society, there are nine academic Head of Departments (HoD) within otorhinolaryngology in South Africa. To ensure effective outreach and recruitment of otorhinolaryngologists, the nine academic HoDs of otorhinolaryngology were contacted and requested to forward the survey link to otorhinolaryngologists at tertiary, secondary, and primary facilities. Not only did this acquire participants for the study, but it also allowed for exposure and awareness of this study. Furthermore, otorhinolaryngologists belonging to the private sector were recruited using an advertisement (see Appendix D) which contained the survey link. These advertisements were placed on all major organizations' social platforms (i.e., Facebook and ENT

Society). Audiologists were targeted through professional organization websites (South African Speech-Language-Hearing Association [SASLHA] and the South African Association of Audiologists [SAAA]), as well as social platforms (i.e., Facebook).

Snowball sampling is a recruitment technique (Allen, 2017; Sadler, Lee, Lim & Fullerton, 2010) that was adopted to recruit more participants (of both professions). The survey received further exposure as all respondents were asked to share the survey link to their social networks and other parties who may have met the eligibility criteria. Snowball sampling allowed the study to receive exposure from potentially difficult-to-reach populations (i.e., HCPs in rural settings), and it encouraged cost-efficiency (Allen, 2017).

As there were multiple methods of recruitment, participants were asked to complete the survey only once. A response was anticipated from at least one otorhinolaryngologist or audiologist per facility however, all audiologists and otorhinolaryngologists within a facility were welcome to partake.

Part two. The researcher acquired a medical record list from the Groote Schuur Hospital Audiology Department; this list included patients who presented with BPPV and underwent audiologic assessment between 2010 and 2018. The respective patient records were used in this study.

Sampling Strategy: Part One

Non-probability purposive sampling was used as the research question required a specific population (Terre Blanche et al., 2014) and a phenomenon of interest (Allen, 2017). Homogenous sampling is a technique of purposive sampling that targets a population that share a similar trait. Audiologists and otorhinolaryngologists are the two professions who are in frequent contact with patients presenting with BPPV. For the purposes of this study, purposive sampling allowed for the researcher to make inferences (generalizations) (Palinkas et al., 2015) regarding the orientation to, and implementation of, EBP from the South African audiologist and otorhinolaryngologist context.

Sample Size

Part one. In 2018, there were 642 audiologists in South Africa (HPCSA, 2019); approximately a third of these audiologists work in government hospitals. There were also approximately 246 practicing otorhinolaryngologists (in the year of 2015) (Mulwafu et al., 2017). According to Fincham (2008) general research response rates of approximately 60% should be a researcher's goal. However, there are major issues associated with internet surveys namely, (1) email checking habits, (2) survey length, (3) survey structure, (4) professionalism, (5) limited respondent willingness (Saleh & Bista, 2017), and (6) internet access (Pecáková, 2016). It is for this reason that 60% was an ambitious target; therefore, an approximate 25 % - 30% response rate was anticipated (Fincham, 2008).

The pooled total of otorhinolaryngologists and audiologists was approximately 888, after taking a response rate of 30% into account, 266 participants represented an estimated sample size for part one. However, this study reached a sample size of 130; with a participation rate of 14.6%. This is only a proportion of the total potential pool as the researcher had no way of knowing who received the online survey link and then decided not to participate.

Part two. According to the list provided by the audiology department and based on the availability of medical records at the Groote Schuur Hospital Audiology Department, the estimated sample size was 188 patients. However, due to (1) missing medical records, (2) duplicate medical records due to multiple visits from patients, and (3) diagnoses that do not pertain to BPPV appearing on the database only 85 medical records were drawn and analysed. Upon review a further five medical folders were excluded therefore, the sample size was 80.

Materials

Developed at the University of South Australia, EBP²Q (McEvoy et al., 2010a) (see Appendix B) is a standardized research tool which consists of 74 closed-ended questions, each using a 5-point Likert scale. There are 58 scorable questions across five self-reported EBP domains (McEvoy et al.,

2010a; McEvoy et al., 2011) namely, *Relevance*, *Terminology*, *Confidence*, *Practice* and *Sympathy*¹⁷. The remainder 16 items are non-domain items with no scoring attached (McEvoy et al., 2010a). The EBP²Q contains its own demographic questionnaire and a “comment” section at the end of each domain. The researcher adapted the demographic questionnaire to meet the objectives of the current study (see Appendix E). In order not to unduly burden participants, the researcher elected not to ask for comments, but to focus on the additional questions regarding BPPV. The EBP²Q takes approximately 10-12 minutes to complete.

In addition to the EBP²Q, and with the direction of clinical guidelines regarding BPPV (See Appendix A), a researcher-developed questionnaire was constructed (Section B, see Appendix C). This short questionnaire was a continuation of the online survey. The questionnaire consisted of a total 13 questions; 11 multiple choice questions (e.g., Do you regularly assess for horizontal BPPV? /Is it recommended to repeat the DHM once treatment has been administered?) and two “check-all-that-apply” questions (one requiring the participant to select the three most common symptoms of BPPV, and the second relating to the recommendations of the BPPV CPG). The researcher sought expert opinion on the questionnaires’ appropriateness from relevant professionals who are regarded as expert consultants/trainers; Section B was reviewed by vestibular experts with audiology¹⁸ and otorhinolaryngology¹⁹ backgrounds.

For part two of the study, a data collection spread sheet was used, having been constructed from literature to capture the key features of BPPV diagnosis and treatment, details of which were extracted from patient records (see Appendix F). The data collection spread sheet was examined by expert clinicians^{18, 19} working in an academic setting to ensure its appropriateness. In order to ensure the reliability of the spreadsheet as well as data abstraction; ten

¹⁷ Refer to Table 1 on p. 45 for explanation of domains.

¹⁸ Dr. Christine Rogers M.Sc, Ph.D, HPCSA accredited instructor for the South African Vestibular Assessment and Rehabilitation Therapy Courses (and director of same). Curriculum consultant to UKZN. Taught nationally and internationally in vestibular diagnosis and rehabilitation. Clinical lead at the institution’s vestibular management clinic.

¹⁹ Dr. Estie Meyer FCORL (SA) (2009), MB ChB Pret (1999). Specialist otologist. Clinical co-lead at the institution’s vestibular management clinic.

medical records were drawn, and the data were entered onto the spread sheet. The process was conducted twice on the same ten medical records to ensure that the data was collected correctly. See Table 2 for further information (Reliability and Validity; p. 57).

Procedure

Upon approval from the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee (Reference number HREC 251/2019) (see Appendix G), survey links were made accessible on the respective platforms. The nine academic HoDs of otorhinolaryngology were contacted and asked to forward the survey link to otorhinolaryngologists working at tertiary, secondary and primary facilities. These surveys were available for a three-month period. Reminders were sent every two weeks. After the deadline had passed, all returned survey data were captured and analysed.

Part two of the study required further consent from the Superintendent of Groote Schuur Hospital (see Appendix H), and the HoD of audiology at Groote Schuur Hospital (see Appendix I). With the assistance of the audiology department, a list of all audiology patients who were recorded as diagnosed and treated for BPPV between the years of 2010 and 2018 was compiled and forwarded to the medical records department. Once the medical records were available, the researcher began data abstraction. The data capture spreadsheet (see Appendix F) was constructed around the BPPV clinical guidelines. By analysing the medical records, the researcher determined whether HCPs diagnosed and managed the BPPV according to the clinical guidelines. Data analysis was completed once all the records had been correctly captured.

Data Management

Microsoft Excel was used to develop the data collection spreadsheet. The spreadsheet was stored as a password protected file. To respect the participants' dignity and ensure confidentiality, no names were captured throughout the course of the research. In part one, each survey respondent was

allocated a participant number according to their profession (i.e., Audiologist respondent #1 = AUD001; otorhinolaryngologist respondent #1 = OTOL001). In part two, all patients were kept anonymous; however, the last three digits of patient folder numbers were recorded on the data collection spreadsheet (see Appendix F) in order to prevent duplication. Without the preceding five numbers, the participants were unidentifiable.

Furthermore, all abstracted data were safeguarded as password protected documents on a password protected electronic device. Abstracted data for this study will be stored as a password protected document for five years, post the publication of this study; this is to allow for possible use of the data in follow-up or related future studies. There are no hard copy data therefore, the device that the abstracted data is stored is password protected with anti-hacking software.

Data Analysis

Part one. Tests of normality²⁰ reflected normal data distributions therefore, parametric tests were used to analyse the data (Mordkoff, 2016). Independent sample t-tests (for audiologists versus otorhinolaryngologists, and urban vs rural) and one-way ANOVAs (for years of experience and type of facility) were conducted to identify comparisons of mean domain scores (pertaining to Section A of the questionnaire) between groups and, to identify statistical significance of the outcomes, respectively.

Fisher's Exact tests were conducted to identify associations between health care providers' (1) occupation (otorhinolaryngology vs audiologist), (2) years of practice (<10, 11-20, 21-30 and > 30 years), (3) location (urban vs rural) and, (4) primary employer (DoH, Private or University) and survey scores (pertaining to Section B of the questionnaire). A Bonferroni correction (p -value of 0.05/6 and p -value of 0.05/5) was used as there were multiple analyses, the p -value was adjusted to ensure that there were no falsely significant findings;

²⁰ QQ Plots and histograms.

avoiding Type 1 statistical errors (Andrade, 2019; M. Henry, personal communication, January 14, 2020).

Part two. The nature of the abstracted data was straightforward and closed ended therefore, descriptive statistics (percentages) were used to organize and describe the data.

Reliability and Validity

Table 2 illustrates the threats and solutions to reliability and validity concerns.

Table 2
Threats and Solutions to Reliability and Validity

Threats	Type of Threat	Rationale	Solution
Part one			
Participant bias, also known as the Hawthorne effect	Reliability	Participants may have been consciously or subconsciously aware that they were a part of a study (McCambridge, Witton & Elbourne, 2014) which analysed their competence towards EBP and clinical guidelines. This effect was the gateway to social desirability bias considerations.	Please see social desirability bias below.
Social desirability bias	Reliability	The EBP ² Q is a self-report questionnaire which informed the researcher on the respondents' attitudes, knowledge, beliefs, and orientation towards EBP. Participants may alter their behaviour or responses in order to be socially desirable, or in line with researcher expectations (Althubaiti, 2016; McCambridge et al., 2013); therefore, skewing the participants'	In hopes to allow for frank responses, anonymity and confidentiality were ensured. Participants were prompted to reply honestly and reminded that their initial answer was most likely to be correct. Part two of the study was an added data source which allowed for further analysis of associations between

		true responses and in turn, the results of the study.	questionnaire results and clinical implementations (Althubaiti, 2016).
Central tendency bias	Reliability	As the domains of EBP ² Q are all Likert scale responses, central tendency bias may result; participants may feel reluctant to respond on extreme ends of the scale (Lavrakas, 2008).	The questions were clear and straightforward. If the participants had chosen extreme categories on the scale, there was no further justification required.
Instrument bias	Validity: content validity	Validity is defined as the ability of an instrument to accurately measure or answer a research question (Zamanzadeh et al., 2015).	The scientific properties of the EBP ² Q had been researched beforehand and accurately relate to the research question. The researcher-developed, Section B (see Appendix C), of the questionnaire was examined by experienced clinicians to ensure its appropriateness.
Non-response bias and low representativeness	Validity	Non-response bias results when a researcher makes an error in estimating or generalizing population characteristics. This occurs due to low survey responses. Certain respondent types may be under-represented (Kei Long, 2017).	Increased efforts were made by the researcher to ensure representativeness by constantly advertising for the online survey.

Part two

Validity	Construct validity	The data collection spread sheet is a self-developed tool in capturing data, therefore, is poses a threat as to whether the instrument is valid.	The data collection spread sheet was analysed by experienced clinicians (i.e., senior audiologists and otorhinolaryngologists).
Intra-rater reliability	Reliability	Intra-rater reliability refers to one independent researcher abstracting the same set of measures in order to ensure integrity of the data collection process (Vassar & Holzmann, 2013).	The process of abstracting and entering data was straightforward and closed ended (i.e., were the symptoms noted consistent with BPPV [YES/NO]) reducing the room for error.
Inter-rater reliability	Reliability	Inter-rater reliability refers to the ability of two independent abstractors producing repeatable and reproducible data (Vassar & Holzmann, 2012). In this study, there were two data abstractors which allowed for error in coding.	To ensure that the reliability and validity were not compromised through inter-rater reliability bias, the second data abstractor was carefully trained. The second data abstractor practiced on medical records which were re-checked for accuracy by the researcher. Cohen's Kappa coefficient was one ($\kappa = 1$). No discrepancies were noted throughout the data collection phase.

Implicit bias of Groote Schuur Hospitals' audiology/otorhinolaryngology staff.	Reliability	Implicit bias occurs when researchers view their participants, subconsciously, through stereotypical social lenses (FitzGerald, Martin, Berner & Hurst, 2019). Assessed medical folders may have been compiled by multiple audiologists and/or otorhinolaryngologists from Groote Schuur Hospital, each with subjective interpretations.	Inter-observer reliability remains a limitation of this research as part two was dependent on the clinicians' level of training and experience.
--	-------------	--	---

Part one and part two

Incomplete data	Incomplete data is a threat to reliability and validity and may further decrease the sample size.	• Part one: participants were prompted to complete every question prior to submitting; to minimise the challenge of a small sample size which usually accompany survey studies, all submitted surveys were still included in the study. • Part two: all efforts were made to attain incomplete data. In instances where data could not be attained or located, respective participant medical records were excluded.
-----------------	---	---

Ethical Considerations

In accordance with the Declaration of Helsinki (World Medical Association, 2013), the well-being and confidentiality of all participants, and their respective medical folders was kept as the first priority. In acknowledging the responsibilities that come with health research, autonomy was considered. Autonomy dictates that competent adults are free to make independent, yet informed decisions (British Medical Association, 2018); in turn, ensuring dignity and respect for each participant. Furthermore, the researcher signed the Singapore Declaration (see Appendix J) and provided a schedule for data collection to her supervisor in order that unannounced visits may be conducted to ensure data collection veracity.

The notion of autonomy was adhered to in part one of this study; the researcher sought each participant's informed consent, and the participant partook entirely at his/her own will/voluntarily. Participants received an information sheet (see Appendix K) regarding, (1) the purpose of the study, (2) the risks and benefits, (3) contact details for further inquiries regarding their rights and welfare and, (4) the right to withdraw from the study at any time. The first page of the survey had a box to be ticked indicating voluntary, informed consent. The survey did not proceed unless the box had been checked.

Due to the design of part 2, it was not feasible to obtain individualised consent from each participant due to timeframe and logistical constraints. Rather, permission to access the records was obtained from the Western Cape Department of Health Research Committee; the CEO of the hospital concerned (see Appendix H), and the HoD of Audiology (see Appendix I). Upon capturing the data and in order to de-identify and uphold participant confidentiality, a study number was allocated to each participant in both parts of the study. Participant names were not captured on any data sheet. The participant could not be identified without his/her file number and/or name.

Beneficence was ensured through the choice of a sound research design (Adams & Callahan, 2014) and by consistently placing the participants' interest and rights as a priority (Kinsinger, 2009). Non-maleficence reminded the researcher to "do no harm" throughout and post the research timeframe. In part

one, the participants risked identification however, very few identifiable demographic questions were asked. Moreover, the researcher is a recent graduate who is not familiar with the audiology or otorhinolaryngology community; therefore, if a participant were the only audiologist or otorhinolaryngologist at a remote facility, it would have been unlikely that the researcher would have identified the participant. Although the communities of these professionals are small, the survey was open to national participants and the researcher is unfamiliar with audiologists or otorhinolaryngologists in areas other than Cape Town. In part two, the participant risk was also identification, however, each participant was given a study number and no names were captured on any data sheet. Non-maleficence aims towards the benefits well-proportionately outweighing the risks (Pantilat, 2008). The risk-benefit ratio of this study was favourable and the researcher vows to keep the identities of attending HCPs (after signing in medical records) confidential.

Justice states that participant selection and enrolment is equitable (Adams & Callahan, 2014). In part one, participation was entirely voluntary. In part two, participants were selected according to the inclusion criteria only, with no underlying bias towards sex, gender, socio-economic status, or ethnicity (Kornblau & Burkhardt, 2012). There was no direct participant benefit in the study; however, knowledge gained from this research may benefit the health professionals managing BPPV and thus, future BPPV patients.

The researcher committed to upholding participant confidentiality at all times. The researcher understood the responsibilities that accompany health care research and understands that she will be held accountable if the above was not ensured (Kinsinger, 2009). If confidentiality were breached; it would have been reported to the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee immediately. No ethical violations occurred in the process of this study.

Risks and Benefits for Participants

The anonymity and confidentiality of participants in both parts of the study were protected; therefore, this study had no potential risks or direct benefits for participants.

Benefits of the Study

The outcomes from this study assisted in understanding the attitudes, beliefs, and knowledge of audiologists and otorhinolaryngologists with respect to EBP and the implementation thereof. The knowledge gained from this study may also give an insight to the current management of BPPV at a tertiary academic hospital in South Africa; and may assist in the future management of BPPV.

Chapter 3

Results

The results will be presented in accordance with the aims and objectives of the study, which examined health care professionals' orientation towards EBP regarding the diagnosis and management of BPPV. Two aspects were evaluated: (1) audiologists' and otorhinolaryngologists' orientation towards EBP in general, as well as their reports of implementation of such practice in the management of BPPV, and (2) the evaluation of diagnosis and management of BPPV against EBP gold standard in the case of Groote Schuur Hospital's records.

Part One: Survey Results

Section A. Section A pertains to the responses from the EBP²Q. Please refer to Table 1 (p. 45) for explanations of domains. The sample size (n) may change for each of the domains as the researcher accepted partially completed surveys and participants may not have answered every question.

Independent sample t -tests, which compared overall domain scores against profession, revealed that otorhinolaryngologists had a significantly higher *Terminology* score than audiologists ($p = .006$), suggesting that otorhinolaryngologists have a greater understanding of common research terms. Table 3 examines otorhinolaryngologists' and audiologists' scores for each domain on the EBP²Q. No other between group differences was found (all p values $> .110$; see Table 3).

Table 3*Independent Sample T-Tests that Examined Otorhinolaryngologists' and Audiologists' Scores for Each Domain on the EBP²Q*

	Profession	N	Mean	SD	<i>t</i>	<i>p</i>	Domain Scoring (Min and Max)
Relevance Score	Audiologist	74	63.19	5.27	-0.59	.554	14 – 70
	Otorhinolaryngologist	38	63.82	5.33			
Sympathy Score	Audiologist	70	22.99	4.42	-1.61	.110	7 – 35 ^a
	Otorhinolaryngologist	34	24.47	4.40			
Terminology Score	Audiologist	70	55.80	14.67	-2.80	.006^b	17 – 85
	Otorhinolaryngologist	34	63.79	11.26			
Practice Score	Audiologist	68	27.47	7.99	-0.83	.406	9 – 45
	Otorhinolaryngologist	31	28.84	6.54			
Confidence Score	Audiologist	66	40.33	7.84	0.71	.482	11 – 55
	Otorhinolaryngologist	30	39.10	8.13			

Note. Partially completed surveys were accepted, therefore *n* values vary across domains.

a Likert scale scores are reversed for the *Sympathy* domain.

b Otorhinolaryngologists scored significantly better in the domains of *Terminology* than audiologists.

A series of one-way ANOVAs were conducted to compare overall domain scores against years of experience. Significant interactions between years of experience and Terminology ($p = .042$), Practice ($p = .045$) and Confidence ($p = .027$) scores (see Table 4) were found. Post-hoc pairwise comparisons (at the Bonferroni corrected p -value of $0.05/6$ comparisons = $.008$) showed that for:

1. *Terminology* scores, those who had 21-30 years of experience scored significantly higher than those who had <10 years of experience ($p = .008$). Therefore, indicating that HCP's with 21 – 30 years of experience have a greater understanding of common research terms as opposed to HCPs with <10 years of experience.
2. *Confidence* scores, those who had 21 – 30 years of experience scored significantly higher than those who had 11 – 20 years of experience ($p = .003$). Therefore, indicating that HCPs with 21 – 30 years of experience have greater confidence in their skills with EBP when compared to HCPs belonging to the group who have 11 – 20 years of experience.

Although an interaction was found for *Practice* scores, at the Bonferroni corrected p -value, no post-hoc comparisons remained statistically significant.

Table 4

A Series of One-Way ANOVAs that Compared Overall Domain Scores from the EBP²Q (Otorhinolaryngologists and Audiologists Combined) with Years of Experience

EBP ² Q Domains and Years of Experience	N	Mean	SD	95% CI for Mean		<i>F</i>	<i>p</i>
				Lower Bound	Upper Bound		
Relevance Score < 10	72	63.11	5.16	61.90	64.32	0.27	.845
11-20	17	63.76	4.59	61.40	66.12		
21-30	13	63.62	6.33	59.79	67.44		
> 30	10	64.60	6.29	60.10	69.10		
Total	112	63.40	5.28	62.41	64.39		

Sympathy Score	< 10	69	22.78	4.133	21.79	23.78	2.07	.108
	11-20	14	24.36	2.92	22.67	26.05		
	21-30	12	25.92	5.95	22.14	29.69		
	> 30	9	24.11	5.62	19.79	28.43		
	Total	104	23.47	4.45	22.61	24.34		
Terminology Score	< 10	70	56.70	14.39	53.27	60.13	2.83	.042*
	11-20	14	56.14	11.53	49.49	62.79		
	21-30	12	68.42	12.51	60.47	76.36		
	> 30	8	62.38	12.94	51.56	73.19		
	Total	104	58.41	14.11	55.67	61.16		
Practice Score	< 10	67	27.34	7.07	25.62	29.07	2.88	.045
	11-20	14	25.14	8.54	20.21	30.07		
	21-30	10	31.60	9.80	24.59	38.61		
	> 30	8	32.75	1.98	31.09	34.41		
	Total	99	27.90	7.56	26.39	29.41		
Confidence Score	< 10	65	40.28	7.23	38.49	42.07	3.20	.027*
	11-20	13	34.85	7.50	30.312	39.38		
	21-30	10	44.60	10.39	37.16	52.04		
	> 30	8	39.75	7.52	33.47	46.03		
	Total	96	39.95	7.91	38.35	41.55		

A series of one-way ANOVAs, which compared the overall domain scores against HCP's primary employer, revealed significant interactions between primary employer and *Sympathy* ($p = .044$). Furthermore, a trend towards significance for *Terminology* ($p = .083$) and *Confidence* ($p = .084$) scores was noted (see Table 5). While post-hoc pairwise comparisons (at the Bonferroni corrected p -value of $0.05/5$ comparisons = $.007$) found no significant between group difference in *Sympathy* scores, at the conventional level of significance, those who worked at a DoH facility had significantly lower *Sympathy* scores compared to those who worked at a research institution/university ($p = .032$).

Table 5

A Series of One-way ANOVAs that Compared Overall Domain Scores from the EBP²Q (Otorhinolaryngologists and Audiologists Combined) with HCPs' Primary Employer

					95% CI for Mean			
		N	Mean	SD	Lower Bound	Upper Bound	<i>F</i>	<i>p</i>
Relevance Score	Private	53	63.28	5.23	61.84	64.72	1.19	.307
	DoH	47	62.98	5.47	61.37	64.58		
	University	12	65.58	4.56	62.68	68.48		
	Total	112	63.40	5.28	62.41	64.39		
Sympathy Score	Private	50	24.20	4.54	22.91	25.49	3.22	.044 ^a
	DoH	44	22.25	4.35	20.93	23.57		
	University	10	25.20	3.16	22.94	27.46		
	Total	104	23.47	4.44	22.61	24.34		
Terminology Score	Private	49	58.41	14.16	54.34	62.47	2.55	.083
	DoH	45	56.42	13.93	52.24	60.61		
	University	10	67.40	12.27	58.62	76.18		
	Total	104	58.41	14.11	55.67	61.16		
Practice Score	Private	46	28.00	7.94	25.64	30.36	0.45	.640
	DoH	42	27.31	5.61	25.56	29.06		
	University	11	29.73	11.88	21.74	37.71		
	Total	99	27.90	7.56	26.39	29.41		
Confidence Score	Private	45	39.00	8.46	36.46	41.54	2.54	.084
	DoH	41	39.73	6.69	37.62	41.84		
	University	10	45.10	8.81	38.80	51.40		
	Total	96	39.95	7.91	38.34	41.55		

Note. DoH = Department of Health.

^a There was a statistical significance between primary employer and *Sympathy* scores. After post-hoc pairwise comparisons (at a Bonferroni corrected *p* value), no statistical between group differences were demonstrated apart from those at the conventional level of significance.

Independent sample *t*-tests were used to compare the overall domain scores against facility location (i.e., urban versus rural). These *t*-tests revealed

a trend towards those working in urban facilities having a significantly higher *Sympathy* ($p = .053$) and *Practice* ($p = .070$) score compared to those working in rural facilities. The scores suggest that, (1) HCPs that work in urban facilities agree that EBP protocols are compatible to their work environment and, (2) these same HCPs are more likely to use EBP in a clinical situation. No other between group differences was found (all p values $> .278$; see Table 6).

Table 6

Independent Sample T-Tests that Compared Overall Domain Scores from the EBP²Q (Otorhinolaryngologists and Audiologists Combined) with Facility Location (i.e., Urban versus Rural)

	Location	N	Mean	SD	t	p
Relevance Score	Urban	93	63.59	5.24	0.84	.403
	Rural	19	62.47	5.51		
Sympathy Score	Urban	88	23.83	4.42	1.96	.053
	Rural	16	21.50	4.16		
Terminology Score	Urban	87	59.08	13.03	1.09	.278
	Rural	17	55.00	18.81		
Practice Score	Urban	82	28.52	7.41	1.83	.070
	Rural	17	24.88	7.77		
Confidence Score	Urban	80	39.98	8.07	0.08	.941
	Rural	16	39.81	7.29		

Section B. For Section B, all analyses were Fisher's Exact tests as more than 20% of the expected cell counts were less than five for every test.

It should be noted that there were only three respondents employed by a research institution/university for Section B. This group has therefore been omitted from analysis as the sample ($n = 3$) is too small. However, descriptive results suggest that the subgroup of HCPs employed at a research institution/university are well versed and aware of the BPPV CPGs. All three participants attained correct answers for 11 of the questions. Two HCPs reported assessing for h-BPPV only sometimes, and the other reported always

assessing the horizontal semicircular canal. Furthermore, two participants advised for no post procedure restrictions whilst one suggested restricted head movement for up to 48 hours after a DHM.

Audiologists had significantly better knowledge regarding triggering symptoms of BPPV than otorhinolaryngologists ($p = .045$; see Table 7). However, no further differences were found between professions.

Table 7

Results from Fisher's Exact Tests that Analysed Section B Questionnaire Scores with Regards to Profession (Otorhinolaryngologist versus Audiologist)

	Audiologist		Otorhinolaryngologist		<i>p</i>	<i>v</i>
	Correct	Incorrect	Correct	Incorrect		
Assessment for p-BPPV	23	2	25	0	.490	.204
Which ear to assess first	16	9	10	15	.156	.240
Description of characteristic nystagmus for p-BPPV of right ear	20	5	22	0	.052	.324
Vertigo and nystagmus fatigue upon repetition of DHM	23	2	23	1	1.00	.080
How to trigger signs and symptoms?	18	7	15	10	.045*	.322
Repeat DHM once treatment administered	8	17	9	16	1.00	.042
Post treatment restrictions	15	10	12	13	.571	.120
Follow-up timeframe	7	18	2	23	.138	.260
Reassessment of the patient at follow-up	20	5	17	6	.736	.072
Further management if BPPV symptoms are present at follow-up	22	3	22	3	-	-

HCPs with under 10 years of experience had significantly better knowledge regarding which ear to assess first ($p = .020$; see Table 8). No further between group differences were found between years of experience and Section B responses regarding the assessment and management of BPPV, with reference to the CPG.

Table 8

The Comparison of Section B Questionnaire Scores against Years of Experience

	<10 years		11-20 years		21-30 years		>30 years		p	v
	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect		
Assessment for p-BPPV	26	2	9	0	6	0	7	0	.142	.181
Which ear to assess first	18	10	3	6	1	5	4	3	.022*	.347
Description of characteristic nystagmus for p-BPPV of right ear	23	4	8	1	5	0	6	0	.226	.196
Vertigo and nystagmus fatigue upon repetition of DHM	25	3	9	0	6	0	6	0	.274	.221
How to trigger signs and symptoms?	16	12	5	4	3	3	4	3	.287	.046
Repeat DHM once treatment administered	9	19	3	6	1	5	4	3	.174	.224

Post treatment restrictions	16	12	5	4	2	4	4	3	.167	.154
Follow-up timeframe	7	21	2	7	0	6	0	7	.061	.279
Reassessment of the patient at follow-up	20	7	7	2	5	1	5	1	.417	.092
Further management if BPPV symptoms are present at follow-up	26	2	7	2	5	1	6	1	.123	.183

Practitioners working in Private Practice had significantly better knowledge regarding post-treatment restrictions compared to HCPs working in DoH facilities ($p = .040$; see Table 9). There were no further significant differences demonstrated between HCPs working in rural and urban areas (see Table 9).

Table 9

Results from Fisher's Exact Tests that Analysed Section B Questionnaire Scores with Regards to Primary Employer and Facility Location

	DoH		Private		p	v	Urban		Rural		p	v
	Correct	Incorrect	Correct	Incorrect			Correct	Incorrect	Correct	Incorrect		
Assessment for p-BPPV	18	1	28	1	1.00	.044	40	2	8	0	1.00	.089
Which ear to assess first	13	6	11	18	.075	.298	20	22	6	2	.250	.201

Characteristic nystagmus for p-BPPV of right ear	16	3	25	2	.635	.133	37	3	5	2	.154	.243
Vertigo and nystagmus fatigue upon repetition of DHM	18	1	27	1	1.00	.041	40	1	6	2	0.65	.348
How to trigger signs and symptoms?	11	8	16	13	1.00	.027	22	20	6	2	.439	.167
Repeat DHM once treatment administered	7	22	10	9	.065	.291	13	29	4	4	.419	.147
Post treatment restrictions	12	17	14	5	.040*	.317	23	19	4	4	1.00	.035
Follow-up timeframe	3	16	5	24	1.00	.019	7	35	2	6	.623	.080
Reassessment of the patient at follow-up	15	4	21	6	1.00	.014	31	9	6	2	1.00	.022
Further management if BPPV symptoms are present at follow-up	19	0	24	5	.142	.276	37	5	7	1	1.00	.007

Section B of the questionnaire was comprised of two questions with multiple correct answers, i.e., question one, the three most common symptoms that accompany BPPV and question eight asked for the participant to choose the correct recommendation with reference to the BPPV CPG. Table 10 illustrates the spread of data for both those questions. No between group differences were found when comparing symptoms knowledge scores or awareness of guidelines scores (see Table 10).

Table 10

Between Group Scores for Symptom Knowledge of BPPV as well as Knowledge of Clinical Guidelines with Regards to BPPV

	Symptom Score			Scores for Awareness of BPPV Guideline						
	All Correct	Some Correct	All Incorrect	pF	v	All Correct	Some Correct	All Incorrect	P	v
Profession				1.00	.139				.157	.404
Audiologist	21	4	1			14	9	2		
Otorhino- laryngologist	21	4	0			20	5	0		
Years of practice				.283	.326				.154	.459
<10	25	3	1			16	3	2		
11-20	6	3	0			7	0	0		
21-30	6	0	0			6	0	0		
>30	5	2	0			5	2	0		

Location				1.00	.042				.544	.264
Urban	35	7	0			30	10	2		
Rural	7	1	0			4	3	0		
Type of facility				.432	.198				.767	.148
DoH	15	4	1			14	4	1		
Private	25	4	0			19	9	1		

Finally, statistical significance ($p = .025$; see Table 11) was found between HCPs working in private facilities and the regular assessment for h-BPPV. This indicates that HCPs working in private facilities were more likely to regularly assess for horizontal canal BPPV compared to practitioners in DoH (public) facilities.

Table 11

Questionnaire Scores Pertaining to the Assessment of Horizontal Canal BPPV with Regards to (i) Profession, (ii) Years of Experience, (iii) Facility Location, and (iv) Type of Facility

Regularly assess for h-BPPV					
	Never	Sometimes	Always	<i>p</i>	<i>v</i>
Profession				.336	.242
Audiologist	4	10	11		
Otorhino-laryngologist	2	16	7		
Years of practice				.198	.264
<10	4	15	9		
11-20	0	6	3		
21-30	1	3	2		
>30	1	2	4		
Location				.086	.343
Urban	3	23	16		
Rural	3	3	2		
Type of facility				.025*	.379
DoH	4	12	3		
Private	2	12	15		

Part Two: Retrospective Record Review

The retrospective record review explored possible correlations between HCPs' diagnosis and management of patients with BPPV, with reference to clinical guidelines (Bhattacharyya et al., 2017). There were 80 medical records that were reviewed; descriptive statistics were used to analyse the data.

Most records, 91% ($n = 73$), suggested that the patient presented with symptoms consistent with BPPV. The remainder 9% ($n = 7$) of medical folders revealed patients presenting with atypical signs and symptoms of BPPV. However, these patients did not exit the BPPV protocol. All (100%, $n = 80$) of the records showed evidence of a DHM being performed; of which 4% ($n = 3$) of patients underwent a unilateral DHM only, and 96% ($n = 77$) a bilateral DHM. Fewer patients, 21% ($n = 17$), underwent assessment of the horizontal canals. Of those patients assessed for h-BPPV, 24% ($n = 4$) showed positive results and a barbecue roll was given.

Of all the patients ($n = 80$) that underwent a DHM, 10 (12.5%) patients presented with a negative result²¹, 32.5% ($n = 26$) presented with positive results and were clinically significant on the day of assessment. All 26 of these patients underwent a CRP. Three patients received mastoid percussion during the CRP and a further six patients were advised to complete additional Brandt Daroff exercises at home. There were 40 (50%) patients who presented subclinically on the day of assessment. Of these 40 patients, 14 (35%) received a CRP only, nine (22.5%) received Brandt Daroff exercises only, three (7.5%) received both a CRP and Brandt Daroff exercises, and 14 (35%) were either recommended to watch for a repeat attack and return, or were referred further.

Of all 30 patients (p-BPPV $n = 26$, h-BPPV $n = 4$) who presented with BPPV, 24 (80%) medical records indicated the presenting canal of BPPV, eight (26.7%) indicated the direction of nystagmus present, and two (6.7%) had indicated the latent period of the nystagmus, thus diagnosing the variant of BPPV (cupulo- versus canalo-lithiasis).

²¹ That is, neither symptoms nor signs.

Of the sample of records reviewed ($n = 80$), most 56 (70%) had documented time frames for follow-up appointments. The majority ($n = 53$; 94.6%) of the HCPs adhered to the institutional protocol of a two-week follow-up timeframe. Three medical folders varied from this; one indicated a three-month follow-up, another indicated an 11-day follow-up, and the last suggested a five-day follow-up.

Referrals. Of the 80 patients in the sample, 27 (33.8%) were referred to physiotherapy, six individuals (8%) to psychology, and one patient (1.3%) to neurology, and finally another (1.3%) was referred for further investigation with videonystagmography (audiology).

Chapter 4

Discussion

Introduction

This chapter will interpret and discuss the findings of the study's aims and objectives. The limitations of the study are explored towards the end of the chapter. The chapter will close with clinical and academic implications and recommendations for future research.

The fundamentals of EBP are underpinned by the desire to provide high-quality, soundly researched care to patients (Sackett et al., 1996). The use of CPGs facilitates the implementation of EBP in the clinical setting (Moodie et al., 2011). Evidence-based CPGs usually emanate from the global North, where resources are abundant, or at the least, superior to those in emerging regions (Birbeck et al., 2013; Spencer et al., 2013; Taba et al., 2012; Treweek et al., 2013). Little consideration is given to LMIC in the development phase of CPGs (Goyet et al., 2015). Despite the good efforts invested into the development and dissemination of EBP, literature shows dismal uptake and implementation rates on a global scale. of EBP (Goyet et al., 2015; Spencer et al., 2013).

In developing contexts including South Africa, the challenges of EBP implementation are not fully understood. The gap between the theory of EBP and its translation into the clinical setting is apparent. Research regarding the implementation of EBP in low-to-middle income contexts is required. Hence, this study explored audiologists' and otorhinolaryngologists' self-reported orientation towards EBP, as well as their adherence to evidence-based clinical practice guidelines in the diagnosis and management of BPPV. To the knowledge of the researcher, this is the first study to use the EBP²Q to explore EBP orientations between otorhinolaryngologists and audiologists²²; therefore, direct comparisons to other literature are difficult.

²² Primo; PubMed; EBSCOhost; Medline; UpToDate; MeSH terms: Evidence-Based Practice; Evidence-Based Practice Profile Questionnaire; Audiology; Otolaryngology; Otorhinolaryngology (searched on June 29, 2020).

The results from the EBP²Q and the add-on researcher-developed survey are interrogated first, followed by discussion of the retrospective record review of cases of BPPV assessed at a tertiary academic hospital in Cape Town.

Part One: The EBP²Q

Contextual influencing factors.

Public sector vs. private sector. Employees of the public sector expressed that EBP and CPGs are not compatible to their clinical context; scoring significantly lower in the *Sympathy*²³ domain compared to HCPs working at university settings ($p = .032$). The public sector yielded the lowest mean²⁴ score ($\bar{x} = 22.25$), followed by the private sector ($\bar{x} = 24.20$) and then, HCPs employed at research institutions/universities ($\bar{x} = 25.20$). The low compatibility is cause for concern as South Africa has an approximate population of 59.62 million (Statistics South Africa, 2020), and the majority of these citizens ($\pm 75\%$) access healthcare through the public sector (Gaede & Versteeg, 2011; Statistics South Africa, 2018). The implementation of EBP in the form of CPGs attempts to ensure diagnostic accuracy, encourage cost efficient healthcare (Dizon et al., 2017; Qaseem et al., 2012), and reduce variations in healthcare (Hakkennes & Dodd, 2008). The perceived incompatibility of CPGs to the clinical context may foster the possibilities of diagnostic error, and the potential for medico-legal cases which are currently burdening South Africa's healthcare system (Kollapen, Carnelly, Jaichand & Lawrence, 2017).

Most CPGs are developed in high-income countries which are not as resource constrained as LMICs (Birbeck et al., 2013; Spencer et al., 2013; Taba et al., 2012; Treweek et al., 2013). However, a slow uptake of EBP has been observed in the latter regions (Spencer et al., 2013). Researchers have invested much time and funds into exploring the barriers of the appropriate uptake and implementation of EBP (Duncombe, 2018; Harding et al., 2014;

²³ "*Sympathy* refers to the compatibility of EBP with professional work" (McEvoy et al., 2011, p. 3).

²⁴ $\bar{x}$ represents the sample mean.

Majid et al., 2011; Weng et al., 2013; Scurlock-Evans et al., 2014; Tacia et al., 2015). Common concepts that had emerged from research suggested lack of time and access to EBP, the inexperience in the action of retrieving and understanding evidence-based literature, the lack of facility resources to implement EBP and CPGs, and clinicians' disagreement with updated EBP recommendations and unwillingness to change their clinical practice behaviours and strategies (Duncombe, 2018; Harding et al., 2014; Majid et al., 2011; Weng et al., 2013; Scurlock-Evans et al., 2014; Tacia et al., 2015). HCPs in public settings face added environmental, cultural, and financial barriers which often result in under-resourced and under-staffed establishments (Hisham et al., 2018; Lafuente-Lafuente et al., 2019; Lee, 2017).

In South Africa the narrative is no different, and barriers hindering the uptake and implementation of EBP are like those of the developed world (Buchanan, 2011; Dizon et al., 2017). A culmination of these barriers together with restricted, or lack of internet access, poor access to research databases and access to computers may hinder the dissemination and implementation of EBP in the clinical setting (Khammarnia, Mohammadi, Amani, Rezaeian & Setoodehzadeh, 2015). Publicly employed HCPs expressed poor compatibility of EBP to the respective context. These findings are in line with previous South African studies' outcomes that suggested that evidence-based practices developed in the global North may not be appropriate (compatible) for the South African health context (Brueton et al., 2010; Dizon et al., 2016; Dizon et al., 2017).

The results did not reveal any further significant outcomes when comparing the public sector and the *Terminology*²⁵, *Relevance*²⁶, *Confidence*²⁷ and *Practice*²⁸ domains. Consequently, suggesting that publicly employed South African audiologists and otorhinolaryngologists have positive orientations towards EBP. Given the small sample size of the current study ($n = 130$), the

²⁵ "*Terminology* refers to an understanding of common research and statistical terms" (McEvoy et al., 2011, p. 3).

²⁶ "*Relevance* refers to the value, emphasis or importance placed on EBP" (McEvoy et al., 2011, p.3).

²⁷ *Confidence* is self-perceived abilities in the steps to retrieving, critically appraising, and implementing EBP literature (McEvoy et al., 2011).

²⁸ "*Practice* refers to the use of EBP in clinical situations" (McEvoy et al., 2011, p.3).

above statement should be interpreted with caution as it may not be generalisable.

There have been efforts made to overcome the issue of EBPs' poor compatibility with low-to-middle income contexts. After nine months of repurposing and contextualizing a stroke CPG to South Africa, Grimmer et al. (2018) concluded that the effort of adapting such guidelines is feasible, cost-efficient, and provides appropriate yet relevant management options for the patient. Like the work of Grimmer et al. (2018), organizations such as the Guideline International Network (GIN) also observed the disengagement between evidence-based guidelines originating from developed worlds and their place within LMICs. The GIN has a working group dedicated to providing support and encouraging academic progress, the development of networks, and sharing knowledge in LMICs who share a common goal; to enhance and improve the quality of healthcare in developing regions. The GIN provides a platform to share and access information relating to, and exploring, guideline development and scientifically robust adaptation, dissemination, implementation, and monitoring processes for guidelines in resource-constrained contexts (GIN, 2020). As a successful framework exists for adaptation of CPGs, South African professional societies should be working with these resources to adapt CPGs; by not doing so is missing an opportunity to improve health services.

In contrast to HCPs employed by the state, an association was observed between HCPs employed by universities and their scoring outcomes in the *Sympathy* domain. These HCPs feel that EBP is compatible to their work context. University settings are typically rich in research; HCPs would have ample opportunity, unrestricted access to research databases and internet access to retrieve up to date information (Chiu et al., 2009; Rogers & Darbyshire, 2019). It is expected that HCPs employed by universities are lecturers or researchers as well as offering clinical services. Therefore, if these HCPs are teaching evidence-based information, it is anticipated that they would be applying it. Thus, the positive association between HCPs employed at universities and improved EBP compatibility scores may be attributed to increased exposure to, and comfort with EBP in the academic environment.

The following section will further explore the urban-rural inequalities and its influence on EBP.

Urban vs. rural health settings. Complex rural and urban disparities exist in South African healthcare (Pillay et al., 2020). The notion that compatibility and EBP implementation is limited in rural health settings is documented globally, i.e., Malaysia, systematic reviews (Hisham et al., 2018; Lee, 2017), as well as in South Africa (Hlongwa & Sibiya, 2019; Naledi et al., 2011; Visagie et al., 2013). This report suggests statistically significant differences existed with HCPs' (audiologists and otorhinolaryngologists combined) scores showing increased compatibility (*Sympathy*; $p = .053$) and application (*Practice*; $p = .070$) of EBP in urban health facilities as opposed to rural health settings. In accordance with Visagie et al.'s (2013) research, it is suggested that South Africa's healthcare system is burdened by challenges which stifle the effective implementation of EBP, and the notion that these challenges are exacerbated in rural setting appears to be upheld.

The aims of this research did not include interrogation of urban-rural inequalities and its effects on EBP. However, when reviewing literature, themes emerged which highlighted fundamental barriers to EBP. Prior to 1994, South Africa was governed by an apartheid system which segregated citizens and their access to amenities, including healthcare, according to their race and ethnic group (African National Congress, 1994). Healthcare facilities located in urban areas were accessible and well-resourced, whilst rural healthcare facilities were under-resourced (African National Congress, 1994). The inequalities faced by today's South African health system were inflicted by the legacy and disparities of the apartheid regime (Naledi et al., 2011). UNICEF (2019) demonstrated that the inequitable distribution of the health budget across South Africa persists, and continues to favour urban settings. Naledi et al. (2011) identified the provincial control of finances as a barrier to district management developing effective solutions and resources to overcome the challenges. It is argued that poorly resourced, rural provinces may be less equipped to address challenges due to the biased distribution of funds (UNICEF, 2019), therefore investing funds into EBP initiatives and training may be considered a low priority in these facilities.

Furthermore, literature shows that rural health settings generally have few specialist placements and often inexperienced staff (Pillay et al., 2020). It is proposed that specialised and experienced HCPs may promote and model EBP in the clinical setting. Therefore, the lack of such healthcare personnel and resources in rural placements must be viewed as an obstacle in the appropriate uptake and implementation of EBP.

Considering the EBP²Q was accessible online and the digital divide that suggests poor internet coverage in rural South Africa (Bornman, 2015), there is a possibility of certain cadres of clinicians being underrepresented. However, previous literature suggests that audiologists and otorhinolaryngologists are mostly found in urban areas (Mulwafu et al., 2017; Pillay et al., 2020). This section has discussed the environmental influencers on self-reported EBP orientations. The report will now proceed to consider practitioner variables and its influences on EBP.

Practitioner variables

The influence profession has on EBP orientations. The EBP²Q scores indicated that otorhinolaryngologists have a greater understanding of EBP terminology compared to audiologists ($p = .006$). Although the EBP²Q is robust, it has been infrequently used in research²⁹, making direct comparisons difficult. However, EBP research generally corroborates the notion that medical doctors are more familiar with, and possess greater knowledge in EBP, than allied HCPs.

In Taiwan, Weng and colleagues (2013) investigated EBP on a large sample (6160) of clinicians. These comprised of doctors ($n = 645$), nurses ($n = 4206$), pharmacists ($n = 430$), occupational therapists and physiotherapists ($n = 179$), technicians³⁰ ($n = 537$), and allied HCPs³¹ ($n = 163$). Weng et al. (2013) used a self-report questionnaire developed by the National Health Research Institute in Taiwan. The questionnaire measured HCPs' awareness, beliefs, attitudes, barriers, and implementation with regards to EBP. Academic training

²⁹ Primo: MeSH terms: Evidence-Based Practice Profile Questionnaire; EBP²; EBP²Q (searched on June 29, 2020).

³⁰ Comprising of diagnostic medical sonographers, medical technologists, and radiographers.

³¹ Comprising of five speech-language therapists, 13 psychological consultants, 50 respiratory therapists, 67 dietitians, 28 other healthcare personnel.

varied across health professions therefore, the researchers divided academic qualifications into five categories, i.e., technical school degree, junior college, bachelor's degree, master's degree, and a doctoral degree (Doctor of Philosophy) (Weng et al., 2013). Weng et al. (2013) reported that although all six disciplines held a favourable stance towards EBP; doctors and pharmacists were likely to have more positive attitudes and beliefs towards EBP ($p = < 0.001$). Weng et al. (2013) demonstrated that doctors displayed more knowledge and skills in EBP when compared with the other HCP groups ($p = < 0.001$). Similar to the current study, when analyzing the impact that different levels of qualification had on EBP, Weng et al. (2013) showed that HCPs with higher levels of qualifications were more likely to implement EBP. Furthermore, deficient, or inadequate knowledge and skills towards EBP were poor predictors of its implementation (Weng et al., 2013).

Direct comparison and the generalisability of Weng and colleagues' outcomes with this report is challenging. First, Weng et al. (2013) selected a different questionnaire. The questionnaire indicated sufficient reliability and validity and was examined by 15 experts; psychometric analysis showed content validity index of 0.96 and Cronbach's $\alpha = 0.88^{32}$. The EBP²Q proved to be more reliable with Cronbach's $\alpha = 0.96$, test-retest reliability (intraclass correlation coefficients range 0.77 – 0.94) and had acceptable convergent validity (McEvoy et al., 2010a). Second, few allied HCPs participated, compared with the remaining groups. Third, the notion of which professions were allocated to which group differs between countries. Weng et al. (2013) separated occupational therapists and physiotherapists from the allied health sample population, whereas in South Africa these are related professions to audiology, as they are all concerned with rehabilitation (Myezwa & Van Niekerk, 2013). Despite these differences in design, the notion that doctors are more familiar and possess greater knowledge in EBP is reflected in Weng et al.'s (2013) outcomes.

Lai et al. (2010) conducted research on 92 doctors, and 52 nurses and allied HCPs employed by two public Malaysian hospitals. Lai et al. (2010)

³² Good internal consistency.

targeted practitioners who attended an introductory EBP course. Their study explored attitudes, confidence and barriers regarding EBP. The authors adapted a version of a questionnaire developed in June 2006 by Lai and Ramesh (2006), experts in the fields of EBP determined the reliability and validity of the respective questionnaire. The questionnaire was administered to participants prior to course commencement, to avoid any motivational influence resulting from EBP training. Like Weng and colleagues (2013) and concurring with this report, Lai et al. (2010) reported that doctors were more confident and held better attitudes towards EBP than their nursing and allied HCP colleagues. Lai et al. (2010) alluded to level of qualification being an integral factor which may influence HCPs' attitude and confidence in EBP. Recommendations emanating from their study included that nursing and allied health undergraduate curricula should be tailored to bridge the gap of these professions' apparent low confidence and attitudes towards EBP (Lai et al., 2010).

Although Lai et al.'s (2010) findings lend support to this report's findings, some discrepancies were noted. The first is the low representativeness of nursing and allied HCPs ($n = 52$), of which 43 were nursing staff and only nine were allied HCPs³³. The second is the variation of training and qualifications between each of the disciplines, e.g., in Malaysia, nurses qualify through a diploma course (Lai et al., 2010). Lai et al.'s (2010) methodology did not discuss the segregation of participants according to their levels of qualification, yet research insinuates that higher levels of qualification and training generally improve HCPs attitudes, beliefs and knowledge towards EBP (Melnik, Fineout-Overholt, Gallagher-Ford & Kaplan, 2012; Weng et al., 2013).

It is proposed that otorhinolaryngologists' orientation and knowledge of EBP, when compared with the audiologists in this report may be associated with increased training in EBP. EBP has been incorporated into the undergraduate core curricula of medicine (Dawes et al., 2005) since the 1960s (Feinstein & Massa, 1959). EBP was taught in the classroom and then integrated into clinical practice (Dawes et al., 2005). The introduction of EBP

³³ Consisting of pharmacists, physiotherapists, dietitians, and laboratory technicians.

filtered into rehabilitation sciences curricula in later years (Arena et al., 2011). In South Africa, all universities offering health sciences are mandated by The Health Professions Act 56 of 1974 to provide an evidence-based curriculum, which equips their graduates with the professional competence in EBP (DoH, 1976). Although the curriculum is grounded by evidence-based theory and the HPCSA (the regulatory authority) evaluates all health sciences training programmes, the onus remains on the graduate to meet the mandated exit level outcomes (ELOs).

For a medical doctor to qualify as an otorhinolaryngologist in South Africa, a postgraduate degree is required (Master's in Medicine; MMed (Otol)). Including undergraduate studies, internship and the MMed (Otol) postgraduate degree, otorhinolaryngologists spend a total of 12 years specializing. The specialization years of an otorhinolaryngologist entails clinical specialty training, the submission of a dissertation, and the completion of a fellowship (Peer & Fagan, 2012).

According to a systematic review conducted by Young, Rohwer, Volmink & Clarke (2014), multifaceted, integrated approaches to learning were proven to yield better EBP orientations and skills amongst HCPs³⁴. These multifaceted approaches are common in postgraduate programmes (Young et al., 2014). It is understood that the groundwork of EBP should be firmly established at an undergraduate level and built on during a postgraduate programme (Maggio, Tannery, Chen, ten Cate & O'Brien, 2013). Further supporting the notion that differing levels of qualification impact EBP orientations, Melnyk et al. (2012) found that nurses with Master's degrees were more comfortable and competent about the steps of EBP ($p = < .001$), and were more confident in its implementation into the clinical environment ($p = < .001$) when compared against nurses with a baccalaureate degree, associate degree or diploma.

It is difficult to make direct comparisons between otorhinolaryngologists' and audiologists' scores as there is an apparent influence that the level of education has on EBP. Audiologists undergo a four-year degree (with an

³⁴ Allied health professionals, physicians, medical residents, interns, nurses, midwives, undergraduate and postgraduate health sciences students.

honors level research project) whilst otorhinolaryngologists undergo 12 years of educational training. Supporting research shows that HCPs' EBP competency is rarely cultivated during a short-term higher education programme (a degree, i.e., a four-year audiology degree) or by a few short courses in the topic (Finotto, Carpanoni, Turroni, Camellini & Mecugni, 2013). While multifaceted, integrated approaches to learning³⁵ were shown to improve EBP orientations and skills; they are common in postgraduate programmes (Young et al., 2014) and deficient in rehabilitation sciences undergraduate programmes (Schoonees, Rohwer & Young, 2017).

Manns, Nortin and Darrah (2015) identified a disconnect between how EBP was taught in an undergraduate physiotherapy programme, and how it is intended to be implemented in clinical practice. Research in a local context by Schoonees et al. (2017) reported that lecturers teaching undergraduate rehabilitation health science programmes expressed concern on the inadequate research and unsuitability of evidence appropriate to South Africa. The unsuitability or lack of evidence was viewed as a potential barrier to the teaching and practicing of EBP (Schoonees et al. 2017). The concerns regarding the paucity of context-appropriate research fuels the debate of colonialism and decolonizing curricula, currently a contentious topic in South Africa (Pillay & Kathard, 2015); however, beyond the scope of the current study.

Due to South Africa's unique health context, evidence-based literature (e.g., CPGs) may not be simple to implement; however, the challenges affecting EBP implementation should not be viewed as an obstacle in teaching the competencies of EBP. Rather, EBP competency is regarded as (1) the appropriate formulation of an answerable question, (2) the act of retrieving the appropriate literature, (3) the skill of critically analyzing the literature, (4) translating the literature into the clinical setting, and (5) evaluating the outcomes (Schoonees et al. 2017). Arguably, these learning outcomes concerning EBP could be achieved at an undergraduate level, but the results from this study support research suggesting the contrary.

³⁵ i.e., lectures, computer lab sessions, workshops, group and clinical case discussions, journal clubs, and portfolios.

It is proposed that the additional academic training and application of EBP in the specializing years of an otorhinolaryngologist may be a partial, yet crucial influencer to the otorhinolaryngologists scoring significantly better. It is suggested that focus is placed on encouraging multifaceted and integrated approaches for teaching EBP in rehabilitation health science curricula, as well as promoting and teaching EBP competencies through CPD programmes. The report will now consider the impact that years of experience has on HCPs' orientations towards EBP.

Years of experience. There was a significant positive relationship between the EBP²Q scores (audiologists and otorhinolaryngologists combined) and HCPs' years of experience. HCPs with 21 – 30 years of experiences scored significantly better in the domains of *Terminology* ($p = .008$) and *Confidence* ($p = .003$) than HCPs with <10 years of experience, and 11 – 20 years of experience, respectively. The finding that scoring across domains increase as years of experience increase was also reported by McEvoy, Williams and Olds (2010b).

McEvoy et al. (2010b) used the EBP²Q and conducted a cross-sectional, descriptive study constituting of 933 participants from the University of South Australia, School of Health Sciences. Participants' professional background differed (i.e., physiotherapy, podiatry, occupational therapy, medical radiation, and kinesiology) with varying levels of education and training in EBP. McEvoy et al. (2010b) was the first study to report that HCPs' self-reported scores differ according to participants' training, exposure, and experience in EBP. It is tempting to assume that with experience, confidence in EBP grows and EBP skills are sharpened however, McEvoy and colleagues (2010b) with increasing exposure only *self-reported* knowledge, attitudes and behaviours improve. Although McEvoy et al. (2010b) expressed caution when generalizing their findings on a national and international scale, a follow-up longitudinal study was conducted (McEvoy et al., 2011). McEvoy and colleagues (2011) conducted the first study that explored changes in knowledge, attitudes, and beliefs (EBP orientations) in allied HCPs (physiotherapists) after entering the workforce. The EBP²Q was administered to the participants at three-time points; final year at university, then the first year of entering the workforce, and at the end of the

second year of working. The outcomes showed a slight decline in the first year of entering the workforce, and an improved EBP profile in the second year (McEvoy et al., 2011). It is suggested that the decline and rise of EBP orientations is a result of junior HCPs adjusting to professional work and lifestyle changes in the first year of entering the workforce (McEvoy et al., 2011). In the second year of working, participants may have become more comfortable in their scope of practice.

This report's sample has demonstrated the relationship between increasing years of experience and improved scoring in the domains of Terminology and Confidence. A possible determinant of this relationship, as intimated by McEvoy et al. (2010b) is that with greater experience in clinical practice, there are greater opportunities for training and exposure to EBP, whether it be formal or informal. It is interesting that older HCPs scored higher in the Terminology domain. It is anticipated that older HCPs would have likely been less exposed to EBP at university, yet their improved scores suggest willingness to engage and enhance their EBP behaviours. The current study supports the notion that repeated exposure to EBP reinforces its approach (McEvoy et al., 2010b). No significant outcome was found between participants' attitudes (i.e., *Relevance*) and years of experience, which may be in part due to the notion that all HCPs hold a positive and favourable stance towards EBP (Aguirre-Raya et al., 2016; Capraş, Bulboacă & Bolboacă, 2020; Heiwe et al., 2011; Lai & Teng, 2011; Lai, Teng & Lee, 2010; Ozga, Jędrzejczyk-Cwanek, Woźniak, Niemczyk & Mędrzycka-Dąbrowska 2019; Weng et al., 2013) regardless of their years of experience. Furthermore, no significant correlation was revealed between the Sympathy and Practice domains, and years of experience. Having discussed the complex influences on HCPs attitudes, knowledge, and skill in EBP, the following section of this report explores the results from Section B of the online questionnaire.

Section B

Section B was a continuation of the online questionnaire. Section B was constructed with reference to the BPPV CPG (Bhattacharyya et al., 2017).

Section B consisted of 13 questions surrounding the assessment and management of BPPV. The following section will briefly discuss the outcomes from Section B.

Between group differences (i.e., facility location, employer, profession, and years of experience) demonstrated that HCPs (audiologists and otologists combined) employed at private facilities reported a more regular assessment of the horizontal semicircular canals ($p = 0.25$). This regular assessment may be attributed to the fewer time-constraints and fair patient caseloads in private facilities, as a result HCPs are able to perform the uncommon supine roll test more regularly.

There is an overall 50/50 sample split; half of the sample advises post management restrictions and half do not. Section Bs' scores suggest that private practitioners are more knowledgeable regarding post management restrictions or rather, the lack thereof than state employees ($p = .040$). Post management restrictions are not evidenced by literature, nor are they recommended in the CPG (Bhattacharyya et al., 2017), yet half of the sample confirmed that they advise it. Bhattacharyya et al. (2017) opined that patients return to normality with reduced levels of anxiety, stress, sleep and work interruptions without the suggestion of post management restrictions. Advising against post management restrictions is a simple way to enforce EBP and ensure maximum patient benefit, the samples' lack of adherence shows a lack of awareness to aspects of the BPPV protocol.

Encouragingly for the profession, which has relatively recently engaged with vestibular training, audiologists demonstrated more awareness than otologists regarding the cardinal symptoms associated with BPPV ($p = 0.45$). Audiologists might be considered the entry point into healthcare for some dizzy patients, and although the South African audiologist-to-population ratio is low, audiologists are still better distributed at PHC levels than otorhinolaryngologists (i.e., the entry point for patients into the healthcare system) (KwaZulu-Natal DoH, 2014). Audiologists also have arguably more intensive training in peripheral vestibular vertigo than otorhinolaryngologists. For example, at the University of Cape Town, audiologists complete a semester length academic

course in vestibular management and have two accompanying clinics for practical clinical learning (C. Rogers, personal communication, February 27, 2021). Therefore, audiologists' awareness of BPPV symptoms is reassuring. The implications of audiologists being aware of cardinal symptoms of BPPV and the BPPV protocol makes healthcare service delivery more cost efficient, reduces unnecessary referrals to specialists and alleviates the challenge of long waiting lists.

The current report also showed that HCPs (audiologists and otorhinolaryngologists combined) with less than 10 years of experience scored significantly better ($p = .020$) than HCPs with more experience regarding which ear to assess first. It is proposed that HCPs with less than 10 years of experience would have graduated more recently thus, may be more familiar with EBPs as they recall it from university (otorhinolaryngologists), and EBP was included in their curricula (audiologists). Considering that vestibular management was only introduced into undergraduate audiology curriculums approximately 13 years ago (Seedat et al., 2018), it is understandable that HCPs who graduated more recently are more familiar with the BPPV CPG.

Khoza-Shongase, and co-workers (2020) reported that South African audiologists employed at public hospitals are not confident in the diagnosis and management of vestibular conditions; a large contribution of these audiologists may have graduated longer ago and thus, were not taught vestibular practice at university. Having become more popular in recent years, particularly in the profession of otorhinolaryngology (Musbahi, Aydin, Omran, Skilbeck & Ahmed, 2017), simulation-based training may be considered for inexperienced HCPs, or simply those who lack confidence in vestibular practice (Khoza-Shongase et al., 2020). von Brevern et al. (2015) demonstrated that it may be difficult for HCPs to practice or develop their vestibular skills after university due to (1) the provocation of vertiginous symptoms upon performing a practice manoeuvre, and (2) the diminishing of nystagmus upon repetition of a manoeuvre. Thus, smartphone applications assist HCPs in developing their skills in diagnostic and management manoeuvres. Organ, Liu and Bromwich (2015) demonstrated the effectiveness of the DizzyFIX application in a prospective randomised control trial on 41 participants in their third year at university; placebo group

(participants with a placebo application) performed significantly lower in CRP correctness than the group with access to DizzyFIX ($p < .0001$). Organ et al. (2015) emphasised the value of simulation-based training and proposed that the implications of it would decrease the referral rate for a seemingly easy to manage condition. In Germany, Długaiczek, Thiemer, Neubert, Schorn and Schick (2018) showed successful outcomes similar to those of Organ and colleagues (2015) on the angular vestibulo-ocular reflex (aVOR) application and opined its effectiveness in improving HCPs' competence and skills in diagnosing and managing BPPV. A plausible way to address audiologists' lack of confidence in management of BPPV is the utilisation of these simulation-based applications.

No significant differences were observed between urban or rural settings and Section Bs' scores however, this should not be generalised to the total population as there may be an underrepresentation of rurally employed HCPs due to the digital divide. The following section will explore the implementation of EBP in the clinical setting with reference to BPPV.

Part Two – The Retrospective Record Review

Part two of the study adopted a retrospective record review design. HCPs' practices of diagnosing and treating BPPV were interrogated in terms of the recommendations of the CPG for this condition (Bhattacharyya et al., 2017). The record review was conducted at Groote Schuur Hospital; a tertiary, urban, public health facility, and the academic teaching hospital for the University of Cape Town. The otorhinolaryngologists and audiologists employed by the hospital or on joint staff (that is, employed by both the provincial government and the university) have varying years of experience and exposure to EBP. Thus, clinicians who assessed patients and made notes in their medical folders may have been totally inexperienced first year registrars, in the case of otorhinolaryngologists, or novice audiologists to the senior consultants (otorhinolaryngologists and audiologists) who run a specialised clinic for vestibular disorders. It was not possible to identify practitioners' ranks or seniority from the records. All patients underwent an audiological examination

and are therefore from the audiology department; it is possible for the otorhinolaryngology department to have seen many more BPPV patients however, not included in this sample.

The results from the retrospective record review suggests that the facility concerned provides care that is considerate and adherent, to some degree, towards CPGs with reference to BPPV. BPPV is the most common cause of peripheral vertigo (Hornibrook, 2011; Liu et al., 2017; You et al., 2019.) and Bhattacharyya et al. (2017) states that between 17% and 24% of dizzy patients receive a diagnosis of BPPV. Therefore, it is comforting that HCPs comply with evidence-based CPGs as it improves diagnosis and management outcomes. Patients' medical folders displayed poor documenting practices, which have the potential to hinder the continuation of care. The discussion will now proceed to explore the findings of the retrospective record review in context of the literature.

The diagnosis and management of p-BPPV. Despite reports of varying sensitivity and specificity depending on the timing of the assessment in relation to the clinical course of BPPV; the DHM is still considered gold standard in the diagnostic assessment of p-BPPV (Bhattacharyya et al., 2017). All patients who were referred with a presenting complaint of episodic dizziness underwent a DHM ($n = 80$). It is important to note that the manoeuvre was conducted irrespective if the patient presented with a typical or atypical case history. Bhattacharyya et al. (2017) highlighted that up to one in three patients show atypical symptoms of BPPV. Therefore, conducting a DHM elicits signs and symptoms of BPPV (i.e., characteristic nystagmus and vertigo) (Gaur et al., 2015), which may not be apparent during the case history taking. The high percentage ($n = 80$; 100%) of patients who underwent a DHM reflects strong adherence to the GCP with respect to the diagnosis of BPPV. By the HCPs ensuring that each patient underwent a DHM, there was little room for patients with p-BPPV to be diagnostically missed (according to the diagnostic criterion for BPPV).

Unfortunately, the adherence to the BPPV CPG reported in the current study has not been demonstrated globally. A Lithuanian study demonstrated

that out of 85 otorhinolaryngologists, almost a third 32.9% ($n = 28$) did not perform any diagnostic manoeuvres for suspected BPPV cases (Ulyte et al., 2019). Among the most common reasons reported for not performing diagnostic manoeuvres was a lack of time and fear of provoking vertiginous symptoms (Ulyte et al., 2019). It is likely that as the otorhinolaryngologists failed to induce symptoms by a provocative test, that BPPV were either incorrectly treated or not treated at all. Earlier studies conducted in Germany (Glasziou & Heneghan, 2008) and Spain (Pérez et al., 2008) similarly demonstrated poor compliance with the BPPV CPG by indicating that only 8% of BPPV patients were managed with CRPs, and only one patient of a total 60 were correctly diagnosed with BPPV, respectively. The current report's high level of compliance towards the BPPV CPG may be attributed to the patients attending a tertiary institution, thus consulting HCPs may have many years of exposure to BPPV and be more familiar with its CPG.

Of all the patients ($n = 80$) that underwent a DHM, only 32.5% ($n = 26$) demonstrated a positive DHM, thus diagnosing posterior (or anterior) semicircular canal BPPV. Although the case history may have been consistent with that of BPPV, there was a low yield after performing the diagnostic manoeuvre. The low yield of BPPV indicates either subclinical BPPV, or that the time elapsed from the onset of symptoms to the point of consultation engendered the self-resolution of BPPV (Bhattacharyya et al., 2017). Groote Schuur Hospital is a tertiary facility that requires a referral; if referral HCPs were aware of the BPPV CPGs, diagnostic assessment and management would be performed sooner at the bedside, resolving patient discomfort.

With regards to the management of the patients with a positive DHM on the day of assessment ($n = 26$), all received the appropriate management, according to Bhattacharyya et al. (2017), of a CRP. In three of the patients, a unilateral DHM was performed only. It is proposed that the HCP elicited a positive DHM response on the first ear tested, and the patient, still in supine, was transitioned to the appropriate repositioning procedure. There is relatively new evidence showing that this is done to limit the discomfort, anxiety, and additional dizziness for the patient (Al-Malky et al., 2016). In this case, it could be suggested that the second ear was not assessed as to avoid potentially

reversing or neutralizing the management of the first ear. Rather, the contralateral side would be tested at follow-up.

h-BPPV. The conventional Dix-Hallpike manoeuvre and CRP is effective in the diagnosis and management of patients presenting with p-BPPV (Bhattacharyya et al., 2017). The second most common form of BPPV is h-BPPV (Casani et al., 2011), and the symptoms might be indistinguishable to those of p-BPPV (Fife. 2012). However, upon a DHM, no nystagmus would be elicited (Bhattacharyya et al., 2017). If a patient presents with a negative DHM and a case history which is compatible with that of BPPV, an assessment for h-BPPV (i.e., supine roll test) is advised (Bhattacharyya et al., 2017).

A supine roll test was performed on 17 (21%) of the total 80 patients. Only four of the 17 patients were diagnosed with horizontal semicircular BPPV. As reflected in the current study's outcomes, h-BPPV has a low incidence rate of between 5% – 22%. Bhattacharyya et al. (2017) posited that the low incidence of h-BPPV may be due to its quick self-resolution. This explanation likely correlates with the low number of patients presenting with h-BPPV in the record review. Time elapsed from patients' onset of symptoms to attendance at Groote Schuur Hospital, may have resulted in either negative supine roll test or subclinical BPPV. All four of the patients with h-BPPV underwent a barbecue roll manoeuvre indicating that the management was implemented as per EBP. The above sections discussed the diagnosis and management of posterior semicircular canal and h-BPPV. The following section will explore subclinical BPPV.

Subclinical BPPV. In the current study, 40 patients (50%) were subclinical on the day of assessment. When analyzing the number of patients on whom a supine roll test was performed ($n = 17$; 21.3%) and the high number of patients presenting with subclinical BPPV ($n = 40$), there appears to be disregard in the assessment of h-BPPV. The non-compliance to the BPPV CPG relating to h-BPPV potentially allowed for the respective diagnosis to be missed in the remainder 23 patients. Furthermore, the large sample of patients presenting with subclinical BPPV suggests that these patients may have waited for an extended period prior to accessing medical help. Time elapsed

engenders the self-resolution of BPPV or residual dizziness³⁶ (Bhattacharyya et al., 2017).

Of the 40 patients with no nystagmus induced by DHM, 17 patients received a CRP (three patients were further advised to do Brandt Daroff exercises at home), nine received Brandt Daroff exercises only and 14 were advised regarding conservative management (watchful waiting). The management demonstrated by the HCPs is consistent with existing literature which reported that the most common management manoeuvre conducted is a CRP, followed by Brandt Daroff exercises (Blohm, 2013).

CPGs state that an accurate diagnosis of BPPV requires (1) a case history of episodic vertigo congruous with that of BPPV, and (2) a positive DHM or supine roll test, defined as the provocation of characteristic nystagmus (Bhattacharyya et al., 2017). Due to BPPV having a spontaneous recovery rate of between 35% - 50% (Burton, Eby & Rosenfeld, 2012), the BPPV CPG provides an option for watchful waiting with a follow-up as initial therapy (Bhattacharyya et al., 2017). However, the panel of experts preferred treatment of a CRP at first consultation; this is to minimize patients' exposure to fall risks as well as to ensure a good quality of life (Bhattacharyya et al., 2017). There is also further evidence which shows that patients who present with subclinical BPPV benefit from the management of a CRP, provided that the patient is aware which side provokes dizziness (Balatsouras & Korres, 2012; Uz et al., 2019). The CRP that was received by 17 (42.5%) of the 40 patients presenting with a negative DHM, demonstrates compliance to the literature supporting the BPPV CPG.

HCPs' management decisions may have been influenced by the history of the condition, possible accompanying co-morbidities of the patient (Bhattacharyya et al., 2017) and/or varying knowledge and skills in the application of EBP by HCPs. In the current study, it can thus be suggested that the 14 patients who were advised regarding watchful waiting may have presented with contraindications for a CRP (i.e., unstable cardiac conditions,

³⁶ More generalised dizziness, motion sensitivity, associated with a high fall risk – after the resolution of BPPV and no provocation of nystagmus (Casani et al., 2019).

cervical/spinal conditions, etc.). Furthermore, an overall of 35 (43.75%) patients were referred further.

Poor documenting practices. BPPV may affect any of the semicircular canals (Bhattacharyya et al., 2017). Fundamentally, a case history that is consistent with that of BPPV, and the eliciting of characteristic nystagmus provides for an accurate diagnosis of BPPV (Bhattacharyya et al., 2017). The components of characteristic nystagmus are (1) the direction of the nystagmus, (2) the latency of onset of nystagmus, (3) the duration of nystagmus, and (4) the fatigability of the nystagmus (You et al., 2019). The semicircular canal affected and the type of BPPV (cupulo- or canalo-lithiasis) depends on the observation and notation of characteristic nystagmus (i.e., the above four features) elicited by a DHM. The variant and type of BPPV govern its management; therefore, the researcher is unable to determine if the appropriate treatment was performed if documenting practices are poor.

Consistent with Mutshatshi, Mothiba, Mamogobo and Mbombi (2018), deficient documenting practices were demonstrated in records made by HCPs at Groote Schuur Hospital's otorhinolaryngology and audiology department. According to the medical folders ($n = 80$), 30 patients had a confirmed diagnosis of BPPV. Most medical folders ($24 = 80\%$) had recorded notes suggesting the presenting semicircular canal, however only eight (26.6%) medical folders indicated the direction of the nystagmus, and few (two = 6.6%) had medical notes regarding the latency period of the nystagmus. Thus, the location and variant of BPPV was not always clear. Poor record keeping and documenting of this condition is concerning as the management of BPPV is informed by the affected semicircular canal. In cases of recurrent BPPV, the history of the condition and previous notes prompt decisions for further investigation (Bhattacharyya et al., 2017). Considering that HCPs may not have appropriately documented clinical findings, the researcher was unable to assume that the appropriate management was given to each of the patients.

Mutshatshi et al. (2018) inferred that the challenges experienced by the South African health system (i.e., shortage of staff, high patient caseloads and a lack of time) predisposed its HCPs to deficient work practice, including poor

clinical documenting practices. Similar to Mutshatshi et al. (2018), the setting of this report might have contributed to deficient documenting practices.

Furthermore, data revealed that an overall of 70% (n = 56) of medical folders had notations advising patients to return for a follow-up. However, it is not unreasonable to assume that this value may be higher than 70%; as follow-up appointments may have been advised (1) verbally, and (2) on an appointment card or “route-slip” which is attached on the outside of medical folders and indicates the follow-up appointment date. It is plausible that “route-slips” may have been completed and the follow-up information was not translated into the medical notes due to time constraints and increased patient caseloads. Nonetheless, according to the institutional protocol, 53 (94.6%) of the total patients documented for a follow-up were advised to return in two-weeks. This is a relatively good percentage of patients, suggesting that Groote Schuur Hospital otorhinolaryngologists and audiologists are adherent and aware of BPPV follow-up protocols.

Wang, Li, Jiang, Dear and Hsieh (2017) advised that LMIC are still faced with the obstacle of poor record keeping and this would include appropriate documentation of the timing of follow ups. However, accurate record keeping is necessary and important. It creates a framework for tracking patients who have not returned for their follow-up appointment and further informs attending HCPs on the history of the condition at hand, allowing for the appropriate continuation of care (Joubert & Casoojee, 2013). The next section will briefly address the referrals made.

Referrals. Various referrals towards further investigation or management were made, with a focus on rehabilitation. In the case of BPPV, Bhattacharyya et al. (2017) described VRT as any further management beyond CRPs. A total of 27 patients (33.75%) were referred to a physiotherapist, six patients (7.5%) were referred to a psychologist, one to a neurologist, and another for further testing (i.e., videonystagmography). The high percentage of referrals in the current study suggests that the patients may have had co- or multi-morbidities as it is unlikely that undergoing successful BPPV management would warrant further referral(s) in a resource-constrained

setting. A referral to physiotherapist may suggest either other issues were detected such as orthopaedic, or residual/related balance disorders, which would require more intensive VRT. Further referrals to psychologists may also suggest that the attending HCPs thought beyond the scope of diagnosing and managing BPPV, and uncovered psychological symptoms, associated with BPPV (Bhattacharyya et al., 2017). As the Groote Schuur Hospital runs a specialised vestibular service, it is plausible to assume that practitioner-patient engagement was deeper and thus, likely prompted further referrals to provide holistic care.

Having discussed HCPs' orientation to EBP and the evidence of these orientations into clinical practice, with reference to BPPV, the report will synthesise part one and part two.

The Translation of Subjective EBP Orientations into Clinical Practice with Reference to BPPV

Scores from the EBP²Q suggested good practice ($p = .070$) and compatibility ($p = .053$) of EBP in an urban health setting, which were demonstrated in the retrospective record review, conducted at an urban, tertiary hospital. Although the EBP²Q demonstrated low compatibility of EBP in the public setting, EBP in the form of the BPPV CPG appears to be well established at Groote Schuur Hospital, a public health facility. The researcher observed adherence to the BPPV CPG in the assessment and management of p-BPPV. The BPPV CPG is well suited for the South African context as it actively discourages over-investigation of patients and promotes simple, usually once-off office-based management which is effective and cost-efficient.

Section B of the online questionnaire showed that private practitioners are more likely to regularly assess the horizontal semicircular canal than other groups ($p = 0.25$). Contrary to the private setting, the retrospective record review demonstrated non-compliance, with reference to the BPPV CPG, in the assessment of horizontal semicircular canals in 23 of the 40 subclinical BPPV patients. This relates to more than half of the subclinical patients (57.5%) being potentially diagnostically missed for h-BPPV. As reported by Bhattacharyya et al. (2017) h-BPPV is rare. It is suggested that (1) due to the rarity of this

horizontal variant of BPPV, it is not entirely likely that patients were neglected, and (2) registrars (otorhinolaryngologists) and audiologists may be less familiar with it and the guidelines.

Consistent with previous literature that medical doctors possess greater knowledge in the realm of EBP (Lai et al., 2010; Weng et al., 2013), scores from the EBP²Q revealed that otorhinolaryngologists are more knowledgeable and familiar with the *Terminologies* ($p = .006$) of EBP than audiologists. Nevertheless, audiologists expressed more knowledge and awareness of the symptoms of BPPV ($p = .045$; see Table 7) when compared with otorhinolaryngologists. Audiologists' increased knowledge and awareness of symptoms of BPPV may be attributed to a familiarity or special interest in dizziness as participants were only asked to proceed with Section B if they assess and manage BPPV.

Thus far, the chapter four has discussed the findings of this study in context of the literature. The chapter will now proceed to explore the limitations and implications of the study.

Study Limitations

Part one. Part one of the study comprised the EBP²Q with Likert scale responses and a researcher-developed questionnaire. The latter consisted of 13 questions, constructed with reference to the BPPV CPG (Bhattacharyya et al., 2017). Facilitators and challenges towards EBP implementation were beyond the scope of this study however, exploring these integral influencers and its impact on EBP orientations would have been beneficial for this study.

Part one's low response rate resulted in a small sample size ($n = 130$) raising concerns of generalisability. The survey was available on an online platform. In the rural setting internet connection may be weak or non-existent (Bornman, 2015), therefore possibly contributing to the low sample size as well as impacting the representation of a broad spectrum of HCPs' employment settings, qualifications and skills sets. So as to achieve an appropriate sample size incomplete surveys were included in the analysis. Incomplete surveys may

have been responsible for non-responder bias. Although published some time ago, Perneger, Chamot and Bovier (2005) suggested that voluntary participants with improved orientation and knowledge towards EBP were more likely to complete surveys. Therefore, a portion of the population may have been under-represented (Cheung, ten Klooster, Smit, de Vries & Pieterse, 2017). Consequently, part one's outcomes are comprised of self-reported measures and may not be a true reflection of HCPs' EBP knowledge, attitudes, beliefs, and application within the clinical setting.

Survey design studies are often subject to small sample sizes and bias (Saleh & Bista, 2017). The effects of participant bias and social desirability bias may have skewed the participants' true responses to be "in-line" with the researcher's expectations (Althubaiti, 2016; McCambridge et al., 2013). In attempt to ensure reliability and allow for frank, truthful responses, anonymity, and confidentiality was promised.

Likert scale responses introduced the central tendency bias where participants may have felt reluctant to answer on extreme ends of the scale (e.g., strongly agree or strongly disagree) and prefer to cluster around three (i.e., neutral) (Lavrakas, 2008). In an effort to avoid the misrepresentation of responses in the outcomes, participants were not required to further justify their answers.

To overcome these biases, instead of an online survey, the researcher could have adopted a qualitative approach, for example, focus group discussions or semi-structured interviews (SSI) as data collection methods. Focus group discussions build on the different dynamics within a group to explore issues in a more context-appropriate and on an in-depth level (Nyumba, Wilson, Derrick & Mukherjee, 2018). The outcomes from focus group discussions provides a holistic narrative that may not have been achieved using a survey, although focus group discussions are not without their limitations (Nyumba et al., 2018). SSI allow for a framework and flexibility in ascertaining participants' perspective with respect to the research question (McIntosh & Morse, 2015). The outcomes from an SSI may have provided in-depth answers regarding HCPs orientations and familiarity with the BPPV CPG. A case study

may have been an interesting approach to identify the similarities and discrepancies between hospital protocols and evidence-based CPGs however, that was beyond the aims and objectives of the current study.

Part two. Part two was a retrospective record review detailing diagnosis and management of BPPV with reference to the CPG (Bhattacharyya et al., 2017). Data were collected from a single site, therefore the results may not be generalisable to the wider South Africa, with vastly different contexts. For example, the site being the leading academic hospital in the province (Western Cape Government, 2020) with the expectations of being highly resourced could well have had some influence on the practices of staff within it.

The validity of the current study relied heavily on HCPs' notes in patients' folders. The researcher was unable to identify or assume a HCP's experience, rank, or seniority which has shown to have an influence on EBP orientations. Limitations to the retrospective record review included (1) poor documenting practices that restricted the researcher from assuming that the correct management was administered to patients, (2) illegible handwriting, (3) incomplete data, and (4) missing medical folders. An alternate method to collect the data in real-time would have been a prospective study. Although, a prospective study may have exposed this study even further to the Hawthorne effect and thus to biased results (McCambridge et al., 2014).

Implications for Training and Clinical Practice

It is well documented that HCPs hold a favourable stance towards EBP however, their knowledge, skills, and application of EBP in practice might be limited (Aguirre-Raya et al., 2016; Capraş et al., 2020; Heiwe et al., 2011; Lai & Teng, 2011; Lai, Teng & Lee, 2010; Ozga et al., 2019; Weng et al., 2013). The researcher has provided insight as to how environmental factors (i.e., facility location and health setting) and practitioner variables (i.e., profession and years of experience) may influence HCPs' EBP orientation and implementation.

The current study supports the idea that otorhinolaryngologists display more knowledge in EBP, which could be attributed to their long and extensive training alongside multifaceted methods of learning and thus, their exposure to EBP. Tertiary institutions offering audiology programmes should ensure that their academic curricula include a rigorous, integrated EBP module to groom their students for clinical practice (Young et al., 2014). These EBP modules should be encouraged from early in the academic programme to allow for adequate exposure.

The positive relationship between years of experience and improved EBP outcomes highlights the immense importance for CPD initiatives to include EBP training. Continual training may promote the implementation of EBP into the clinical setting. Continual EBP training for HCPs at different stages in their careers may be an effort to narrow the gap to keep HCPs up-to-date and current in the field of EBP. The urban-rural inequalities which were highlighted in the study advocates for prioritization of EBP training and implementation in rural settings.

While the outcomes of this study showed HCPs' adherence to the BPPV CPG in a tertiary, urban, public health facility, the findings cannot be generalised to contexts across South Africa.

Recommendations for Future Research

The current study is one of the first to take initiative in exploring South African audiologists' and otorhinolaryngologists' knowledge, attitudes, beliefs, and application of EBP and CPGs. The study population was relatively small, it is advised that future research confirm these outcomes in larger studies. It may also be beneficial to adopt different methodologies, including qualitative strategies, to explore these orientations and applications of EBP across different contexts in South Africa. There is a need for curriculum development research which explores the nature, rigor, and effectiveness of EBP modules in an undergraduate audiology degree. The promotion of EBP should be further complemented by context-appropriate research exploring the benefits EBP training in continual professional development initiatives. The researcher is

aware that clinical training in the field of EBP may not alleviate the challenges interrupting EBP implementation. Therefore, the outcomes from this study also advocates for research exploring urban-rural inequalities and encourages the prioritization for provisions of resources to rural settings.

Conclusion

This study examined otorhinolaryngologists' and audiologists' orientations towards EBP and BPPV, and their translation of EBP into the diagnosis and management of BPPV, with reference to the BPPV CPG.

Consistent with Dizon et al. (2017), the current study outcomes highlighted South African HCPs' poor beliefs regarding the compatibility of EBP in public health facilities. This finding raises major concerns as majority of the South African population access healthcare through the public sector (Gaede & Versteeg, 2011; Statistics South Africa, 2018). Scores from the EBP²Q showed trends of improved compatibility and practice of EBP in urban settings as compared to rural settings. Identifying the challenges and barriers affecting EBP implementation was beyond the scope of this study however, it is suggested that the urban-rural inequalities may have influenced HCPs' self-reported EBP orientations. In addition, HCPs employed at universities showed improved EBP compatibility to their respective work context; with unrestricted access to the internet, databases and up-to-date teaching material, this outcome is unsurprising (Rogers & Darbyshire, 2019).

Lending support to previous literature that medical doctors are more competent in EBP (Lai et al., 2010; Weng et al., 2013); otorhinolaryngologists showed to be more knowledgeable in the *Terminology* of EBP. Direct comparisons between audiologists and otorhinolaryngologists had proven to be difficult as it is suggested that levels of qualification impact EBP orientations. The increased training and exposure to EBP in the specialising years of an otorhinolaryngologist is suggested to have influenced survey responses. The study had also observed an association between increasing years of experience and knowledge and confidence in EBP. The study agreed with the notion suggested by McEvoy et al. (2010b) and McEvoy et al. (2011) that more

experience in clinical practice may provide a platform for increased exposure to EBP therefore, reinforcing its approach.

Although previous literature suggests that evidence-based CPGs developed in high-income countries may not be appropriate for the South African context (Brueton et al., 2010; Dizon et al., 2016; Dizon et al., 2017), the researcher observed adherence towards EBP and CPGs (Bhattacharyya et al., 2017) in the diagnosis and management of p-BPPV. Outcomes of the current study, together with future findings may inform the curricula of higher education programmes, the development and dissemination of context appropriate, evidence-based CPG's.

References

- Adams, L. A., & Callahan, T. (2014). Research ethics. Retrieved on September 18, 2018, from <https://depts.washington.edu/bhdept/ethics-medicine/bioethics-topics/articles/research-ethics>
- African National Congress [ANC]. (1994). *National health plan for South Africa*. Johannesburg, South Africa: Umanyano Publications.
- Aguirre-Raya, K. A., Castilla-Peón, M. F., Barajas-Nava, L. A., Torres-Rodríguez, V., Muñoz-Hernández, O., & Garduño-Espinosa, J. (2016). Self-perception and knowledge of evidence based medicine by physicians. *BMC Medical Education*, 16(1), 166. doi:10.1186/s12909-016-0681-6
- Al-Lawama, M. (2016). How to implement medical evidence into practice in developing countries. *International Journal of Medical Education*, 7, 320-321. doi:10.5116/ijme.57b8.9002
- Al-Malky, G., Cane, D., Morgan, K., Randomskij, P., Rutkowskij, R., West, P., & Wilkinson, A. (2016). *Recommended procedure: positioning tests*. West Lothian, Scotland: British Society of Audiology.
- Alhaidary, A. (2020). Evidence-based practice patterns among speech-language pathologists and audiologists in Saudi Arabia. *Communication Disorders Quarterly*, 41(4), 242-249.
- Allen, D., & Harkins, K. (2005). Too much guidance? *The Lancet (British Edition)*, 365(9473), 1768–1768. doi. 10.1016/s0140-6736(05)66578-6
- Allen, M. (2017). *The SAGE Encyclopedia of Communication Research Methods*. Thousand Oaks, California: SAGE Publications.
- Althubaiti, A. (2016). Information bias in health research: definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, 9, 211-217. doi:10.2147/JMDH.S104807
- American Academy of Audiology [AAA]. (2009). Position statement and clinical practice guidelines: ototoxicity monitoring. Retrieved on July 29, 2021, from https://oto/audiology-web.s3.amazonaws.com/migrated/OtoMonGuidelines.pdf_539974c40999c1.58842217.pdf
- American Academy of Audiology [AAA]. (2013). American Academy of Audiology clinical practice guidelines: pediatric amplification. Retrieved

on July 29, 2021, from https://audiology-web.s3.amazonaws.com/migrated/PediatricAmplificationGuidelines.pdf_539975b3e7e9f1.74471798.pdf

American Academy of Audiology [AAA]. (2019). Clinical practice guideline: cochlear implants. Retrieved on July 29, 2021, from <https://mk0audiologyotvgk5ps.kinstacdn.com/wp-content/uploads/2021/05/CochlearImplantPracticeGuidelines.pdf>

Amor-Dorado, J. C., Barreira-Fernández, M. P., Aran-Gonzalez, I., Casariego-Vales, E., Llorca, J., & González-Gay, M. A. (2012). Particle repositioning maneuver versus Brandt-Daroff exercise for treatment of unilateral idiopathic BPPV of the posterior semicircular canal: a randomized prospective clinical trial with short-and long-term outcome. *Otology & Neurotology*, 33(8), 1401-1407.

Andrade C. (2019). Multiple testing and protection against a Type 1 (false positive) error using the Bonferroni and Hochberg corrections. *Indian Journal of Psychological Medicine*, 41(1), 99–100. doi:10.4103/IJPSYM.IJPSYM_499_18

Arena, R., Goldberg, L., Ingersoll, C., Nichols-Larsen, D., & Shelledy, D. (2011). Research in the allied health professions: why fund it? A report of the ASAHP Research Committee. *Journal of Allied Health*, 40, 161-166.

Balatsouras, D. G., & Korres, S. G. (2012). Subjective Benign Paroxysmal Positional Vertigo. *Otolaryngology-Head & Neck Surgery*, 146(1), 98-103.

Bhattacharyya, N., Baugh, R. F., Orvidas, L., Barrs, D., Bronston, L. J., Cass, S., . . . Haidari, J. (2008). Clinical practice guideline: Benign Paroxysmal Positional Vertigo. *Otolaryngology-Head & Neck Surgery*, 139(5), 47-81.

Bhattacharyya, N., Gubbels, S. P., Schwartz, S. R., Edlow, J. A., El-Kashlan, H., Fife, T., . . . Corrigan, M. D. (2017). Clinical practice guideline: Benign Paroxysmal Positional Vertigo (Update). *Otolaryngology-Head & Neck Surgery*, 156(3), 1-47.

Bhaumik, S. (2017). Use of evidence for clinical practice guideline development. *Tropical Parasitology*, 7(2), 65-71. doi: 10.4103/tp.TP_6_17

- Birbeck, G. L., Wiysonge, C. S., Mills, E. J., Frenk, J. J., Zhou, X.-N., & Jha, P. (2013). Global health: the importance of evidence-based medicine. *BMC Medicine*, 11(1), 223. doi:10.1186/1741-7015-11-223
- Bisdorff, A., Von Brevern, M., Lempert, T., & Newman-Toker, D. E. (2009). Classification of vestibular symptoms: towards an international classification of vestibular disorders. *Journal of Vestibular Research: Equilibrium & Orientation*, 19(1-2), 1–13. doi:10.3233/VES-2009-0343
- Blohm, A. (2013). *A survey of audiologists' clinical practices and their formal education and training in the assessment and management of adults with vestibular pathologies* (Doctoral dissertation). Towson University, United States of America.
- Boisvert, I., Clemesha, J., Lundmark, E., Crome, E., Barr, C., & McMahon, C. M. (2017). Decision-making in audiology: balancing evidence-based practice and patient-centered care. *Trends in Hearing*, 21, 653-664. doi:10.1177/2331216517706397
- Bornman, E. (2016). Information society and digital divide in South Africa: results of longitudinal surveys. *Information, Communication & Society*, 19(2), 264-278. doi:10.1080/1369118X.2015.1065285
- Boyd, N., Pater, J., Ginsburg, A., & Myers, R. (1979). Observer variation in the classification of information from medical records. *Journal of Chronic Diseases*, 32(4), 327-332.
- Bressi, F., Vella, P., Casale, M., Moffa, A., Sabatino, L., Lopez, M. A., . . . Sterzi, S. (2017). Vestibular rehabilitation in Benign Paroxysmal Positional Vertigo: Reality or fiction? *International Journal of Immunopathology and Pharmacology*, 30(2), 113-122. doi:10.1177/0394632017709917
- British Medical Association [BMA]. (2018). Autonomy or self-determination. Retrieved on July 18, 2019, from <https://www.bma.org.uk/advice-and-support/ethics/medical-students/ethics-toolkit-for-medical-students/autonomy-or-self-determination>
- Brueton, V., Yogeswaran, P., Chandia, J., Mfenyana, K., Modell, B., Modell, M., & Nazareth, I. (2010). Primary care morbidity in Eastern Cape Province. *South African Medical Journal* 100(5), 309-312. doi:10.7196/samj.3427
- Buchanan, H. (2011). *Evidence-based practice in the occupational therapy profession in South Africa and the Western Cape*. (Doctoral dissertation

- (Occupational Therapy). Retrieved from Primo. (https://uct.primo.exlibrisgroup.com/permalink/27UCT_INST/2q8rfo/alm-a9910304641104041)
- Burger, R., Bredenkamp, C., Grobler, C., & van der Berg, S. (2012). Have public health spending and access in South Africa become more equitable since the end of apartheid? *Development Southern Africa*, 29(5), 681-703. doi:10.1080/0376835X.2012.730971
- Burger, R., & Christian, C. (2020). Access to health care in post-apartheid South Africa: availability, affordability, acceptability. *Health Economics, Policy and Law*, 15(1), 43-55. doi:10.1017/S1744133118000300
- Burton, M. J., Eby, T. L., & Rosenfeld, R. M. (2012). Extracts from the Cochrane Library: modifications of the Epley (canalith repositioning) maneuver for posterior canal Benign Paroxysmal Positional Vertigo. *Otolaryngology-Head & Neck Surgery*, 147(3), 407-411. only one hyphen
- Califano, L., Salafia, F., Mazzone, S., Melillo, M. G., & Califano, M. (2014). Anterior canal BPPV and apogeotropic posterior canal BPPV: two rare forms of vertical canalolithiasis. *Acta Otorhinolaryngologica Italica*, 34(3), 189-197.
- Campbell, R. M., Venn, T. J., & Anderson, N. M. (2018). Cost and performance tradeoffs between mail and internet survey modes in a nonmarket valuation study. *Journal of Environmental Management*, 210, 316-327. doi:10.1016/j.jenvman.2018.01.034
- Capraș, R.-D., Bulboacă, A. E., & Bolboacă, S. D. (2020). Evidence-based medicine self-assessment, knowledge, and integration into daily practice: a survey among Romanian physicians and comparison between trainees and specialists. *BMC Medical Education*, 20(1), 19. doi:10.1186/s12909-020-1933-z
- Casani, A. P., Nacci, A., Dallan, I., Panicucci, E., Gufoni, M., & Sellari-Franceschini, S. (2011). Horizontal semicircular canal Benign Paroxysmal Positional Vertigo: effectiveness of two different methods of treatment. *Audiology and Neurotology*, 16(3), 175-184.
- Casani, A. P., Navari, E., Albera, R., Agus, G., Asprella Libonati, G., Chiarella, G., . . . Califano, L. (2019). Approach to residual dizziness after successfully treated Benign Paroxysmal Positional Vertigo: effect of a

- polyphenol compound supplementation. *Clinical Pharmacology: Advances and Applications*, 11, 117-125. doi:10.2147/CPAA.S210763
- Chatterji, S., Byles, J., Cutler, D., Seeman, T., & Verdes, E. (2015). Health, functioning, and disability in older adults - present status and future implications. *The Lancet*, 385(9967), 563–575. doi:10.1016/S0140-6736(14)61462-8
- Cheung, K., ten Klooster, P., Smit, C., de Vries, H., & Pieterse, M. (2017). The impact of non-response bias due to sampling in public health studies: a comparison of voluntary versus mandatory recruitment in a Dutch national survey on adolescent health. *BMC Public Health*, 17(1), 276. doi:10.1186/s12889-017-4189-8
- Chiu, Y.-W., Weng, Y.-H., Lo, H.-L., Ting, H.-W., Hsu, C.-C., Shih, Y.-H., & Kuo, K. N. (2009). Physicians' characteristics in the usage of online database: A representative nationwide survey of regional hospitals in Taiwan. *Informatics for Health & Social Care*, 34(3), 127-135. doi:10.1080/17538150903102372
- Ciorba, A., Cogliandolo, C., Bianchini, C., Aimoni, C., Pelucchi, S., Skarżyński, P. H., & Hatzopoulos, S. (2019). Clinical features of Benign Paroxysmal Positional Vertigo of the posterior semicircular canal. *SAGE Open Medicine*. <https://doi.org/10.1177/2050312118822922>
- Clay-Williams, R., Hounsgaard, J., & Hollnagel, E. (2015). Where the rubber meets the road: using FRAM to align work-as-imagined with work-as-done when implementing clinical guidelines. *Implementation Science*, 10, 125-125. doi:10.1186/s13012-015-0317-y
- Daly, J. (2005). *Evidence-based medicine and the search for a science of clinical care* (Vol. 12). Berkeley: University of California Press.
- Dawes, M., Summerskill, W., Glasziou, P., Cartabellotta, A., Martin, J., Hopayian, K., . . . Osborne, J. (2005). Sicily statement on evidence-based practice. *BMC Medical Education*, 5(1), 1. doi:10.1186/1472-6920-5-1
- Department of Health. (2008). Annual national health plan 2008. Republic of South Africa: Department of Health.

- Department of Health [DoH]. (1976). Health professions Act 56 of 1974; regulations defining the scope of the profession of physiotherapy. (Government Gazette 5349). South Africa: Department of Health.
- Department of Health [DoH]. (1997). White Paper for the Transformation of the Health System in South Africa. (Government Gazette 7910). South Africa: Department of Health.
- Dizon, J., Grimmer, K., Louw, Q., Kredo, T., Young, T., & Machingaidze, S. (2016). South African Guidelines Excellence (SAGE): adopt, adapt, or contextualise? *South African Medical Journal*, 106(12), 1177-1178.
- Dizon, J., Grimmer, K., Louw, Q., Machingaidze, S., Parker, H., & Pillen, H. (2017). Barriers and enablers for the development and implementation of allied health clinical practice guidelines in South African primary healthcare settings: a qualitative study. *Health Research Policy and Systems*, 15(1), 79.
- Dlugaiczky, J., Thiemer, M., Neubert, C., Schorn, B. A., & Schick, B. (2018). The aVOR app increases medical students' competence in treating Benign Paroxysmal Positional Vertigo (BPPV). *Otology & Neurotology*, 39(5), 401-406.
- Duncombe, D. C. (2018). A multi-institutional study of the perceived barriers and facilitators to implementing evidence-based practice. *Journal of Clinical Nursing*, 27(5-6), 1216-1226. doi:10.1111/jocn.14168
- Dunlap, P. M., Khoja, S. S., Whitney, S. L., & Freburger, J. K. (2018). Assessment of physician adherence to guidelines for the diagnosis and treatment of Benign Paroxysmal Positional Vertigo in ambulatory care settings. *JAMA Otolaryngology–Head & Neck Surgery*, 144(9), 845-846.
- Elstein, A. S. (2004). On the origins and development of evidence-based medicine and medical decision making. *Inflammation Research*, 53(2), S184-S189. doi:10.1007/s00011-004-0357-2
- ENT Society. (2020). Patients. Retrieved on June 19, 2021, from <https://www.entsociety.co.za/Patients>
- Enuameh, Y. A. K. (2016). Riding a wave in developing countries: challenges and priorities for evidence based practice. *JBIM Evidence Synthesis*, 14(9), 1-2. doi:10.11124/jbisrir-2016-003086

- Epley J. M. (1992). The canalith repositioning procedure: for treatment of Benign Paroxysmal Positional Vertigo. *Otolaryngology-Head & Neck Surgery*, 107(3), 399–404. doi:10.1177/019459989210700310
- Fagan, J., & Jacobs, M. (2009). Survey of ENT services in Africa: need for a comprehensive intervention. *Global Health Action*, 2(1), 1932.
- Faralli, M., Lapenna, R., & Gambacorta, V. (2017). Resistant posterior semicircular canal BPPV with changing oculomotor pattern solved with mastoid vibration application. *Journal of Otolaryngology-Head & Neck Surgery*, 1(1), 1-3.
- Feinstein, A. R., & Di Massa, R. (1959). Prognostic significance of valvular involvement in acute rheumatic fever. *New England Journal of Medicine*, 260(20), 1001-1007. doi:10.1056/nejm195905142602002
- Fife, T. D. (2012). Positional dizziness. *CONTINUUM: Lifelong Learning in Neurology*, 18(5), 1060-1085. doi:10.1212/01.Con.0000418376.80099.24
- Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American Journal of Pharmaceutical Education*, 72(2), 43. doi:10.5688/aj720243
- Finotto, S., Carpanoni, M., Turrone, E. C., Camellini, R., & Mecugni, D. (2013). Teaching evidence-based practice: developing a curriculum model to foster evidence-based practice in undergraduate student nurses. *Nurse Education in Practice*, 13(5), 459-465. doi:10.1016/j.nepr.2013.03.021
- FitzGerald, C., Martin, A., Berner, D., & Hurst, S. (2019). Interventions designed to reduce implicit prejudices and implicit stereotypes in real world contexts: a systematic review. *BMC Psychology*, 7(1), 29. doi:10.1186/s40359-019-0299-7
- Gaede, B., & Versteeg, M. (2011). The state of the right to health in rural South Africa. *South African Health Review*, 2011(1), 99-106. doi:10.10520/EJC119080
- Gaur, S., Awasthi, S. K., Bhadouriya, S. K. S., Saxena, R., Pathak, V. K., & Bisht, M. (2015). Efficacy of Epley's maneuver in treating BPPV patients: a prospective observational study. *International Journal of Otolaryngology*, 2015, 487160. doi:10.1155/2015/487160

- Giannoni, B., Vannucchi, P., & Pagnini, P. (2005). Definition and classification of paroxysmal positional vertigo. *Audiological Medicine*, 3(1), 4-6.
- Glasziou, P., & Heneghan, C. (2008). Epley and the slow boat from research to practice. *Evidence Based Medicine*, 13(2), 34-35. doi:10.1136/ebm.13.2.34-a
- Goyet, S., Touch, S., Ir, P., Saman, S., Fassier, T., Frutos, R., . . . Barennes, H. (2015). Gaps between research and public health priorities in low income countries: evidence from a systematic literature review focused on Cambodia. *Implementation Science*, 10, 32. doi:10.1186/s13012-015-0217-1
- Greenhalgh, T. (2019). *How to Read a Paper: The Basics of Evidence-Based Medicine and Healthcare* (6th ed.). Hoboken, New Jersey: John Wiley & Sons, Incorporated.
- Griech, S. F., & Carroll, M. A. (2018). The use of mastoid vibration with canalith repositioning procedure to treat persistent Benign Paroxysmal Positional Vertigo: a case report. *Physiotherapy Theory & Practice*, 34(11), 894-899. doi:10.1080/09593985.2018.1425937
- Grill, E., Penger, M., & Kentala, E. (2016). Health care utilization, prognosis and outcomes of vestibular disease in primary care settings: systematic review. *Journal of Neurology*, 263(1), 36-44.
- Grimmer, K., Louw, Q., Dizon, J. M., van Niekerk, S. M., Ernstzen, D., & Wiysonge, C. (2018). Standardising evidence strength grading for recommendations from multiple clinical practice guidelines: a South African case study. *Implementation Science*, 13(1), 117. doi:10.1186/s13012-018-0803-0
- Groote Schuur Hospital Facility Board. About Groote Schuur Hospital. (2018). Retrieved on July 20, 2021, from <https://www.gshfb.co.za/groote-schuur-hospital/>
- Guideline International Network [GIN]. LMIC – low and middle income countries. (2020). Retrieved on June 19, 2020, from <https://g-i-n.net/working-groups/lmic>
- Guo, X.-D. (2011). Benign Paroxysmal Positional Vertigo. *Journal of Neurosciences in Rural Practice*, 2(1), 109-110.

- Guyatt, G. H. (1991). Evidence-based medicine. *American College of Physicians Journal Club*, 114, A-16.
- Hakkennes, S., & Dodd, K. (2008). Guideline implementation in allied health professions: a systematic review of the literature. *Quality and Safety in Health Care*, 17(4), 296-300. doi:10.1136/qshc.2007.023804
- Halker, R. B., Barrs, D. M., Wellik, K. E., Wingerchuk, D. M., & Demaerschalk, B. M. (2008). Establishing a diagnosis of Benign Paroxysmal Positional Vertigo through the Dix-Hallpike and side-lying maneuvers: a critically appraised topic. *The Neurologist*, 14(3), 201-204.
- Hall, S., Ruby, R., & McClure, J. (1979). The mechanics of Benign Paroxysmal Positional Vertigo. *The Journal of Otolaryngology*, 8(2), 151-158.
- Hamid, M. A. (2010). The scope of practice of auditory and vestibular medicine. *Current Opinion in Otolaryngology & Head and Neck Surgery*, 18(5), 405-406.
- Hamman, M. (2015). *The characteristics of individuals which influence vestibular therapy outcomes: a retrospective record review*. (Doctoral dissertation), University of Witswatersrand, Johannesburg.
- Hanley, K., & O' Dowd, T. (2002). Symptoms of vertigo in general practice: a prospective study of diagnosis. *The British Journal of General Practice*, 52(483), 809-812.
- Harding, K. E., Porter, J., Horne-Thompson, A., Donley, E., & Taylor, N. F. (2014). Not enough time or a low priority? Barriers to evidence-based practice for allied health clinicians. *Journal of Continuing Education in the Health Professions*, 34(4), 224-231. doi:10.1002/chp.21255
- Haynes, D. S., Resser, J. R., Labadie, R. F., Girasole, C. R., Kovach, B. T., Scheker, L. E., & Walker, D. C. (2002). Treatment of Benign Paroxysmal Positional Vertigo using the Semont maneuver: efficacy in patients presenting without nystagmus. *The Laryngoscope*, 112(5), 796-801. doi:10.1097/00005537-200205000-00006
- Health Professions Council of South Africa [HPCSA]. (2019). Statistics. Retrieved on February 20, 2020, from <https://www.hpcsa.co.za/Publications/Statistics>
- Heiwe, S., Kajermo, K. N., Tyni-Lenné, R., Guidetti, S., Samuelsson, M., Andersson, I.-L., & Wengström, Y. (2011). Evidence-based practice:

- attitudes, knowledge and behaviour among allied health care professionals. *International Journal for Quality in Health Care*, 23(2), 198-209. doi:10.1093/intqhc/mzq083
- Henry, J. A., Stewart, B. J., Griest, S., Kaelin, C., Zaugg, T. L., & Carlson, K. (2016). Multisite randomized controlled trial to compare two methods of tinnitus intervention to two control conditions. *Ear and Hearing*, 37(6), 346-359. doi:10.1097/aud.0000000000000330
- Heydari, A., Mazlom, S. R., Ranjbar, H., & Scurlock-Evans, L. (2014). A study of Iranian nurses' and midwives' knowledge, attitudes, and implementation of evidence-based practice: the time for change has arrived. *Worldviews on Evidence-Based Nursing*, 11(5), 325-331. doi:10.1111/wvn.12052
- Hilton, M. P., & Pinder, D. K. (2014). The Epley (canalith repositioning) manoeuvre for Benign Paroxysmal Positional Vertigo. *Cochrane Database of Systematic Reviews*, (2), CD003162. doi:10.1002/14651858.cd003162.pub2
- Hisham, R., Liew, S. M., & Ng, C. J. (2018). A comparison of evidence-based medicine practices between primary care physicians in rural and urban primary care settings in Malaysia: a qualitative study. *British Medical Journal*, 8(7), e018933. doi:10.1136/bmjopen-2017-018933
- Hlongwa, E. N., & Sibiya, M. N. (2019). Challenges affecting the implementation of the Policy on Integration of Mental Health Care into primary healthcare in KwaZulu-Natal province. *Curationis*, 42(1), 1-9. doi:10.4102/curationis.v42i1.1847
- Honda, A., Ryan, M., van Niekerk, R., & McIntyre, D. (2014). Improving the public health sector in South Africa: eliciting public preferences using a discrete choice experiment. *Health Policy and Planning*, 30(5), 600-611. doi:10.1093/heapol/czu038
- Hornibrook, J. (2011). Benign Paroxysmal Positional Vertigo (BPPV): history, pathophysiology, office treatment and future directions. *International Journal of Otolaryngology*, 2011, 1-13. doi:10.1155/2011/835671
- Hu, M.-Y., Wu, Y.-N., McEvoy, M. P., Wang, Y.-F., Cong, W.-L., Liu, L.-P., . . . Zhou, C.-L. (2020). Development and validation of the Chinese version of the evidence-based practice profile questionnaire (EBP2Q). *BioMed*

- Central Medical Education*, 20(1), 280-293. doi:10.1186/s12909-020-02189-z
- Ibekwe, T. S., & Rogers, C. (2012). Clinical evaluation of posterior canal Benign Paroxysmal Positional Vertigo. *Nigerian Medical Journal*, 53(2), 94-101. doi:10.4103/0300-1652.103550
- Jansen, A. C. M., van Aalst-Cohen, E. S., Hutten, B. A., Büller, H. R., Kastelein, J. J. P., & Prins, M. H. (2005). Guidelines were developed for data collection from medical records for use in retrospective analyses. *Journal of Clinical Epidemiology*, 58(3), 269-274. doi:10.1016/j.jclinepi.2004.07.006
- JB1. (2020). JB1 Collaboration. Retrieved on October 28, 2020, from <https://joannabriggs.org/global-reach/collaboration>
- Joubert, K., & Casoojee, A. (2013). Hearing-screening record-keeping practices at primary healthcare clinics in Gauteng. *The South African Journal of Communication Disorders*, 60, 27-30.
- Kei Long, C., ten Klooster, P. M., Smit, C., de Vries, H., Pieterse, M. E., & Cheung, K. L. (2017). The impact of non-response bias due to sampling in public health studies: a comparison of voluntary versus mandatory recruitment in a Dutch national survey on adolescent health. *BMC Public Health*, 17, 1-10. doi:10.1186/s12889-017-4189-8
- Kerber, K. A. (2015). Benign Paroxysmal Positional Vertigo: opportunities squandered. *Annals of the New York Academy of Sciences*, 1343, 106-112. doi:10.1111/nyas.12721
- Khammarnia, M., Haj Mohammadi, M., Amani, Z., Rezaeian, S., & Setoodehzadeh, F. (2015). Barriers to implementation of evidence based practice in Zahedan teaching hospitals, Iran, 2014. *Nursing Research and Practice*, 2015, 357140-357140. doi: 10.1155/2015/357140
- Hathiram, B., & Khattar, V. (2012). Videonystagmography. *Otorhinolaryngology Clinics*, 4, 17-24. doi:10.5005/jp-journals-10003-1084
- Khoza-Shangase, K. (2018). Vestibular function in a group of adults with HIV/AIDS on HAART. *African Journal of Infectious Diseases*, 12(1), 7-14.

- Khoza-Shangase, K., Sebothoma, B., & Seedat, T. (2020). Vestibular assessment and management in adults: South African audiologists' expressed level of confidence and knowledge explored. *Hearing, Balance and Communication*, 18(1), 55-60. doi: 10.1080/21695717.2019.1630981
- Kim, J. S., Oh, S.-Y., Lee, S.-H., Kang, J. H., Kim, D. U., Jeong, S.-H., . . . Kim, H. J. (2012). Randomized clinical trial for geotropic horizontal canal Benign Paroxysmal Positional Vertigo. *Neurology*, 79(7), 700-707. doi:10.1212/WNL.0b013e3182648b8b
- Kinsinger, F. S. (2009). Beneficence and the professional's moral imperative. *Journal of Chiropractic Humanities*, 16(1), 44-46. doi:10.1016/j.echu.2010.02.006
- Kochkin, S., Beck, D., Christensen, L., Compton-Conley, C., Fligor, B., Kricos, P., . . . Turner, R. (2010). MarkeTrak VIII: the impact of the hearing healthcare professional on hearing aid user success: correlations between dispensing protocols and successful patient outcomes. *The Hearing Review*, 17(4), 12–34.
- Kollapen, J. J., Carnelly, M., Jaichand, V., & Lawrence, M. I. (2017). Issue paper 33, project 141, medico-legal claims. South African Law Reform Commission, Cape Town, South Africa.
- Kornblau, B. L., & Burkhardt, A. (2012). *Ethics in rehabilitation: a clinical perspective* (2 ed.). Thorofare, New Jersey: Slack Incorporated.
- Kruger, M., Rogers, J., Stout, C. E., Burra, H., & Richardson J. (2011). Report of international workers' compensation survey. In C. E. Stout, M. Kruger, & J. Rogers (Eds.), *Current perspectives in clinical treatment and management in workers compensation cases*. eBook: Bentham Science Publishers. (eISBN: 978-1-60805-251-6).
- KwaZulu-Natal Department of Health. (2014). Referral system: levels of healthcare. Retrieved June 15, 2020, from <http://www.kznhealth.gov.za/Referral-system.htm>
- Lafuente-Lafuente, C., Leitaó, C., Kilani, I., Kacher, Z., Engels, C., Canoui-Poitaine, F., & Belmin, J. (2019). Knowledge and use of evidence-based medicine in daily practice by health professionals: a cross-sectional survey. *BMJ Open*, 9(3), e025224. doi:10.1136/bmjopen-2018-025224

- Lai, N., & Ramesh, J. (2006). The product of outcome-based undergraduate medical education: competencies and readiness for internship. *Singapore Medical Journal*, 47(12), 1053-1062.
- Lai, N. M., & Teng, C. L. (2011). Self-perceived competence correlates poorly with objectively measured competence in evidence based medicine among medical students. *BioMed Central Medical Education*, 11(1), 1-8. doi:10.1186/1472-6920-11-25
- Lai, N. M., Teng, C. L., & Lee, M. L. (2010). The place and barriers of evidence based practice: knowledge and perceptions of medical, nursing and allied health practitioners in malaysia. *BMC Research Notes*, 3(279), 1-8. doi:10.1186/1756-0500-3-279
- Laine, C., Taichman, D. B., & Mulrow, C. (2011). Trustworthy clinical guidelines. *Annals of Internal Medicine*, 154(11), 774-775.
- Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* (Vol. 1). California, United States of America: SAGE Publications, Inc.
- Lee, M. (2017). Social workers' evidence-based practice use and challenges in rural environments: a systematic review. *Contemporary Rural Social Work Journal*, 9(1), 14. Retrieved on June 12, 2019, from https://digitalcommons.murraystate.edu/crsf/vol9/iss1/14?utm_source=digitalcommons.murraystate.edu%2Fcrsf%2Fvol9%2Fiss1%2F14&utm_medium=PDF&utm_campaign=PDFCoverPages
- Leone, M., Ragonnet, B., Alonso, S., Allaouchiche, B., Constantin, J.-M., Jaber, S., . . . Group, A. (2012). Variable compliance with clinical practice guidelines identified in a 1-day audit at 66 French adult intensive care units. *Critical Care Medicine*, 40(12), 3189-3195.
- Liu, D.-H., Kuo, C.-H., Wang, C.-T., Chiu, C.-C., Chen, T.-J., Hwang, D.-K., & Kao, C.-L. (2017). Age-related increases in Benign Paroxysmal Positional Vertigo are reversed in women taking estrogen replacement therapy: a population-based study in Taiwan. *Frontiers in Aging Neuroscience*, 9, 404. doi: 10.3389/fnagi.2017.00404
- López-Escámez, J., Lopez-Nevot, A., Gamiz, M., Moreno, P., Bracero, F., Castillo, J., & Salinero, J. (2000). Diagnosis of common causes of vertigo using a structured clinical history. *Acta Otorrinolaringologica Espanola*, 51(1), 25-30. López-Escámez, J. A., Carey, J., Chung, W. H., Goebel, J.

- A., Magnusson, M., Mandalà, M., Newman-Toker, D. E., Strupp, M., Suzuki, M., Trabalzini, F., Bisdorff, A., Classification Committee of the Barany Society., Japan Society for Equilibrium Research., European Academy of Otolaryngology and Neurotology (EAONO)., Equilibrium Committee of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS)., & Korean Balance Society. (2015). Diagnostic criteria for Menière's Disease. *Journal of Vestibular Research*, 25(1), 1–7. doi: 10.3233/VES-150549
- Louw, C., Swanepoel, W., Eikelboom, R. H., & Hugo, J. (2018). Prevalence of hearing loss at primary health care clinics in South Africa. *African Health Sciences*, 18(2), 313–320. doi:10.4314/ahs.v18i2.16
- Lyons, C., Brown, T., Tseng, M. H., Casey, J., & McDonald, R. (2011). Evidence-based practice and research utilisation: perceived research knowledge, attitudes, practices and barriers among Australian paediatric occupational therapists. *Australian Occupational Therapy Journal*, 58(3), 178-186. doi:10.1111/j.1440-1630.2010.00900.x
- Ma, A. K., Nedzelski, J., Chen, J., Le, T., Mick, P., Lea, J., . . . Parnes, L. (2019). Otolaryngology/neurotology recommendations – Choosing Wisely campaign. *Journal of Otolaryngology-Head & Neck Surgery*, 48(1), 1-3.
- Machin, D., & Campbell, M. J. (2005). *The design of studies for medical research*. Chichester, England: John Wiley & Sons Ltd.
- Maggio, L. A., Tannery, N. H., Chen, H. C., Cate, O. t., & O'Brien, B. (2013). Evidence-based medicine training in undergraduate medical education: a review and critique of the literature published 2006–2011. *Academic Medicine*, 88(7), 1022 - 1028.
- Mahlali, P., & Dlamini, J. (2015). Minimum data sets for human resources for health and the surgical workforce in South Africa's health system: a rapid migration of stock analysis. Retrieved on June 12, 2019, from https://www.who.int/workforcealliance/031616south_africa_case_studiesweb.pdf
- Majid, S., Foo, S., Luyt, B., Xue, Z., Yin-Leng, T., Yun-Ke, C., & Mokhtar, I. A. (2011). Adopting evidence-based practice in clinical decision making: nurses' perceptions, knowledge, and barriers. *Journal of the Medical Library Association*, 99(3), 229-236. doi:10.3163/1536-5050.99.3.010

- Mandalà, M., Pepponi, E., Santoro, G. P., Cambi, J., Casani, A., Faralli, M., . . . Nuti, D. (2013). Double-blind randomized trial on the efficacy of the Gufoni maneuver for treatment of lateral canal BPPV. *The Laryngoscope*, 123(7), 1782-1786. doi:10.1002/lary.23918
- Manns, P. J., Norton, A. V., & Darrah, J. (2015). Cross-Sectional study to examine evidence-based practice skills and behaviors of physical therapy graduates: is there a knowledge-to-practice gap? *Physical Therapy*, 95(4), 568-578. doi:10.2522/ptj.20130450
- Maphumulo, W. T., & Bhengu, B. R. (2019). Challenges of quality improvement in the healthcare of South Africa post-apartheid: a critical review. *Curationis*, 42(1), 1-9. doi:10.4102/curationis.v42i1.1901
- Marsden, J., Pavlou, M., Dennett, R., Gibbon, A., Knight-Lozano, R., Jeu, L., . . . Creanor, S. (2020). Vestibular rehabilitation in multiple sclerosis: study protocol for a randomised controlled trial and cost-effectiveness analysis comparing customised with booklet based vestibular rehabilitation for vestibulopathy and a 12 month observational cohort study of the symptom reduction and recurrence rate following treatment for Benign Paroxysmal Positional Vertigo. *BMC Neurology*, 20(1), 430. doi:10.1186/s12883-020-01983-y
- Marten, R., McIntyre, D., Travassos, C., Shishkin, S., Longde, W., Reddy, S., & Vega, J. (2014). An assessment of progress towards universal health coverage in Brazil, Russia, India, China, and South Africa (BRICS). *The Lancet*, 384(9960), 2164-2171. doi:10.1016/S0140-6736(14)60075-1
- Mendelson, M., Boloko, L., Boutall, A., Cairncross, L., Calligaro, G., Coccia, C., Dave, J. A., De Villiers, M., Dlamini, S., Frankenfeld, P., Gina, P., Gule, M. V., Hoare, J., Hofmeyr, R., Hsiao, M., Joubert, I., Kahn, T., Krause, R., Kroopman, A., ... Schuur Hospital Covid-Response Team, O. B. O. T. G. (2020). Clinical management of COVID-19: Experiences of the COVID-19 epidemic from Groote Schuur Hospital, Cape Town, South Africa. *South African Medical Journal*, 110(10), 973–981. doi:10.7196/SAMJ.2020.v110i10.15157
- McCambridge, J., Witton, J., & Elbourne, D. R. (2014). Systematic review of the Hawthorne effect: new concepts are needed to study research

- participation effects. *Journal of Clinical Epidemiology*, 67(3), 267-277. doi:10.1016/j.jclinepi.2013.08.015
- McEvoy, M. P., Williams, M. T., & Olds, T. S. (2010a). Development and psychometric testing of a trans-professional evidence-based practice profile questionnaire. *Medical Teacher*, 32(9), 373-380.
- McEvoy, M. P., Williams, M. T., & Olds, T. S. (2010b). Evidence based practice profiles: differences among allied health professions. *BMC Medical Education*, 10(1), 69. doi: 10.1186/1472-6920-10-69
- McEvoy, M. P., Williams, M. T., Olds, T. S., Lewis, L. K., & Petkov, J. (2011). Evidence-based practice profiles of physiotherapists transitioning into the workforce: a study of two cohorts. *BMC Medical Education*, 11(1), 100. doi:10.1186/1472-6920-11-100
- McIntosh, M. J., & Morse, J. M. (2015). Situating and constructing diversity in semi-structured interviews. *Global Qualitative Nursing Research*, 2. doi:10.1177/2333393615597674
- Melnyk, B. M. (2015). Important information about clinical practice guidelines: key tools for improving quality of care and patient outcomes. *Worldviews on Evidence-Based Nursing*, 12(1), 1-2. doi:10.1111/wvn.12079
- Melnyk, B. M., Fineout-Overholt, E., Gallagher-Ford, L., & Kaplan, L. (2012). The state of evidence-based practice in US nurses: critical implications for nurse leaders and educators. *The Journal of Nursing Administration*, 42(9), 410-417.
- Michael, P., Muñoz, D., Tuma, A., Gárate, M., Barraza, C., Nuñez, M., & Breinbauer, H. A. (2019). A Chair-based Abbreviated Repositioning Maneuver (ChARM) for fast treatment of posterior BPPV. *European Archives of Oto-rhino-laryngology*, 276(8), 2191–2198. doi: 10.1007/s00405-019-05460-2
- Melnyk, B. M., Fineout-Overholt, E., Stillwell, S. B., & Williamson, K. M. (2010). Evidence-based practice: step by step: the seven steps of evidence-based practice. *The American Journal of Nursing*, 110(1), 51-53.
- Monitor Group. (2008). *Health Systems Comparison Project*. Cambridge, England: Mimeo.
- Moodie, S. T., Kothari, A., Bagatto, M. P., Seewald, R., Miller, L. T., & Scollie, S. D. (2011). Knowledge translation in audiology: promoting the clinical

- application of best evidence. *Trends in Amplification*, 15(1), 5-22. doi:10.1177/1084713811420740
- Mordkoff, J. T. (2016). The assumption(s) of normality. Retrieved on September 1, 2019, from <http://www2.psychology.uiowa.edu/faculty/mordkoff/GradStats/part%201/I.07%20normal.pdf>
- Mulwafu, W., Ensink, R., Kuper, H., & Fagan, J. (2017). Survey of ENT services in sub-Saharan Africa: little progress between 2009 and 2015. *Global Health Action*, 10(1), 1289736. doi:10.1080/16549716.2017.1289736
- Munoz, J. E., Miklea, J. T., Howard, M., Springate, R., & Kaczorowski, J. (2007). Canalith repositioning maneuver for Benign Paroxysmal Positional Vertigo: randomized controlled trial in family practice. *Canadian Family Physician*, 53(6), 1049-1048.
- Musbahi, O., Aydin, A., Al Omran, Y., Skilbeck, C. J., & Ahmed, K. (2017). Current status of simulation in Otolaryngology: a systematic review. *Journal of Surgical Education*, 74(2), 203-215. doi:10.1016/j.jsurg.2016.09.007
- Mutshatshi, T. E., Mothiba, T. M., Mamogobo, P. M., & Mbombi, M. O. (2018). Record-keeping: challenges experienced by nurses in selected public hospitals. *Curationis*, 41(1), 1-6. doi:10.4102/curationis.v41i1.1931
- Myezwa, H., & van Niekerk, M. (2013). National Health Insurance implications for rehabilitation professionals and service delivery. *South African Journal of Physiotherapy*, 69(4), 3–9. doi:10.4102/sajp.v69i4.372
- Naledi, T., Schneider, H., & Barron, P. (2011). Primary health care in SA since 1994 and implications of the new vision for PHC re-engineering. *South African Health Review*, 2011(1), 17-28.
- Neuhauser, H. K. (2016). The epidemiology of dizziness and vertigo. *Handbook of Clinical Neurology*, 137, 67-82. doi:10.1016/b978-0-444-63437-5.00005-4
- Nunez, R. A., Cass, S. P., & Furman, J. M. (2000). Short-and long-term outcomes of canalith repositioning for Benign Paroxysmal Positional Vertigo. *Otolaryngology—Head & Neck Surgery*, 122(5), 647-652.
- Nyumba, T., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application

- in conservation. *Methods in Ecology and Evolution*, 9(1), 20-32. doi:10.1111/2041-210X.12860
- Odeh, L. E. (2010). A comparative analysis of global north and global south economies. *Journal of Sustainable Development in Africa*, 12(3), 1-12.
- Olswang, L. B., & Prelock, P. A. (2015). Bridging the gap between research and practice: implementation science. *Journal of Speech, Language & Hearing Research*, 58(6), 1818-1826. doi: 10.1044/2015_JSLHR-L-14-0305
- Organ, B., Liu, H., & Bromwich, M. (2015). An iPhone-assisted particle repositioning maneuver for Benign Paroxysmal Positional Vertigo (BPPV): a prospective randomized study. *The Journal of the American Board of Family Medicine*, 28(1), 118-120.
- Ozga, D., Jędrzejczyk-Cwanek, M., Woźniak, K., Niemczyk, E., & Mędrzycka-Dąbrowska, W. (2019). Knowledge, behaviors, and attitudes of Polish nurses as compared with evidence-based practice in relation to the guidelines of the European Resuscitation Council. *Global Advances in Health and Medicine*, 8. doi:10.1177/2164956119897566
- Padarath, A., Ntuli, A., & Berthiaume, L. (2004). Human Resources. South African Health Review 2003/04. Retrieved on December 02, 2019, from www.hst.org.za/publications/423
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health*, 42(5), 533–544. doi:10.1007/s10488-013-0528-y
- Panczyk, M., Belowska, J., Zarzeka, A., Samoliński, Ł., Żmuda-Trzebiatowska, H., & Gotlib, J. (2017). Validation study of the Polish version of the Evidence-Based Practice Profile Questionnaire. *BMC Medical Education*, 17(1), 38. doi:10.1186/s12909-017-0877-4
- Pantilat, S. (2008). Beneficence vs. nonmaleficence. Retrieved on August 5, 2018, from http://missinglink.ucsf.edu/lm/ethics/content%20pages/fast_fact_bene_nonmal.htm

- Pascoe, M., & Norman, V. (2011). Contextually-relevant resources in Speech-language Therapy and Audiology in South Africa: are there any? *South African Journal of Communication Disorders*, 58(1), 1-5. doi:10.4102/sajcd.v58i1.35
- Pecáková, I. (2016). Pitfalls of quantitative surveys online. *Acta Oeconomica Pragensia*, 24(6), 3-15.
- Peer, S. (2013). Otorhinolaryngology - not just tonsils and grommets: Insights into the ENT scene in South Africa. *South African Medical Journal*, 103, 455-457.
- Peer, S., & Fagan, J. (2012). Do South African universities provide the required training platforms for otolaryngology specialist training? *South African Medical Journal*, 102(8), 691-692.
- Pérez-Vázquez, P., & Franco-Gutiérrez, V. (2017). Treatment of Benign Paroxysmal Positional Vertigo: a clinical review. *Journal of Otology*, 12(4), 165-173. doi:10.1016/j.joto.2017.08.004
- Pérez, P., Manrique, C., Álvarez, M. J., Aldama, P., Álvarez, J. C., Luisa Fernández, M., & Méndez, J. C. (2008). Evaluation of Benign Paroxysmal Positional Vertigo in primary health-care and first level specialist care. *Acta Otorrinolaringologica*, 59(6), 277-282. doi:10.1016/S2173-5735(08)70238-2
- Perneger, T. V., Chamot, E., & Bovier, P. A. (2005). Nonresponse bias in a survey of patient perceptions of hospital care. *Medical Care*, 43(4), 374-380.
- Phillips, J. S., Mallinson, A. I., & Hamid, M. A. (2011). Cost-effective evaluation of the vestibular patient. *Current Opinion in Otolaryngology & Head and Neck Surgery*, 19(5), 403-409. doi:10.1097/MOO.0b013e32834aba84
- Pillay-van Wyk, V., Msemburi, W., Laubscher, R., Dorrington, R. E., Groenewald, P., Glass, T., . . . Bradshaw, D. (2016). Mortality trends and differentials in South Africa from 1997 to 2012: second National Burden of Disease Study. *The Lancet Global Health*, 4(9), 642-653. doi:10.1016/S2214-109X(16)30113-9
- Pillay, M., & Kathard, H. (2015). Decolonizing health professionals' education : audiology & speech therapy in South Africa. *African Journal of Rhetoric*, 7, 193-227.

- Pillay, M., Tiwari, R., Kathard, H., & Chikte, U. (2020). Sustainable workforce: South African Audiologists and Speech Therapists. *Human Resources for Health*, 18(1), 47. doi:10.1186/s12960-020-00488-6
- Polensek, S. H., & Tusa, R. (2009). Unnecessary diagnostic tests often obtained for Benign Paroxysmal Positional Vertigo. *International Medical Journal of Experimental and Clinical Research*, 15(7), 89–94.
- Polensek, S. H., Sterk, C. E., & Tusa, R. J. (2008). Screening for vestibular disorders: a study of clinicians' compliance with recommended practices. *International Medical Journal of Experimental and Clinical Research*, 14(5), 238–242.
- Polensek, S. H., Tusa, R. J., & Sterk, C. E. (2009). The challenges of managing vestibular disorders: a qualitative study of clinicians' experiences associated with low referral rates for vestibular rehabilitation. *International Journal of Clinical Practice*, 63(11), 1604–1612. doi:10.1111/j.1742-1241.2009.02104.x
- Puustjärvi, J., & Puustjärvi, L. (2015). *Practicing evidence-based medicine in developing countries*. Paper presented at the 2015 IST-Africa Conference, Lilongwe, Malawi.
- Qaseem, A., Forland, F., Macbeth, F., Ollenschläger, G., Phillips, S., & van der Wees, P. (2012). Guidelines International Network [GIN]: toward international standards for clinical practice guidelines. *Annals of Internal Medicine*, 156(7), 525-531.
- Ralston, M., Schatz, E., Naidoo, N., & Kowal, P. (2018). Including older adults in development goals: is subjective wellbeing the answer? A case study of older South Africans. *Journal of Development Studies*, 54(4), 702-718. doi:10.1080/00220388.2017.1311406
- Reid, S. (2002). Community service for health professionals: human resources. *South African Health Review*, 2002, 135-160.
- Ribeiro, K. M. O. B. d. F., Freitas, R. V. d. M., Ferreira, L. M. d. B. M., Deshpande, N., & Guerra, R. O. (2017). Effects of balance vestibular rehabilitation therapy in elderly with Benign Paroxysmal Positional Vertigo: a randomized controlled trial. *Disability and Rehabilitation*, 39(12), 1198-1206.

- Rodrigues, D. L., Ledesma, A. L. L., de Oliveira, C. A. P., & Bahamad Júnior, F. (2018). Physical therapy for posterior and horizontal canal Benign Paroxysmal Positional Vertigo: long-term effect and recurrence: a systematic review. *International Archives of Otorhinolaryngology*, 22(4), 455-459.
- Rogers, M., & Darbyshire, P. (2019). The EBP lockout. what clinicians need to put the “E” into EBP. *Journal of Clinical Nursing*, 28(17-18), 3045-3048. doi:10.1111/jocn.14902
- Sackett, D. L., Rosenberg, W. M., Gray, J. M., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: what it is and what it isn't. *British Medical Journal*, 312, 71-72.
- Sadler, G. R., Lee, H. C., Lim, R. S. H., & Fullerton, J. (2010). Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nursing & Health sciences*, 12(3), 369-374.
- Saleh, A., & Bista, K. (2017). Examining factors impacting online survey response rates in educational research: perceptions of graduate students. *Journal of MultiDisciplinary Evaluation*, 13(29), 63-74.
- Schoonees, A., Rohwer, A., & Young, T. (2017). Evaluating evidence-based health care teaching and learning in the undergraduate human nutrition; occupational therapy; physiotherapy; and speech, language and hearing therapy programs at a sub-Saharan African academic institution. *PloS One*, 12(2), e0172199. doi:10.1371/journal.pone.0172199
- Scurlock-Evans, L., Upton, P., & Upton, D. (2014). Evidence-based practice in physiotherapy: a systematic review of barriers, enablers and interventions. *Physiotherapy*, 100(3), 208-219. doi: 10.1016/j.physio.2014.03.001
- Seedat, T., Khoza-Shangase, K., & Sebothoma, B. (2018). Vestibular assessment and management in adults: current practice by South African audiologists. *Hearing, Balance and Communication*, 16(2), 88-100. doi:10.1080/21695717.2018.1463757
- Shah, R. K., Preciado, D. A., & Zalzal, G. H. (2013). *Otolaryngology for the Pediatrician*. Seattle, Washington: Bentham Science Publishers.

- Shaw, G. (2012). Cover story: searching for answers why don't audiologists use best practice guidelines? *The Hearing Journal*, 65(5), 12-14. doi:10.1097/01.HJ.0000414380.97740.c2
- Smith, R., & Rennie, D. (2014). Evidence-based medicine — an oral history. *Journal of the American Medical Association*, 311(4), 365-367. doi:10.1001/jama.2013.286182
- Socher, D. D., Socher, J. A., & Azzi, V. J. B. (2012). Evaluation of the quality of life of patients with Benign Paroxysmal Positional Vertigo associated with Ménière's disease before and after vestibular rehabilitation. *International Archives of Otorhinolaryngology*, 16, 430-436.
- Song, C. I., Kang, B. C., Yoo, M. H., Chung, J. W., Yoon, T. H., & Park, H. J. (2015). Management of 210 patients with Benign Paroxysmal Positional Vertigo: AMC protocol and outcomes. *Acta Oto-laryngologica*, 135(5), 422-428. doi:10.3109/00016489.2014.993089
- Soto Varela, A., Bartual Magro, J., Santos Pérez, S., Vélez Regueiro, M., Lechuga García, R., Pérez-Carro Ríos, A., & Caballero, L. (2001). Benign paroxysmal vertigo: a comparative prospective study of the efficacy of Brandt and Daroff exercises, Semont and Epley maneuver. *Revue de Laryngologie - Otologie - Rhinologie*, 122(3), 179-183.
- Spencer, L. M., Schooley, M. W., Anderson, L. A., Kochtitzky, C. S., DeGross, A. S., Devlin, H. M., & Mercer, S. L. (2013). Seeking best practices: a conceptual framework for planning and improving evidence-based practices. *Preventing Chronic Disease*, 10, 207. doi:10.5888/pcd10.130186
- Statistics South Africa. (2018). *General Household Survey 2018*. Pretoria, South Africa: Stats SA.
- Statistics South Africa. (2020). Protecting South Africa's elderly. Retrieved on March 03, 2021, from <http://www.statssa.gov.za/?p=13445>
- Stucki, G., Bickenbach, J., Gutenbrunner, C., & Melvin, J. (2018). Rehabilitation: The health strategy of the 21st century. *Journal of Rehabilitation Medicine*, 50(4), 309–316. doi:10.2340/16501977-2200
- Sur, R. L., & Dahm, P. (2011). History of evidence-based medicine. *Indian Journal of Urology*, 27(4), 487-489. doi:10.4103/0970-1591.91438

- Swanepoel, D. W. (2006). Audiology in South Africa. *International Journal of Audiology*, 45(5), 262-266.
- Taba, P., Rosenthal, M., Habicht, J., Tarien, H., Mathiesen, M., Hill, S., & Bero, L. (2012). Barriers and facilitators to the implementation of clinical practice guidelines: a cross-sectional survey among physicians in Estonia. *BMC Health Services Research*, 12(1), 455. doi:10.1186/1472-6963-12-455
- Tacia, L., Biskupski, K., Pheley, A., & Lehto, R. H. (2015). Identifying barriers to evidence-based practice adoption: a focus group study. *Clinical Nursing Studies*, 3(2), 90-96.
- Terre Blanche, M. T., Durrheim, K., & Painter, D. (2014). *Research in practice: Applied methods for the social sciences*. Cape Town, South Africa: UCT Press.
- The World Bank. (2019). Classifying countries by income. Retrieved on March 03, 2021, from <https://datatopics.worldbank.org/world-development-indicators/stories/the-classification-of-countries-by-income.html#:~:text=As%20of%201%20July%202019,between%20%243%2C996%20and%20%2412%2C375%3B%20high%2D>
- Thorén, E. S., Öberg, M., Wänström, G., Andersson, G., & Lunner, T. (2014). A randomized controlled trial evaluating the effects of online rehabilitative intervention for adult hearing-aid users. *International Journal of Audiology*, 53(7), 452-461. doi:10.3109/14992027.2014.892643
- Tiffen, J., Corbridge, S. J., & Slimmer, L. (2014). Enhancing clinical decision making: development of a contiguous definition and conceptual framework. *Journal of Professional Nursing*, 30(5), 399-405. doi:10.1016/j.profnurs.2014.01.006
- Treweek, S., Oxman, A. D., Alderson, P., Bossuyt, P. M., Brandt, L., Brožek, J., . . . Consortium, D. (2013). Developing and evaluating communication strategies to support informed decisions and practice based on evidence (DECIDE): protocol and preliminary results. *Implementation Science*, 8, 6. doi:10.1186/1748-5908-8-6
- Tunkel, D. E., Bauer, C. A., Sun, G. H., Rosenfeld, R. M., Chandrasekhar, S. S., Cunningham, E. R., ... Whamond, E. J. (2014). Clinical practice

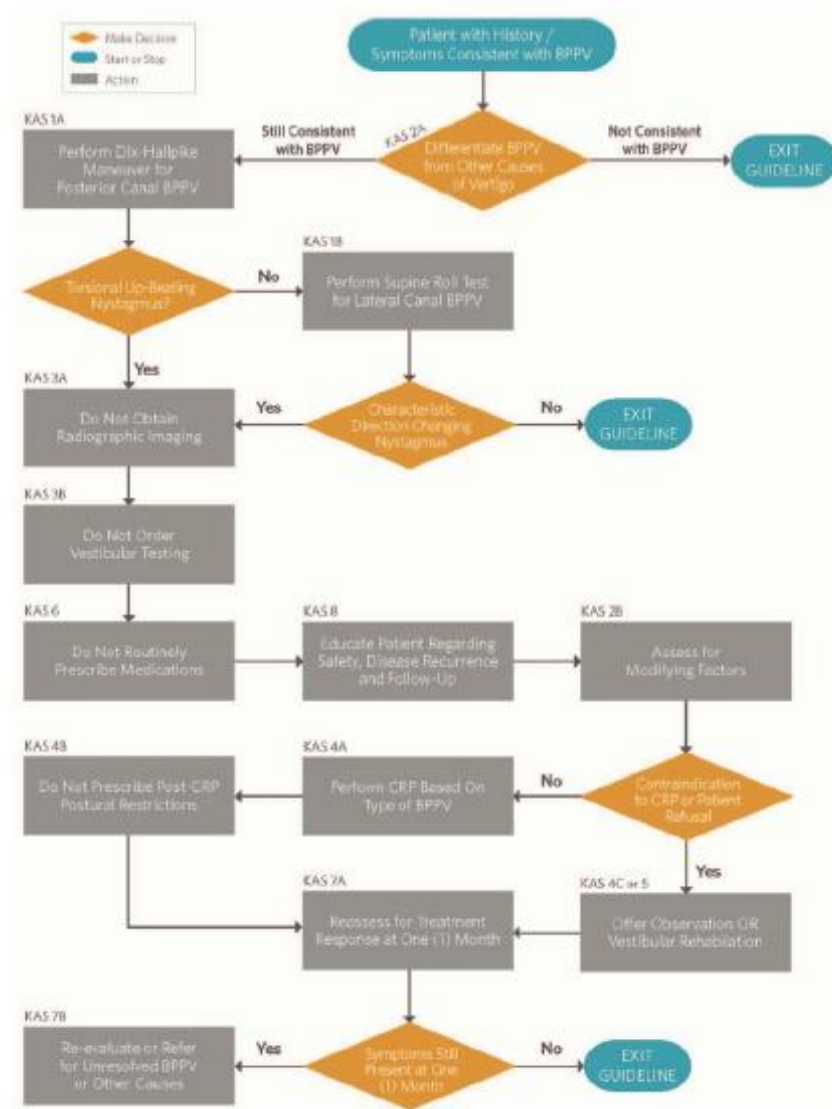
- guideline: Tinnitus. *Otolaryngology–Head and Neck Surgery*, 151(2I), 1–40. doi:10.1177/0194599814545325
- Ulyte, A., Valančius, D., Masiliūnas, R., Paškonienė, A., Lesinskas, E., Kaski, D., . . . Ryliškienė, K. (2019). Diagnosis and treatment choices of suspected Benign Paroxysmal Positional Vertigo: current approach of general practitioners, neurologists, and ENT physicians. *European Archives of Oto-Rhino-Laryngology*, 276(4), 985-991.
- UNICEF. (2019). 2018/19 Health budget brief: South Africa. Retrieved on September 29, 2020, from <https://www.unicef.org/esa/sites/unicef.org/esa/files/2019-03/UNICEF-South-Africa-2018-Health-Budget-Brief.pdf>
- United Nations. (2006). Convention on the Rights of Persons with Disabilities, Retrieved on January 19, 2019, from <http://www.un.org/esa/socdev/enable/rights/convtexte.htm>.
- Uz, U., Uz, D., Akdal, G., & Celik, O. (2019). Efficacy of Epley maneuver on quality of life of elderly patients with subjective BPPV. *The Journal of the International Advanced Otology*, 15(3), 420-424.
- van Rensburg, H., & Engelbrecht, M. (2012). Transformation of the South African health system–post-1994. *Health and Health Care in South Africa*, 2, 121-188.
- van Rensburg, H. (2014). South Africa's protracted struggle for equal distribution and equitable access – still not there. *Human Resources for Health*, 12(1), 26. doi:10.1186/1478-4491-12-26
- van Vugt, V. A., van der Wouden, J. C., Essery, R., Yardley, L., Twisk, J. W. R., van der Horst, H. E., & Maarsingh, O. R. (2019). Internet based vestibular rehabilitation with and without physiotherapy support for adults aged 50 and older with a chronic vestibular syndrome in general practice: three armed randomised controlled trial. *BMJ*, 367, l5922. doi:10.1136/bmj.l5922
- Vandvik, P. O., Brandt, L., Alonso-Coello, P., Treweek, S., Akl, E. A., Kristiansen, A., . . . Guyatt, G. (2013). Creating clinical practice guidelines we can trust, use, and share: a new era is imminent. *Chest*, 144(2), 381-389. doi:10.1378/chest.13-0746

- Vassar, M., & Holzmann, M. (2013). The retrospective chart review: important methodological considerations. *Journal of Educational Evaluation for Health Professions*, 10, 12. doi:10.3352/jeehp.2013.10.12
- Visagie, S., Scheffler, E., & Schneider, M. (2013). Policy implementation in wheelchair service delivery in a rural South African setting. *African Journal of Disability*, 2(1), 63. doi:10.4102/ajod.v2i1.63
- von Brevern, M., Bertholon, P., Brandt, T., Fife, T., Imai, T., Nuti, D., & Newman-Toker, D. (2015). Benign Paroxysmal Positional Vertigo: diagnostic criteria. *Journal of Vestibular Research*, 25(3, 4), 105-117.
- Vreeken, H. L., van Rens, G. H., Kramer, S. E., Knol, D. L., & van Nispen, R. M. (2015). Effects of a dual sensory loss protocol on hearing aid outcomes: a randomized controlled trial. *Ear and Hearing*, 36(4), 166-175.
- Wallace, R., & Vanhook, P. (2015). The importance of evidence-based practice. *Tennessee Nurse*, 78(4), 11-22.-
- Wang, Y.-H., Chan, C. Y., & Liu, Q.-H. (2019). Benign Paroxysmal Positional Vertigo – recommendations for treatment in primary care. *Therapeutics and Clinical Risk Management*, 15, 719-125. doi: 10.2147/TCRM.S203291
- Wang, Z., Li, N., Jiang, M., Dear, K., & Hsieh, C.-R. (2017). Records of medical malpractice litigation: a potential indicator of health-care quality in China. *Bulletin of the World Health Organization*, 95(6), 430-436. doi:10.2471/BLT.16.179143
- Weng, Y.-H., Kuo, K. N., Yang, C.-Y., Lo, H.-L., Chen, C., & Chiu, Y.-W. (2013). Implementation of evidence-based practice across medical, nursing, pharmacological and allied healthcare professionals: a questionnaire survey in nationwide hospital settings. *Implementation Science*, 8, 112. doi:10.1186/1748-5908-8-112
- Western Cape Government. (2020). Groote Schuur Hospital: overview. Retrieved on February 15, 2021, from <https://www.westerncape.gov.za/yourGov/163>
- World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human

- Subjects. *Journal of the American Medical Association*, 310(20), 2191-2194. doi:10.1001/jama.2013.281053
- You, P., Instrum, R., & Parnes, L. (2019). Benign Paroxysmal Positional VertigoS. *Laryngoscope Investigative Otolaryngology*, 4(1), 116-123. doi:10.1002/lio2.230
- Young, T., Rohwer, A., Volmink, J., & Clarke, M. (2014). What are the effects of teaching evidence-based health care (EBHC)? Overview of systematic reviews. *PloS One*, 9(1), e86706. doi:10.1371/journal.pone.0086706
- Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A.-R. (2015). Design and implementation content validity study: development of an instrument for measuring patient-centered communication. *Journal of Caring Sciences*, 4(2), 165-178. doi:10.15171/jcs.2015.017

Appendix A

The Relationship of Guideline Key Action Statements for BPPV (Bhattacharyya et al., 2017)



Appendix B

Evidence Based Practice Profile Questionnaire



UNIVERSITY OF SOUTH AUSTRALIA

Evidence-Based Practice Profile Questionnaire

The aim of this questionnaire is to collect data on evidence-based practice (EBP) knowledge, behaviours and attitudes

Survey instructions

We would be very appreciative if you could please take some time to complete this survey.
It will take 10-12 minutes to complete.
Please circle one number in each line or tick/answer as requested.
Comment on your responses as appropriate in the areas provided

Thank you for your time in completing this questionnaire

Rate your RESPONSE to the following statements:

	Not at all true	Not really true	Possibly true	Quite likely true	Very true
1. I understand what is meant by the term evidence-based practice (EBP)	1	2	3	4	5
2. I am aware of EBP in my profession	1	2	3	4	5
3. My profession uses EBP as a framework	1	2	3	4	5
4. I am aware of current developments in EBP in my profession	1	2	3	4	5

Do you have any comments about your responses?

Rate your RESPONSE to the following statements:

	No intention at all	Unlikely to consider doing it	Could consider doing it	Highly likely to consider doing it	Absolutely intend to do it/keep doing it
5. I intend to develop knowledge about EBP	1	2	3	4	5
6. I intend to develop skills in accessing, acquiring and appraising evidence relevant to my area of practice	1	2	3	4	5
7. I intend to read relevant literature to update knowledge	1	2	3	4	5
8. I intend to apply best available evidence findings to improve practice	1	2	3	4	5

Do you have any comments about your responses?

Rate your RESPONSE to the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
9. Application of EBP is necessary in my work	1	2	3	4	5
10. Literature and research findings are useful in my day-to-day work	1	2	3	4	5
11. I need to increase the use of evidence in my daily work	1	2	3	4	5
12. I am interested in learning or improving the skills necessary to incorporate EBP into my work	1	2	3	4	5
13. EBP improves the quality of my work	1	2	3	4	5
14. EBP helps me make decisions about clients in my work	1	2	3	4	5
15. EBP does not take into account the limitations of my day-to-day work	1	2	3	4	5
16. There isn't much point in doing EBP because there is a lack of strong evidence to support most of the work I do	1	2	3	4	5
17. EBP does not take into account my clients' preferences	1	2	3	4	5
18. In making decisions about my professional work, I value clinical/field experience more than scientific studies	1	2	3	4	5
19. Workplace experience is the most reliable way to know what really works	1	2	3	4	5
20. Critical appraisal of the literature and its relevance to the client is not very practical in the real world of my profession	1	2	3	4	5
21. Seeking relevant evidence from scientific studies is not very practical in the real world	1	2	3	4	5

Do you have any comments about your responses?

Rate your UNDERSTANDING of the following terms:

	Never heard the term	Have heard it but don't understand	Have some understanding	Understand quite well	Understand and could explain to others
22. Relative risk	1	2	3	4	5
23. Absolute risk	1	2	3	4	5
24. Systematic review	1	2	3	4	5
25. Odds ratio	1	2	3	4	5
26. Meta analysis	1	2	3	4	5
27. Number needed to treat	1	2	3	4	5
28. Confidence interval	1	2	3	4	5
29. Publication bias	1	2	3	4	5
30. Forest plot	1	2	3	4	5
31. Intention to treat	1	2	3	4	5
32. Statistical significance	1	2	3	4	5
33. Minimum clinically worthwhile effect	1	2	3	4	5
34. Clinical importance	1	2	3	4	5
35. Randomised controlled trial (RCT)	1	2	3	4	5
36. Dichotomous outcomes	1	2	3	4	5
37. Continuous outcomes	1	2	3	4	5
38. Treatment effect size	1	2	3	4	5

Do you have any comments about your responses?

IN THE PAST YEAR HOW OFTEN have you:

	Never	Monthly or less	Fortnightly	Weekly	Daily
39. Formulated a clearly answerable question that defines the client or problem, the intervention and outcome(s) of interest	1	2	3	4	5
40. Tracked down the relevant evidence once you have formulated the question	1	2	3	4	5
41. Searched an electronic database	1	2	3	4	5
42. Critically appraised any literature you have discovered to determine the methodological quality	1	2	3	4	5
43. Integrated research evidence with your expertise	1	2	3	4	5
44. Considered your clients' preferences when making clinical/professional decisions	1	2	3	4	5
45. Read published research reports	1	2	3	4	5
46. Informally shared and discussed literature/research findings with others in your workplace	1	2	3	4	5
47. Formally shared and discussed literature/research findings with others in your department/practice (eg journal club, in-service presentation)	1	2	3	4	5

Do you have any comments about your responses?

Rate your **CONFIDENCE** in the following EBP activities:

	Not at all confident	A little confident	Reasonably confident	Quite confident	Very confident
48. Research Skills	1	2	3	4	5
49. Computer skills	1	2	3	4	5
50. Ability to identify gaps in your knowledge	1	2	3	4	5
51. Ability to convert your information needs into clearly answerable questions	1	2	3	4	5
52. Awareness of major information types and sources	1	2	3	4	5
53. Ability to search an electronic database	1	2	3	4	5
54. Ability to access evidence (get copies of articles or reports)	1	2	3	4	5
55. Ability to critically analyse evidence against set standards ie quality scoring	1	2	3	4	5
56. Ability to determine how valid (close to the truth) the material is	1	2	3	4	5
57. Ability to determine how useful (clinically applicable) the material is	1	2	3	4	5
58. Ability to apply information to individual cases (ie integrate research evidence with personal preferences, values, concerns, expectations)	1	2	3	4	5

Do you have any comments about your responses?

Rate your RESPONSE to the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
59. I want to learn new information	1	2	3	4	5
60. I critically evaluate new ideas	1	2	3	4	5
61. I have good management skills	1	2	3	4	5
62. I solve problems using a plan	1	2	3	4	5
63. I enjoy studying	1	2	3	4	5
64. In my organisation, leaders continually look for opportunities to learn	1	2	3	4	5
65. I make time to read research	1	2	3	4	5
66. Insufficient time is one of the greatest barriers to the use of EBP in my clinical/professional practice	1	2	3	4	5
67. My workload is too great for me to keep up to date with all the new evidence	1	2	3	4	5
68. The cost of information resources limits my use of EBP in my clinical/professional practice	1	2	3	4	5
69. Easy access to computers dictates whether or not I practise EBP	1	2	3	4	5
70. The resources available to me are adequate to undertake EBP	1	2	3	4	5
71. Collective support amongst my colleagues is one of the greatest facilitators to my use of EBP in clinical/professional practice	1	2	3	4	5
72. Support from management is one of the greatest facilitators to my use of EBP in clinical/professional practice	1	2	3	4	5
73. Senior management/my employer requires me to use EBP	1	2	3	4	5
74. I've just had a gutful of EBP	1	2	3	4	5

Do you have any comments about your responses?

Appendix C
Continuation of Questionnaire, Questions Adapted According to the
2017 BPPV CPG (Bhattacharyya et al., 2017)

Currently, do you treat patients with Benign Paroxysmal Positional Vertigo (BPPV)?

☐ **YES**

☐ **NO**

If no, please exit this questionnaire here. Thank you for participating.

If yes, please continue to Section B of this questionnaire.

SECTION B OF QUESTIONNAIRE

1. Please select the three most common symptoms that accompany BPPV:

- a. Diplopia (double vision)
- b. Hearing loss
- c. Dizziness which arises from rolling over in bed
- d. Numbness or tingling
- e. Vertigo
- f. Nausea and vomiting
- g. Dizziness when sitting still

2. What is the correct procedure in diagnosing BPPV?

- a. Dix-Hallpike manoeuvre (DHM)
- b. Canalith Repositioning Procedure (CRP)

- c. Diagnostic hearing assessment
 - d. Radiographic testing i.e., MRI's or CT scans
3. Which ear do you assess first?
- a. The side you/the patient think is implicated from case history
 - b. The side you/the patient think is NOT implicated from case history
4. The response for posterior canalithiasis of the right ear would be:
- a. Right dependent DHM - Torsional, right beating nystagmus; elicited after a latency of a few seconds; duration of <60 seconds
Left dependent DHM - No response
 - b. Right dependent DHM - No response
Left dependent DHM - Torsional, left beating nystagmus; elicited after a latency of a few seconds; duration of >20 seconds
 - c. Right dependent DHM - Torsional, right beating nystagmus; no latency; duration of >60 seconds
 - d. Left dependent DHM - No response
 - e. Response bilaterally - Vertical nystagmus; elicited after a latency of a few seconds; duration of <60 seconds
5. Does the vertigo and nystagmus fatigue upon repeating the DHM in the case of Posterior BPPV?
- a. Yes
 - b. No

6. Do you regularly assess for horizontal BPPV?

- a. Never
- b. Sometimes
- c. Always

7. If case history strongly suggests BPPV however, the signs do not present on the day the DHM is performed; how do you trigger the signs and symptoms?

- a. BPPV is excluded as a differential diagnosis
- b. Shake the head in hyperextension
- c. Do a Semont style induction
- d. Ask the patient to return on the day of their next attack
- e. Treat the patient even though they only present with symptoms and not signs

8. Do the guidelines recommend the following for BPPV?

	Yes	No
Further vestibular testing for patients who meet the BPPV criteria		X
Radiographic testing		X
Canalith Repositioning Procedure as primary therapy	X	
Medical therapy		X

9. Is it recommended to repeat the DHM once treatment has been administered?

- a. Yes
- b. No
- c. It, depends – if so, what does it depend on?

10. Do you advise the patient with post treatment restrictions or instructions?

- a. No
 - b. Yes, please state your post treatment instructions below:
-

11. Do you recommend a follow-up appointment to your patient? If yes, how long after the initial treatment would you recommend a follow-up appointment?

- a. Two weeks
 - b. Three weeks
 - c. One month
 - d. No follow-up
 - e. Other (please specify)
-

12. How do you reassess the patient at the follow-up appointment?

- a. Subjective patient reports and objective tests (i.e., DHM)
- b. Subjective patient reports, audiological assessment and, objective tests (i.e., DHM)
- c. Subjective patient report only

13. What would you do if BPPV symptoms are still present at the follow-up appointment?

- a. Refer
- b. Repeat management
- c. Patient attended the follow-up therefore, patient should exit the protocol

Appendix D
Recruitment Advertisement (Part One)

**EVIDENCE-BASED PRACTICE,
PRACTICING EVIDENCE-BASED
CARE.**

**ARE YOU OFFERING YOUR
PATIENTS THE BEST AVAILABLE
CARE?**

**SHARE YOUR THOUGHTS:
www.xxx.com**



**PLEASE ASSIST US IN
UNPACKING AND
UNDERSTANDING EVIDENCE-
BASED GUIDELINES FROM THE
CLINICIANS PERSPECTIVE.**

Appendix E

Demographic Questionnaire

Dear participant,

Thank you for choosing to partake in my study.

The following questions will be inquiring further into your demographic environment. Please complete all the questions and answer truthfully. All your information will be protected!

1. What is the location of the health facility that you work at?
 - a. Urban: Health facilities based in metropolitan areas with access to specialist care and technology.
 - b. Rural: Health facilities based outside of metropolitan areas with little or no access to specialist care and/or technology (Couper, 2003).
 - c. Remote (deep) rural: Health facilities based in isolated areas with a low population and basic health services.

2. Who is your primary employer?
 - a. Department of Health
 - b. Private Practice
 - c. Research institution/ university

3. Gender
 - a. Female
 - b. Male

4. Years of experience

- a. 0 – 10
- b. 11 – 20
- c. 21 – 30
- d. 31 – 40
- e. 41 – 50

5. What is your highest level of qualification?

- a. Honours (Hons.)
- b. Masters (MSc.)
- c. Doctorate (PhD.)

Appendix F
Data Collection Spreadsheet

		DHM PERFORMED			WAS THE FOLLOWING RECORDED?				TREATMENT				
F N	SYMPTOMS NOTED & CONSISTENT WITH BPPV	UNI	BILAT	H- CANAL	PRESENTING CANAL	NYSTAGMUS SITTING (SI) SUPINE (SU) BOTH (B)	LATENCY	DHM REPEATED WITH NYSTAGMUS DIMINISHING ON REPETITION	C R P	REPEAT DHM IN SAME SESSION	MASTOID PERCU- SSION NOTED	POST Rx INSTRUC- TION(S) ADVISED	FOLLOW- UP ADVISED IN TWO WEEKS?

FN = Folder number; Uni = Unilateral DHM performed; Bilat = Bilateral DHM performed; H-CANAL = Horizontal semicircular canal assessed; Latency = Latency period of nystagmus documented.

Appendix G

Human Research Ethics Committee Approval

 UNIVERSITY OF CAPE TOWN YUNIBESITHI YOKHESITHI YOKHESITHI YOKHESITHI	HUMAN RESEARCH ETHICS COMMITTEE ETHICS COMMITTEE 12 MAY 2020 UNIVERSITY OF CAPE TOWN	
FHS017: Annual Progress Report / Renewal Record Reviews/Audits/Collection of Biological Specimens/Repositories/Databases/Registries		
HREC office use only (FWA00001637; IRB00001933)		
This serves as notification of annual approval, including any documentation described below.		
☒ Approved	Annual progress report	Approved until/next renewal date: 30-05-2021
☐ Not approved	See attached comments	
Signature Chairperson of the HREC/ Designee	Signature Removed	Date signed: 13/5/2020
Note: Please note that incomplete submissions will not be reviewed. Please email this form and supporting documents (if applicable) in a combined pdf-file to hrec-enquiries@uct.ac.za .		
Please clarify your plan for research-related activities during COVID-19 lockdown		
Principal Investigator to complete the following:		
1. Protocol information		
Date (when submitn. this form)	07 May 2020	
HREC REF Number	251/2019	Current Ethics Approval was granted until: 30 May 2020
Protocol title	Exploring the attitudes, beliefs and orientation regarding evidence-based practice in South Africa: using Benign Paroxysmal Positional Vertigo (BPPV) as an exemplar.	
Principal Investigator	Christine Rogers	
Department / Office Internal Mail Address	christine.rogers@uct.ac.za	
1.1 Does this protocol receive US Federal funding? ☐ Yes ☒ No		
2. Protocol status (tick ✓)		
☐ Research-related activities are ongoing		
☒ Data collection is complete, data analysis only		
Please indicate (in the block below) the titles and HREC reference numbers of any projects currently making use of the Database/registry/repository.		
N/A		
3. Protocol summary		
Total number of records or specimens collected, reviewed or stored since the original approval	210	
Total number of records or specimens collected, reviewed or stored since last progress report	210	
Have any research-related outputs (e.g. publications, abstracts, conference presentations) resulted from this research? If yes, please list and attach with this report.	☐ Yes ☒ No	
4. Signature		

25 March 2020 Page 1 of 2 FHS017
 (Note: Please complete the Closure form (FHS018) if the study is completed within the approval period)

Appendix H
Letter of Consent to the Superintendent of Groote Schuur Hospital



**Department of Health and
Rehabilitation Sciences
Faculty of Health Sciences**
Divisions of Communications
Sciences and Disorders,
Nursing and Midwifery,
Occupational Therapy,
Physiotherapy

F45 Old Main Building,
Groote Schuur Hospital,
Observatory 7925
Tel: +27 (0) 21 406 6315 Fax:
+086 611 0725
E-mail:
Christine.Rogers@uct.ac.za
Internet: www.uct.ac.za

DATE .../.../2019

The Chief Executive Officer

Groote Schuur Hospital, Cape Town

Dear Dr. Patel,

RE: Evidence based practice of Benign Paroxysmal Positional Vertigo (BPPV);
exploring the attitudes, beliefs and knowledge of audiologists and
otolaryngologists.

I am a post graduate student currently completing my Masters in Audiology at
the University of Cape Town, South Africa. My Masters is comprised of a
dissertation in which research needs to be completed. The goal of evidence-
based practice (EBP) is to provide fair, high-quality, and current medical care

which reflects the values, interests, needs, well-being and individual choices of our patients. However, in most cases these guidelines are developed in high income countries with little regard to developing countries and their accompanying burdens i.e., accessibility, lack of funding and resources, etc. It is hopeful that the outcomes of this study will assist in the understanding of the attitudes, beliefs and knowledge of audiologists and otolaryngologists with the respect to the implementation of EBP within our current context. The knowledge gained from this study will also give an insight to the current management of BPPV and may assist in the future management of BPPV. This study has been approved by Human Research Ethics Committee (HREC ref number 251/2019) and the Western Cape Department of Health.

The aim of this study is to examine the implementation of EBP regarding management of Benign Paroxysmal Positional Vertigo (BPPV). Two aspects will be evaluated (1) attitudes, beliefs and knowledge regarding EBP in general, and implementation of such practice in the management of BPPV and, (2) evaluation of management of BPPV against EBP in the case of Groote Schuur Hospital's academic hospital's records.

Part two of my master's research is a retrospective record review which requires the analysis of patient profiles (demographics and audiological profiles), the treatment they were administered and treatment outcomes. It is for this part I seek your permission.

I kindly ask for your permission to access Groote Schuur's medical records of the Audiology/ENT clinic. If permission is granted, I would like to assure you that there will be minimum pressure and/or inconvenience placed upon your staff members. Furthermore, I would like to assure you that the confidentiality of both the clinicians and the patients will be protected; this is a minimal risk study.

The UCT FHS Human Research Ethics Committee can be contacted on 021 406 6338 in case participants have any questions regarding their rights and welfare as research subjects on the study.

Many thanks for your time,

X

Signature Removed

Tanaya Naidoo



**Department of Health and
Rehabilitation Sciences
Faculty of Health Sciences**
Divisions of Communications
Sciences and Disorders,
Nursing and Midwifery,
Occupational Therapy,
Physiotherapy

F45 Old Main Building,
Groote Schuur Hospital,
Observatory 7925
Tel: +27 (0) 21 406 6315 Fax:
+086 611 0725
E-mail:
Christine.Rogers@uct.ac.za
Internet: www.uct.ac.za

On this ____ day of the ____ month, 2019, I
_____ grant Tanaya Ellen Ravi Naidoo access
to Groote Schuur Hospitals medical folders for the purpose of the above-
mentioned study (HREC ref number 251/2019).

X

Dr Patel
Chief Executive Officer, Groote Schuur Hosp...

X

Date

Appendix I

Letter of Consent to the Audiology Head of Department at Groote Schuur Hospital



**Department of Health and
Rehabilitation Sciences
Faculty of Health Sciences**
Divisions of Communications
Sciences and Disorders,
Nursing and Midwifery,
Occupational Therapy,
Physiotherapy

F45 Old Main Building,
Groote Schuur Hospital,
Observatory 7925
Tel: +27 (0) 21 406 6315 Fax:
+086 611 0725
E-mail:
Christine.Rogers@uct.ac.za
Internet: www.uct.ac.za

DATE .../.../2019

Head of Department: Audiology

Groote Schuur Hospital, Cape Town

Dear Ms. Sharon Pithey,

RE: Evidence based practice of Benign Paroxysmal Positional Vertigo (BPPV);
exploring the attitudes, beliefs and knowledge of audiologists and
otolaryngologists.

I am a post graduate student currently completing my Masters in Audiology at
the University of Cape Town, South Africa. My Masters is comprised of a
dissertation in which research needs to be completed. The goal of evidence-
based practice (EBP) is to provide fair, high-quality, and current medical care

which reflects the values, interests, needs, well-being and individual choices of our patients. However, in most cases these guidelines are developed in high income countries with little regard to developing countries and their accompanying burdens i.e., accessibility, lack of funding and resources, etc. It is hopeful that the outcomes of this study will assist in the understanding of the attitudes, beliefs and knowledge of audiologists and otolaryngologists with the respect to the implementation of EBP within our current context. The knowledge gained from this study will also give an insight to the current management of BPPV and may assist in the future management of BPPV. This study has been approved by the Human Research Ethics Committee (HREC ref number 251/2019) and the Western Cape Department of Health.

The aim of this study is to examine the implementation of EBP regarding management of Benign Paroxysmal Positional Vertigo (BPPV). Two aspects will be evaluated (1) attitudes, beliefs and knowledge regarding EBP in general, and implementation of such practice in the management of BPPV and, (2) evaluation of management of BPPV against EBP in the case of Groote Schuur Hospital's academic hospital's records.

Part two of my master's research is a retrospective record review which requires the analysis of patient profiles (demographics and audiological profiles), the treatment they were administered and treatment outcomes. It is for this part I seek your permission.

I kindly ask for your permission to access Groote Schuur's medical records of the Audiology/ENT clinic. If permission is granted, I would like to assure you that there will be minimum pressure and/or inconvenience placed upon your staff members. Furthermore, I would like to assure you that the confidentiality of both the clinicians and the patients will be protected; this is a minimal risk study.

The UCT FHS Human Research Ethics Committee can be contacted on 021 406 6338 in case participants have any questions regarding their rights and welfare as research subjects on the study.

Many thanks for your time,

Signature Removed

X

Tanaya Naidoo



**Department of Health and
Rehabilitation Sciences
Faculty of Health Sciences**
Divisions of Communications
Sciences and Disorders,
Nursing and Midwifery,
Occupational Therapy,
Physiotherapy

F45 Old Main Building,
Groote Schuur Hospital,
Observatory 7925
Tel: +27 (0) 21 406 6315 Fax:
+086 611 0725
E-mail:
Christine.Rogers@uct.ac.za
Internet: www.uct.ac.za

On this ____ day of the ____ month, 2019, I
_____ grant Tanaya Ellen Ravi Naidoo access
to Groote Schuur Hospitals medical folders for the purpose of the above-
mentioned study (HREC ref number 251/2019).

X

Ms. Sharon Pithey
Audiology Head of Department, Groote Sch...

X

Date

Appendix J

Singapore Declaration

Singapore Statement on Research Integrity

Preamble. The value and benefits of research are vitally dependent on the integrity of research. While there can be and are national and disciplinary differences in the way research is organized and conducted, there are also principles and professional responsibilities that are fundamental to the integrity of research wherever it is undertaken.

PRINCIPLES

Honesty in all aspects of research
Accountability in the conduct of research
Professional courtesy and fairness in working with others
Good stewardship of research on behalf of others

RESPONSIBILITIES

- 1. Integrity:** Researchers should take responsibility for the trustworthiness of their research.
- 2. Adherence to Regulations:** Researchers should be aware of and adhere to regulations and policies related to research.
- 3. Research Methods:** Researchers should employ appropriate research methods, base conclusions on critical analysis of the evidence and report findings and interpretations fully and objectively.
- 4. Research Records:** Researchers should keep clear, accurate records of all research in ways that will allow verification and replication of their work by others.
- 5. Research Findings:** Researchers should share data and findings openly and promptly, as soon as they have had an opportunity to establish priority and ownership claims.
- 6. Authorship:** Researchers should take responsibility for their contributions to all publications, funding applications, reports and other representations of their research. Lists of authors should include all those and only those who meet applicable authorship criteria.
- 7. Publication Acknowledgement:** Researchers should acknowledge in publications the names and roles of those who made significant contributions to the research, including writers, funders, sponsors, and others, but do not meet authorship criteria.
- 8. Peer Review:** Researchers should provide fair, prompt and rigorous evaluations and respect confidentiality when reviewing others' work.
- 9. Conflict of Interest:** Researchers should disclose financial and other conflicts of interest that could compromise the trustworthiness of their work in research proposals, publications and public communications as well as in all review activities.
- 10. Public Communication:** Researchers should limit professional comments to their recognized expertise when engaged in public discussions about the application and importance of research findings and clearly distinguish professional comments from opinions based on personal views.
- 11. Reporting Irresponsible Research Practices:** Researchers should report to the appropriate authorities any suspected research misconduct, including fabrication, falsification or plagiarism, and other irresponsible research practices that undermine the trustworthiness of research, such as carelessness, improperly listing authors, failing to report conflicting data, or the use of misleading analytical methods.
- 12. Responding to Irresponsible Research Practices:** Research institutions, as well as journals, professional organizations and agencies that have commitments to research, should have procedures for responding to allegations of misconduct and other irresponsible research practices and for protecting those who report such behavior in good faith. When misconduct or other irresponsible research practice is confirmed, appropriate actions should be taken promptly, including correcting the research record.
- 13. Research Environments:** Research institutions should create and sustain environments that encourage integrity through education, clear policies, and reasonable standards for advancement, while fostering work environments that support research integrity.
- 14. Societal Considerations:** Researchers and research institutions should recognize that they have an ethical obligation to weigh societal benefits against risks inherent in their work.

The Singapore Statement on Research Integrity was developed as part of the 2nd World Conference on Research Integrity, 21-24 July 2010, in Singapore, as a global guide to the responsible conduct of research. It is not a regulatory document and does not represent the official policies of the countries and organizations that funded and/or participated in the Conference. For official policies, guidance, and regulations relating to research integrity, appropriate national bodies and organizations should be consulted. Available at: www.singaporestatement.org

Appendix K Information Sheet

Dear participant,

I am a post graduate student currently completing my Masters in Audiology at the University of Cape Town, South Africa. My Masters is comprised of a dissertation which aims to examine the implementation of evidence-based practice (EBP) regarding management of Benign Paroxysmal Positional Vertigo (BPPV). Two aspects will be evaluated (1) attitudes, beliefs and knowledge regarding EBP in general, and implementation of such practice in the management of BPPV and, (2) evaluation of management of BPPV against EBP in the case of Groote Schuur Hospital's academic hospital's records. It is hopeful that the outcomes of this study will assist in the understanding of the attitudes, beliefs and knowledge of audiologists and otolaryngologists with the respect to EBP within our current context. The knowledge gained from this study will also give an insight to the current management of BPPV and may assist in the future management of BPPV.

Your **voluntary** participation is required for part one:

Part one is comprised of a once-off online questionnaire which takes approximately 10-12 minutes to complete. Participation is completely voluntary. The anonymity and confidentiality of all participants will be upheld therefore, this study has no potential risks. However, the participant has the right to withdraw from the study at any moment and will not be held accountable.

The UCT FHS Human Research Ethics Committee can be contacted on 021 406 6338 in case participants have any questions regarding their rights and welfare as research subjects on the study.

For further inquiries regarding your rights and welfare, please do not hesitate to contact the researcher:

Tanaya Naidoo

University of Cape Town

ndxtan007@myuct.ac.za

You have the right to withdraw from this study at any time and will not be held accountable.

☐ I understand and wish to continue to the survey. ☐ I do not wish to partake in this study.