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Clinicians' knowledge, attitudes and behaviours towards evidence-based practice using clinical presentations of dizziness and vertigo as an exemplar

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To my mental and emotional support structure

Mom, Dad, Suzie, and Emma

Without you, I would not have made it to where I am today

You are appreciated more than you know

To my friends, family, and colleagues

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To my supervisor, Dr Christine Rogers

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Without which, the quality of my work would have suffered

I look forward to working with you in the future

To my research participants

Whatever the motivation for your participation

Thank you for the valuable input you have made to my research

I hope I have honoured your contributions

To the readers of my research

Thank you for giving me a platform to share my findings

Yours sincerely

Richard Clarke

Abstract

Evidence-based practice (EBP) is an approach to clinical decision-making that incorporates well-researched and established scientific knowledge with other sources of knowledge such as practitioner experience, patient preferences, and clinical context. Use of EBP aims to provide standardised care, which is rooted in the best available evidence. Among the most important and arguably clinically relevant outcomes of EBP are Clinical Practice Guidelines (CPG), which cover a variety of topics in medicine and associated professions. CPG exist for vestibular conditions, which are prevalent in the general and medical populations. Nevertheless, there is some suggestion that EBP regarding dizziness is sub-optimal in wealthy countries, and little is known about CPG use in LMIC, particularly across the professions that would be expected to use them. However, despite the availability and proliferation of evidence in the health sciences, research has shown that uptake and utilisation of EBP is poor even in the Global North. In low- and middle-income countries (LMIC) such as South Africa where resources are scarce, previous research has suggested that additional challenges exist which are specific to the developing context. There is, however, little research on translation of EBP into clinical practice. Thus, this study sought to investigate the knowledge, attitudes, and practices towards evidence-based practice of a specific subset of South African clinicians (audiologists, otorhinolaryngologists, and physiotherapists) in South Africa, using assessment and management of dizzy patients as an exemplar.

Mixed methodology achieved the study's aims. Phase one employed a two-part questionnaire. Fifty-four participants, comprising 37 audiologists, five Ear, nose and throat surgeons (ENTs), and nine physiotherapists were surveyed to identify their orientation towards EBP using the Evidence-Based Practice Profile Questionnaire (EBP2Q). Independent samples t-tests and one-way ANOVAs were used to analyse the EBP2Q data. Three cases of common vestibular pathologies (Ménière's disease, vestibular migraine, and persistent postural perceptual dizziness) based on the CPG, were developed by the researcher and a Delphi panel of experts. Survey participants answered questions regarding implementation of CPGs in each case. Cases were scored according to matches with the CPGs. Phase two adopted a qualitative, descriptive approach and comprised four mini focus groups with a total of 10 participants representing the three professions surveyed. The focus groups aimed to

explore participants' self-perceived barriers and facilitators to the use of EBP in general as well as in the context of dizzy patients.

The most clinically relevant result was that the case questionnaire analysis revealed that approximately half of participants were able to identify Meniere's disease and vestibular migraine, whereas only one quarter of participants could identify the case of functional dizziness. Focus groups revealed barriers to the use of EBP such as lack of access to research and lack of time to research. Furthermore, participants recognised that the complexity of dizzy patients had led to sub-optimal assessment and management of such patients. Quantitative results of the current study suggested that participants with additional exposure to research through postgraduate training had higher scores on the EBP2Q in four out of five domains and the total questionnaire score than those with undergraduate training only. These results were consistent with previous research from wealthy countries which suggested that increased exposure through postgraduate training and working at academic facilities results in better orientation towards EBP. However, mean domain scores amongst participants in studies from wealthy countries appear to be higher than those from the sample on the current South African study, although it is difficult to tell whether the difference is statistically significant. Additionally, there was no apparent influence of years' experience on orientation towards EBP, contradicting what has been found in previous research.

Outcomes of the study suggest that while healthcare practitioners have good attitudes towards EBP, it is more effectively implemented by clinicians with postgraduate training. Further, ease of access and exposure to research is the greatest facilitator to use of research and EBP by clinicians. Despite that, barriers to uptake and utilisation of EBP such as lack of access to research, lack of contextually relevant research, and low confidence at appraising literature were described. In addition, barriers common to the Global North and Global South were recognised such as lack of time to conduct literature searches and overburdening of clinical staff. Finally, a gap was noted in the knowledge of practitioners managing dizzy patients, specifically regarding patients with functional dizziness. Thus, this study highlights the need for use and application of EBP to the management of dizzy patients. Additional training of audiologists, ENTs and physiotherapists may be required regarding effective, multidisciplinary management of dizzy patients.

Keywords: evidence-based practice, developing country, clinical practice guidelines, dizziness, vestibular management.

Contents

List of Abbreviations

Abbreviation	Meaning
ANOVA	Analysis of Variance
APA	American Psychological Association
AuD	Doctor of Audiology (by coursework)
BPPV	Benign Paroxysmal Positional Vertigo
CPD	Continuous Professional Development
CPG	Clinical Practice Guideline
CT	Computerised Tomography (scan)
EBP	Evidence-Based Practice
EBP2Q	Evidence Based Practice Profile Questionnaire
ENT	Ears, Nose and Throat Surgeon (Otorhinolaryngologist)
GNI	Gross National Income
GP	General Practitioner
HCP	Healthcare Professional
HIC	High Income Country
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
HPCSA	Health Professions Council of South Africa
HREC	Human Research Ethics Committee
JVR	Journal of Vestibular Research
LMIC	Low- and Middle-Income Country
MRI	Magnetic Resonance Imaging
PhD	Doctor of Philosophy degree (in South Africa, usually by dissertation)
PPPD	Persistent Postural Perceptual Dizziness
SAAA	South African Association of Audiologists

SASLHA	South African Speech-Language and Hearing Association
SASP	South African Society of Physiotherapists
VRT	Vestibular rehabilitation therapy

Glossary

Audiologist	An audiologist is an allied healthcare professional who assesses and manages hearing and balance [1].
Allied health professionals	Allied HCPs are often involved in health and rehabilitation. Such professions may include audiology, speech-language pathology, occupational therapy, and physiotherapy [2].
Dizziness	Non-vertiginous dizziness is the feeling of disturbed or impaired spatial orientation without a distorted sense of motion [3].
Dual-qualified communication therapists	In South Africa, dual-qualified communication therapists are those who studied speech therapy and audiology either as a dual degree which ended in 2017, or studied them consecutively [4].
Evidence based practice (EBP)	Evidence-based practice is described as the integration of clinical experience with high quality evidence and patients' values [5].
Ears, nose and throat surgeon (ENT)	Otorhinolaryngologist or ear, nose and throat specialist.
Highly Active Antiretroviral Therapy	Highly active antiretroviral therapy is the treatment used to control the viral load of patients with HIV/AIDS [6]
General Practitioner (GP)	In South Africa, doctors who have completed their MBChB degrees as well as their two years of internship and one

year of community service. Thus, general practitioners are qualified doctors but non-specialists [7].

High-income countries (HIC)

High income countries as defined by the World Bank for the 2020 fiscal year using the World Bank Atlas Method as those which have a gross national income (GNI) per capita of over $12 376 [8]. Among those countries are UK, Australia, USA, Hong Kong, China, and Japan [8].

Low- and middle-income countries

Low- and middle- income countries are defined by the World Bank for the 2020 fiscal year using the World Bank Atlas Method as those which have a gross national income (GNI) per capita of under $12 375 which is the upper limit of upper-middle income countries [8]. South Africa falls into the category of upper-middle income countries [8]. However, in terms of healthcare provision, South Africa falls into the low income bracket [9].

Orientation towards EBP

Orientation refers to the knowledge, attitudes and behaviours towards evidence-based practice [10].

Physiotherapist

A physiotherapist is an allied healthcare professional who assesses and manages a variety of injuries including those in orthopaedics, neurology, respiratory, cardiovascular, sports as well as different patient age groups such as paediatrics and geriatrics [11]. Physiotherapist is the term used in South Africa and the United Kingdom. In the United States of America, a physiotherapist is known as a physical therapist.

Vertigo

Vertigo is the perception of self-motion when no self-motion is occurring [12].

Vestibular assessment	Throughout this research report vestibular assessment and management will be used to refer to the assessment and management of patients who present with dizziness and vertigo.

Chapter 1: Literature Review

Introduction

This study concerns clinicians' knowledge, attitudes and practices regarding use and uptake of evidence-based practice (EBP) in South Africa. Vestibular assessment and management was used as an exemplar to contextualise the use of EBP by audiologists, physiotherapists and otolaryngologists (ENTs) in South Africa. The study was conducted using mixed methodology. Phase one employed quantitative methodology using a two-part survey to assess knowledge, attitudes, and practices of Healthcare Professionals (HCPs) towards EBP, as well as understanding and application of Clinical Practice Guidelines (CPGs) using three cases of vestibular pathologies. Phase two employed qualitative, descriptive methodology using focus groups to explore HCPs' barriers and facilitators to uptake and utilisation of EBP in general, as well as regarding assessment and management of dizzy patients.

The literature review will discuss EBP and previous research. Implementation of EBP in low- and middle- income countries (LMIC) including South Africa will be described. Furthermore, tools to assess the uptake and utilisation of EBP are examined. The Evidence-Based Practice Profile Questionnaire was chosen for the quantitative data collection and will be discussed, along with the rationale for its use. Relevant to how patients with vestibular disorders are managed in South Africa, knowledge of CPGs regarding vestibular pathologies was explored.

The literature review continues by introducing the symptom of dizziness, and its management in the context of developing countries such as South Africa. Finally, uptake and use of EBP by the specific professionals who manage dizzy patients will be explored. The chapter concludes with the gaps in the literature concerning uptake and utilisation of EBP, the rationale for the study, and the study question.

Background of evidence-based practice

Evidence-based practice is an approach to decision-making that incorporates well-researched and established scientific knowledge with other sources of knowledge such as practitioner experience, patient preferences and context [13]. Scientific knowledge is ranked on a hierarchy of research evidence, often referred to as the pyramid of evidence [14], based on the strength and rigour of the research design [14].

Within the levels of evidence, meta-analyses, systematic reviews, and double blinded randomised control trials are placed at the highest level of evidence due to their rigour, validity and reliability [14]. Professional anecdotes and case studies rank lower in the hierarchy [13]. Therefore, EBP and CPGs, which are supported by systematic reviews and meta-analyses, are considered the gold standard of research evidence [14, 15].

Despite the assumption of high-quality evidence underpinning EBP, the movement is not without its critics. For example, it is argued that isolated use of EBP fails to account for individual variations in patients' presentations [16]. Further, health systems governed by policies that are unchallenged due to their empirical validity may not provide optimal care to the individuals who vary from the norm [16]. However, completely personalised medicine is impractical [16] and expensive. Thus, to effectively use EBP, a combination of the best available evidence, patient-specific factors, and clinical expertise is optimal [13]. One of the most important and arguably clinically relevant products of EBP is CPGs, which cover a variety of topics in medicine and associated professions such as physiotherapy and audiology. Hence, one method to apply EBP in the clinical setting is combining clinical reasoning and using CPG to support and rationalise management decisions.

Clinical practice guidelines

The development of CPGs was prompted by the need for easily accessible clinical directives which provide practitioners with evidence-based assessment and management solutions [17]. Thus, use of CPGs aims to reduce diagnostic error, encourage cost-effective healthcare by avoiding expensive and unnecessary investigation, and standardise patient care [17-20]. Literature has suggested that for optimal patient diagnosis and management, it is vital that HCPs have access to context-appropriate, high-quality, evidence-based CPGs [17, 21].

CPGs are developed by identifying and outlining clinical areas where healthcare can be improved, reviewing the literature through the use of scoping and systematic reviews, and meta-analyses [17, 20], translating the evidence into CPGs, and assessing patient outcomes based on CPG implementation [20]. Subsequently, due to the dynamic nature of research [22], it is vital that CPGs are continuously revised and adapted depending on the context in which they are required [17].

There are, however, limitations to CPGs, particularly relating to their application to patient management. Criticisms of CPGs have been that they are non-specific and unclear [17]. Further, HCPs question guidelines which make recommendations using phrases such as “if necessary” or “if clinically appropriate”, as practitioners tend to make use of the guidelines when they are unsure what is necessary or clinically appropriate [17]. In addition, CPGs have been decried due to their ‘cookie cutter’ approach to patient diagnosis and management [16]. However, despite the apparent lack of patient-centredness of CPGs, favourable outcomes have been reported following the appropriate application of the relevant CPG [23]. Thus, clinical utilisation of CPGs also requires incorporation of practitioners’ clinical experience to ensure application of appropriate CPGs which is, of course, the essence of EBP [13].

Studies on uptake of evidence-based practice in developing countries

Previously, EBP has been researched using cross-sectional survey designs to explore self-perceived knowledge, attitudes and practices of participants [24, 25]. The knowledge, attitudes and practices of HCPs are important paradigms to consider when assessing orientation towards EBP and have been researched previously using cross-sectional surveys by certain researchers [26, 27]. However, purely quantitative studies like surveys do not allow for contextualisation of the quantitative data. Qualitative studies have also been used to further explore barriers to use of EBP, providing clinicians a platform to discuss the topic of EBP more in-depth for richer data [19, 24, 25, 28]. Hence, due to small numbers of participants, questions about generalisability in qualitative studies are frequent [29]. Mixed methods studies have also been used to study EBP [26] and have allowed for contextualisation of the answers which were provided in the questionnaires. However, in the study by Stander, Grimmer [26] the sample size for the qualitative section was small. Therefore, the researchers’ recommendation was to interpret the clinical significance of the results with caution [26]. A mixed methods study will therefore provide additional data to increase the strength of this research while allowing a more holistic set of answers to current research question.

Tools assessing uptake of evidence-based practice

Following on from how uptake of evidence has been assessed in previous studies, it is important to explore the use of tools which have been used to identify knowledge, attitudes and practices regarding EBP. In a large-scale systematic review

conducted on 34 instruments used to rate use of EBP, it was found that only nine had at least one aspect of validity and reliability tested [30]. This may suggest that evidence about uptake and use of EBP is flawed as the instruments used to assess EBP are lacking in rigour. It was further noted that the psychometric testing of most of the items on the scales which were examined was inadequate [30]. Further, few of the instruments probed respondents' knowledge of EBP (8/34) or skills relating to EBP (3/34) [30]. The Evidence-Based Practice Profile Questionnaire (EBP2Q) was not one of the instruments assessed in the systematic review, possibly as Buchanan and colleagues (2016) confined their review to studies with occupational therapists. Therefore, the EBP2Q will be discussed in the next section.

Evidence-Based Practice Profile Questionnaire

Numerous questionnaires assess EBP as a whole, as well as multiple domains pertaining to EBP [31]. These domains include awareness, attitudes, self-efficacy, intention, behaviours, and organisation regarding EBP. However, many of the questionnaires either assess too few of the relevant domains [31], have not been through rigorous psychometric testing [30] or were developed specifically for certain professions [30, 32]. Almost all studies conducted using the Evidence-Based Practice Profile Questionnaire (EBP2Q) have occurred in wealthy countries.

The EBP2Q was developed as a questionnaire which could span multiple professions, assess multiple domains, and had a rigorous psychometric testing process [31]. The EBP2Q has been used as a trans-professional questionnaire that was developed and has been cross-culturally translated and validated [10, 33-35]. The EBP2Q was originally developed at the University of South Australia in a study of over 700 health (physiotherapy, psychology, nursing) and non-health (commerce) students, lecturers and academics [31]. The EBP2Q has five domains: relevance (emphasis and importance placed on EBP), sympathy (sense of compatibility of EBP with one's work), terminology (understanding of common research terms), practice (individual's use of EBP), and confidence (perception of ability with EBP skills), which aim to identify and assess each part of the participant's orientation towards EBP. A Likert scale creates scores and comments to support the answers are sought. In addition to its use as a holistic assessment of EBP, the EBP2Q can also be split into its separate domains so that specific parts of EBP can be assessed [10]. Separation of domains can be helpful as specific domains can speak more to the aims of the research than others.

The EBP2Q has been used in conjunction with semi-structured interviews in mixed methods studies wherein the EBP2Q forms the quantitative component [36]. McEvoy, Luker [36] sought to identify changes in EBP2Q domain scores from the end of clinicians' training to the end of their first year of work. The results suggested that the EBP2Q domain scores declined during the year that participants were working [36]. The qualitative phase of the study was conducted using semi-structured interviews after the second administration of the EBP2Q. The interviews explored the declining domain scores over a year of clinical work. Some of the participants reported lack of time to conduct research as well as low confidence at analysing and appraising research [36]. Further, the survey results are subject to the biases which are present in most survey studies, such as social desirability bias [32] and participants having low motivation to answer in detail due to time constraints [32]. McEvoy, Luker [36] demonstrated the value of having a qualitative component to complement the quantitative data. Further, McEvoy, Luker [36] showed effective use of the EBP2Q in a mixed methods study. Hence, the EBP2Q in conjunction with a qualitative component suggests good utility for the current mixed methods design.

Having discussed an adequate design for use of the EBP2Q, it is important to explore uptake of EBP in high income countries (HIC), as well as LMIC.

Poor uptake of EBP in high income countries

Wealthy countries have better access to resources such as equipment, internet, and research facilities than developing countries [21, 37]; and yet, HCPs in HIC still experience barriers to uptake and utilisation of EBP [38, 39]. Thus, inconsistent use and application of EBP by clinicians in the Global North can be attributed to attitudes and behaviours of HCPs, as opposed to resource constraints [38]. Commonly noted barriers to uptake of EBP in HIC are limited time to conduct research, constrained access to appropriate literature, lack of confidence at appraisal of literature, and unwillingness to change clinical practice behaviours [38-41]. Interestingly, even though most CPG are developed in wealthy countries [21, 37], limited access to literature is preventing the effective uptake of EBP in HIC [39]. Rogers and Darbyshire [42] suggested that HCPs lose access to online databases and university libraries once they have graduated from university. Therefore, HCPs who are not associated with universities may have limited access to the most recent evidence available, hindering their uptake of EBP. However, it has been noted that most vestibular CPG, such as those used in the current study

for Meniere's disease [43], persistent postural perceptual dizziness (PPPD) [44], and vestibular migraine [45] are open access and are therefore available to any healthcare practitioner with an internet connection. It is therefore suggested that the limited uptake and utilisation of EBP in the Global North can be attributed to poor attitudes towards EBP and deprioritising its use in clinical practice [38], as opposed to limited availability of CPGs.

Having briefly discussed some of the difficulties experienced by HCPs in wealthy countries regarding uptake and utilisation of EBP, it is important to explore the barriers to EBP experienced by the HCPs in the current study: audiologists, ENTs and physiotherapists.

Evidence-based practice in audiology

There are few CPGs in audiology [23] worldwide. In addition, the CPGs for audiology were developed using clinical expertise, rather than rigorous studies using the highest levels of evidence such as systematic reviews, meta-analyses and randomised control trials [23]. Therefore, the quality of the underpinning research for the CPGs is arguable. Some areas of research in audiology would have ethical implications with experimental designs, where one group would receive an intervention (study group) while the other would not (control group) [23]. Withholding an intervention in the case of communication disorders in either adults or children would have serious consequences. While motivation for the use of EBP and CPGs has been demonstrated by audiologists [41, 46], they may be better inclined towards CPGs if the guidelines were underpinned by more robust evidence [23]. Therefore, careful conception and execution of rigorous research methodologies, to feed into appropriate CPG for the audiology profession is required and at this point is under-developed.

Research reflects a similar conundrum to the implementation of EBP. Audiologists consider EBP important and yet is not necessarily used as often or effectively as it should be [40, 46, 47]. The factors affecting clinical decision-making were assessed in a group of European audiologists by Boisvert, Clemesha [40]. Clinical results and patient preferences were ranked as the most important sources of information for management decisions, followed by advice from colleagues. Only 20% of the study sample reported use of research evidence and they would only do so if they have no clear solution [40]. Further, years of experience had a negative relationship

with use of guidelines, suggesting that audiologists with more experience relied more heavily on their clinical reasoning than the available literature. Audiologists have, however, expressed interest in and understanding of the importance in using the best evidence [40]. Roman [41] demonstrated that use of EBP in clinical practice is more complex than simply reading a study at face value. Use of EBP also requires analysis of the literature in terms of rationale for sample size, validity of data, and statistical and clinical significance of data [41]. Audiologists have demonstrated confidence in reading literature to identify the evidence for clinical practice [41]. However, audiologists also demonstrate low confidence in analysing the available literature [41, 46]. Therefore, audiologists may prefer to consult with colleagues because it is easier than analysing the literature. Similar to other HCPs, audiologists have reported that use of EBP is limited by time [40, 46] and limited access to resources due to restricted access to online journals which require membership or payment [41].Therefore, despite willingness to use evidence and understanding of the importance of EBP, audiologists still experience barriers to the use of literature and the best evidence [41, 46].

Evidence-based practice in otolaryngology

ENTs are medical specialists who often work closely with audiologists in clinical practice [48]. Reflecting the discussion of audiology research, it has been suggested that use of randomised control trials to develop effective treatments and management is increasing in ENT [49]. In addition, there is a proliferation of systematic reviews within the ENT profession [49].

A recent systematic review by Ryan, Leu [50] indicated CPGs exist for common pathologies and treatments in the ENT domain, such as paediatric tonsillectomy, otitis media with effusion, and adult sinusitis; but that adherence to guidelines was variable. Overall, slightly more than half (56%) the ENTs surveyed adhered to practice as per guidelines. In the Netherlands, attitudes and behaviours towards EBP of ENT surgeons and residents were surveyed by Rademaker, Smit [39]. The McColl Questionnaire, a validated Likert-type questionnaire was used to assess attitudes towards EBP [39]. Behaviours were assessed using one validated questionnaire, and one non-validated questionnaire which sought to explore the information-seeking behaviours of ENTs [39]. Despite few respondents (68) completing the survey, the results of the attitude surveys demonstrated that ENTs have a good understanding of the importance of EBP [39]. However, the behaviour sections demonstrate that they

were severely limited by time. Respondents noted that when they are busy, searching for evidence in literature is not a priority and thus rely on their gut and prior knowledge [39]. The results of the study by Rademaker, Smit [39] are confirmed by Shin, Rauch [49] and Aarts, van der Heijden [51] who suggested that while ENTs hold favourable attitudes to EBP, it was reported that guidelines were not compatible with clinical practice. However, there are few recent supporting studies to confirm if ENTs' apparent low compatibility of EBP with clinical practice is still the case in the Global North.

Evidence-based practice in physiotherapy

Physiotherapists are rehabilitation practitioners who provide a wide variety of therapies from post-surgical hospital-based rehabilitation and neurorehabilitation to women's health and strength and balance training [52]. Due to the diversity of conditions managed by physiotherapists, especially in hospitals, it is reasonable to assume that they experience time pressure in their clinical practice. Thus, the use of CPG in physiotherapists' clinical practice may be highly beneficial to increase efficiency and effectiveness of patient treatment.

Uptake and utilisation of EBP by physiotherapists has been studied in wealthy and developing countries. A large Italian study was conducted by Castellini, Corbetta [53]. A total of 1289 physiotherapists were included in the study in which self-reported orientations towards EBP were assessed as well as knowledge of EBP principles. Results suggested participants overrated their grasp of EBP, showing poor knowledge of EBP principles despite indicating good self-perceived knowledge of EBP principles [53]. In addition, the sample of Italian physiotherapists scored similarly to a study on American physiotherapists 17 years prior [54]. Interestingly, respondents in the study by Castellini, Corbetta [53] who had Master's degrees demonstrated better knowledge of EBP principles than those with qualifying undergraduate education, supporting results from other studies on physiotherapists [24, 55-57] which have occurred around the world. In addition, a large-scale systematic review by da Silva, Costa [24] suggested that while physiotherapists hold positive opinions about EBP, their implementation of EBP principles in practice could be improved. Further, da Silva, Costa [24] demonstrated barriers to use of EBP in a clinical setting which have been supported by more recent literature such as time [28, 36, 53, 56, 58, 59], lack of resources, commonly experienced in developing countries [19, 37, 58], and limited abilities at appraising literature [2, 19, 56, 58].

It can be argued that there are similarities between barriers to use of EBP in the Global North and the Global South. However, CPGs which are developed to the context of the Global North, pose challenges to the adoption of such CPGs to the developing world [25, 58]. Healthcare systems in the developing world experience challenges which make accessibility to and implementation of EBP onerous [21, 58, 60]. Furthermore, resource limitations in LMIC may exacerbate the challenges experienced by HCPs to utilisation of EBP. Thus, challenges to EBP in LMIC will be discussed next.

Evidence-based practice in low- and middle-income countries

Research emerging from LMIC such as South Africa, Iran, and Azerbaijan, all of which are categorised as upper-middle income countries [8] suggest many obstacles to EBP, including physical and geographical barriers which may hinder access to healthcare for patients, as well as access to literature for HCPs. [5, 28, 58, 60]. Such barriers are seldom mentioned in CPGs. However, a large systematic review of HCPs' adherence to EBP [5] which included 103 articles from LMIC showed that the most commonly mentioned difficulties with EBP are lack of resources [58, 60], and lack of time, both mentioned by numerous authors [58, 60, 61]. Therefore, if there are barriers to EBP implementation in HIC, these are likely to be even more acute in LMIC, where healthcare systems are frequently in crisis [62] and there are resource and fiscal constraints [63].

Health context of the study

South Africa is categorised as an upper-middle income country [8], yet known as a historically unequal country due to the country's past of apartheid [62] . Moreover, South Africa's turbulent past has resulted in a major disparity between public and private healthcare [4, 62]. This disparity may lead to challenges in uptake and utilisation of EBP. Thus, the health context of South Africa will be discussed next.

Healthcare in South Africa

South Africa's public healthcare system resembles that of a low income country [64]. Yet, South Africa faces similar public health concerns to those of wealthy countries such as an ageing population and non-communicable diseases [65]. However, due to the inequitable healthcare system, South Africa also experiences additional healthcare challenges which include maternal and child mortality, and a quadruple burden of disease [63, 65]. The quadruple burden of diseases include communicable diseases such

as HIV/AIDS and tuberculosis; non-communicable diseases like cancer, stroke, and cardiovascular disease [66], injury such as gunshot wounds and motor vehicle accidents, and Type One diseases, examples of which are nutritional deficiencies, e.g. severe acute malnutrition [67]. Due to the above factors, the public healthcare system is severely under pressure where there is less than one healthcare professional to every 1000 people, as opposed to Europe's ten to every 1000 people [62]. In addition, the public healthcare system serves approximately 84% of the population of South Africa [4]. The overburdened healthcare system, especially in the public sector leads to long waiting times for patients and many health problems going unaddressed [4, 20, 62]. In addition, overburdening of HCPs in the public healthcare sector may contribute to limited uptake and utilisation of EBP in the public sector [18, 19, 21]. Barriers to EBP such as limited time, limited context-specific research, limited abilities at appraisal of research, and poor attitudes towards adoption of EBP to clinical practice [18, 19, 21, 28, 68] have been reported previously.

In stark contrast to the situation discussed in the public health sector, South Africa's private health centre is on par with some of the best healthcare systems in the world such as Sweden, Australia, Ireland, Switzerland, and Belgium [27]. However, private facilities only serve approximately 16% of the South African population [4]. Most private healthcare facilities are in urban areas and are utilised by generally affluent patients who have medical insurance cover, or those who have enough funding to pay for private services [69]. Clients who utilise private healthcare systems have direct, and almost unlimited access to medical specialists, providing they have the funds for such consultations [69]. It is not unreasonable to assume that private practitioners have better access to the internet. Internet access presents opportunities to utilise online resources and databases, as well as online courses to improve use of EBP. In contrast, access to guidelines may impose challenges to practitioners in the public sector. Thus, it is important to discuss barriers and challenges to uptake and utilisation of EBP in South African HCPs.

Adherence to evidence-based practice of allied health practitioners in South Africa

In South Africa, barriers to evidence-based practice are shown to be common across multiple allied health professions [2]. The allied health professions include audiology, physiotherapy [19, 28], psychology [70], and occupational therapy. Psychologists

in South Africa reported barriers such as lack of evidence for certain interventions, concerns about use of Western practices in the South African context and lack of clinical practice guidelines for their profession [70]. However, despite the reports from psychologists that there is a lack of guidelines, there is evidence available regarding appropriate management of anxiety, depression and panic which come from other less industrialised countries such as India [71]. One must therefore query whether the available evidence has limitations for psychologists in less developed healthcare systems or if they simply do not use the evidence and guidelines which are available.

Recently, a study by Naidoo [27] suggested that audiologists have good orientation towards EBP. In addition, the study suggested that audiologists could effectively implement the CPGs for benign paroxysmal positional vertigo (BPPV) in a clinical setting [27]. However, although BPPV is the most common cause of vestibular vertigo [72], management of BPPV is not conducted by many audiologists in South Africa [73]. Furthermore, the study by Naidoo [27] was conducted at an academic tertiary hospital, suggesting that the practitioners at the research site had higher exposure and better access to research. Practitioners with better exposure and access to research, especially in an academic facility have demonstrated better orientation to EBP [27, 32, 55]. Further, Naidoo [27] only examined the orientation towards EBP of audiologists and ENTs and only regarding BPPV, not varied vestibular pathologies. Thus, it is possible that implementation of the guideline for BPPV in the study by Naidoo [27] is not a true representation of application of CPG by audiologists to clinical practice.

Physiotherapists, especially in South Africa, have made a significant contribution to the literature surrounding evidence-based practice. The contributions from physiotherapy in South Africa have come in the form of quantitative studies [59], qualitative studies [19, 28, 58], and clinical practice guidelines [18]. Most of the studies have been specific to physiotherapy, but a few have included allied health in general [18, 58]. While physiotherapists have generated valuable research to the field of vestibular management [74], there are few studies on their uptake of evidence specifically regarding management of dizzy patients. Similar to other professional groups, physiotherapists experience barriers to use of EBP such as lack of resources, lack of support from employers, lack of understanding of theory and implementation of EBP [59] and lack of time, which has been mentioned across several studies in South Africa [2, 5, 28]. Thus, despite their valuable contributions to the guidelines for management of

patients with dizziness and vertigo, it is unclear whether local physiotherapists follow the guidelines.

It is a requirement by the Health Professions Council of South Africa (HPCSA) that all universities which provide health sciences degrees teach evidence-based curricula. Hence, attempts have been made to integrate EBP into undergraduate programmes [2, 75]. However, supporting literature has suggested that development of comprehensive knowledge and understanding of EBP is not always effective at an undergraduate level [2, 75]. A South African study assessed final year students in the allied health professions (physiotherapists, human nutrition students and speech, language and hearing therapy students) as well as new (one year) graduates [2]. Both groups reported that key competencies related to EBP such as database searches, critical appraisal and asking questions were not explicitly taught [2]. Moreover, lecturers who were interviewed by Schoonees, Rohwer [2] reported that there was a lack of research relevant to the South African context and lack of time within the curriculum to include additional modules focussed on EBP. Therefore, a tension between curriculum requirements and apparent learning outcomes is apparent. If EBP is not being taught during undergraduate training, it is important to question where it is being taught and learned, and how EBP is being utilised in clinical practice, if at all.

Turning now from the broad purpose and focus of the current study, the way in which the uptake and utilisation of EBP will be contextualised is discussed next. Orientation towards EBP in the current study will be demonstrated in the context of assessment and management of patients with dizziness and vertigo. The following section explores the symptom of dizziness as well as how it spans multiple professions in how it is assessed and treated. Further, specific HCPs' adherence to the evidence will be discussed regarding their approach to dizzy patients.

The symptom of dizziness

Dizziness and vertigo are two distinct but related constructs [76], both of which impact how a person perceives their sense of equilibrium and relationship with the environment [12, 77]. Dizziness and vertigo can be attributed to a diverse range of conditions and therefore, are notoriously difficult to assess and treat due to the variety of signs and symptoms exhibited by dizzy patients [78]. The subsequent sections will

demonstrate that symptoms of dizziness are common, thus signalling a need for proficiency in managing aetiological factors.

Symptoms of dizziness are frequent in the general population [76, 79] and have a reported lifetime prevalence of approximately 17% to 30% [76, 80]. More specifically, vertigo has a reported lifetime prevalence of 3% to 10% [80]. Further, in the medical population, dizzy patients are thought to account for approximately 10 to 35% of primary care visits [81]. The aforementioned prevalence figures are taken from HIC, as there is little research exploring the prevalence figures for dizziness and vertigo in less industrialised countries. However, it is important to note that the quadruple burden of disease in South Africa can cause dizziness and vertigo either through the pathologies themselves or the treatment thereof [82-84]. Therefore, it is possible that dizziness has similar prevalence figures in South Africa to those identified in HIC [85]; although of course the threshold at which patients might present could be very different depending on the context.

Healthcare professionals' role in vestibular management

Due to the variety of symptoms and conditions which cause dizziness and vertigo, a thorough and targeted case history is crucial and will often form the basis of diagnosis [77]. Additionally, because of the number of pathologies which can cause dizziness and vertigo, such symptoms can be assessed and managed by a wide variety of HCPs including general practitioners (GPs), cardiologists, neurologists, audiologists, ENTs, and physiotherapists [86]. The latter three groups formed the participants included in the study. Hence, their contribution to the assessment and management of dizzy patients will be discussed next.

Audiologists and ENTs are among the professionals trained in the assessment and management of vestibular pathologies. However, in South Africa, until 2011, vestibular training was excluded from audiology programmes at university level [1, 73]. In recent years, however, audiology students receive a full semester theoretical course in vestibular assessment and management and two practical clinical courses in vestibular assessment and management [1]. In contrast, audiologists who qualified prior to 2011 had to undergo additional training to conduct vestibular assessment and management [73]. Therefore, one of the challenges for newly graduated audiologists is

that many of their senior colleagues may not have knowledge or experience in management of dizzy patients, highlighting the importance of adherence to CPGs.

Physiotherapists are trained in neurorehabilitation [74]. Although vestibular rehabilitation falls within the realm of neurorehabilitation [74], it is not a specific exit level outcome for physiotherapy students in South Africa [52]. Thus, only physiotherapists with a special interest in neurorehabilitation and vestibular rehabilitation manage dizzy patients; and such physiotherapists are few in number. Internationally, valuable contributions from physiotherapists have included development of comprehensive guidelines for vestibular rehabilitation[74]. The guidelines by Hall, Herdman [74], however, are not open access, although short versions of the text are available. while vestibular rehabilitation does not necessarily require consultation of physiotherapists as audiologists are qualified to offer this service, physiotherapists are important professionals in the management of patients with vestibular pathologies.

Poor adherence to evidence-based practice in assessing dizzy patients

Healthcare practitioners in the Global North have identified such as lack of knowledge [87]; dislike of dizzy patients [86], and time constraints as negatively influencing adequate assessment and management of dizzy patients[39, 60]. The referenced research has focused on HCPs including ENTs, audiologists, physiotherapists as well as several other specialities such as cardiologists and neurologists. It is important to note that dislike of dizzy patients may stem from lack of confidence due to the perceived complexity of such patients' assessment and management [78]. Further, as a consequence of the barriers to managing dizzy patients, the professionals who are able to manage dizzy patients often prefer not to consult them [86]. Thus, it is suggested that there are few clinicians who willingly consult dizzy patients, let alone effectively and efficiently. However, HCPs may feel more confident consulting patients with dizziness and vertigo if they used the available guidelines.

Despite the straightforward nature of bedside examinations for dizzy patients and the minimal assessment requirements suggested in CPG [83, 88], patients may still be sent for expensive computerised tomography (CT) scans as well as magnetic resonance imaging (MRI) scans [88]. MRI and CT scans have a high rate of false positives and an exceptionally low yield [89] for vestibular pathologies. Scans are conducted despite the evidence, which has shown that a bedside examination would

be cheaper and more accurate [89]. Mismanagement of patients presenting with dizziness and vertigo includes not only unnecessary scans, but inappropriate and expensive referrals [87] to professionals who may not improve the patient's outcomes. Mismanagement may therefore lead to continued help-seeking behaviour and chronicity of symptoms or pathologies [90]. Prolonged symptoms can also lead to psychiatric comorbidities such as anxiety and depression [91] and increased cost to the healthcare system. Thus, dizziness is a cause of increasing, and often unnecessary financial burden on healthcare systems, and this practice should be challenged by EBP and CPG.

Rationale

Gaps in the literature surround the knowledge, attitudes and practices of allied HCPs regarding evidence-based practice. In addition, there is little research of translation regarding knowledge and understanding of EBP to clinical implementation of relevant CPGs. Further, there is limited research regarding how local professionals assess and manage dizzy patients. While limited research has evaluated EBP in allied health fields, there are very few mixed methods studies which provide quantitative data with the additional qualitative perspectives of the practitioners involved. Thus, while use of EBP has been shown to vary amongst HCPs, the specific barriers to use and uptake of EBP have not been adequately explored. Optimising outcomes through adherence to EBP is especially important in a population of patients who are prone to mental health conditions [91], such as those described in patients with dizziness and vertigo. This study may form a basis on which research can be conducted on overcoming the barriers to EBP as well as how to improve management of patients with dizziness and vertigo.

Research Question

What is the orientation of a specific subset of HCPs (audiologists, otolaryngologists (ENTs), physiotherapists) towards evidence-based practice, using clinical presentations of dizziness and vertigo as an exemplar?

Chapter 2: Methodology

Aim

The aim of this study was to identify and explore the knowledge, attitudes and practices of a specific subset of HCPs (audiologists, otorhinolaryngologists, and physiotherapists) regarding evidence-based practice using presentations of dizziness and vertigo as an exemplar. This research was conducted using mixed methodology, hence, objectives for each design and method will be described separately.

Objectives

Quantitative cross-sectional survey objectives

The objectives of the cross-sectional survey were:

- To explore respondents' self-perceived knowledge, attitudes and practices towards EBP using the EBP2Q.
    - To seek correlations between participants' mean domain and total scores on the EBP2Q, and (1) profession (ENT, audiologist, physiotherapist), (2) years of experience (0-10 years, 11 – 20 years, 21 – 30 years, >30 years), (3) work sector (private, public, academic), (4) level of education (undergraduate, postgraduate), and (5) formal EBP training.
- To develop three case vignettes of vestibular conditions (Ménière's disease, PPPD, and vestibular migraine) and questions regarding the relevant CPGs using a Delphi consensus technique [92]. Further, the case vignettes sought to explore participants' understanding and application of the relevant CPGs to the three vestibular pathologies.
    - To identify correlations between total scores on the EBP2Q, and scores on the open-ended case questionnaire.
    - To explore participants' knowledge and application of the relevant CPGs pertaining to cases of Ménière's disease, PPPD, and vestibular migraine.

Focus group objectives

The objectives of the focus groups were:

- To explore
    - the knowledge, attitudes and practices of audiologists, ENTs and physiotherapists towards the EBP approach
    - barriers and facilitators to use of EBP in general
    - the use and compatibility of EBP and CPGs in assessment and management of dizzy patients

Study Design

Mixed methodology was selected for several reasons. First, the strengths and weaknesses of quantitative and qualitative methodologies offset one another [93]. The quantitative phase is important as it allows data to be collected from a large representative sample, which can improve generalisability of the study [94]. However, the results obtained may lack details about the rationale for the participants' answers[95]. Thus, the qualitative phase drew on a small sample of the selected population to provide a rich and meaningful description of the phenomenon being studied [95, 96]. In addition, mixed methods studies seek to obtain complementary results between each phase of the study. While triangulation allows the researcher to be more confident in the validity of their results by comparing each phase, complementary results provide a more holistic and meaningful set of results [96]. Thus, the qualitative phase aimed to elaborate on the results obtained during the quantitative phase. In addition, if conflicting or unexpected results are obtained, the qualitative portion of the study helps to further explore possible reasons for the results obtained [96].

The specific mixed method adopted by the current study was a sequential explanatory design [97]. The explanatory design is useful when a researcher is attempting to explain the results obtained in the quantitative portion of the study [97, 98]. The sequential explanatory design involves quantitative data and qualitative data strands being collected consecutively, so that results of the quantitative study can inform the design and data collection process of the qualitative phase [96]. The results are subsequently combined to provide a more comprehensive picture of the phenomenon being studied [96]. Figure 1 shows the procedural diagram for the sequential explanatory mixed methodology.

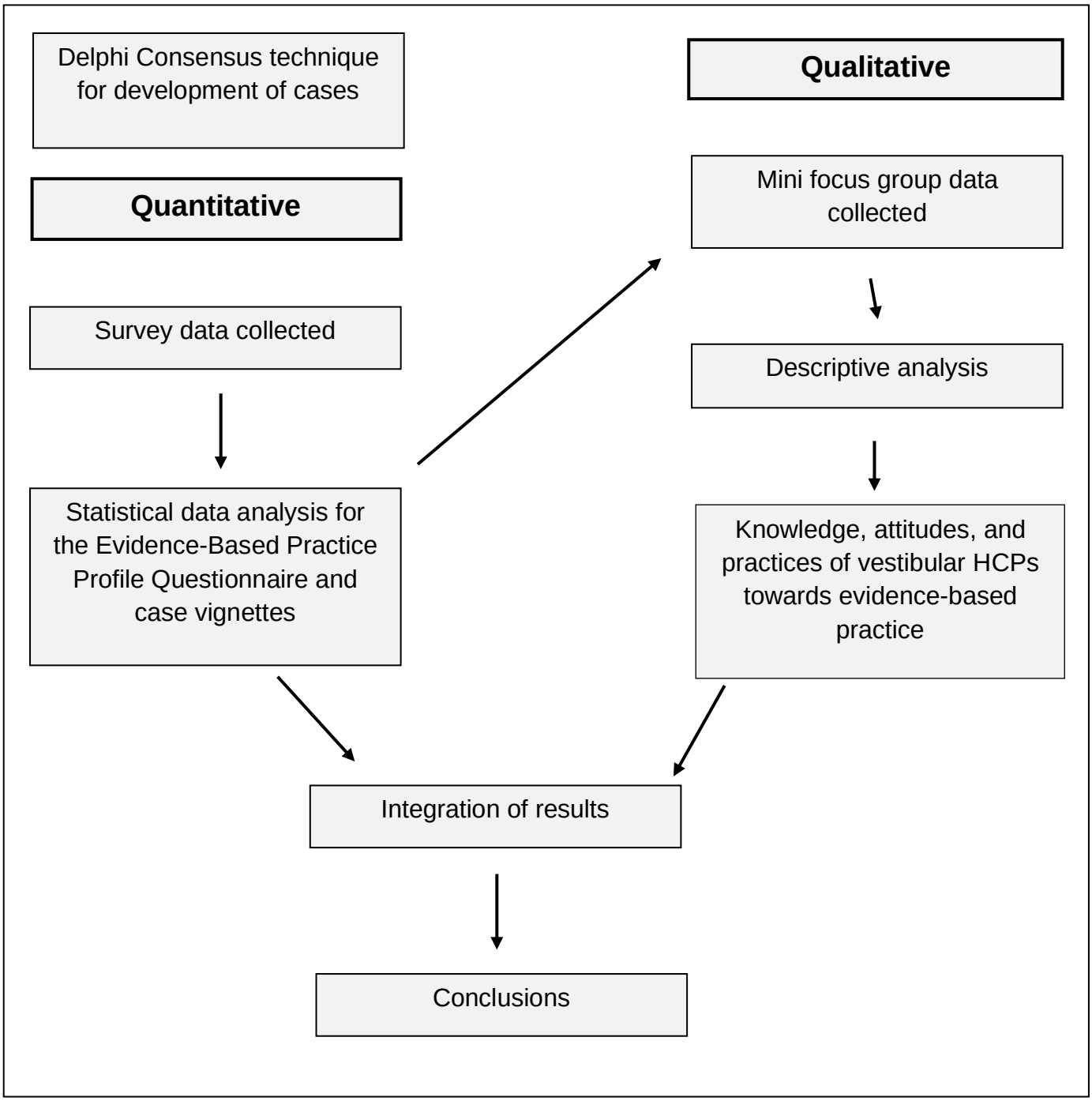

Figure 1: Sequential explanatory mixed methods study design

Phase 1 of the study was a quantitative cross-sectional survey study design using the Evidence-Based Practice Profile Questionnaire (see Appendix A). A cross-sectional design was used to collect data at one point in time, in contrast to longitudinal studies which continuously collect data over a longer period of time [94]. The most common way to conduct cross-sectional studies is by using survey methodology [99, 100]. Survey studies are an inexpensive and accessible [100] method of obtaining data. To elaborate, surveys that are conducted online only incur the cost of the internet

connection and the website used to create the survey if required. Further, online surveys are available to any healthcare professional with an internet connection, as long as they are provided a way to access the survey (via URL or website) [94]. Therefore, survey studies are able to collect data from a large sample of participants in a short period of time [56]. The quantitative section of a mixed methods study is important as it has high reliability and validity and can be easily replicated in other studies [94]. Despite the accessibility and cost-effectiveness of survey study designs, there are limitations, including a lack of depth and context [101]. Further, survey designs do not allow inferences of cause, effect and rationale for the phenomenon to be made [99]. In addition, surveys might experience poor response rates [102] and biases exhibited by survey respondents. Thus, quantitative survey studies in isolation provide limited utility. Further, in developing countries such as South Africa, many rural areas do not have stable internet connection [62, 68, 103]. Hence, an internet-based survey may exclude a large portion of South Africa's rural HCPs.

Phase 2 of the study employed qualitative, descriptive methodology [104]. A qualitative descriptive approach allowed the researcher to provide straightforward descriptions of the participants' experiences [105]. Descriptive methodology does not seek to provide in-depth theoretical and conceptual understanding of the subject [104] as with phenomenology or grounded theory [104]. Rather, descriptive methodology allows the researcher to explore clinical issues and provide information with which to implement changes in clinical practice [104]. A common method used to obtain information within the descriptive paradigm is using focus groups, which will be discussed next [29].

Focus groups are often employed in research to obtain rich and meaningful information about knowledge and attitudes of participants towards the phenomenon being studied [29]. Mini focus groups are used when the sample pool is small [29], as with vestibular practitioners. Further, mini focus groups are used when the participants have a high level of expertise [29] and thus, groups can be smaller without compromising the reliability of the data [29]. Focus group methodology uses questions or statements to guide discussion around the topic of interest. The aim of a focus group is not to cause arguments or to reach consensus [94] about the topic, but to allow participants to freely and openly discuss their thoughts, feelings, knowledge and attitudes [94]. The natural flow of the discussion is recorded, transcribed and analysed to obtain rich and

meaningful data about the phenomenon [94]. The focus groups were conducted with a topic guide comprising a series of questions and statements to stimulate discussion (see Appendix B). Participants in the focus groups were selected based on who would provide the most meaningful and insightful contribution to the current research topic. The focus groups explored the results obtained during the survey phase by providing background and contextual information [56] to the quantitative data. Data were analysed using content analysis [106].

Development of cases to accompany EBP2Q

Delphi Consensus

Before the survey study commenced, a Delphi consensus technique [92] was conducted to develop three cases on vestibular assessment and management to add to the end of the survey. Delphi consensus procedures require input from experts in the specific field being studied [92].

Inclusion Criteria

Only HCPs who were known to be experts (as defined in Appendix C) in the field of vestibular assessment and management were included in the Delphi consensus. In addition, to represent the study sample, at least one panellist was required from each profession (audiology, ENT and physiotherapy).

Exclusion Criteria

HCPs with limited time were excluded as a Delphi consensus is a process which takes time and repetition for the greatest validity [92].

Recruitment

Practitioners who were known for their vestibular expertise and who specifically offered vestibular services were identified and contacted by email, Whatsapp messenger, or word of mouth (see Appendix D for information and consent form). The selected experts were consented, and all of the experts contacted agreed to participate. The panellists are described below.

Participant description

The Delphi consensus panellists comprised four experts of vestibular assessment and management. The first expert was an audiologist who owned a large private practice who had a special interest in vestibular assessment and management. The audiologist has a clinical doctorate of audiology (AuD) and studied vestibular

assessment and management and consults patients with dizziness and vertigo weekly. The second expert was a physiotherapist with a special interest in vestibular assessment and management. She has attended multiple courses on vestibular assessment and management and has been consulting patients with dizziness and vertigo for the last 10 years. She now sees dizzy patients daily and provides vestibular rehabilitation therapy (VRT) as well as bedside vestibular examinations. The third expert was a consultant otologist and ENT surgeon at a large tertiary hospital in South Africa. She has taken multiple courses for vestibular assessment and management and has been consulting patients with dizziness and vertigo for 11 years. She now consults dizzy patients weekly and has access to full bedside and computerised vestibular assessments. Further, she has access to imaging including computerised tomography (CT) and magnetic resonance imaging (MRI). The fourth expert was an audiologist working as a clinical educator at a research-intensive university. This audiologist has completed a course in vestibular assessment and management. Since taking the course, she has consulted patients with dizziness and vertigo at a large tertiary hospital weekly for the last four years. She also has access to full bedside examination and full computerised vestibular assessment.

Procedure

Vestibular case vignettes and questions about the evidence relating the assessment, diagnosis and management of the vestibular presentations were developed by the researcher. The case questions were all open-ended, allowing for the participants to answer the questions in as much or as little detail as they felt was necessary. The aim of the Delphi consensus was to evaluate and develop the cases by ascertaining agreement regarding the appropriateness and applicability of the cases to novice and intermediate level (see operational definition in Appendix C) vestibular HCPs from different backgrounds (ENT, audiology, physiotherapy).

For the Delphi procedure, four participants from the target professions were asked to independently answer all of the case questions as well as the Delphi questions. The Delphi questionnaire consisted of six “yes or no” questions such as “given your expertise in the field of vestibular management, were you able to identify the pathologies in each of the cases provided?” and “if this case were given to a novice/intermediate vestibular practitioner, would they be able to identify the appropriate clinical practice guideline?”. Each yes or no question was followed by a

free text field for the panellists to leave any comments regarding adjustments for the cases or questions.

The Delphi comprised one round, after which 90% agreement was obtained. Since agreement was over 75%, it was regarded as adequate [92]. Should consensus not have been obtained, results would have been returned to participants for further comment and refinement. The finalised cases are presented in Appendix E.

Sampling Strategies

Phase 1: cross-sectional survey

The cross-sectional survey was aimed at a specific subset of HCPs (audiologists, ENTs and physiotherapists). Thus, probability sampling would not provide a representative or appropriate sample for the current research. Therefore, non-probability purposive sampling [107] was used as a sampling method for the survey.

Phase 2: focus groups

As with phase one, the intention of the researcher was to use purposive sampling to select participants for the focus groups [107]. The focus groups were aimed at HCPs who were not necessarily experts (defined in Appendix C) at vestibular assessment and management but had completed training either through university or postgraduate courses. Purposive sampling would have been the ideal sampling method as it would have allowed a representative sample [108] of the study population to be enrolled. However, the change in recruitment strategies due to poor response prompted a shift to convenience sampling. Convenience sampling is a type of non-probability sampling which is based on the availability of participants [108]. Hence, participants were recruited as mentioned previously, and those who were available were sent consent forms and requested to participate in the focus group discussions. In addition, due to the change in sampling and recruitment strategies, most focus group participants could be considered experts according to the working definitions (Appendix C). Thus, expert bias may have played a role in the focus group discussions.

Participants

The sample of survey participants is described in detail in Chapter 3, Results.

Phase 1: Cross sectional survey study

Inclusion Criteria

Audiologists, physiotherapists, and ENTs in South Africa registered with the Health Professions Council of South Africa (HPCSA) were eligible, who:

1. are currently practicing in any setting (e.g., state, private, academic) and have had training in vestibular management either at undergraduate or post-graduate level (e.g., courses, diplomas or postgraduate studies). Or

2. do not have any formal training but see at least one patient for vestibular management per month were eligible.

Exclusion Criteria

Potential participants who completed the demographic section of the questionnaire and do not conduct vestibular assessment and management were excluded.

Recruitment

Snowball sampling is a recruitment technique [94] which was used to recruit participants to the survey phase of the study [109]. Snowball sampling is a far-reaching recruitment strategy which allows participants to recruit their colleagues via email links and word of mouth. Snowballing allowed for further reach of the EBP2Q within the desired populations [110] as the aim was for each person who received the email link to send it on to more people and the sample would grow exponentially. Thus, the technique is called snowball sampling. The mailing lists for the South African Association of Audiologists (SAAA), the South African Speech-Language and Hearing Association (SASLHA), the ENT Society, and the South African Society of Physiotherapy (SASP) were used to disseminate the survey (see Appendix F for the letter to professional societies). Further, Facebook and Whatsapp groups specific to audiologists and allied health professionals as well as personal emails and messages were used to recruit participants.

Phase 2: Focus Group

Recruitment

Similar to recruitment for the survey study, snowball sampling was used initially to recruit focus group participants (See recruitment for phase 1). Social media such as the SAAA Facebook group and the SASP Facebook group were used to recruit

participants (see Appendix H for information sheet and consent forms). Members were asked to reply if they were interested and were personally messaged with the information and consent forms. Further, each of the professional societies (SAAA, SASLHA, ENT Society, and SASP) were requested to advertise the focus group studies. Any professional who showed interest was asked for their email so that they could be sent the full information sheet and the survey if they had not already completed it. Further, participants who completed the survey and were willing to participate in the focus groups were asked to provide their contact details so that they could be sent the consent forms.

Despite attempts being made to recruit focus group participants via snowballing [109], very few HCPs showed interest in focus group participation. Thus, the researcher changed recruitment from snowballing to targeted recruitment by requesting participation from HCPs via telephone, email, social media, and Whatsapp.

Inclusion Criteria

The participants included in this study were HPCSA-registered audiologists, ENTs and physiotherapists. Focus group participants had to be HCPs who practiced vestibular assessment and management.

Exclusion Criteria

Professionals with time constraints were excluded due to the length of time required for focus group discussions [111, 112].

Participant description

Four mini focus groups were conducted. Two groups comprised two professionals and two groups comprised three participants. The ten HCPs who participated in the focus groups comprised two physiotherapists, one ENT, and seven audiologists. Six of the seven audiologists worked in private practices, and one of the audiologists worked in an academic and government setting. All the audiologists had worked in vestibular assessment and management in varying capacities. However, none of the audiologists worked exclusively in vestibular assessment and management. Experience levels at assessing dizzy patients ranged between five and twenty years. Three of the audiologists had undergraduate qualifications, two had master's qualifications, and two had PhDs. Both physiotherapists who participated in the focus groups worked in private practices. Both of their practices focussed on

neurorehabilitation and thus, regularly consult dizzy patients; however, they did not exclusively consult dizzy patients. Both physiotherapists had between three- and ten-years' experience at vestibular assessment and management and both had master's degrees in physiotherapy. Finally, the ENT worked part time in a government and academic setting and part time in a private setting. She was a specialised otologist and had 11 years' experience specific to vestibular assessment and management.

Sample Size

Phase 1: Cross sectional survey

As of 2018, there were at least 623 audiologists registered with the HPCSA [4]. As of 2015, there were 246 practicing ENTs in South Africa [113] and as of 2019 there were 7937 active registrations for physiotherapists in South Africa [114]. All ENTs have vestibular training; however, it is unknown how many are actively treating vestibular patients. It is reasonable to assume for all three professions, vestibular management is regarded as a 'niche' area, which had the potential to impact sample size.

There have, however, been small studies in South Africa by Seedat, Khoza-Shangase [73,] Khoza-Shangase, Sebothoma [115] which explored the current practice of audiologists regarding vestibular assessment and management. These studies only attracted 32 participants, of which only half reported that they conducted vestibular assessment. Moreover, a keyword search using "balance" and "vestibular" on the South African Association of Audiologists website suggested only six practices which advertise vestibular services. Furthermore, 49 practices advertised vestibular services on the South African Speech-Language and Hearing Association website. Further, while neurorehabilitation is common practice amongst physiotherapists, there are very few physiotherapy practices which advertise vestibular rehabilitation services. Additionally, the physiotherapy professional boards do not provide numbers of physiotherapists who conduct vestibular rehabilitation.

According to Fincham [116], general response rates to research of 60% should be the researcher's goal. However, response rates to email surveys drop to approximately 30% without follow up emails [116]. The poor response rate is due to factors such as survey length, privacy, pre-notification, and interest in the subject matter [102]. Therefore, follow-up emails were sent, and information sheets were included to pique the interest of potential participants.

While it is difficult to estimate the number of professionals who practice vestibular assessment, it is safe to assume that the number of such professionals is far lower than the number of ENTs, physiotherapists, and audiologists practicing in South Africa. Thus, with the 30% response rate reported in Fincham [116], a more realistic intended sample size is 50 participants.

Phase 2: focus groups

The literature has shown that three to six focus groups are enough to reproduce 90% of the prevalent themes in a group of participants [117], thus, 90% data saturation will have been reached by the end of the sixth focus group [117]. However, the number of focus groups were subject to adjustment based on the number of participants willing to participate. A total of four mini focus groups were held (n=10).

Materials

Evidence-Based Practice Profile Questionnaire

The EBP2Q (Appendix A) developed by McEvoy, Williams [31] was used as the quantitative component of this mixed methods study. The EBP2Q is an open access standardised tool with high validity (see Validity and reliability) and has been shown to provide good self-reported assessment of orientation towards EBP [118]. The EBP2Q is a 74-point closed-ended self-assessment questionnaire. The questionnaire comprises 58 questions, each using a 5-point Likert scale which requires participants to assess their orientation towards evidence-based practice using five domains: confidence, relevance, sympathy, practice, and terminology [31]. The remaining 16 questions are non-domain items which allow participants to self-reflect on their orientation towards EBP, hence, there are no scores attached [31]. EBP2Q also has a demographic questionnaire to obtain information about participants' work settings, years' experience, EBP training, and levels of education. Table 1 below shows the scoring of the EBP2Q.

Table 1: Scoring of the Evidence-Based Practice Profile Questionnaire

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
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
			Total: **290**

Survey cases

The survey cases were developed using the most recent CPG available their respective conditions. Case 1 described a patient with a typical presentation of Ménière's disease using the CPG by Basura, Adams [43]. Case 2 described a patient with a previous acute vestibular pathology, who over 6 months had developed persistent postural perceptual dizziness (PPPD) as outlined in the CPG by Staab, Eckhardt-Henn [44]. Finally, Case 3 presented a patient with vestibular migraine as described by Lempert, Olesen [45]. All three CPGs were taken from the seminal *Journal of Vestibular Research* [12], and a Delphi consensus technique was used (see procedure) to ensure validity and reliability of the questions to be used in the survey cases. Rationale for the selection of each vestibular pathology chosen is discussed next.

Ménière's disease was selected for the study as it is a widely described, yet significantly overdiagnosed vestibular pathology [119, 120]. Ménière's disease was one of the first reported vestibular pathologies, with its symptomatology first being described in the 1800s [120]. The intensity of the symptoms of Ménière's Disease (tinnitus, fluctuating hearing loss and episodic vertigo) have led to extensive research on its management [119-121]. Despite copious literature on diagnosis and management of Ménière's disease, it has some of the lowest prevalence figures of any vestibular pathologies [120]. Patients with Ménière's disease often have to undergo intensive medical management [120] in an attempt to prevent recurrence of aural symptoms [119]. Ménière's disease, however, shares many of its symptoms with vestibular migraine, which is considerably more prevalent [121-123]. In addition, while vestibular migraine has been described with varying nomenclature for some time (migrainous vertigo, migraine-induced/associated dizziness), its first diagnostic criteria were only published in 2001 [124]. Furthermore, vestibular migraine requires a multidisciplinary approach to management as some patients require vestibular rehabilitation in conjunction with prophylactic medical treatment [91, 121]. Finally, PPPD was selected for this study as it is one of the most common causes of dizziness [91, 125]. PPPD has been labelled under many names such as phobic postural vertigo, functional dizziness, and chronic subjective dizziness [125]. However, Staab, Eckhardt-Henn [44] grouped all previous versions of functional dizziness under the umbrella term of PPPD which is the best

description for this type of dizziness thus far [44, 91, 125]. PPPD is a chronic type of functional dizziness often caused by long-term maladaptive behaviours to previous acute vestibular conditions [44, 125] such as vestibular migraine and Ménière's disease [123]. PPPD is noted to be one of the most disabling causes of dizziness [126] due to the chronicity and persistence of symptoms which include general imbalance, persistent dizziness, non-rotatory vertigo [44]. PPPD requires a holistic and broad rehabilitation-based approach to management, which may include cognitive behavioural therapy, vestibular rehabilitation, and medication using selective serotonin reuptake inhibitors [127].

The open-ended questions (see Appendix E) related to the cases described were taken from the relevant CPGs. Questions were scored according to the relevant CPGs using a researcher-developed scoring rubric (see Appendix I) to give a numerical value to respondents' answers. Respondents were given one point per correct answer. Some questions had one answer (identification of the pathology), while others had multiple answers (diagnostic criteria), and responses were scored accordingly. Case 1 (Ménière's disease) was scored out of 15, Case 2 (PPPD) was scored out of 11, and Case 3 (vestibular migraine) was scored out of 9. Thus, the total maximum possible score for all three cases was 35 points.

Hence, these three cases were hoped to effectively assess participants' knowledge and application of CPGs to clinical practice.

Procedure

Ethical clearance was obtained from the University of Cape Town Faculty of Health Sciences Human Research Ethics Committee (HREC approval number: 137/2021, see Appendix F).

Cross sectional survey

Permission was obtained from the SAAA, SASP, and ENT Society mailing lists to advertise the survey. The survey was disseminated using the professional societies' mailing lists. Further, the survey was disseminated via Facebook groups for South African audiologists, the SAAA Facebook group and via audiology-specific Whatsapp groups, personal messages via Whatsapp and private audiology network groups. Two months [116] were given for participants to respond and weekly reminders were sent to foster response rates [116].

The survey was conducted online using Survey Monkey (https://www.surveymonkey.com/). Participants were automatically consented via Survey Monkey using the survey information sheet and consent form (see Appendix G). Participants were able to withdraw at any time. At the end of each section of the EBP2Q, there was an option to add comments, which was encouraged to elaborate on participants' answers. At the end of the survey, participants who showed interest in the focus groups were requested to leave their details. A list of names of interested participants were kept and given numbers prior to analysis. Participants were reconsented for the focus groups (see Appendix H for the information sheet and informed consent documents) and their surveys were kept aside on a password protected Google Drive for triangulation of data.

Focus groups

Due to the on-going COVID-19 pandemic, the nature of this research was adjusted to facilitate minimal direct contact and social distancing between participants and the researcher. Thus, focus groups were conducted using the online meeting software, Zoom.

Four mini focus groups each comprising two or three participants were conducted. All participants were consented individually before the focus group began. Participants were emailed consent forms and required to complete them prior to the focus groups. The researcher has had training in focus group facilitation and completed further courses before the focus groups were conducted. The focus groups were introduced by the researcher who explained the study and participants were required to introduce themselves to establish rapport and understanding. A set of ground rules was established to prevent participants from interrupting or talking over one another [111]. The participants were asked questions according to the topic guide (see Appendix B) which was developed to answer the aims of the study. The researcher used pauses and probes such as "tell me more" or "can you speak more on that" [111] when discussion slowed down to draw more information from the participants.

The focus groups took approximately one hour each. Further, because the discussions were held over Zoom, time was not included for refreshments after the discussions. All focus groups were recorded using voice recording software in the

Zoom software. Descriptive notes were taken during the focus group sessions, to add context and facilitate reflection for the researcher [95].

Data Management

All data were downloaded from Surveymonkey and entered onto an Excel spreadsheet. They were then stored on a password protected document on a password protected computer. In addition, all respondents were assigned participant numbers (e.g., respondent #1 = 13086005510) by SurveyMonkey when data were downloaded off the platform.

To maintain focus group participants' anonymity and dignity throughout the study, they were assigned participant numbers according to their focus group (i.e., first participant in the first focus group = Group 1 P1; third participant in the fourth group = Group 4 P3). Therefore, confidentiality was maintained during data analysis. Data for the focus groups were collected using the Zoom software which allows the Zoom meeting to be recorded. Subsequently, Otter AI (https://otter.ai/?r=%2Fhome) was used to transcribe the recording of the meetings. Otter AI allows audio or video files to be uploaded and the software transcribed everything that was said during the recording. Otter AI does not separate the transcription into separate speakers, so editing was done manually. All recordings were stored on a password protected Google Drive and, on a password protected computer using anti-malware software to prevent hacking. The researcher was responsible for all data storage and management. Coding of all focus group transcripts was done initially and then repeated 5 days later to ensure good quality and consistency of codes [106]. Verbatim records of transcriptions were kept, along with all coded and interpreted data. All data will be kept for a maximum of 10 years [128] to allow research to be reproduced as well as maintaining integrity, security and quality [128]. Thereafter, all data will be destroyed by the researcher.

Data Analysis

Phase 1: Cross sectional survey study

Descriptive statistics were used to describe gender, profession, work setting (e.g., government vs private), years of experience, level of education (Bachelor's, Master's or PhD) and the nature and length of any EBP training. No questionnaires were excluded from the study as all questionnaires were completed.

Tests of normality (Q-Q plots and histograms) conducted on the data indicated that the data were normally distributed. Therefore, parametric statistics were used to analyse the survey data. A series of independent sample t-tests were used to compare scores between groups with two independent variables with a significance level of p=0.05 [129]. The groups analysed using independent sample t-tests were gender, level of education and participation in EBP training. Six tests were conducted on each dataset, one for each domain and one for the total questionnaire score. As multiple tests were done on a single dataset, there is a higher chance of Type 1 error occurring [129]. Thus, the Bonferroni correction applied, giving a significance level of .008 [130], lessening the occurrence of Type 1 error [130]. Independent sample t-tests were conducted on the entire questionnaire and per domain.

For data which had more than two variables, one-way ANOVAs were conducted to examine the relationships between groups and scores on the questionnaire as well as the relationship between groups and their scores on each domain. Therefore, profession, work setting, years of experience and length of EBP course were analysed using one-way ANOVAs.

Phase 2: Focus Group

Qualitative content analysis [131] was used for the focus groups. Before analysis could begin, the researcher described his own experience with the phenomenon so that personal experiences and biases were not relied upon during the subsequent steps of analysis [95]. The first step in data analysis is coding (see Appendix J), which entailed labelling important and recurring words or phrases throughout the focus group transcriptions. Codes were then grouped into categories [132]. Categories are labels which are given to groups of codes which occur often through the data [95]. Subsequently, themes emerged from the categories which were used to group the codes [95]. Themes are larger groups which encompass the categories generated throughout the transcriptions [132]. Themes were not taken directly from the data but generated by the researcher based on the information provided by the participants [132]. Synthesised member checking [133] was conducted to improve reliability of the focus group data (see next section).

Validity, reliability and trustworthiness

Delphi Consensus

Before the survey was disseminated, it was important to ensure that the case vignettes were appropriate and applicable to the study sample, i.e., novice and intermediate level vestibular HCPs. A Delphi consensus technique, already described, was used to ascertain the applicability and appropriateness of the questions linked to the cases. Further, because the Delphi technique was conducted amongst a group of experts, the technique also improves the content validity of the survey. Additionally, the assumption that more experts are more likely to arrive at the correct answer than one expert alone suggests that the validity of the results is high [92]. Therefore, the Delphi consensus technique was a good way to validate the case vignettes and their subsequent questions.

Evidence-based practice profile questionnaire

The EBP2Q was validated in a study on 526 students, lecturers and academics [31]. The final questionnaire was distributed two separate times to 105 participants which incurred similar results (Kappa ≥ 0.8), indicating that the questionnaire has good internal and test-retest reliability [31]. The EBP2Q was shown to have good test-retest reliability (Bland Altman limits of agreement suggest minimum and maximum scores on two occasions will be between -7.7 and 8.7) [31]. and good internal consistency (Cronbach's alpha 0.96) [31]. Appendix K demonstrates the reliability and validity of the EBPQ2 cross culturally and trans-professionally.

Survey studies are subject to several biases from respondents. For example, social desirability bias suggests that participants adjust their true responses to align with researcher's expectations [134]. Further, Likert-type surveys are subject to central tendency bias, which suggests that participants are hesitant to answer in the extreme i.e., strongly agree or strongly disagree [135]. Both biases mentioned were addressed by maintaining strict confidentiality and anonymity of participants, which it was hoped would encourage respondents to answer honestly. In addition, participants were not required to provide explanations for their responses although they did have the opportunity to support their responses at the end of each section.

Focus groups

Focus groups often have difficulty maintaining high trustworthiness [29] due to their nature, which relies on participants giving insights on their personal experiences [29]. A

systematic review by Nyumba, Wilson [29] demonstrated that results of qualitative studies which used focus group methodologies are seldom trustworthy because researchers omit important methodological details. Methodological omissions include the sample size and group size, number of focus groups conducted and the rationale for choosing focus group methodology [29]. The current research aimed to improve reliability by fully disclosing the methodological choices, procedures, and results.

Trustworthiness is a term used in qualitative research instead of validity and reliability as qualitative research defines the concepts of validity and reliability differently to that in quantitative research [136]. Trustworthiness was ensured by improving credibility and confirmability of the focus groups. Credibility of the study is how the researcher knows that the results of the study are true, and representative of the phenomenon being studied [106]. Confirmability is how the readers of the dissertation know that the results are true to what was explored by the participants without any external biases from the researcher [106]. Confirmability of focus group data was ensured through synthesised member checking. Synthesised member checking involves a summary of all focus group and interpreted data being returned to participants [133]. Participants were reminded at the end of the focus groups that the transcripts would be sent to them once they were compiled by the researcher. The participants were requested to provide feedback on whether data analysis matched the essence of the discussion and what was described during the focus group sessions [133]. All corrections and notes from the participants were recorded and included in the data analysis. To ensure confirmability, voice recordings from the focus groups were transcribed using transcription software to ensure verbatim transcriptions of the information provided by participants. The transcriptions were reviewed by the researcher to ensure accurate transcriptions by the software.

Triangulation was used to increase the credibility of data. Triangulation is a technique used in mixed methods research which seeks to explore the phenomenon from more than one angle [93]. Thus, by comparing results from the quantitative and qualitative phases of the study, background and context are provided in an attempt to support the quantitative results [93]. Subsequently, data obtained from the various methods are collated to provide a more holistic understanding of the phenomenon being researched [93, 96]. Triangulation in the current research was conducted by comparing the results of participants' responses on the EBP2Q to their responses to

the open-ended questions on the case vignettes. Finally, survey responses were compared to participants' responses during the focus groups. Triangulation ensured that results were consistent between both parts of the study. If the results of all parts of the study correlate with one another, they are regarded as having high trustworthiness [96].

The fact that the majority of focus group participants were experts in vestibular assessment and management put the focus groups at risk of expert bias [137]. Expert bias suggests that people who are considered to be experts in a certain field are more likely to look for opinions which are the same as their own [137]. In addition, experts may have influence on the opinions or less experienced professionals which may skew results of the focus groups. Thus, expert bias was addressed by including experts from different professions [137] who did not necessarily know one another and could, therefore, provide their own opinions without judgement.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki [138] The researcher endorses the Singapore Statement on Research Integrity (see Appendix L).

Autonomy was maintained through the study by allowing the participants the choice of completing the survey or opting out at any time with no questions asked. Further, participation in the study was completely voluntary and participants were not coerced or forced to continue with the study. Survey participants were required to consent before they were allowed to access the survey. Focus group participants were required to fill in consent forms to participate in the focus groups. Delphi panellists were also consented before they were sent the cases for review.

To maintain confidentiality, all participants in the focus groups and the EBP2Q study were anonymised and given study numbers. Survey participants were not required to enter their names for the survey to maintain anonymity. However, participants were given the opportunity to enter their details at the end of the study if they were interested in participating in the focus groups. This caused participants' identities to be revealed to the researcher. Additionally, focus group participants were able interact with one another, revealing their identities. This was outlined in the information and consent forms requesting that participants do not disclose one-

another's identities or discuss opinions voiced during the focus group sessions outside the research setting.

To honour the principle of nonmaleficence [139], during the focus group, participants were asked to maintain a professional demeanour throughout and avoid judgemental attitudes towards other participants' answers and interpretations so that all participants felt comfortable to speak freely and openly. No harm was anticipated from the survey phase or the focus groups and risks such as breaches of confidentiality were mitigated by having participants sign the consent forms and information sheets which included a section on maintaining confidentiality (Appendix H).

Beneficence [139] was addressed by considering best interest of all participants. Open access guidelines links for common vestibular disorders were provided at the end of the case questionnaire addressing the principle of beneficence. Guidelines were provided so that participants could improve their knowledge if they felt it was necessary, thus addressing the issue of beneficence.

Due to COVID-19 restrictions, the focus groups were held using the online platform, Zoom. Therefore, the convenience of participating from home may have increased willingness to participate. Since there were few risks to the study and the patients could benefit by increasing their knowledge on vestibular assessment and management, the benefits of the study outweighed the risks. Further, participants were given an option to receive a précis of the outcome of the research once they had completed the survey. Only if participants choose to request the research outcomes, would they be able to enter their email addresses.

Justice requires that participant selection is equitable and representative of the population being studied [140]. There was no bias towards socio-economic status, gender, sex, or ethnicity. The researcher understands the responsibilities accompanying research in healthcare and will maintain transparency throughout the research and reporting thereof [140]. The study's findings will further be disseminated to the wider research community through publication of a report.

The study had no conflict of interest. No staff or researcher had any investment in the study in terms of monetary compensation or incentive. Further, there were no

royalties, trademarks or copyrights involving any of the questionnaires or surveys used in the study.

Chapter 3: Results

To reiterate, this study sought to explore the knowledge, attitudes, and practices of HCPs towards evidence-based practice (EBP). Knowledge was assessed in a quantitative manner using two resources, viz., the EBP2Q and Cases based on CPG. Knowledge and application of clinical practice guidelines (CPGs) were explored using Ménière's disease, PPPD, and vestibular migraine as exemplars. These results are reported first. Qualitative data were generated by focus groups. These results follow before finally triangulating all the data and presenting a summary of the findings.

Phase 1: Evidence-Based Practice Profile Questionnaire and results of the Cases based on Clinical Practice Guidelines.

Analysis of the Evidence-Based Practice Profile Questionnaire

A total of 54 surveys were completed by respondents. All surveys were completed; however, one participant did not complete parts of the demographic information. Thus, the sample size (n) may be 53 or 54. The majority of participants were audiologists (n=37, or 69%), followed by physiotherapists (n=9, or 17%), ENTs (n=5, or 9%) and "other" (n=3, or 5%). For analysis, participants were split into groups of demographics as follows: profession (audiologists, ENTs and physiotherapists), work setting (private sector, public sector, academic sector, and other), years in practice (≤10, 11 – 20, 21 – 30, >30), highest qualification (undergraduate, postgraduate), formal EBP training, and duration of EBP training (short course of 10 – 20 hours, training as part of degree).

Scoring for the EBP2Q is broken down in Table 1: Scoring of the Evidence-Based Practice Profile Questionnaire, but is briefly revised here to provide a framework to interpret the results The minimum possible score on the EBP2Q is 58, suggesting poor orientation towards EBP and the maximum possible score is 290 suggesting perfect orientation to EBP. The EBP2Q has a total possible range of 232. The total mean score of the full sample (n=54) was 205.37, with a median of 204.5 and a range of 138 to 276. Besides analysing an overall score, it is possible to score the five domains of the EBP2Q separately. Each domain has different total scores due to the number of questions therein. The mean domain scores as well as the minimum and maximum

scores for the whole sample were as follows: relevance $\bar{x}$ = 61.44 (14 – 70), sympathy $\bar{x}$ = 24.08 (7 – 35), terminology $\bar{x}$ = 55.90 (17 – 85), practice $\bar{x}$ = 27.34 (9 - 45), and confidence $\bar{x}$ = 38.50 (11 – 55). Figure 2 below shows the distribution of scores on the EBP2Q.

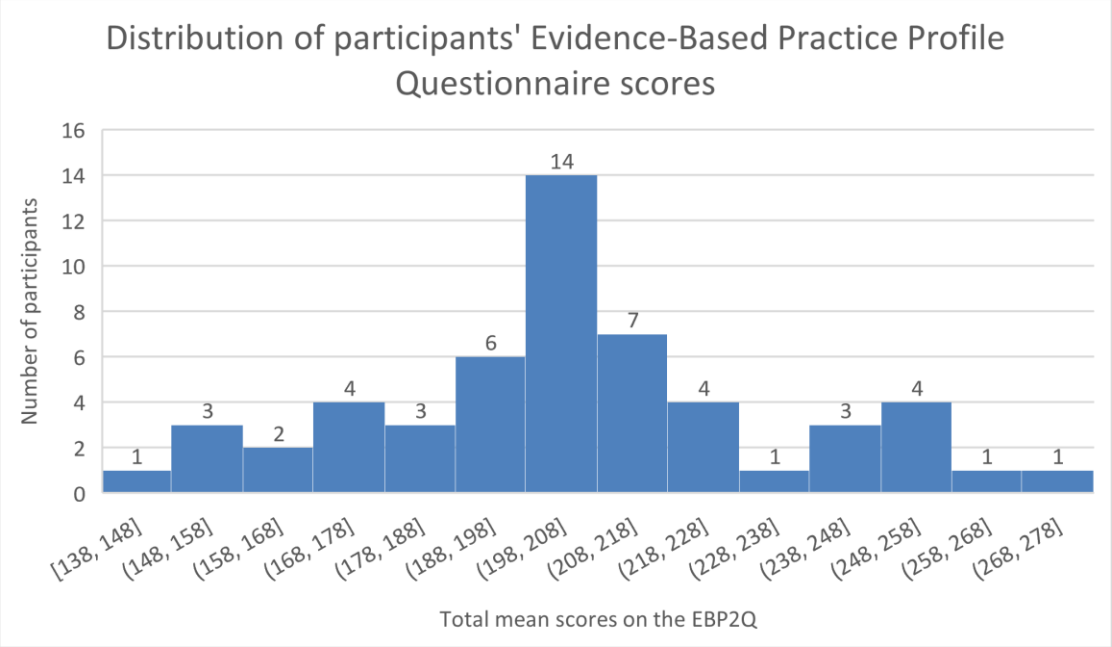

Figure 2: Histogram showing the distribution of respondents' scores on the EBP2Q

Tables 2 to 5 below break down respondents' scores in the EBP2Q by domain, followed by the total scores which are shown at the end of each table. Additionally, all significant effects of demographic groups on scores on the questionnaire are described below.

Demographic-specific results of the EBP2Q

Effects of profession on EBP orientation

Table 2 presents the means scores per profession across the five domains explored by the EBP2Q. A series of one-way ANOVAs revealed a significant relationship between Profession and scores on the Sympathy domain (p = .002). At a Bonferroni corrected p-value of 0.008, physiotherapists had significantly lower Sympathy Scores compared to Audiologists (p = .001) and ENTs (p = .005) (see Table 2).

Table 2: EBP2Q scores by profession

	Profession	n	Mean	SD	*F*	*p*	Domain Scoring (min and max)
Relevance Score	Audiologist	37	61.35	5.87	*< 0.01*	*.996*	14 – 70
	ENT	5	61.60	5.94			
	Physiotherapist	9	61.33	6.71			
Sympathy Score	Audiologist	37	24.62	4.09	*7.18*	***.002***	7 – 35
	ENT	5	26.00	3.81			
	Physiotherapist	9	19.11	4.54			
Terminology Score	Audiologist	37	54.51	11.45	*1.77*	*.181*	17 – 85
	ENT	5	64.20	11.54			
	Physiotherapist	9	52.00	14.54			
Practice Score	Audiologist	37	27.62	5.78	*0.81*	*.453*	9 - 45
	ENT	5	29.20	9.36			
	Physiotherapist	9	24.89	9.06			
Confidence Score	Audiologist	37	38.30	8.75	*1.39*	*.260*	11 – 55
	ENT	5	42.60	8.20			
	Physiotherapist	9	34.89	6.68			
Total Score	Audiologist	37	206.41	27.77	1.93	.157	58 - 290
	ENT	5	223.30	32.10			
	Physiotherapist	9	192.20	32.84			

Effects of years' experience on EBP orientation

A total of 53 out of 54 participants provided their years of experience. Most respondents (n=31) had less than 10 years' experience, followed by 21 - 30 years (n=9), 11 - 20 years (n=7), and > 30 years (n=6). Total scores suggested that respondents with over 30 years' experience had the highest mean scores ($\bar{x}$ = 215.33). However, statistical analysis using a series of one-way ANOVAs revealed no significant relationship between years of experience and total scores on EBP2Q or across the five domains of the EBP2Q when assessed across all three professions.

Effects of work setting on EBP orientation

Participants' work settings were separated into private sector (n = 31), public sector (n = 13), academic sector (n = 7), and other (n = 3) which included corporate sector, private companies and non-government organisations. The "other" category was excluded from analysis as the sample size was too small (n = 3). Table 3 shows the mean domain and total scores between work settings.

A series of one-way ANOVAs revealed:

1. No significant relationship between work setting and EBP2Q scores (see Table 3) at a Bonferroni corrected p-value of 0.008, despite those in an academic having the highest mean total scores.

Table 3: Domain scores by work setting

	Work Setting	N	Mean	SD	*F*	*p*	η^2
Relevance Score	Private	31	61.10	6.18	0.06	.941	< 0.01
	Public	13	61.77	4.95			
	Academic	7	61.14	6.39			
Sympathy Score	Private	31	23.87	4.16	1.25	.296	0.05
	Public	13	22.46	6.12			
	Academic	7	25.86	2.91			
Terminology Score	Private	31	53.03	10.70	2.61	.084	0.10
	Public	13	54.92	11.92			
	Academic	7	64.43	16.77			
Practice Score	Private	31	26.81	6.03	1.27	.291	0.05
	Public	13	26.38	6.42			
	Academic	7	31.00	9.80			
Confidence Score	Private	31	37.10	7.70	1.32	.278	0.05
	Public	13	38.31	9.99			
	Academic	7	42.86	8.99			
Total Score	Private	31	201.90	26.52	1.87	.165	0.07
	Public	13	203.85	32.22			
	Academic	7	225.29	34.48			

Effects of highest qualification on EBP orientation

Table 4 demonstrates the total and domain scores comparing HCPs with a qualifying undergraduate degree (four-year bachelor's degree for physiotherapy and audiology) and a postgraduate degree (Master's level and above). Independent sample *t*-tests revealed a significant difference in Terminology (p = .013), Practice (p = .047) and Confidence (p = .005) scores by highest qualification. In domains, those with postgraduate education had higher scores than those with undergraduate degrees. There was also a pattern of results which suggested that those with a postgraduate training having significantly higher Sympathy Scores (p = .061) compared to those with only an undergraduate degree. However, at the Bonferroni corrected p-value of 0.008, only the Confidence domain was significantly higher in respondents with a postgraduate degree than those with an undergraduate degree.

Table 4: Domain scores by highest qualification

Domain	Highest qualification	N	Mean	SD	*t*	*p*	*d*
Relevance Score	Undergraduate	31	61.65	5.53	0.27	.790	0.07
	Postgraduate	23	61.22	6.19			
Sympathy Score	Undergraduate	31	22.94	5.01	-1.92	**.061**	0.53
	Postgraduate	23	25.30	3.69			
Terminology Score	Undergraduate	31	51.45	10.62	-2.56	**.013**	0.71
	Postgraduate	23	59.78	13.26			
Practice Score	Undergraduate	31	25.48	5.57	-2.04	**.047**	0.71
	Postgraduate	23	29.22	7.92			
Confidence Score	Undergraduate	31	35.06	8.28	-2.97	**.005**	0.82
	Postgraduate	23	41.70	7.88			
Total Score	Undergraduate	31	204.10	29.71	-0.50	.621	0.14
	Postgraduate	23	208.32	31.44			

Effects of EBP training on EBP orientation

The sample was split evenly between respondents who had (n = 27) and had not (n = 27) undergone formal EBP training. Even though respondents who had received formal EBP training had higher mean total and domain scores than those who had not, independent sample *t*-tests revealed no statistically significant differences in EBP scores between those who had and had not undergone formal EBP training.

A total of 34 participants responded regarding the length of EBP training received, despite only 27 participants reporting that they received formal EBP training. The majority of the 34 participants (n=24) received training as a part of their degrees, followed by a short course of 10 – 20 hours (n=7), and those who had done a single lecture of one to three hours (n=3). The additional seven participants who reported a length of EBP course suggests that some participants may have had EBP training which they did not regard as formal training. The category of a single lecture was removed from analysis due to small sample size (n=3). Independent sample *t*-tests revealed a significant difference in Relevance (p = .039) scores by length of EBP course (see Table 5). Those who had done a short course had significantly higher scores than those who had EBP training as part of their degree on the relevance domain. However, at the Bonferroni corrected p-value of 0.008, there were no

significant differences between participants with a short course and those with training as part of their degree.

Table 5: Domain scores by length of EBP course

	Length of Course	N	Mean	SD	*t*	*p*	*d*
Relevance Score	Short (10-20 hours)	7	66.29	3.86	2.106	**.039**	0.93
	Part of degree (>20 hours)	24	61.71	5.17			
Sympathy Score	Short (10-20 hours)	7	23.71	3.73	-0.21	.832	0.09
	Part of degree (>20 hours)	24	24.17	5.19			
Terminology Score	Short (10-20 hours)	7	58.86	10.67	0.19	.853	0.08
	Part of degree (>20 hours)	24	57.92	11.96			
Practice Score	Short (10-20 hours)	7	27.43	5.00	0.08	.933	0.04
	Part of degree (>20 hours)	24	27.17	7.72			
Confidence Score	Short (10-20 hours)	7	42.71	3.99	1.03	.313	0.44
	Part of degree (>20 hours)	24	39	9.23			
Total Score	Short (10-20 hours)	7	219.00	16.30	0.72	.476	0.31
	Part of degree (>20 hours)	24	209.96	31.62			

Analysis of the Cases 1-3 based on CPGs

A total of 15 (28%) participants completed the cases section of the survey. All 15 participants completed Case 1 (Ménière's disease), but two participants (one ENT and one physiotherapist) stopped answering after Case 1. Thus, only 13 participants completed all three cases. By profession, 10 audiologists completed the cases, followed by three ENTs. Relationships were sought between answers on the open-ended questions and domain scores of the respondents as well as the respondents' total scores. Results of the open-ended questions are described below. Case 1 (Ménière's disease) was scored out of 15 (minimum = 0, maximum = 15) with a mean score of 5. Case 2 (PPPD) was scored out of 11 (minimum = 0, maximum = 11) with a mean of 1.62. Case 3 (vestibular migraine) was scored out of 9 (minimum = 0, maximum = 9) with a mean of 3.85. The total case score was out of 35 (minimum = 0, maximum = 35) with a mean of 10.46.

It is important to note that, in response to the question "Based on the history provided, which clinical practice guideline would you use to diagnose and manage this patient? If more than one, please state all of the ones you would consider", three participants stated which assessment were to be conducted on the patient, suggesting

possible misunderstanding of the question. However, the other 12 respondent responded appropriately.

Case 1: Ménière's disease

Nine of the 15 (60%) respondents were able to correctly identify Ménière's disease as the pathology. Eight of the nine participants who correctly labelled the disease could name at least one criterion for a definite diagnosis, and four of those could name at least two criteria. Eight of the nine participants who correctly recognised the pathology identified the indication for vestibular rehabilitation. Two of the eight participants gave the specific answer regarding indication for vestibular rehabilitation as mentioned in the guideline.

Case 2: PPPD

Five of 13 respondents (38%) successfully identified PPPD. The same five respondents also knew the correct management for the patient and whether vestibular rehabilitation was required or not. The majority of the other participants diagnosed the previous acute vestibular pathology from the history (Ménière's disease, vestibular neuritis) but missed the subsequent development of chronic functional dizziness.

Case 3: vestibular migraine

Seven of 13 respondents (54%) correctly identified vestibular migraine as the relevant pathology. Six of the seven respondents characterised at least one criterion required for a definite diagnosis of vestibular migraine, four of those defined at least two criteria. Six out of the seven participants correctly reported how to manage the patient further and all seven respondents knew whether the patient required vestibular rehabilitation.

Triangulation between scores on the EBP2Q and the case questionnaire

The scores on the EBP2Q of participants who answered the case questionnaire indicated that these participants had a higher mean total score ($\bar{x}$ = 215.13) than the total sample of 54 participants ($\bar{x}$ = 204.5). Interestingly, participants who completed the case questionnaire also had higher mean domain scores on all domains (relevance $\bar{x}$ = 62.47, sympathy $\bar{x}$ = 25.4, terminology $\bar{x}$ = 58.5, practice $\bar{x}$ = 28.4, and confidence $\bar{x}$ = 40.27) than the total sample of 54 participants. Although the difference is slight, it suggests that HCPs who consult dizzy patients have better orientation towards EBP than those of the current sample of HCPs who do not consult dizzy patients.

Phase 2: Mini Focus Groups

The mini focus groups were analysed using content analysis and themes were developed according to the process as described in Methodology. In addition, participants were described in detail in Methodology. Briefly, there were 10 participants, comprising 7 audiologists, two physiotherapists and one ENT. Figure 3 demonstrates coding of a sample of the discussion. The subsequent themes were used to describe the results from the focus groups. Figure 3 shows how Theme 2 was developed.

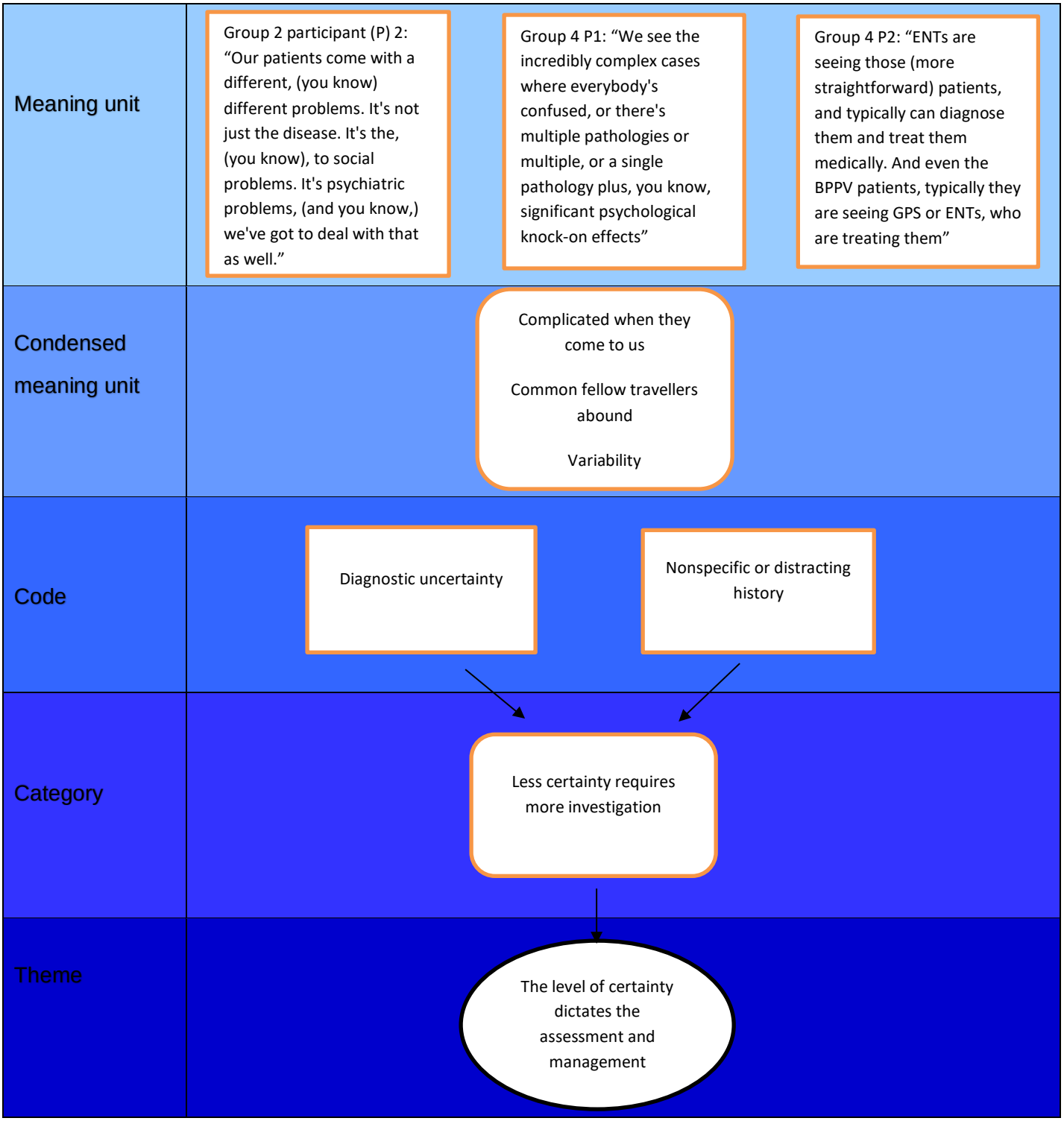

Figure 3: The process of coding

Theme 1: Guidelines do not capture the nuances of the patient's reality

Almost all participants referred to dizzy patients as "complicated or "complex". Participants reasoned that patients often have multiple factors in addition to the presenting complaint of dizziness, which could affect the assessment, management, and outcomes. Several participants mentioned that because dizzy patients are complex, many of the guidelines have limited clinical use in isolation.

Group 3 P (participant) 2 stated, "There are clinical guidelines out there. But, a lot of the clinical guidelines are also being established in research facilities, that, you know, they are seeing patients, but it's not a clinical basis".

Group 2 P1 added,

"… the problem is not the Ménière's (disease), the problem is not the fact that they can't hear so well anymore. The problem is that they've lost their job because they are a pilot, and they will never fly again or, you know, their husband divorces them, because they look like they drunk all the time. Or, you know, these other things that you know, or a mother will say, 'I cannot even pick up my baby, because I've got this fear that I'm going to let them fall'…"

These statements reflect that the complexity involved in assessing and managing dizzy patients is not necessarily the dizziness itself, but the additional burdens placed on the patients by their dizziness. Therefore, the nuances of dizzy patients' realities are such that application of CPG is not enough and EBP recommendations need to move beyond diagnostic algorithms.

Theme 2: The level of certainty dictates the assessment and management

When participants were asked how they decide on assessment and management strategies, all ten participants responded that the history in some manner is the most important influence on what dictates the professional's approach. Most participants reported the use of questionnaires, which were filled in prior to the consultation. The results were used to direct the line of questioning during the case history which, in turn, would drive the assessment. There was extensive agreement amongst all participants that in most cases, assessment is also based on the level of certainty by the HCPs.

Group 2 P2 stated,

"Let's say we think it's Ménière's (disease)[1] by the symptoms, so it sounds like Ménière's, but the hearing test is normal, or the tinnitus is kind of in the head and we're just not sure which ear, or let's say they had ear pathology before and ear surgery and the audio (hearing test) doesn't help us and we're not sure which ear (is affected), then we might send them (for testing)".

Group 4 P1 routinely conducts computerised assessment on patients who have seen multiple HCPs with no definite diagnosis and an unclear or complex case history. Furthermore, many of her patients have developed multiple comorbidities, and clinicians often have difficulty identifying contributing factors. She reported the following regarding these patients:

"When I do see a patient for a VNG and it's a full diagnostic, then I feel very uncomfortable to skip certain tests, you know, then I want to do everything. You know, to start saying like, 'oh, maybe we don't need to do calorics or maybe we can skip the oculomotors'. It feels criminal, you know, at that point, because you can quite easily miss something unless you do a whole lot".

Participants in other groups shared a similar sentiment regarding full vestibular test batteries, supporting the theme that the level of certainty of the patient's diagnosis dictates the assessment/s to be conducted. The notion that more "typically" presenting patients undergo less assessment is in support of the evidence and indeed would be congruent with CPG. However, the indication that patients who are referred with less certainty undergo more tests, rather than referring back to guidelines contradicts the evidence.

Theme 3: Training, support, and confidence go hand-in-hand

A follow-on theme which stemmed from the fact that dizzy patients are often complex, was that support is often required as vestibular practitioners may lack confidence. The majority of participants reported that they felt much more comfortable seeing dizzy patients if they had someone to consult regarding the patient's history and results. Almost every participant reported that they had a mentor, whether the mentor was another, more experienced audiologist, ENT, or physiotherapist. Interestingly, these mentors did not necessarily come from the same profession as the

[1] When words are inserted into the focus group quotations in brackets, they are the researcher's additions to provide clarity for the reader

participant themselves. These participants are adhering to the principles of EBP which require use of a combination of the best evidence, clinical expertise, and patient preferences. Although the participants may not necessarily be using their personal clinical expertise, they are using the expertise of someone who they consider more senior and more experienced. Further, participants suggested that they knew that the professionals whom they consulted had knowledge of the CPGs.

One of the aims of the original CPG was to encourage practitioners to use shared and standardised terminology and taxonomies to describe vestibular conditions. Therefore, it was interesting to note the difficulty mentioned by several participants in that communication between professionals treating dizzy patients was seldom effective.

Group 1 P2 and Group 3 P1 (both physiotherapists) who are regularly referred patients for rehabilitation, rather than assessment, shared the following sentiment: “ENTs refer you patients, and literally all they scribble is vestibular rehab, or (they) just kind of give you, like, diagnosis, vestibular rehab, and nothing else.”

Both physiotherapists reported that this lack of information can cause difficulty when trying to manage the patients, as the rehabilitation professionals may not have specific results from which to target their rehabilitation. Thus, while there are comprehensive guidelines developed by and for physiotherapists, if referring doctors are not specific, it is difficult for the physiotherapists to decide which rehabilitation protocols to use.

The notion of poor referrals was echoed by Group 3 P2 (audiologist), regarding receiving referrals with no diagnostic information or results:

“...education amongst other professionals (is a problem). ENTs and neurologists, specifically…, to be honest with you, I will often get referrals from ENTs, or neurologists (who) will say, vestibular rehab, and I will ignore what they say. And I will discuss it with the patient and just explain to them why I need to do a full assessment with their permission.”

Group 3 P2 went on to say:

“Depending on who the ENT or neurologist is, I will send them a message and be like, ‘this patient needs a full assessment, not just rehab, what am I rehabbing?’ And I often say to them, ‘how are you going to diagnose a brain tumour without doing an MRI scan?’”

Group 1 P1 (audiologist) also reported that it is important to refer to the ‘correct’ ENT (one with expertise in vestibular medicine): “… there's no point doing this full four-hour assessment and it gives you this result, and you send it to an ENT, and he has no clue what it's talking about…”

The development CPG for vestibular pathologies has made the practice of vestibular assessment and management far more accessible to HCPs. However, the old attitudes of disliking of dizzy patients are still perceived as pervasive within the ENT community and have not been changed by the development and availability of vestibular CPG. Group 2 P1 (ENT) expressed:

“…if you're interested in vestibular, most doctors are not, it's I think, you know, it takes so much time that it's not worth really anybody's while, you know, to be interested in it. And luckily, you guys (audiologists) took it over! So, we don't have to be in it! Because we (ENTs as a profession) don’t like dizzy patients.

Barriers and facilitators to EBP

The following section was not given a theme. Rather, barriers and facilitators to EBP reported during the focus groups will be discussed below.

Barriers to EBP

Limited access to the latest research

Participants noted that certain journals require payment to access them. Alternatively, one could access the journals through an academic institution. However, many HCPs do not necessarily have institutional access to research. Thus, most professionals preferred to speak to a more experienced colleague.

Group 1 P2 (physiotherapist) reported the following: “I've tried to access them (CPGs) in the past, and they're not always freely available…you need to have access to (you know), through an academic institution or something like that.”

Group 3 P2 (audiologist) stated, “(if you want) up to date journal articles, you have to pay.”

In a parallel vein to limited access to research, participants mentioned the overwhelming amount of literature available, some of which might appear contradictory. Further, participants recognised difficulty which could be experienced by less experienced practitioners in analysis and appraisal of literature. Group 1 P1 stated the following:

"I can understand how somebody who is in practice full time, finds it overwhelming to keep up with evidence-based practice. And the other thing is that research is always conflicting. So, it's not even just reading what the latest research is, it's about comparing the latest research and who had a stronger methodology, and (you know) was there bias in this research article?"

Group 1 P2 continued,

"Barriers would be maybe, for most people in general, would probably be time and accessibility and the fact that obviously, there's so much research to go through, you don't know where to start. And I think at the moment, especially with COVID, that I am constantly attending webinars, and there's this barrage of information coming at you all the time that it's difficult to keep up."

Poor attitudes towards EBP

Group 2 P2 is an audiologist who trains other audiologists and works in academia. Further, she had the highest mean score on the EBP2Q ($\bar{x}$ = 257) of all audiologists, and the highest score on the case questionnaire (32/35) of all participants who completed the case questionnaire and who participated in the focus groups. She suggested that the research and evidence is available, but the audiologists who she trains do not prioritise use of the available evidence. She spoke at length regarding the audiologists she trains (at postgraduate level) and reported that the means are available to implement best practice. She reported that even though audiologists know what is involved in implementation of EBP, they refuse to put the steps in place as it may require too much effort, time, or money. She stated the following:

"We have had so many people, for instance, in government saying to us, 'we've got money for that'. Because they've got budget, they've got so much money in government for equipment! But you know, 'if we buy it, then it's gonna mean I have to do it, and then I'm gonna take so much longer!' And then (you know) it was a mission

for us with some hospitals to get them to do baby screening, and to go from OAEs to ABRs, because now they've (staff) got to put electrodes on and scrub. And (you know) some of them moan because they have to wash their hands!"

She mentioned Continuous Professional Development (CPD) courses and how, despite the intention to improve evidence-based practice, the courses and questionnaires are fraudulently completed, defeating the point of the exercise.

She reported: "…how many secretaries are super-efficient in doing SASLHA online articles for their work for their employers!? The secretaries fill it (the questionnaire linked to the online article) in! So they get clever, and they get their CPD points, but it goes to the audiologist, you know!,"

CPGs are seldom appropriate for the context of South Africa

The barrier of too few context-appropriate CPGs was a problem which was noted by most of the participants as demonstrated in Theme 1: Guidelines do not capture the nuances of the patient's reality.

In addition, Group 2 P2 suggested that more context-specific research is required for development of context-specific CPGs. However, she opined that South Africa is lacking expertise to conduct research on a large scale:

" …at most universities, you don't necessarily have a vestibular expert to the level where they can supervise PhD studies or sometimes even Master's studies. And I think that if you also have to advance the research, we do need stats about our people (patients)... but you know, we need studies that is on our population of people and scope of practice, as well as (lack of) expertise at universities can be barriers."

Group 2 P1 also indicated that in the government facility in which she works, her team contextualises the assessment and management to the patient's needs, albeit informally: "We do tailor make it a little bit more, we had to Africanise it, because we can't do all the tests. They (the patients) can't afford it."

Facilitators to EBP

In contrast to the rather jaundiced view regarding continuing professional development expressed by Group 2 P2, others noted that the proliferation and diversification of available CPD activities facilitated EBP. Two participants (Group 2 P2 and Group 3 P2, both audiologists) recognised that recently, during COVID-19 and

minimal face-to-face contact, there were many webinars held by HCPs who were considered experts in their specific fields. Thus, the webinars were assumed to promote the best evidence regarding the subject being presented. Participants further recognised that webinars have made experts from across the world accessible to people with internet connections. Further, this accessibility to international professionals may have been adopted more readily by HCPs as it may not require as much time to be taken from practice than in-person courses.

Another facilitator reported by focus group participants was access to journals through professional society membership. For example, Group 3 P1 (physiotherapist) reported that their respective professions had access to journals through special interest groups and journal clubs. Further, Group 2 P1 (ENT) reported that the ENT Society of South Africa provides free access to selected journals to their members.

Focus group participants reported that some of the companies which sell vestibular equipment provide support for practitioners. Further, assistance is not limited to professionals who have bought the companies' equipment. Group 2 P1, Group 2 P2, and Group 1 P1 reported that they knew of organisations who run Zoom discussions once per week, wherein professionals can present complex or interesting cases and ask for input and information from all professionals present. Of course, such an activity could be helpful if there was a high priority on actual EBP and guidelines, or it could represent simply putative expertise which might not be high on the hierarchy of evidence.

Another facilitator noted was regarding audiologists' knowledge of dizzy patients. Group 4 P1 reported, "the undergraduate students are far better equipped (now), but it's to actually take that step and go and do a vestibular workup, like a bedside assessment, in conjunction with an audiogram is very powerful".

Therefore, she suggests that newly graduated audiologists are more confident when consulting dizzy patients than they were previously.

Triangulation of results amongst focus group participants

It was noted that EBP2Q scores and Case questionnaire scores of the focus group participants were amongst the highest of the total sample (EBP2Q $\bar{x}$ = 215.14, case questionnaire $\bar{x}$ = 24.43). In addition, the mean EBP2Q and Case questionnaire

totals were higher than the same mean totals of the full sample of n=54 and n=16. Further, Group 1, P1 (audiologist) and P2 (physiotherapist) as well as Group 2 P2 (audiologist) had some of the highest case questionnaire scores (25/35, 30/35, and 32/35 respectively) and some of the highest EBP2Q total scores (247/290, 211/290, and 257/290) out of the full sample of 54 participants. In addition, eight of the ten focus group participants had some level of postgraduate training. Therefore, focus group participants' good understanding and implementation of EBP may be attributed to their postgraduate education.

Summary of important findings

Education level overall (participants with postgraduate education) and exposure to research (those who work in academic fields) had statistically significant positive impacts on scores on the EBP2Q.

The EBP2Q found no significant correlations between years' experience and orientation towards EBP. Despite this, questionnaire respondents reported that their best facilitators to use of EBP were more experienced superiors and colleagues. In addition, focus group participants reported that they preferred to consult experienced colleagues rather than conduct their own literature searches.

Just over half of respondents could identify MD and VM as pathologies and only 38% of respondents could identify PPPD as a pathology, despite PPPD being much more prevalent than the other two pathologies. Further, focus group participants reported that most dizzy patients have comorbid PPPD or functional dizziness; echoing the perception that the condition is commonly seen in daily practice.

Barriers to EBP were noted such as limited access to research and evidence, CPGs which are not suitable to the health context of South Africa, limited time to conduct research, difficulty appraising literature, and poor attitudes towards changing of clinical practices and behaviours.

Facilitators to use of EBP included access to online courses which previously would have been difficult to attend, and free access to literature for ENTs and physiotherapists through professional societies, special interest groups, and journal clubs.

Results will be further explored in Chapter 4, Discussion.

Chapter 4: Discussion

Introduction

This chapter will discuss the findings in terms of the study's aims and objectives. Subsequently, study limitations will be described, followed by the implications for future research and conclusion to the study.

EBP is an approach to clinical decision-making used to standardise, and arguably improve patient care by using the best available evidence and applying it in the clinical setting [13]. One of the most important and likely most clinically relevant products of EBP is Clinical Practice Guidelines (CPGs), which cover a variety of topics in medicine, including vestibular management. During development of CPGs, researchers seldom consider the context of emerging regions [21]. Hence, in countries such as South Africa where resources are scarce, certain authors have noted challenges to uptake and utilisation of EBP including limited time to research, high patient loads, lack of resources for implementation of best practice, and lack of access to literature [19, 21, 58, 68]. Therefore, despite a global push for healthcare to be practiced using the best evidence [21], there are barriers to the uptake and utilisation of EBP worldwide.

Research on the use of EBP, and specifically CPGs in developing countries such as South Africa is scarce. Therefore, local barriers to EBP have not been fully explored or understood. Further, despite efforts to improve the use of EBP in the health professions, there remains a mismatch between self-perceived understanding of EBP, actual knowledge of EBP and CPGs, and their application to clinical practice [2, 19, 58]. These notions are supported by the current report. Previous research has not focused on different professional groups who routinely assess dizzy patients and their attitudes towards EBP. One South African study by Naidoo [27] evaluated management of one condition, namely BPPV, by focussing on compliance with guidelines. However, Naidoo [27] used different methodology to the current study, and did not evaluate physiotherapists' management, a gap this report hoped to address. Thus, the current research expanded on the previous work by using mixed methodology to explore the uptake and utilisation of EBP and CPGs as the two are so intertwined.

In the era of multi-disciplinary practice, it is important to appreciate how the different professionals who interact with dizzy patients utilise EBP. Therefore, this research sought to examine the self-reported orientation towards EBP of audiologists, ENTs and physiotherapists in South Africa using the EBP2Q. The uptake and utilisation of EBP were further explored in the context of the dizzy patient where participants were assessed on their knowledge of CPGs relevant to three commonly described vestibular pathologies. Subsequently, barriers and facilitators to EBP were explored using focus group methodology. In addition, the current study is one of the first to examine knowledge and understanding of common vestibular pathologies while attempting to link results to self-perceived orientation towards EBP. Due to the nuanced approach adopted, drawing direct comparisons to previous literature is challenging.

The focus group results will be briefly woven through the discussion of the survey results where appropriate, and then discussed at length in later sections.

Phase 1

Part 1: The Evidence-Based Practice Profile Questionnaire

Overall performance of participants on EBP2Q

An overall review of the results of the EBP2Q is as follows: the minimum possible score on the EBP2Q is 58, suggesting poor orientation towards EBP, and the maximum possible score is 290, suggesting perfect orientation to EBP [31]. The EBP2Q has a total possible range of 232 [31]. The mean total score of the full sample (n=54) was 205.37, with a median of 204.5 and a range of 138 to 276. In addition, the mean domain scores as well as the minimum and maximum scores for the whole sample were as follows: relevance[2] $\bar{x}$ = 61.44 (14 – 70), sympathy[3] $\bar{x}$ = 24.08 (7 – 35), terminology[4] $\bar{x}$ = 55.90 (17 – 85), practice[5] $\bar{x}$ = 27.34 (9 - 45), and confidence[6] $\bar{x}$ = 38.50 (11 – 55). The domain means showed that the EBP2Q respondents scored highest on the relevance domain ($\bar{x}$ = 61.44 out of 70 or 87%), suggesting that EBP is recognised as important in clinical practice. However, respondents had the lowest

[2] The relevance domain assesses the value placed on EBP by the practitioner
[3] The sympathy domain assesses self-perceived compatibility of work with EBP
[4] The terminology domain assesses knowledge of research terms and terms related to EBP
[5] The practice domain assesses actual use of EBP in clinical practice
[6] The confidence domain assesses self-perceived ability to use EBP

mean domain scores on the practice domain ($\bar{x}$ = 27.34 out of 45 or 60%), suggesting that respondents were only partially implementing EBP in the clinical setting.

Orientation to EBP by domain on the EBP2Q

While this researcher analysed overall scores to offer a sense of where the sample was distributed on the range, it is important to note that studies using the EBP2Q did not use the mean total questionnaire score to compare participant groups. Rather, only the domain means were used to compare groups. McEvoy, Luker [36] examined Australian physiotherapists' orientation towards EBP immediately after graduation and then after one year in the work force. After a year's experience, the Australian physiotherapists scored higher than participants in the current study in the domains of terminology ($\bar{x}$ = 64.2) and confidence ($\bar{x}$ = 40.9) and slightly lower than the current participants in practice ($\bar{x}$ = 25.5), sympathy ($\bar{x}$ = 23.7), and relevance ($\bar{x}$ = 60.9). The study by McEvoy, Luker [36] was conducted on new graduates. Thus, it is conceivable that these participants' terminology scores were higher due to how recently they were in an academic setting. This speaks to the fact that higher exposure and access to research improves orientation towards EBP, which will be discussed next. However, it is equally plausible that the higher confidence scores of the participants in McEvoy, Luker [36] may be attributed to the fact that less experienced professionals cannot effectively rate their own abilities with EBP [32]. The notion of poor ability of new graduates to self-evaluate is further exemplified by the fact that participants' scores dropped significantly after one year in the workforce [36].

A Norwegian study by Titlestad, Snibsoer [33], which sought to translate and adapt the EBP2Q cross-culturally, examined the orientation towards EBP of a group of healthcare professionals (HCPs) which included physiotherapists, occupational therapists, social workers, and health sciences students before and after an EBP course. However, the professionals and students were not separated during analysis as the aim of the study was to adapt the EBP2Q rather than compare professionals to students. Despite undergoing the EBP training, mean domain scores showed that the sample of respondents from Norway scored lower than the current sample of professionals in all five domains: relevance ($\bar{x}$ = 58.7), terminology ($\bar{x}$ = 51.6), sympathy ($\bar{x}$ = 20.3), practice ($\bar{x}$ = 21.2), and confidence ($\bar{x}$ = 33.8). As expected, the pre-course domain scores were lower than post-course. However, the vast majority of the sample in Titlestad, Snibsoer [33] were undergraduate students. Domain scores of

the participants in the current study with only qualifying undergraduate education were compared to the scores in Titlestad, Snibsoer [33]. Interestingly, EBP2Q respondents in the current study with only qualifying undergraduate education scored higher than respondents in Titlestad, Snibsoer [33] on all domains except terminology. The difference in scores between the current report and Titlestad, Snibsoer [33] may be attributed to the clinical experience of the participants in the current study.

A study of physiotherapists' orientation towards EBP was conducted in Philippines by Rotor, Palad [56]. Participants' experience varied from six to ten years. Work setting was evenly split between private and public sector and although over half of the participants were Filipino, 33% were trained in the United States of America. Domain mean scores were as follows: relevance ($\bar{x}$ = 63.3), terminology ($\bar{x}$ = 67.3), sympathy ($\bar{x}$ = 25.2), practice ($\bar{x}$ = 22.6), and confidence ($\bar{x}$ = 41.6). The sample from Rotor, Palad [56] demonstrated higher domain scores than the sample in the current report on four out of five domains, with the exception of the practice domain. Better scores by Filipino physiotherapists than the current sample of professionals suggests that the sample of Filipino physiotherapists had better orientations towards EBP than the South African sample. However, the South African sample used evidence in the clinical setting more than the Filipino sample, as suggested by the mean practice domain scores.

Naidoo [27] examined orientation towards EBP of a group of South African audiologists and ENTs. No mean total scores or mean domain scores of the full sample were provided. However, a comparison of domain scores between the audiologists and ENTs in Naidoo [27] and those in the current study shows that scores were within one or two points of each other between studies. Further, scores of private and state HCPs between Naidoo [27] and the current study suggests that scores were similar between the two studies. However, the current study showed that state HCPs scored higher than private HCPs on some domains and lower on others. However, the sample in Naidoo [27] had more representation of HCPs from state facilities than the current study had. As the majority of South Africa utilises public healthcare [4], a crucial finding in Naidoo [27] was HCPs working in state facilities had poorer orientations towards EBP than those in private facilities.

When comparing studies from Australia, Norway, and Philippines with this research report, South African participants had neither the best, nor the worst scores noted amongst HCPs whose orientations to EBP have been assessed using the EBP2Q. The study by Naidoo [27] had better representation of South African HCPs than the current study as the sample size was larger (n=112) and included more public sector respondents (n=47) than the current study. Therefore, despite exclusion of physiotherapists, it is possible that Naidoo [27] better reflects what is happening amongst the sample of HCPs on the ground than the current sample does. HCPs in the public and private sectors in Naidoo [27] and the current study would have had similar training. In addition, the difference between orientation towards EBP of public and private sector HCPs may correlate with the reports of poor attitudes of some HCPs by one of the focus group participants.

Education and training and their effects on orientation towards EBP is expanded upon in the next section.

Influences of education and training

Better orientation towards EBP in professionals with postgraduate education

Participants with postgraduate education, including audiologists and physiotherapists with master's degrees, doctoral degrees, and postgraduate diplomas and certifications, and all ENTs scored significantly higher than respondents with qualifying undergraduate education on the terminology (p=.013), practice (p=.047), and confidence (p=.005) domains, as well as the total score (p=.027). Additionally, respondents with postgraduate education scored higher on the sympathy domain (p=.061) than those with qualifying undergraduate education. It was noted that all but two focus group participants had postgraduate education (Master's, PhD or equivalent) and one of the two was completing her Master's degree at the time of research. Further, the EBP2Q scores of the focus group participants were higher than that of the total sample of 54 participants. Thus, while not necessarily true for all vestibular care practitioners, the higher levels of education in the sample of vestibular practitioners suggests better orientation towards EBP, as established by the EBP2Q.

A study by McEvoy, Williams [55] sought to examine orientation towards EBP of healthcare students at a university in Australia. Participants included physiotherapists, occupational therapists, podiatrists, and medical imaging students [55]. All

undergraduate students from first to final year as well as postgraduate students were included in the study [55]. The results exhibited that postgraduate students scored significantly higher in all domains of the EBP2Q than all undergraduate students [55]. However, results from the junior undergraduate students (first year) and senior undergraduate students (fourth year) were not separated, which may be a limitation to the study by McEvoy, Williams [55]. Scores of the junior students may have decreased the mean of the sample of students as a whole. Thus, it may have been interesting to compare scores of senior undergraduate students to postgraduate students. Comparison of results between participants with postgraduate education in the current study and postgraduate students in McEvoy, Williams [55] revealed highly similar scores between the postgraduate groups on both studies. This consistency in results further implies that HCPs with postgraduate education have better knowledge, attitudes and practices regarding uptake and utilisation of EBP. Having discussed how the study participants' education affected their scoring, it is important to discuss where and how EBP has been taught.

Training of the ENTs, audiologists, and physiotherapists in South Africa

Having discussed how orientations towards EBP are affected by level of education, it is important to know how each of the study's professional groups (ENT, audiology, physiotherapy) are trained in South Africa. For a medical doctor to qualify as an ENT in South Africa, they are required to complete a Master of Medicine (MMed) in otorhinolaryngology, a postgraduate degree. Thus, including undergraduate training (6 years), internship (2 years), community service (1 year) and an MMed (otorhinolaryngology), ENTs have 12 years of training [141]. A decade ago, ENT training in South Africa was criticised in the literature by Peer and Fagan [141] and then rigorously defended by Loock [142]. Nevertheless, the orientation towards EBP of the ENTs in the sample of the current study is amongst the best of any of the demographic groups within the study, which supports the notion of quality education, particularly at postgraduate level.

By contrast, audiologists and physiotherapists undergo four years of undergraduate training with submission of an honours-level research project. Locally, postgraduate training is not a requirement for qualification to practice as an audiologist or physiotherapist. It is a requirement of the HPCSA that all universities which provide health sciences degrees teach evidence-based curricula [1, 52]. Hence, attempts have

been made to integrate EBP into undergraduate programmes [2, 22]. However, supporting literature has suggested that development of comprehensive knowledge and understanding of EBP is not always effective at an undergraduate level [2, 75]. A multifaceted and integrated approach to learning has been shown to improve uptake and utilisation of EBP [143]. Further, such an approach is common in postgraduate education [143]. Results of this report's EBP2Q suggest that presence of postgraduate training signals significantly higher scores than presence of undergraduate education alone, and concur with previous literature such as McEvoy, Williams [55] and Naidoo [27]. However, at a level of postgraduate training, there is no appreciable difference in terms of the impact of the professional grouping. That is, ENTs have longer training [141] than audiologists and physiotherapists, but it does not increase appreciation of EBP more than a research, rather than clinical Master's degree does. Nonetheless, it is clear than postgraduates' orientation to EBP is enhanced. It is important to turn now to the way EBP is taught and integrated into university education.

Integration of EBP into university teaching

EBP is a critical construct which should underpin all health sciences teaching [22]. Hence, strong recommendations have been made for academic institutions to integrate EBP into curricula by continuously updating the information they teach and the guidelines they use [2, 22]. Further, Lehane, Leahy-Warren [22] recommended that EBP should be taught as a framework on which contextual clinical knowledge can be built, both by lecturers and students. Building the EBP framework for students can be difficult as research and evidence is dynamic, with the exceptions of certain concepts which will never change [22]. Thus, the approach taken to clinical teaching is that there are multiple ways in which the evidence can be applied to different situations. Therefore, EBP may not be taught explicitly, but is rather woven through all clinical, theoretical, and academic education undergone by the student [2].

It is likely that EBP is incorporated into clinical teaching at an undergraduate level as the scores of participants in the current report are similar to results demonstrated by participants in research by McEvoy, Williams [55] in Australia; Titlestad, Snibsoer [33] in Norway, and Panczyk, Belowska [10] in Poland. However, it has been suggested that a comprehensive knowledge and understanding of EBP is seldom developed at the level of undergraduate education [75].

Roman [41] argued that while clinical audiologists have the motivation to use EBP in practice, they have difficulty researching and analysing available evidence. Roman [41] further suggested that there are barriers to access to research such as paywalls and restriction to full text access. Furthermore, it is possible that there is low confidence at literature appraisal as the teaching of research analysis may not translate to clinical practice [41]. In addition, many clinicians recognise that there is not enough time to conduct literature searches [41], which was supported by the focus group participants in the current study. Finally, both Roman [41], and Shaw [23] recognised that the study designs in the development of audiology CPG are not always using the highest levels of evidence (e.g., randomised control trials). All of the aforementioned factors may affect the way audiologists conduct literature analyses.

Similar findings by Schoonees, Rohwer [2] in a group of South African allied health students, including physiotherapy, occupational therapy, and speech-language and hearing therapy students also expressed difficulty with key competencies such as database searches and critical appraisal of literature. Additionally, these allied health students also reported that these key competencies were seldom expressly taught to them [2]. Even though the literature has shown the importance of health sciences students being taught all clinical information through an evidence-based lens, there is little research to show how key competencies related to EBP such as critical appraisal and understanding of research and database searching are developed [2]. While it was noted that the theoretical principles of EBP were taught in research methodology and application of research courses [2], the allied health students believed that the input was not enough and they would rather have had continuous education to help them consolidate their knowledge on the principles of EBP [2]. Interestingly, results of the current study showed that there was no significant difference in domain scores or total scores between participants who had and had not undergone formal EBP training. This result exhibited by the current study may suggest that the EBP training being undergone by the health professionals was either inadequate, inexplicit or not well understood by the students. This finding further supports Schoonees, Rohwer [2], who suggested that EBP should be integrated into teaching from first year and explicitly assessed throughout undergraduate education.

The mismatch in theoretical understanding of the concept of EBP, and the clinical implementation of EBP was recognised by Snibsøer, Ciliska [32] and was supported by

the current report as the total mean practice score was lower than the total mean knowledge score. This mismatch may suggest that health sciences students are taught the best evidence related to their specific profession at the time, without having the tools to continuously update their knowledge as the evidence and research changes.

Years of experience

Total mean scores on the EBP2Q demonstrated that respondents with >30 years' experience had the highest mean scores ($\bar{x}$ = 275.00) on the questionnaire, followed by those with 11 – 20 years' experience ($\bar{x}$ = 265.14), 21 – 30 years' experience ($\bar{x}$ = 262.67), and finally, professionals with <10 years' experience scored the lowest ($\bar{x}$ = 260.68). However, there was no statistically significant difference in scores between years' experience on any of the domains or the total score. Thus, the results suggest that experience may not play a crucial role in self-perceived orientation towards EBP in the current sample of HCPs. This result is in contrast with Naidoo [27], who suggested that HCPs with more experience have better EBP orientations. In addition, Naidoo [27] suggested that ENTs have significantly better orientation towards EBP than audiologists, which also does not agree with the results of the current study. It is possible that the inconsistency in results may have been caused by differences in the samples where the current study included physiotherapists, and the number of respondents with postgraduate education may have differed.

There is scarce research on the influence of clinical experience on the knowledge, attitudes and practices of HCPs towards EBP. Brief mentions have been made of more seasoned clinicians suggesting that their experience is more valuable than the available research, especially in the context of South African healthcare [21, 28, 68]. However, such statements imply limited understanding of the definition of EBP, which states that EBP makes use of a combination of the best evidence, clinical experience, and patient-specific factors[13]. However, very few studies have investigated the gap between self-reported orientation towards EBP, and actual knowledge of relevant CPGs and their application to clinical practice. Hence, the following section will be discussing the application of EBP through the use of CPGs in the specific context of dizzy patients.

Access to and use of CPGs

Barriers to EBP commonly noted in the developing world include lack of access such as poor internet and paywalls to journals, lack of time, lack of confidence at appraising research and unwillingness to change clinical practices [2, 60, 68]. Focus group participants supported the findings of previous literature, suggesting that lack of time to continuously read and analyse research was problematic. These participants suggested that limited time stems from overwhelming amounts of research, which may have conflicting results. However, despite time being a barrier to conduct literature searches, several focus group participants reported that they make time to conduct necessary research. This contradiction suggests that certain HCPs prioritise the use of evidence in their clinical practice and thus, consider it vital to conduct literature searches. It is possible that practitioners who are in contact with dizzy patients are required to maintain high levels of knowledge due to the complexity which comes with vestibular assessment and management. However, HCPs who see more straightforward patients may perceive that they do not require regular revision of literature. Therefore, it is important to discuss the implementation of CPGs in the assessment and management of dizzy patients.

Application of CPGs to dizzy patients

In terms of vestibular practice, focus group participants showed positive attitudes towards use of CPG, but their practices varied. Most participants expressed that the case history and the level of certainty of diagnosis gained from the case history dictate the level of assessment, rather than solely following prescribed steps outlined in guidelines for diagnosis and assessment. Patients with more typical presentations of certain pathologies reportedly required less computerised vestibular testing while patients with more vague or complex histories were sent for more comprehensive investigation such as computerised vestibular assessment, or imaging. Thus, clinical judgement was relied on heavily, even at the initial stages of the clinical encounter. These reports are in line with the literature, which states that in most patients, a comprehensive case history results in a diagnosis [77]. Moreover, most patients do not require full computerised vestibular test batteries [88, 89], nor are the latter frequently recommended in the CPGs. The exceptions reported by participants, however, were patients with typical presentations who require specific management such as canal-specific vestibular rehabilitation or ear-specific medical/surgical treatment. In such cases, patients reportedly do not undergo a full battery of tests. Rather they only

undergo targeted investigation to answer the question posed by the healthcare practitioner.

The deviation from the guidelines, however, came from HCPs who consulted more complex dizzy patients. Focus group participants expressed discomfort at omitting certain tests such as oculomotor, subjective visual vertical, or calorics, as they felt every test adds to the picture. While this view is in contrast with what is recommended in the literature, the participants reported that the patients referred to them for computerised assessment had no clear cause of dizziness, and thus, were almost always seen by numerous specialists. Therefore, the referring professionals sought extra information to add to the diagnostic picture. Focus group participants noted that a full battery of tests could lead to incidental findings even in normally functioning patients, but felt that they were confident enough to identify a finding as incidental and report it as such to avoid unnecessary investigation.

Development and adaptation of accessible CPGs

In recent years, the translation of CPGs from the Global North to the developing world has been prioritised by local and international researchers and organisations. The Guidelines International Network (GIN) is a network of organisations which has existed since 2002 [144]. The overall aim of this network is to improve the quality of healthcare through the systematic development of CPGs. Further, the GIN has a working group dedicated to lending support to LMIC by supporting activities which improve understanding and implementation of CPG, and exploring methods of adaptation, dissemination and implementation of guidelines to the developing context [144]. The GIN is also one of the world's largest libraries for clinical practice guidelines and provides a platform which allows researchers to collaborate with networks of professionals for adaptation, dissemination and implementation of CPG, especially in resource-constrained healthcare systems [144]. The GIN is a successful and accessible network for HCPs in developing contexts, and failure to collaborate with such a network may be an oversight on the part of the researchers who adapt guidelines to LMIC.

Certain researchers have explored the best methods to adopt and adapt CPG from developed countries to emerging countries. However, several limitations have been noted to adaptation of guidelines such as flawed or poorly reported source

guidelines [145]; limited formal evaluations of implementation and uptake of the CPG [146], and time and resource consuming nature of adaptation of CPG [146]. Further, barriers to implementation of CPG exist as reported by Song, Li [145] such as cost of intervention, applicability of intervention, or feasibility of implementation of the CPG. Recently, a group of South African researchers [21] have demonstrated that it can be feasible and cost-effective to adapt CPG from HIC to developing countries. These studies will be discussed next.

A paper by Gonzalez-Suarez, Dizon [37] was one of the first to describe adaptation of CPGs from HICs to LMICs, followed by Grimmer, Louw [21], who adapted a CPG for stroke which was developed in the Global North. The aim was to contextualise and repurpose the guideline for a developing country such as South Africa. The authors concluded that with careful planning and site-specific solutions to overcome barriers, it is feasible and can be cost effective for CPGs from developed countries to be adapted to the context of developing countries [21]. Adaptation of such guidelines would be more realistic for the Global South than developing completely new guidelines [21, 37]. However, resistance to change of clinical behaviours and strategies [68] may pose a threat to the use of newly adapted guidelines, suggesting that even if guidelines were developed to suit the context where they are used, they may still not be implemented.

Grimmer, Louw [21] and Gonzalez-Suarez, Dizon [37] demonstrated that it is feasible to adapt CPGs for use in resource constrained countries. However, in audiology and ENT are falling behind in development and adaptation of context-relevant CPGs. Although, at a superficial evaluation, with their low emphasis on instrumented and therefore expensive investigations, vestibular CPGs would appear to be suited for use in South Africa for dizzy patients. Nevertheless, formal examination and contextualisation could be warranted. Moreover, because of the multi-professional approach required for the assessment and management of dizzy patients, the adaptation of vestibular CPGs should be facilitated by a multidisciplinary team of local balance experts. Professional societies in South Africa such as the ENT Society, SAAA, SASHLA, and SASP, should support the CPG adaptation process and aid in disseminating the CPGs to the relevant HCPs once the CPGs have been published and researching if and how CPG application affects patient outcomes.

Part 2: Open-ended questionnaire

Having discussed respondents' self-perceived knowledge, attitudes and practices regarding EBP, it is important to turn now to participants' knowledge of the CPGs regarding commonly described vestibular pathologies. Statistical analysis was conducted on the answers to the case questions to identify correlations between scores on the EBP2Q and scores on the case questions. Due to the small sample size of participants who completed part 2 of the questionnaire (n=15), analysis was conducted on the entire sample group without specifying profession, work setting, or years' experience. Due to the small sample size, results were interpreted with caution. First, the common results across all three cases will be discussed, followed by the case-specific qualitative description. To contextualise the results of the cases, the pathologies' presentations will be described in some detail prior to discussing how the respondents managed the pathologies.

Case 1: Ménière's disease

Ménière's disease was first reported in 1861 [147], making the disease one of the first otologic diseases described. The combination of episodic vertigo, unilateral low frequency sensorineural hearing loss, and accompanying tinnitus are the hallmark features of Ménière's disease [43, 119]. Due to the disabling nature of Ménière's disease, patients often seek urgent help. However, Ménière's disease, is commonly mis- and over-diagnosed [119, 120, 148]. Additionally, because variable symptoms are often described to health professionals who have little knowledge of the disease itself [78, 87], patients may undergo unnecessary investigations or receive a life-changing diagnosis [149, 150]. Further, because of variable severity and tempo of symptoms, a multitude of treatment and management options exist to target reduction of symptoms in the active phase of disease [119]. Moreover, management of symptoms such as hearing loss, and tinnitus is strongly recommended [43]. However, patients who are misdiagnosed may not end up receiving the appropriate management, leading to development of maladaptive behaviours and additional functional dizziness [91]

Outcomes of Case 1 showed that nine out of 15 (60%) respondents could correctly identify Ménière's disease as the pathology, making Case 1's pathology most likely to be correctly identified when compared with Cases 2 and 3. Eight of the nine participants knew at least one criterion for definite diagnosis, while four could name at least two criteria. Eight participants knew whether patients with Ménière's disease

required vestibular rehabilitation therapy (VRT). Despite the implications of mismanagement of patients with Ménière's disease, it is concerning that over one third (40%) of survey respondents who manage dizzy patients could not identify it as the pathology in Case 1.

Two participants suggested Ménière's disease in Case 2 and Case 3 as the pathology. Attribution of Ménière's disease to the conditions in Case 2 and Case 3 may lend further support to the reports of mis- and overdiagnosis of Ménière's disease [119, 120, 148], especially since the pathologies in the other cases were described according to their symptoms in their specific CPGs.

Case 2: Persistent postural perceptual vertigo (PPPD)

The term PPPD describes a common, chronic type of functional dizziness [125]. To elaborate, PPPD was coined as an umbrella term for key features of chronic subjective dizziness, phobic postural dizziness, and visual vertigo [44, 125]. Symptoms of PPPD include generalised unsteadiness, non-rotatory vertigo, persistent dizziness, gait disorders, and avoidance behaviours, all of which can lead to considerable disability [44, 127]. PPPD is a well-documented comorbidity to most vestibular disorders and is often triggered by long-term maladaptive behaviours to previous vestibular symptoms caused by neuro-otologic, medical, or psychological events [125]. Over half of patients who have had an acute vestibular insult develop secondary PPPD [90, 91]. Further, PPPD is reportedly more common in patients with previous or concurrent psychiatric conditions such as depression, anxiety or panic disorder [91]. Patients with comorbid PPPD are often those who experience the most significant self-reported disability [90, 91]. Frequently, patients with PPPD are misdiagnosed or mismanaged, leading to chronicity and further help-seeking behaviours at patients' own cost or the cost of the healthcare system [90, 91, 151]. Again, the latter notions were discussed in depth in the focus groups and are presented in more detail later. However, PPPD is treatable primarily through cognitive behavioural therapy and counselling, medical intervention for psychiatric comorbidities, and with vestibular rehabilitation for the underlying vestibular pathology [127]. Hence, PPPD is a necessary consideration for all patients who present with dizziness.

Outcomes of Case 2 indicated that only five out of 13 respondents (38%) correctly identified PPPD as the pathology. The same five participants also knew the

management for such patients. Despite the prevalence of PPPD [44, 125], the majority (62%) of participants in the current study did not recognise it as the pathology currently affecting the patient in Case 2. It was noted that if respondents were under time constraints, it is possible that they missed the differentiation in the case description between the prior vestibular pathology and the condition currently affecting the patient. However, it is equally possible that the data are a true reflection of respondents' knowledge of PPPD.

Despite the volume of literature available on treatment and management of patients with PPPD, there is little research on uptake and utilisation of the evidence regarding management of such patients [91]. A possible reason was presented by Sezier, Saywell [126], who interviewed eight working adults in New Zealand diagnosed with PPPD. Results of this qualitative study suggested participants perceived clinicians prejudiced towards PPPD, as patients' assessments often yielded no significant findings. Participants described multiple instances where their HCPs were uninterested or dismissive of their conditions, purportedly due to limited knowledge of the condition [126]. Participants reported that they simply wanted validation from someone who would listen and understand their condition. However, they experienced frustration from their consultations [126]. Additionally, participants described significant disability and reduced quality of life due to their PPPD [126].

This report's focus group participants frequently referred to patients with comorbid PPPD or comorbid psychiatric conditions as complex or complicated. However, complexity in the realm of assessment and management of dizziness is a relative term. Complexity has been described as illness which has contributors which could not be found on clinical examination [152]. Of course, the absence of tangible signs is strikingly similar to disorders on the functional dizziness spectrum, including PPPD.

Results of Case 2, while interpreted with caution due to generalisability concerns, may be a true reflection of the sample's knowledge and understanding of PPPD as a condition.

Case 3: Vestibular migraine

Vestibular migraine is a vestibular disorder which has been described in different ways (migrainous vertigo, migraine-induced/associated dizziness, benign recurrent vertigo) for the past 50 years [122]. However, the first diagnostic criteria were only

described in 2001 by Neuhauser, Leopold [124]. Patients with vestibular migraine present similarly to Ménière's disease in that they may experience episodes of vertigo, tinnitus and decreased hearing [121]. Vestibular migraine, however, requires the presence of migraine symptoms concurrently with aural symptoms in at least 50% of episodes [45]. Research has suggested that it is difficult to distinguish the two diseases in the initial phases of disease onset [45, 121]. However, as the diseases progress, markers such as progressive hearing loss and occurrence of migraine symptoms make differentiation of the two diseases easier [121, 122].

Additional difficulty is experienced in diagnosis of vestibular migraine as investigation often reveals no findings between episodes. Further, if a patient is assessed soon after an episode, results are not specific enough to be included in the CPG [45]. For diagnosis of vestibular migraine, therefore, it is important that the consulting healthcare professional has knowledge of the appropriate CPG, allowing for diagnosis based on the case history and bedside examination alone.

Seven (54%) out of 13 respondents correctly identified vestibular migraine as the pathology. Six of the seven knew at least one criterion for definite diagnosis and four of the six knew at least two criteria. All seven participants indicated the correct management options for vestibular migraine. Missed diagnosis of vestibular migraine, suggested by the number of professionals who did not identify vestibular migraine in the sample, may therefore lead the patient down a path of extensive and expensive investigation. Interestingly, approximately half of patients with vestibular migraine are reported to have comorbid PPPD or psychiatric conditions such as anxiety or depression [45]. Moreover, Ménière's disease and vestibular migraine require significantly different medical and rehabilitative management strategies [120, 122]. Reflecting on the discussion in the focus groups, combined with the outcome of the Cases, perhaps deeper familiarity with the CPGs might result in more focused, evidence-based diagnosis and management of dizzy patients.

Implications of questionnaire findings

The findings of part two of the questionnaire are likely reflective of what is happening in local clinical practice, despite the small sample size. While Ménière's disease has been shown to be the most familiar of the vestibular pathologies presented in the cases, it is also the least prevalent, epidemiologically, of the three [147].

The familiarity of Ménière's disease may be attributed to the fact that Ménière's has been described for the longest in the literature. Ménière's disease may also be the best known of the three pathologies because of the severity of its symptoms, despite it sharing several of its symptoms with vestibular migraine [121]. Additionally, Ménière's disease stands apart from vestibular migraine and PPPD as it may require more aggressive medical or surgical treatments than the other two pathologies [119]. The overlap of symptomatology between vestibular migraine and Ménière's disease [121], coupled with the suggestion in the current results that Ménière's disease is the better known of the two pathologies is compatible with the construct that Ménière's disease is frequently overdiagnosed and vestibular migraine is frequently underdiagnosed [120]. More concerning, however, is that PPPD, epidemiologically the most common of the three pathologies [91], was identified by just over one third of participants. In addition, focus group participants regarded patients with comorbidities such as PPPD, anxiety, and depression as complex. The perception of complexity can be attributed to the confidence of HCPs at understanding the patient's specific signs, symptoms and needs. The limited ability of the sample to identify PPPD implies that patients with comorbid PPPD may not be managed optimally, despite how well PPPD has been documented in the literature [44, 125].

The perceived complexity involved in management of dizzy patients already described may be overwhelming to less experienced practitioners. Hence, focus groups highlighted the need for additional training, mentorship, or support of HCPs who consult with dizzy patients. Clinicians should have open lines of communication with those who are more experienced in the field of vestibular assessment and management. Training should be tailored to the needs of the practitioners and should target the understanding and application of relevant CPGs. Further, practitioners should be intuitive enough to know their limitations, and refer when they are uncertain of their diagnosis.

The prejudice which is held against patients with functional dizziness could cause low motivation for HCPs to understand the condition. Limited understanding of PPPD leads to uncertainty of assessment and management options, poor patient outcomes and probable additional cost to the patient and the healthcare system while the patient is investigated [151]. A recommendation is for use of a multi-disciplinary team (MDT). Use of an MDT is an effective solution which would have HCPs who were unsure of

patients' conditions referring to practitioners who are more knowledgeable or experienced in the specific field. Moreover, each professional addresses the dizzy patient from a slightly different perspective. For example, in South Africa, audiologists complete psychology courses over three years of their training [1]. Physiotherapists are concerned with functional and activity-based outcomes [153]. ENTs and psychiatrists can exclude or manage otologic and mental health comorbidities respectively [70, 141]. Rather than causing redundancy, the strengths of each profession would enhance patient care, including for patients with PPPD who report severe decreases in quality of life [126].

It was also noted that there was marked attrition between the EBP2Q and the case vignettes. Survey respondents were instructed to continue with the cases if they regularly consulted with dizzy patients. Hence, approximately 70% of the sample did not continue with the questionnaire. The high dropout rate between parts of the questionnaire suggests that very few HCPs in the sample are consulting with dizzy patients. Further, the small sample size of 15 participants is similar to previous South African studies on health professionals who manage dizzy patients by Khoza-Shangase, Sebothoma [115] and Seedat, Khoza-Shangase [73].

Focus Groups

The focus group data will be discussed according to the themes by which they were organised in the results section. Subsequently, the barriers and facilitators to EBP will be discussed.

Theme1: Guidelines do not capture the nuances of the patient's reality

One of the more prevalent problems noted within this theme was that patients' dizziness was not necessarily the main concern, rather dizziness acted as a trigger for consultation. It was reported that participants' patients struggled with the knock-on effects of the dizziness. All focus group participants scored higher than the mean scores of the Case questionnaire. Therefore, patients were discussed with empathy, and focus group participants showed understanding of the ramifications of chronic forms of dizziness. In contrast, as shown by Sezier, Saywell [126], patients' experiences were often different, and that they felt dismissed by their HCPs. While this may not reflect on the focus group participants specifically, quantitative results from the Cases might support the latter notions. The variation in how patients are

perceived and managed is demonstrated by the difference between the quantitative and qualitative data.

Theme 2: The level of certainty dictates the assessment and management

Theme 2 was identified throughout the focus groups predominantly in response to the topic questions, “When encountered with a dizzy patient, how do you decide what assessment and management is conducted?” and “What guides your clinical decision making in your assessment and management?”. Most participants expressed that the case history and the level of certainty of diagnosis gained from the case history dictated the level of assessment. In such cases, patients reportedly do not undergo a full battery of tests, rather they only undergo the tests which answer the question posed by the healthcare practitioner. Participants reporting that they favoured testing to answer a question, rather than indiscriminate testing, is in line with the vestibular CPGs. Indeed, a skilfully taken case history is sufficient for diagnosis in most cases [77].

The notion of indiscriminate testing of dizzy patients contrary to CPGs was studied in series based at Emory University in the USA [154-156]. Polensek and Tusa [155] assessed HCPs’ compliance with CPGs regarding assessment of patients with BPPV. BPPV is a condition for which there is a pathognomonic test [72]. However, results showed that most of the HCPs in Polensek, Sterk [154] used only the patient’s case history to diagnose possible causes of dizziness without doing any diagnostic manoeuvres. Omission of the diagnostic manoeuvre in assessing patients with BPPV is in direct contradiction of the CPG [72]. Thus, while forming a differential diagnosis through a thorough case history is recommended by many vestibular CPGs [43-45, 77], diagnosis of BPPV can seldom be made without the diagnostic manoeuvres [72]. Adding to the researcher’s previous argument that patients are inappropriately assessed and managed if CPGs are not followed, Polensek and Tusa [155] showed that 71% of patients with BPPV were sent for imaging. In most cases, MRIs of the brain were ordered, which were not diagnostic and only caused unnecessary expense to the patient and the hospital. However, the studies discussed above are 13 and 14 years old respectively. The more recent study by Naidoo [27] has indicated that HCPs who consult dizzy patients are now effectively using the diagnostic manoeuvres for BPPV in the setting in which the study was conducted. Therefore, HCPs may be practicing more closely to the recommendations of the CPGs, at least for BPPV [27].

Theme 3: Training, support, and confidence go hand-in-hand

A major theme drawn from the results is the impact of training, education, and professional support for assessment and management of dizzy patients. Results of the EBP2Q in this report demonstrate that increased exposure and access to research enhances orientation towards EBP.

Despite variable levels of training of audiologists, ENTs and physiotherapists at managing dizzy patients, it was noted through the theme of training and confidence was that all participants had access to a multidisciplinary team for support. In addition, over half of participants responded on the EBP2Q that support from colleagues and mentors is their biggest facilitator to use of EBP. The quality of practitioners who were called upon for support was not disclosed, so it is not known if they in turn relied on evidence or their personal experience and expertise. However, focus group participants reported that they felt more confident making diagnoses and managing dizzy patients if they had access to more knowledgeable and experienced professionals.

One focus group participant also reported that she has been approached by universities because they need help with development of their evidence-based syllabus. The notion that universities are approaching senior HCPs whom they perceive as knowledgeable regarding EBP suggests that even at the level of university education, EBP is not necessarily integrated as it should be. Yet, there is a desire by the university mentioned to upskill its educators to ensure that teaching is in line with EBP.

Barriers to uptake and implementation of EBP

Limited access to research

Focus group participants who were not associated with a university reported that they had significant difficulty accessing research due to paywalls, reflecting previous commentary [2, 40, 41]. However, the CPG in the *Journal of Vestibular Research* are open access and available to anyone with internet access. Further, one of the focus group participants referred to several audiology-specific best practice recommendations available through the HPCSA [157].

CPGs are seldom appropriate for the context of South Africa

One participant reported that in her clinic, she has to adapt the test battery from what is recommended in the guidelines because patients can seldom cover the costs of the tests[7]. However, previously cited studies [21, 37] which sought to adapt CPGs to the developing context suggested that adaptation of CPGs can be both feasible and cost-effective. Furthermore, vestibular CPGs seldom call for extensive laboratory testing, and in some instances directly state that laboratory testing is unnecessary. Thus, the requirements for assessment and management of dizzy patients are generally low cost. One focus group participant stated that in most instances, a case history, audiogram and a vestibular bedside examination is enough to make an accurate diagnosis, which is directly in line with what is suggested in the vestibular CPGs. Most participants agreed with this notion.

Poor attitudes towards EBP

One focus group participant spoke at length about the poor attitudes of some audiologists towards EBP; and their failure to prioritise its use. The statements regarding poor attitudes towards EBP are supported by several papers which suggest that a prevalent problem within the health professions is resistance to change of clinical practices in accordance with best practice recommendations [60, 68, 158].

It is interesting to hear the reflections of a prominent audiologist who is an academic, a clinician, and a trainer, as several studies, including the current report, have suggested that audiologists hold good attitudes towards uptake and implementation of EBP [27, 40, 41]. However, the studies mentioned above all used self-assessment scales which may be subject to social desirability bias. Thus, results of self-assessment scales often show that the respondents hold good attitudes towards the subject matter. Good attitudes of audiologists reported in the literature is in contrast to what was reported by the focus group participant.

Focus group participants involved in management of dizzy patients further expressed that there is often poor communication amongst referring HCPs, usually ENTs or neurologists. Dislike of dizzy patients was also mentioned by the ENT who

[7] One focus group extensively discussed the tension between private practices having to fund expensive equipment and best practice for testing patients. However, that discussion was not presented in the results as it was not pertinent to the research question of the current study. However, this footnote may provide a background to the mentions of laboratory vestibular testing.

participated in the focus groups. Thus, ineffective communication and vague referrals may be attributed to the attitudes of medical specialists towards dizzy patients, and is consistent with previous work [87, 154].

Implications for training and clinical implementation of EBP

Literature has shown that audiologists, physiotherapists, and ENTs place high importance on use of EBP in a clinical setting [25, 27, 38, 40, 41, 46] and is supported by the results of the current study. In addition, barriers to uptake and utilisation of EBP mentioned in previous studies have been supported by results of the current study.

The most clinically interesting finding of this study was that results of the open-ended Case questionnaire suggested a critical downfall in management of vestibular patients. Despite a small sample size, questions may be raised from the results. For example, only 38% of participants could identify PPPD. This result, along with the supporting research might suggest an inherent prejudice against patients with functional and psychiatric comorbidities; yet this was not reflected by the empathy expressed in the focus groups. Hence, an attitude change may be required when managing dizzy patients due to the frequency of PPPD as a comorbidity. Further, the current study makes a strong case for additional training on collaboration within the multidisciplinary team when managing dizzy patients. Each professional discipline managing the patient within their strengths will provide the best outcomes for the patient.

Study limitations

Survey limitations

It is important to discuss shortcomings and limitations to the current study so that future research can seek to improve and expand on the findings discussed previously.

The main limitation for both phases of the study is sample size. Low response rates to the EBP2Q (n=54) and the open-ended Cases (n=16) raises questions about the generalisability of the study outcomes. Generalisability further comes into question due to the spread of data between state and private practitioners, where there were more private practitioner participants than state. Since most of the population of South Africa utilises the government healthcare system [4], the results may not be generalisable to that health sector in South Africa. The study by Naidoo [27] has better

representation from state HCPs and may depict more generalisable results regarding HCPs in the public health sector.

The survey was conducted online using Surveymonkey as a platform. However, poor internet and computer accessibility, especially in rural parts of South Africa [68] may have contributed to the limited sample size and distribution of participants' settings. To improve sample size and response rates, follow-up emails were sent monthly [116]. In addition, methods of communication with respondents can affect recruitment, i.e., participants who do not regularly check emails [102]. Thus, multiple recruitment strategies were used, including snowballing, and personally contacting potential participants via email, social media and telephone. In addition, survey studies can be impacted by participant interest, length of survey, and assurance of confidentiality and privacy [102]. Despite these efforts, sample size remained challenging. Solutions might include surveying participants attending congresses. Yet, individuals' willingness to attend CPD activities might in itself pre-suppose an orientation to, and desire for evidence.

Survey studies are also subject to several biases from respondents. For example, social desirability bias suggests that participants adjust their true responses to align with researcher's expectations [134]. Further, Likert-type surveys are subject to central tendency bias which suggests that participants are hesitant to answer in the extreme i.e. strongly agree or strongly disagree [135]. Both biases mentioned were addressed by maintaining strict confidentiality and anonymity of participants. In addition, participants were not required to provide explanations for their responses, which may have limited the information given by the respondents.

The Cases at the end of the EBP2Q were subject to several factors which affected sample size. First, Cases were aimed at practitioners who regularly consult with dizzy patients. Over 70% of the sample withdrew from the Cases, significantly decreasing sample size. While attrition may have affected generalisability of the study, it may indicate how few of the sample HCPs conduct vestibular assessment and management. Cases were open-ended, and thus took longer to complete. Hence, participants may have rushed their responses, leading to inaccuracy of results and inaccuracy of data. This barrier could have been overcome by the researcher developing a multiple-choice questionnaire, rather than an open-ended questionnaire.

The questionnaire was conducted online, allowing the participants to conduct internet searches for answers if they felt it was necessary. Additionally, cases were developed using an expert panel to be accessible to novice and intermediate vestibular care professionals. Thus, respondents did not need to extract relevant information from a patient's spoken case history, possibly making the case vignettes easier than an in-person patient interview.

The study used vestibular assessment and management as a lens to explore participants' self-perceived orientation towards EBP and their actual knowledge and application of CPGs. Hence, for the study to be more generalisable, it may be more effective to assess knowledge of EBP using a more widely practiced part of the professions including audiology. It would be interesting, for example, to evaluate if local audiologists follow evidence-based practice when prescribing, validating and verifying hearing aid fittings.

Focus group limitations

Sample size was a limiting factor in the focus groups (n=10). The researcher experienced significant difficulty in recruitment of focus group participants. The researcher attempted to recruit using personal communications such as Whatsapp, email, and phone calls. Low participation in focus groups may be attributed to the time involved in focus group discussions [29]. Additionally, coordination of HCPs was challenging due to clashing schedules of busy practitioners. Hence, the researcher decided to conduct a series of smaller mini focus groups [29].

Focus group participants were selected for their special interest and their additional training in assessment and management of vestibular disorders leading to selection bias. However, selection of HCPs was done purposefully to investigate how HCPs with some experience in vestibular assessment and management addressed the patients in the case vignettes. The majority of focus group participants had postgraduate training with the exception of two participants. Moreover, most focus group participants taught others about vestibular assessment and management, further implying high expertise as described in the study's working definition of an expert. Thus, inherent qualities in the participants put the focus groups at risk of expert bias [137]. Expert bias suggests that people who are considered to be experts in a certain field are more likely to look for opinions which are the same as their own [137]. Expert

bias was addressed by including a number of experts of different professions [137] who did not necessarily know one another and could, therefore, provide their own opinions without judgement.

Despite the possible impact of having expert focus group participants, there was not equal representation of all three professions amongst the focus group participants. There were seven audiologists, two physiotherapists, and one ENT. Hence, while data saturation was attained by the end of the fourth focus group, there was not as much input from ENTs and physiotherapists as there was from audiologists.

Recommendations for future research

This report is one of the first to attempt to compare self-reported and assessed knowledge of EBP in audiologists, physiotherapists, and ENTs in the milieu of the dizzy patient. It is important that more research is conducted on how HCPs assess, diagnose, and manage dizzy patients as the current practices may not necessarily be evidence-based. Further, it is advisable to attain more variation in study participants where possible.

To effectively assess respondents' abilities to recognise vestibular pathologies from a patient history in a realistic setting, the future researcher should play a video of a consenting patient giving a case history to an HCP. The respondents would need to extract the relevant information from the video provided and answer questions about the recording.

The researcher also recognises that there are barriers to EBP in South Africa which are more difficult to overcome than with improved application of EBP alone. Thus, adaptation of CPG from the Global North to the context of the developing world is recommended, as has been done before in occupational therapy and physiotherapy [21, 37].

The researcher recommends further qualitative exploration of application of CPGs to assessment and management of dizzy patients. It is important that rationale for when, how, and why CPGs are applied to dizzy patients is explored, as freely available vestibular CPGs are ineffective if they are not correctly applied.

Conclusion

This study examined the knowledge, attitudes and practices regarding EBP, and application of EBP to assessment and management of dizzy patients through the use and understanding of relevant CPGs.

Scores from the EBP2Q suggested that higher exposure to research had the most significant influence on self-reported orientation towards EBP, as in the case of participants with postgraduate education. Therefore, while respondents held EBP in positive regard, their implementation of EBP was sub-optimal if they had only a qualifying undergraduate degree. Moreover, consistent with the supporting research, this study highlighted several barriers to the uptake and utilisation of EBP in South Africa. Specifically, barriers such as poor access to research and limited understanding on how to appraise research, limited time, high workload and resistance to change of clinical practices and strategies were described in the focus group discussions.

This study also recognised a gap in the knowledge of HCPs regarding understanding and implementation of CPGs, especially in the context of dizzy patients. While the sample size was small, the results suggest a possible lack of responsiveness towards patients with prevalent vestibular pathologies such as vestibular migraine, as well as functional comorbidities to vestibular pathologies. This study in conjunction with future research may provide clarity on uptake and implementation of CPGs to dizzy patients. Further, outcomes of this study may provide a platform on which to improve evidence-based management of dizzy patients in the future.

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Appendices

Appendix A: 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

1 ☞

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?

Demographics

75. What is your age? _____
76. When is/was your final year as an undergraduate student?_____
77. Sex: ☐ Female ☐ Male
78. Are you currently working in the profession for which you have trained/are training?
    ☐ YES ☐ F/T ☐ P/T
    ☐ NO
79. What is that profession?_____

80. Which of the following best describes your MAIN work setting: *(Tick one box only)*
    ☐ Public sector ☐ Private sector ☐ Academic
    ☐ Community-based agency (Domiciliary Care, Community Centre, Charitable institution)
    ☐ Other (please specify) _____

81. Type of work: In which area have you mainly worked in the past year?
(Tick one box only)
    ☐ Managers (eg Health/Education Manager)
    ☐ Education (eg teacher or educator at University, School)
    ☐ Health (eg Diagnostic, Promotion, Therapy, Allied Health, Medical, Nursing)
    ☐ Information, Communication, Technology
    ☐ Legal, Social and Welfare
    ☐ Arts and Media
    ☐ Business, Human Resources and Marketing
    ☐ Design, Engineering, Science and Transport
    ☐ Other (please specify) _____

82. Please provide a brief overview of your work experience in the past 12 months:
_____

83. Are you currently studying? ☐ NO
    ☐ YES ☐ F/T ☐ P/T
84. If YES, what are you studying? _____

85. What is your highest qualification attained? *(Tick one box only)*
    ☐ Registered Nurse
    ☐ Post graduate certificate course
    ☐ Bachelor
    ☐ Masters course work /Graduate Entry
    ☐ Masters (Research)
    ☐ Other (Please specify) _____
    ☐ Diploma
    ☐ Graduate Diploma
    ☐ Honours (Bachelor WITH Honours or Bachelor AND Honours degree)
    ☐ PhD

86. Have you formally undertaken any training in EBP? ☐ NO ☐ YES
    If YES: choose longest completed course if you have done more than one
    ☐ EBP course as part of University education (Bachelor, Masters etc) >20 hrs
    ☐ Short course 10 - 20 hours
    ☐ Weekend course 3 - 10 hrs
    ☐ Single lecture 1- 3 hrs
87. Is English your first language? ☐ YES ☐ NO

Appendix B: Focus group topic guide

Topic Questions

- When encountered with a dizzy patient, how do you decide what assessment and management will be conducted on the patient?
- What guides your clinical decision-making in your assessment and management?
- Do you make use of clinical guidelines for vestibular pathologies? Why or why not?
- Do you experience barriers and facilitators to practicing vestibular assessment? What are they?
- Do you experience barriers and facilitators to using evidence-based practice? What are they?

Appendix C: Operation definitions of novice, intermediate and expert practitioners

Operational definitions for the purpose of the Delphi Consensus procedure:

Vestibular practice: the assessment, diagnosis, and rehabilitation of vestibular disorders.

Novice healthcare practitioner [159]: Irrespective of profession, a novice practitioner is a practitioner who still adheres strictly to rules without flexibility. Novice practitioners spend time remembering the rules they have been taught and find it difficult to adjust their management according to a specific patient as they have not had the appropriate experience in the field. Further, a novice practitioner is one who readily seeks advice from practitioners who have superior experience. Therefore, novice practitioners do not take full responsibility for patient outcomes as they still follow instructions given by superiors.

Intermediate healthcare practitioner [159]: Irrespective of profession, an intermediate level practitioner is one to whom the rules come more easily, allowing them more flexibility to make more contextual decisions in clinical practice. Intermediate practitioners provide advice to novice practitioners but may still seek advice from experts in their fields. Intermediate practitioners may feel anxious about decisions they make as they may not consult the expert for every decision they make.

Expert healthcare practitioner [159]: Irrespective of profession, an expert healthcare practitioner is one who is at the top of their department or practice and has many years' experience in their field. Expert practitioners no longer think about the rules as the rules have been ingrained through experience. Further, experts have developed intuition for their field and only need to think analytically when encountered with a novel experience. Experts seldom need to ask questions about clinical practice and when they do, they will only ask sub-specialists in the specific field with which they are struggling. However, they are the ones who are looked to for answers by all others in clinical practice. Experts are responsible for all themselves, others, and their environments.

Appendix D: Demographic questionnaire and information sheet for Delphi consensus

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Website: www.dhrs.uct.ac.za Christine.Rogers@uct.ac.za

Date:

To whom it may concern

Re: Delphi Consensus

Participation in Delphi Consensus

Thank you for allowing me to contact you regarding participation in a Delphi consensus. To remind you, my name is Richard Clarke and I am a student at the University of Cape Town studying a MSc in Audiology. The aim of this study is to identify the knowledge, attitudes and beliefs of a specific subset of HCPs (audiologists, ENTs and physiotherapists) regarding EBP and diagnosis decisions using presentations of dizziness and vertigo as an exemplar. Orientation towards EBP will be assessed using an internet-based survey and clinical reasoning will be assessed using three case vignettes on vestibular pathologies. Further, the research will be expanded to focus groups that will be required to discuss cases about vestibular assessment and management.

A Delphi consensus will be used to develop the vestibular case vignettes and their subsequent questions that will follow the survey. The aim of the Delphi consensus is to ascertain agreement regarding the appropriateness and applicability of the cases to non-expert vestibular HCPs. The Delphi procedure will occur in two rounds in which you will be shown three cases and questions about the cases. You will be asked to answer the questions below about the cases and their questions. You will have one

week to respond, and all feedback will be returned via email. Each round should take you approximately 10 minutes. The entirety of the Delphi consensus will take approximately one month.

Please answer the below questions as honestly and accurately as possible

- What is your profession?
- How long have you been in this profession?
- How long have you practiced vestibular management?
- How often do you consult with patients with vestibular management?
- What post-graduate training, courses, diplomas, etc have you done in vestibular assessment and management?

Please read the cases and answer the subsequent questions about them before answering the following questions:

1. Are you able to understand what is being said in the case? Please note any concerns or discrepancies

Yes:	No:

2. Would you be able to make a diagnosis based on the information given? Please describe any foreseeable difficulties regarding making an accurate diagnosis

Yes:	No:

3. What would your diagnosis be in each case?

1.	2.	3.

4. Could you accurately and easily answer each question pertaining to the cases?

Yes:	No:

5. If the cases were given to an audiologist, ENT or physiotherapist without vestibular expertise, would they be able to understand what is being said?
   1: Audiologist

Yes:	No:

2: ENT:

Yes:	No:

3: Physiotherapist

Yes:	No:

6. If the cases were given to an audiologist, ENT or physiotherapist without vestibular expertise, would they be able to make a diagnosis based on the cases

   1: Audiologist

Yes:	No:

   2: ENT:

Yes:	No:

   3: Physiotherapist

Yes:	No:

7. If the cases were given to an intermediate level audiologist (5-9 years' experience), ENT or physiotherapist without vestibular expertise, would they be able to accurately answer each question?

Yes:	No:

Please feel free to leave any comments below:

_____
_____
_____
_____
_____
_____

Appendix E: Case vignettes and open-ended questions

Please answer each question in the space provided. You may answer the question in as much or as little detail as you see fit.

Case 1 Patient X

Patient X is a 55-year-old woman and was referred to the vestibular clinic with a six-month history of episodic dizziness with associated nausea and vomiting, hearing loss and tinnitus in the left ear. Further history taking revealed that X is in good health and is not on any chronic medications. Her dizziness is described as “the whole room spins, and I feel as if I can’t walk”. The episodes last between two and eight hours, during which X hears a low-pitched rushing noise in the left ear and experiences severe nausea and vomiting. After dizzy episodes, her hearing seems to be worse. X has not noticed any triggers for the dizzy episodes and has no history of occupational noise exposure and no history of head trauma.

1. Based on the history provided, which clinical practice guideline would you use to diagnose and manage this patient? If more than one, please state all of the ones you would consider.
2. Narrowing down your choice of guidelines to the most likely pathology, which clinical practice guideline would you apply to the management of this patient?
3. Based on the appropriate clinical practice guideline, which criteria are required for a definite diagnosis?
4. Does the clinical practice guideline recommend referral? If so, what is the aim of the referral?
5. Based on the appropriate clinical practice guideline, is a referral for vestibular rehabilitation therapy indicated? If so, which of the key VRT strategies would you focus on for this patient and why?
6. Besides your responses to questions 4 and 5 for Patient X, is there anything else you would include in management for her? How does this differ from what is suggested by the clinical practice guideline?

Case 2 Patient Y

Patient Y is a 30-year-old female who came to the dizzy clinic because of a persistent feeling of imbalance for the last 8 months. Her dizziness started with an episode of sudden onset true rotatory vertigo with associated nausea, vomiting, and tinnitus which lasted approximately 24 hours which was preceded by mild flu-like symptoms. She went to the emergency centre during this episode as she was anxious that she may be having a stroke. However, she was cleared using MRI and CT scans and prescribed Serc (betahistine) which eased the vertigo. Since the initial episode, Y has had gradual improvement but still experiences dizziness. However, her symptoms have now changed to a feeling of unsteadiness when walking in complex visual environments such as shopping malls and which is aggravated by rapid head movements. She also reported "brain fog" which is causing difficulty concentrating and affecting her memory. Her dizziness has been persistent and present more often than not for the last 8 months, her symptoms have led to her to leave the house and interact with her friends less.

1. Based on the history provided, which clinical practice guideline would you use to diagnose and manage this patient? If more than one, please state all of the ones you would consider.
2. Narrowing down your choice of guidelines to the most likely pathology, based on the appropriate clinical practice guideline, what criteria are required for a possible diagnosis?
3. Based on the appropriate clinical practice guideline, is medical management indicated for this patient? If so, please elaborate.
4. Based on the appropriate clinical practice guideline, is a referral for vestibular rehabilitation therapy indicated? If so, which of the key VRT strategies would you focus on for this patient and why?
5. Does the clinical practice guideline recommend referral? If so, what is the aim of the referral?
6. Besides your responses to questions 3, 4, and 5 for Patient Y, is there anything else you would include in management for her? How does this differ from what is suggested by the clinical practice guideline?

Case 3 Patient Z

Patient Z came to the dizzy clinic with recent complaints of severe unilateral headaches causing her to see zigzag lines. With the headaches, she reports vertigo which makes her feel incredibly nauseous, to the point where she has vomited before. She has had three episodes over the last three months which have lasted approximately one to two hours. Z has found that she feels better when lying in bed with the lights off and curtains drawn. A diagnostic hearing examination revealed with normal hearing sensitivity bilaterally.

1. Based on the history provided, which clinical practice guideline would you use to diagnose and manage this patient? If more than one, please state all of the ones you would consider.
2. Narrowing down your choice of guidelines to the most likely pathology, which clinical practice guideline would you apply to the management of this patient?
3. Based on the appropriate clinical practice guideline, which criteria are required for a definite diagnosis?
4. Does the clinical practice guideline recommend referral? If so, what is the aim of the referral?
5. Based on the appropriate clinical practice guideline, is a referral for vestibular rehabilitation therapy indicated? If so, which of the key VRT strategies would you focus on for this patient and why?
6. Besides your responses to questions 4 and 5 for Patient Z, is there anything else you would include in management for her? How does this differ from what is suggested by the clinical practice guideline?

Appendix F: Dissemination via professional boards

Email to professional boards requesting permission to disseminate the EBP2Q internet-based survey via their mailing lists

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Website: www.dhrs.uct.ac.za Christine.Rogers@uct.ac.za

To whom it may concern

Re: Permission to disseminate internet-based survey via your mailing lists

This research has been approved by Faculty of Health Science Human Research Ethics Committee (HREC reference Number: 137/2021)

My name is Richard Clarke and I am a student at the University of Cape Town studying an MSc in Audiology. The aim of this study is to identify the knowledge, attitudes and beliefs of a specific subset of HCPs (audiologists, ENTs and physiotherapists) regarding EBP and diagnosis decisions using presentations of dizziness and vertigo as an exemplar. Orientation towards EBP will be assessed using an internet-based survey. Further, the research will be expanded to focus groups that will be required to discuss cases about vestibular assessment and management.

The internet-based survey requires a sample size of 269 participants and the easiest way to achieve such a sample size would be by disseminating the study via the mailing lists of the professional bodies relevant to the professionals in the study.

I kindly ask that you help me to disseminate the internet based poll via your mailing list. Should permission be granted, all identities and results from the study will remain anonymous.

If there are any queries regarding the study and the ethical considerations thereof, my contact details are below.

Kind regards

Richard Clarke
Audiologist (AU0007501)
Contact: 076 734 6940 / 021 377 4615
Email: Richard.Clarke@westerncape.gov.za / Richardmclarke95@gmail.com

Supervisor Contact details:
Christine Rogers
Tel: 021 406 6315
Email: Christine.Rogers@uct.ac.za

If you have any queries regarding the ethics or individual rights and welfare of participants, please do not hesitate to contact:

The Faculty of Health Sciences Human Research and Ethics Committee
Tel: 021 406 6492
Email: Sumayah.Ariefdien@uct.ac.za
HREC approval number: 137/2021

Appendix G: Survey study information sheet and consent form

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Re: Participation in survey study

Thank you for taking the time to complete this survey. My name is Richard Clarke and I am a student at the University of Cape Town studying a MSc in Audiology. The aim of this study is to identify the knowledge, attitudes and beliefs of a specific subset of HCPs (audiologists, ENTs and physiotherapists) regarding EBP and diagnosis decisions using presentations of dizziness and vertigo as an exemplar. Orientation towards EBP will be assessed using an internet-based survey. Further, the research will be expanded to focus groups that will be required to discuss cases about vestibular assessment and management. Orientation towards evidence-based practice will be assessed using the Evidence-Based Practice Profile Questionnaire. Subsequently, to assess clinical reasoning, you are requested to read three cases of patients with vestibular pathologies and answer the questions that follow.

Participation

Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason.

Benefits

You will receive no direct benefits from participating in this research study. However, links to open access guidelines for vestibular assessment and management will be provided at the end of the study. Further, your responses may help us learn more about the knowledge, attitudes and beliefs of a specific subset of HCPs regarding the assessment and management of patients with dizziness and vertigo. Further, it may

serve as a basis for further studies and interventions to increase the implementation of EBP into vestibular assessment and management in South Africa.

Risks

The only foreseeable risk of this study is inconvenience caused by spending ten minutes taking the survey. Should you agree to participate in the focus groups, further information sheets and consent procedures will follow.

Confidentiality

Survey answers will be sent to a link at SurveyMonkey.com where data will be stored in a password protected electronic format. Survey Monkey does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. If you are willing to participate in a focus group discussion as a follow on from this survey, please leave your details below and you will be contacted shortly with the information sheet and consent form.

If you have any queries regarding the ethics or individual rights and welfare of participants, please do not hesitate to contact:

The Faculty of Health Sciences Human Research and Ethics Committee
Tel: **021 406 6492**
Email: **hrec-enquiries@uct.ac.za**
HREC approval number: 137/2021

Thank you for your time

Richard Clarke
Audiologist (AU0007501)
Contact: 076 734 6940 / 021 377 4615
Email: Richard.Clarke@westerncape.gov.za / Richardmclarke95@gmail.com

Supervisor Contact details:
Christine Rogers

Tel: 021 406 6315
Email: Christine.Rogers@uct.ac.za

Please see the link to the webpage of the *Journal of Vestibular Research*. The URL will take you to the International Classification of Vestibular Disorders (ICVD) with clinical practice guidelines for the management of a number of vestibular pathologies.

http://www.jvr-web.org/ICVD.html

ELECTRONIC CONSENT: Please select your choice below. You may print a copy of this consent form for your records. Clicking on the “Agree” button indicates that

- You have read the above information
- You voluntarily agree to participate
- You are 18 years of age or older

Agree:

Disagree:

Appendix H: Recruitment and information letter for focus groups

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Date:

To whom it may concern

Re: Clinicians' orientation towards evidence-based practice using clinical presentations of dizziness and vertigo as an exemplar

Participation in focus groups for Phase 2

Thank you for allowing me to contact you regarding participation in a focus group. To remind you, my name is Richard Clarke and I am a student at the University of Cape Town studying a MSc in Audiology. The aim of this study is to identify the knowledge, attitudes and beliefs of a specific subset of HCPs (audiologists, ENTs and physiotherapists) regarding EBP and diagnosis decisions using presentations of dizziness and vertigo as an exemplar. Orientation towards EBP will be assessed using an internet-based survey. Further, the research will be expanded to focus groups that will be required to discuss cases about vestibular assessment and management.

I will be hosting a focus group and I believe that you will make a valuable contribution to the study as you have experience in your specific field which includes vestibular assessment and management. Thus I would like to invite you to participate in the focus group study. This letter further explains my request and will be followed by a consent form:

What do you need to do?

- You will be asked to review three vignettes of typical vestibular presentations and asked to explain your assessment and management of the patient presented in each vignette. Vignettes will be handed out at the beginning of the session. If the discussion is being held in an online forum, vignettes will be sent to each participant before the discussion begins.
- You will be asked about your view on evidence-based practice and the barriers and facilitators you experience
- Once the session is concluded, all interpreted data will be returned for your perusal as it is vital that the correct information has been extracted from each session. If you feel that the data do not adequately reflect your experience, please feel free to adjust them as you feel necessary.

What else do you need to know?

- Participation in the focus groups is voluntary and you may opt out at any time.
- Unfortunately, there will be no payment for your participation. However, if the focus group is held in person, refreshments and a small thank you gift will be provided.
- The focus group will take approximately two hours total. Approximately 90 minutes will be given to complete the case discussions and 30 minutes will be provided for refreshments such as coffee and tea. If the discussion is held online, there will be no refreshments.
- The discussion will be audio-recorded and transcribed using specialised online transcription software. Your name will not be used during data analysis and rather you will be provided with a participant number
- Focus groups are such that confidentiality cannot be maintained between participants. However, each participant will sign a consent form expressly stating that they will not repeat anything that was said in the context of the focus group.
- Participants may recognise one another during the focus groups, whether online or in person. However, participants will be given pseudonyms so that they will not be recognisable to someone reading the study.

- Member checking will be conducted following the focus group discussion. This entails the researcher sending the themes and codes to each participant for review and correction if necessary. If you are satisfied with the depiction of your answers, please return it to the researcher. If you are not satisfied, please correct the notes and then send them back.

Risks

There is not likely to be any distressing or personal content mentioned in the focus group. However, should you become upset by anything mentioned, referrals will be made to the appropriate HCPs.

Benefits

There will be no benefit to you from this research. However, links to helpful open access guidelines on vestibular assessment and management will be provided for your perusal. However, your input is valuable and may contribute to future research on the subject. Further, it may serve as a basis for further studies and interventions to increase the implementation of EBP into vestibular assessment and management in South Africa.

Kind regards

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If you have any queries regarding the ethics or individual rights and welfare of participants, please do not hesitate to contact:

The Faculty of Health Sciences Human Research and Ethics Committee
Tel: 021 406 6492
Email: hrec-enquiries@uct.ac.za
Consent Form

I have read the consent form and the information sheet and taken the opportunity to ask any questions I may have.	
I agree to participate in the focus group of my own accord. I agree to the use and potential publishing of any results for research purposes.	
I know that I may leave the focus group at any time with no questions asked.	
I understand that the focus group will be voice recorded and results will be written up. I understand that my profession and years of experience will be described for credibility. However, a pseudonym/participant number will be provided to me to protect my identity.	
I understand that I will be identified by other members of the focus group.	
I understand that there is minimal risk in participating in this focus group. However, should the need arise, I may ask the researcher to refer me to the appropriate healthcare professional or provide counselling after the focus group.	
I understand that I will not be paid for participating in the focus group.	
I understand that all information and identities revealed in the group are confidential and I may not disclose any information which has been discussed.	

Study Number:

Signed: _____ Date: _____

Please see the link to the webpage of the *Journal of Vestibular Research*. The URL will take you to the International Classification of Vestibular Disorders (ICVD) with clinical practice guidelines for the management of a number of vestibular pathologies.

http://www.jvr-web.org/ICVD.html

Background Information

- What is your profession?

_____

- Do you work in government, private or academia?

_____

- How many years' experience do you have? Please include general practice, specific vestibular experience as well as degrees and diplomas you hold

_____
_____
_____
_____
_____

- How often do you see patients for vestibular assessment and management?

_____

Appendix I: Open-ended questionnaire scoresheet

Open-ended questionnaire scoresheet

Case 1: Ménière's disease [43]

Question	Answer	Score allocation
1	Ménière's Disease (DDX Vestibular Neuritis)	1
2	Ménière's Disease	1
3	• 2 or more attacks of vertigo: 20 minutes - 12 hours • Low Frequency SNHL in affected ear at least once before, during or after one of the episodes • Fluctuating aural symptoms (hearing loss, tinnitus, aural fullness) in affected ear • Not better explained by another diagnosis	4
4	Yes: • Audiometric testing • Patient education/ counselling • Symptomatic management of attacks • Intratympanic gentamycin • Hearing amplification • Vestibular rehabilitation for chronic imbalance	6
5	Yes, for chronic imbalance Not for acute episodes	1
6	Recommended dietary and lifestyle modifications Monitor changes in symptoms	2

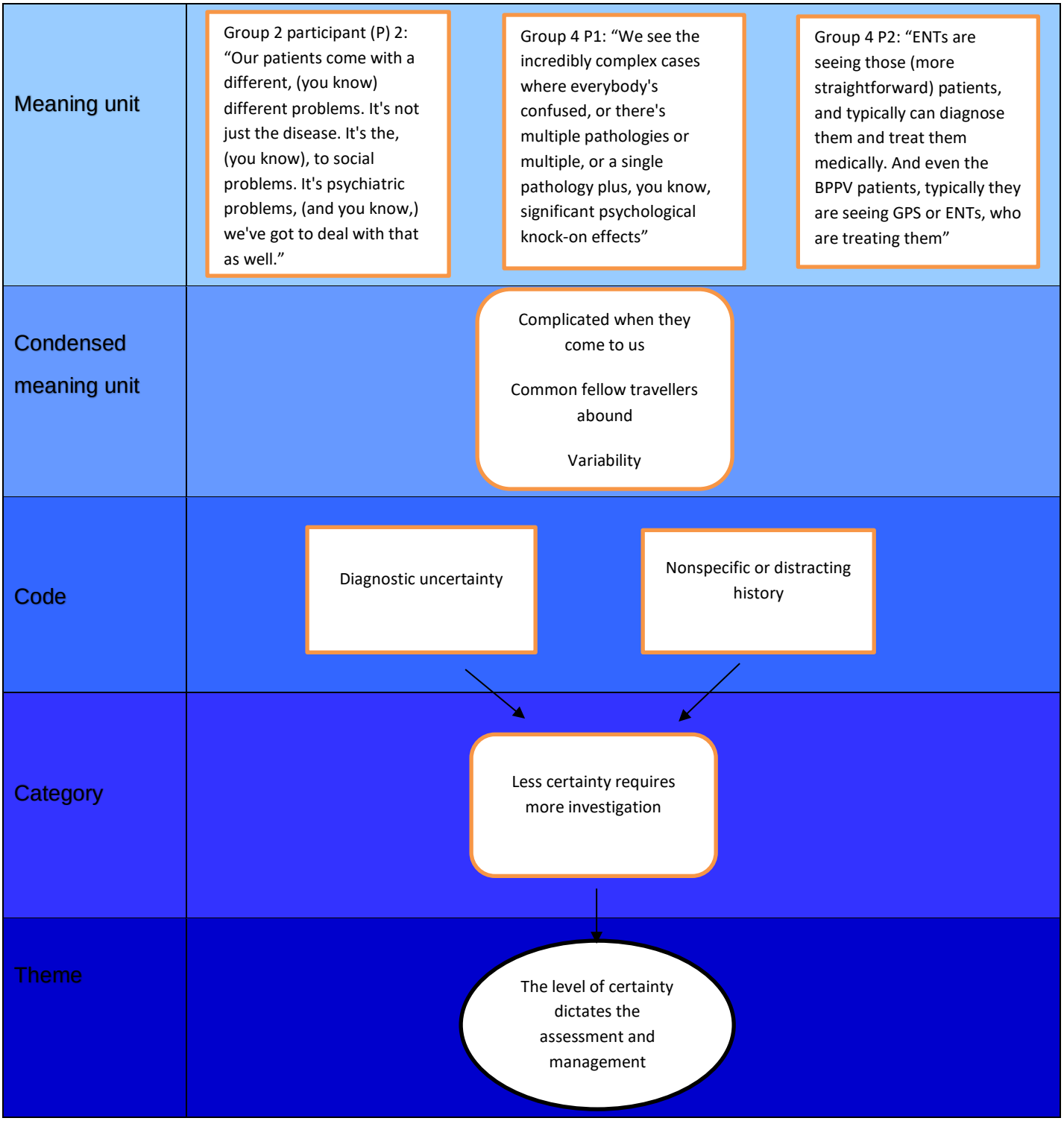
Case 2: PPPD [44]

Question	Answers	Score allocation
1	PPPD	1
2	• Symptoms present most days for at least 3 months • Prolonged but fluctuating symptoms • Symptoms aggravated by posture, movement or complex visual environments • Precipitated by conditions causing dizziness or vertigo • Causes significant functional impairment	5
3	SSRIs, antidepressants, anti-anxiety medications	1
4	No	1
5	No, otherwise possible psychology referral	1
6	Cognitive behavioural therapy, mindfulness	2

Case 3: Vestibular Migraine [45]

Question	Answers	Score allocation
1	Vestibular migraine	1
2	Vestibular Migraine	1
3	• At least 5 episodes with vestibular symptoms, with moderate to severe intensity lasting 5 mins -72 hours • Current or previous history of migraine • One or more migraine features with at least half of vestibular episodes (unilateral headache, visual aura, pulsating moderate to severe pain, photo/ photophobia) • Not better accounted for by another diagnosis	4
4	Yes, for migraine prophylaxis	1
5	No	1
6	No	1

Appendix J: Coding process



Appendix K: Validity and reliability of the EBP2Q

	Content Validity Index	Test-retest reliability	Internal consistency	Outcome
[31]		Intraclass correlation coefficients for each domain are as follows: -Relevance: 0.92 - Terminology: 0.94 -Practice: 0.83 -Confidence: 0.83 -Sympathy: 0.77	Cronbach's alpha 0.96 was demonstrated on the questionnaire overall. Cronbach's Alpha for each domain is shown below: -Terminology 0.94 -Relevance 0.94 -Confidence 0.93 -Practice 0.85 -Sympathy 0.76 Convergent validity: - Practice 0.66, - Confidence 0.80 - Sympathy 0.54	The evidence-based practice profile (EBP(2)) questionnaire is a reliable instrument with the ability to discriminate for three factors, between respondents with differing EBP exposures.
[35]	Good content validity (≥0.98)	Intraclass correlation coefficient of 0.82 – 0.95 were demonstrated. Three domains were maintained from the English to the Chinese version of the Evidence-based Practice Profile Questionnaire – sympathy, practice, and confidence. Intraclass correlation coefficients for each of the directly translated domains are as follows: -Practice: 0.92 -Confidence: 0.95 -Sympathy: 0.68	Cronbach's Alpha of 0.94 overall	Some of the domains of the English EBP2Q could not be translated effectively to the Chinese version of the questionnaire. However, the three domains which would be directly applied to the Chinese version of the questionnaire showed good reliability. Further, the questionnaire as a whole has good validity.

[10]		Intraclass correlation coefficients for each domain are as follows: -Relevance: 0.94 - Terminology: 0.97 -Practice: 0.92 -Confidence: 0.95 -Sympathy: 0.68	Cronbach's alpha ranging from 0.800 to 0.972 Cronbach's Alpha for each domain is shown below: -Terminology 0.971 -Relevance 0.937 -Confidence 0.940 -Practice 0.923 -Sympathy 0.798	The Polish version of the EBP2Q is comparable in terms of psychometry to the original English version.
[33]		Intraclass correlation coefficients for each domain are as follows: -Relevance: 0.91 - Terminology: 0.94 -Practice: 0.90 -Confidence: 0.94 -Sympathy: 0.66	Cronbach's Alpha for each domain is shown below: -Terminology 0.79 -Relevance 0.69 -Confidence 0.76 -Practice 0.45 -Sympathy 0.47	The cross-culturally adapted EBP2-Norwegian version was valid and reliable for the domains Relevance, Terminology and Confidence, and responsive to change for all domains, except Sympathy.

Appendix L: Singapore Statement on Research Integrity

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 at 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