

https://dspace.org/

An investigation into hearing aid trials: audiologist practices and adult patient experiences

Heliopoulos, Angie Argypo

2021

https://hdl.handle.net/10539/33486

Downloaded from a DSpace repository. https://dspace.org/

Faculty of Humanities

Department of Speech Pathology and Audiology

An investigation into hearing aid trials: Audiologist practices and adult patient experiences.

Angie Argypo Heliopoulos

A dissertation submitted in fulfilment of the requirements for the degree of Master of Arts in Audiology in the Faculty of Humanities, University of the Witswatersrand, Johannesburg

.

March 2021

TABLE OF CONTENTS

Declaration vi

Acknowledgements vii

Abstract viii

List of Abbreviations and Acronyms x

List of tables xi

List of Figures xii

List of appendices xiii

CHAPTER 1: INTRODUCTION 1

Orientation and background of the study 2

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW 6

International Classification of Functioning 7

Hearing loss 9

Types of hearing loss 9

Audiologists 10

Hearing aids 10

Satisfaction of hearing aids 12

Aural rehabilitation 15

Counseling 16

Trial period 18

Brain maturation 21

Rationale 24

CHAPTER 3: METHODOLOGY 26

Aim 27
Secondary objectives 27
Research question 27
Research Design 27
Description of Participants 29
Sampling size and sampling strategy 29
Inclusion and exclusion criteria 30
Profile of the hearing aid user 31
Data collection 32
Data collection tools 32
Data collection process 34
Data Analysis 35
Ethical Considerations 37
Pilot study 39
Reliability and Validity 41
CHAPTER 4: RESULTS 44
Introduction 45
Results: Phase 1 45
Participant's demographics 45
Hearing aid characteristics 46
Return rates on hearing aids 48
Trial period 50
Adjusting to hearing aids/brain maturation 54

Counseling....54
Aural rehabilitation....56
Results: Phase 2....58
Theme 1: Hearing aid characteristics....59
Sub-theme 1: Connectivity....60
Sub-theme 2: Background noise....61
Sub-theme 3: Physical appearance....62
Sub-theme 4: Comfort....64
Sub-theme 5: Price/expense....65
Theme 2: Experience with hearing aids....66
Sub-theme 1: Positive experience....67
Sub-theme 2: Negative experience....69
Sub-theme 3: Choosing the hearing aid....71
Sub-theme 4: Good relationship with audiologist....73
Sub-theme 5: Patient centered....75
Sub-theme 6: Advice to audiologists....75
Theme 3: Hearing aid trials....77
Sub-theme 1: Finding the process of hearing aid trials beneficial....78
Sub-theme 2: Duration of the trial period....80
Recommended duration of a trial period....81
Sub-theme 3: Amount of hearing aids trialed....82
Recommended amount of hearing aids to trial by the user....83
Theme 4: Counselling....85

Sub-theme 1: Physical handouts/written information.....85
Sub-theme 2: Follow-up appointments.....87
Theme 5: Family, work, social 89
Sub-theme 1: Hearing aids positively impacted relationships.....89
Sub-theme 2: Hearing loss negatively impacted relationships 90
Sub-theme 3: Work 91
CHAPTER 5: DISCUSSION.....93
Hearing aids.....95
Trial period 101
Counselling 105
Aural rehabilitation.....108
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS 111
Conclusion 112
Strengths of the study 114
Limitations of the study.....115
Implications 115
Recommendations for future research 115
REFERENCES.....117
APPENDICES 128
Appendix A: Participant information sheet to the audiologist.....129
Appendix B: Survey for audiologists.....131
Appendix C: Interview questions 135
Appendix D: Participant information sheet to the hearing aid users 137

Appendix E: Consent form for participation in the study.....138

Appendix F: Consent form to tape-record the interview 139

Appendix G: Ethics certificate 141

DECLARATION

I, Angie Heliopoulos, declare that this research topic titled: "*An investigation into hearing aid trials: Audiologist practices and adult patient experiences"* is my own work. This research has not been submitted for any other degree or to any other institution. I am responsible for the content of this study and the conclusions presented.



_____

Angie Argypo Heliopoulos

15 March 2021

ACKNOWLEDGEMENTS

"Only as high as I reach can I grow. Only as far as I seek can I go. Only as deep as I look can I see. Only as much as I dream can I be"- Karen Ravn

I would like to express my sincerest gratitude to the following people. Without you, this dissertation would not be possible:

- My supervisor Dr. Nomfundo Moroe- You have guided me throughout this process mentally and emotionally. You shared my enthusiasm and love for this research topic and without that; it wouldn't be what it is today. I am eternally grateful!
- My parents, Soula and Pano Heliopoulos- I owe everything to you. You have sculptured me to be the ambitious and independent woman I am today. You provided me with the most loving and infectious upbringing, I am truly blessed.
- My sister, Sofia Heliopoulos- You have always been the support that I needed when I needed throughout my life. But this time you went above and beyond to proof read and edit this research above your busy schedule. And for that I cannot thank you enough.
- To all my friends- For always asking how my research is going and keeping me in check. For offering advice in time of need and ensuring I stay optimistic and not lose focus.
- To all the participants- let's face it, without you this research would truly not be possible, thank you!

ABSTRACT

Background: The process of adjusting and becoming accustomed to hearing aids may be best facilitated by providing a hearing aid trial period. A trial period allows the user time to adjust to the hearing aid in terms of fit and perception of sound. Globally, hearing aid trials are often perceived as an 'up-in-the-air' process in that, there are no standardised frameworks or regulations on the recommended hearing aid trial period. Additionally, there is a dearth of knowledge on hearing aid trials within the South African population. The practices of audiologists in fitting and possibly trialing of hearing aids have not been explored in the local context, thus bringing about the purpose of the current study. **Objective:** The main purpose of this study was to explore audiologists' hearing aid trialing practices and describe hearing aid users' experiences from these hearing aid trials. The secondary objectives looked at determining a suitable number of hearing aids to test per trial period as well as the most preferred duration of a trial period. It also looked at comparing patient satisfaction with hearing aid trials, and lastly, exploring the hearing aid users' decisions in choosing hearing aids. **Method:** A sequential, explanatory, mixed method approach was chosen to formulate the study. A purposive sampling strategy in conjunction with snowball sampling was used to identify and recruit participants. 95 audiologists and eight hearing aid users in South Africa were recruited for this study. Data were collected through the use of an online survey via Google forms, as well as semi-structured online or telephonic interviews. A pilot study was conducted prior to the commencement of the main study in order to ensure reliability of the main study. Quantitative analysis included both descriptive and inferential statistical analysis (Chi-square method of analysis). The qualitative aspect of data analysis incorporated thematic analysis where five themes were identified. **Results:** The results indicated that two weeks was the most recommended duration of a trial period from audiologists. The duration of hearing aid trials by the hearing aid users varied with one-week, two-weeks, three weeks and two-month trials. However, a one-to-three-week trial period was recommended by participants. Furthermore, participants felt that one month was too long. Only 72.63% of audiologists offer hearing aid trials to their patients. Most audiologists who offer hearing aid trials choose to trial their patients with 2 different hearing aids. The majority of participants' trialed one set of hearing aids during their trial period. One half of the hearing aid

users felt like trialing only one set of hearing aids is enough while the second half felt like they would like to trial two pairs to compare. Hearing aid trials are most commonly only provided if requested by the hearing aid user. The first hearing aid(s) trialed are the ones the users usually choose if more than one pair is trialed. Hearing aid users all felt that trialing hearing aids first before purchasing them should be mandatory practice. All participants reported a good and positive experience whilst using hearing aids during the hearing aid trial. **Conclusion:** Findings revealed a need for trialing periods to become standard practice by audiologists when fitting hearing aids. Not enough audiologists are providing this service even though the users reported only benefits and positive experiences from these trials.

Keywords: *Hearing aid trials, trial period, hearing aids, audiologist, counselling, aural rehabilitation*

LIST OF ABBREVIATIONS AND ACRONYMS

AR	Aural Rehabilitation
ASHA	American Speech-Language-Hearing Association
BTE	Behind-The-Ear
CIC	Completely-In-Canal
CNS	Central Nervous System
dB	Decibels
ENT	Ear Nose and Throat
FDA	Food and Drug Administration
FTC	Federal Trade Commission
HPCSA	Health Professions Council of South Africa
ICF	International Classification of Functioning
IIC	Invisible-In-Canal
ITC	In-The-Canal
ITE	In-The-Ear
REM	Real Ear Measures
RIC	Receiver-In-Canal
QoL	Quality of Life
SAAA	South African Association of Audiologists
SASLHA	South African Speech-Language and Hearing Association
SNR	Signal-to-noise-ratios
WHO	World Health Organization

LIST OF TABLES

Table 1: Participant inclusion and exclusion criteria

Table 2: Profile of the hearing aid users interviewed

Table 3: Details of the interviews

Table 4: Location and duration of practice of audiologists

Table 5: Most common reported deciding factor when purchasing a hearing aid

Table 6: Reasons for hearing aid returns

Table 7: Physical and audiological complaints about hearing aids

Table 8: The relationship between hearing aid trials versus duration of practice, dispensing hearing aids and providing hearing aid fittings ($\alpha = 0.05$) using the Chi-square test of contingency.

Table 9: Most common topics covered during counseling

Table10: Reasons why aural rehabilitation is not offered by audiologists

Table 11: Themes and subthemes categorized

LIST OF FIGURES

Figure 1: The interactive model of functioning and disability

Figure 2: Three stages of the pilot study

Figure 3: Number of different hearing aid brands sold

Figure 4: Return rates on hearing aids

Figure 5: Subjective opinions of duration of trial periods

Figure 6: Number of hearing aids trialed per period

Figure 7: Opinions on the duration to retrain the brain from deprived sounds

Figure 8: Diagrammatic representation of theme 1 and its subsequent sub-themes

Figure 9: Diagrammatic representation of theme 2 and its subsequent sub-themes

Figure 10: Diagrammatic representation of theme 3 and its subsequent sub-themes

Figure 11: Diagrammatic representation of theme 4 and its subsequent sub-themes

Figure 12: Diagrammatic representation of theme 5 and its subsequent sub-theme

LIST OF APPENDICES

Appendix A: Participant information sheet to the audiologist

Appendix B: Survey for audiologists

Appendix C: Interview questions

Appendix D: Participant information sheet to the hearing aid users

Appendix E: Consent form for participation in the study

Appendix F: Consent form to tape-record the interview

Appendix G: Ethics certificate

CHAPTER 1: INTRODUCTION

The following chapter provides the basic motivation and overview of the research study. It also describes the ideas behind this specific topic, which brings about the purpose of the research.

Orientation and background of the study

Despite the significant prevalence of the loss of hearing in the human population, the use and uptake of hearing aids is still poor (Knudsen et al., 2010; Gallagher & Woodside, 2018). Only a small portion of the hearing-impaired population seek help for their hearing problems and make use of their hearing aids indefinitely (Knudsen et al., 2010). In the United Kingdom, on average only 23% of the older population who could benefit from hearing aids seek help, and actually use their hearing aids (Gallagher & Woodside, 2018). Yong et. al. (2019) conducted a study on access to hearing aid policies in eight middle-and high-income countries (United States of America, Great Britain, Northern Ireland, Australia, China, Brazil, Japan, Germany, United Kingdom and Netherlands). The findings revealed that, globally, hearing aid use amongst adults remains low. Percentages range from 10-20% in some countries, and 20-30% in other countries. According to Campbell and McMillan (2015), the most common factors related to hearing aid disuse and outcome includes finances, cognitive ability, vision, dexterity and the influence of other people.

Approximately one third of individuals over the age of 65 years are affected by a disabling hearing loss (World Health Organization [WHO], 2019). In adults (15 years+), a disabling hearing loss is classified as a loss greater than 40 decibels (dB) in their better hearing ear (WHO, 2017). In 2018, global estimates on hearing loss indicated 432 million (93%) of those affected with a disabling hearing loss are adults (WHO, 2019). Age-related hearing loss (also known as presbycusis) is often underdiagnosed and undertreated even though the older generation is considered a higher risk group (Peer, 2015). The World Health Organization (WHO) report an estimate of 466 million people (6.1%) worldwide have a disabling hearing loss (WHO, 2019). What is most terrifying is that the majority of those affected with a disabling hearing loss live in low and middle income countries such as Sub-Saharan Africa, South Asia, and Asia Pacific (WHO, 2019). Statistics reports on the prevalence of hearing loss in South Africa are deemed unreliable, as they are based on the national census that tends to underestimate hearing loss in the country (Ramma & Sebothoma, 2016). Nevertheless, the latest census conducted in 2011 (reported in 2012) on the South African population found that approximately 5% of the population have some kind of disability and the prevalence of a hearing loss was

estimated at approximately 20% of these reported disabilities (Stats SA, 2012). This makes hearing loss the third highest reported disability alongside vision and physical disability (Stats SA, 2012). While this information is useful, it should be used with caution as it was gathered eight years ago. There is still a dearth of updated and accurate information regarding the widespread presence of hearing loss in South Africa.

The lack of research studies into hearing in South Africa is quite concerning as hearing is one of the most crucial senses for communication in all animal species. Thus, the presence of a hearing loss not only negatively impacts communication, but ultimately the quality of life (Gallagher & Woodside, 2018). Hearing loss is also associated with other illnesses such as depression, anxiety, self-isolation, psychological disorders as well as the increased risk of dementia (Lin et al., 2011; Yong et al., 2019). Studies on the correlation between a hearing loss and dementia found that hearing loss was accompanied with lowered test scores of memory and executive function (Popelka et al., 2016). Furthermore, hearing loss significantly decreases the intensity of the speech signal and clarity of words/messages (Smiljanic & Bradlow, 2009).

Hearing loss may be congenital due to genetic factors or certain complications during pregnancy and/or childbirth. It may also be acquired due to infectious diseases, the use of particular drugs/medications, chronic ear infections, trauma or exposure to excessive noise (WHO, 2019). Due to the above effects of hearing loss being irreversible, hearing aids may provide a variety of clinically- proven benefits to the wearer such as decreasing listening effort, improving communication, slowing down cognitive decline and improved quality of Life (QoL) to name a few (McCormick, 2016). However, it must be noted that even with all these benefits, hearing aids only partially overcome the majority of the deficits that are associated with hearing loss such as reduced speech discrimination and communication (McCormick, 2016).

The purpose of a hearing aid is to improve a person's access to sound in all their environments (Dillion, 2010). Hearing aids achieve this by amplifying treble and base sounds within the ear to compensate for the decrease in hearing sensitivity (Popelka

et al., 2016).There are many hearing aid styles and brands to choose from such as custom hearing aids, external hearing aids and ear moulds vs. slim-tube fittings into the ear canal (Popelka et al., 2016). Some of the brands sold in South Africa include Oticon, Starkey, Phonak, Signia, Widex, ReSound, Beltone, and Unitron (Hearing Tracker, 2020). These are available both in the public and private sectors. Typically, hearing aids are dispensed and fitted by audiologists, who are professionals trained on the prevention, screening, assessment, diagnosis and treatment of persons with hearing loss (American Speech-Language-Hearing Association [ASHA], 2019). In South Africa, there are currently 781 registered audiologists and 1450 dually qualified speech therapist and audiologists registered with the Health Professions Counsel of South Africa (HPCSA) to date (Health Professions Council of South Africa [HPCSA], 2020). Audiologists provide personalized services with the aim to improve an individual's overall QoL, especially in terms of communication (Shilpa, 2017). Some of these services provided include: individual and family counselling for treatment and management options, referrals to the Ear-Nose and Throat (ENT) specialist, assessing candidacy for hearing aids and cochlear implants, and lastly, fitting and programming the assistive devices together with audiologic rehabilitation to ensure maximum hearing and communicative outcomes in all aspects (ASHA, 2019). Audiologists possess the necessary knowledge and skills to provide a patient with the hearing aid best suited for the needs of a patient. Audiologists ascertain this information based on the patient's case history and lifestyle provided. The hearing aid fitting process entails: assessment, treatment planning, selection, verification, orientation and validation of the hearing aids (ASHA, 2019). Depending on the length of time and the degree of the loss, in most cases, when a person is first fitted with the hearing aid, their brain may be startled when it receives acoustic signals. Therefore, the brain needs time to, once again, become familiar with the high/low frequency sounds of speech and environmental noise.

The process of adjusting and becoming accustomed to hearing aids may be best facilitated by providing a hearing aid trial period. A hearing aid trial is a period in which the hearing aid user is afforded time to try out hearing aids before purchasing them, with the option to return or exchange them (ZipHearing, 2016). This trial period is a crucial part of the hearing aid fitting process, as it allows the user time to adjust to the hearing aid in terms of fit and perception of sound (ZipHearing, 2016).

Globally, hearing aid trials are often perceived as an ‘up-in-the-air’ process in that, there are no standardised frameworks or regulations on the recommended hearing aid trial period. The time period of a hearing aid trial, together with a number of hearing aids to potentially trial, is not under any consumer protection law in most parts of the world. With this inconsistency, some patients may trial hearing aids to adjust to them while others may not. Or, some may try out different brands and products until making their decisions, while others may not. This inconsistency creates uncertainty for both dispensers and consumers of hearing aids due to differing opinions on the most appropriate duration of the trial period, as well as the most appropriate number of hearing aids to test during this time. It was for this reason that the current research study was conceptualized. There is a dearth of knowledge on hearing aid trials within the South African population. Furthermore, the practices of audiologists in fitting and possibly trialling of hearing aids have not been explored in the local context. As such, to the knowledge of the researcher, there is no documented literature on the experiences of hearing aid users who are the direct beneficiaries of the hearing aid trial process. Therefore, this study aims to explore the trialing practices of audiologists in South Africa as well as describe the hearing aid users’ experience of undergoing a trial period.

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

This chapter will critically discuss theoretical framework and rationale for this study. The literature review will focus on hearing loss, hearing aids (such as types, styles, and satisfaction), trial periods, aural rehabilitation, counseling, and brain adjustment to hearing aids.

Theoretical Framework

International Classification of Functioning

Until recently, 'health' was seen as anything opposite to death or disease (Kostanjsek, 2010). The adoption of the International Classification of Functioning, Disability and Health (ICF) marked a paradigm shift in the way disability and health is measured and understood (Kostanjsek, 2010). This framework acknowledges that every human being can experience a decrease in health and therefore experience some disability. This framework encompasses multiple dimensions of human functioning including psychological, biological, social and environmental aspects, resulting in a biomedical paradigm with a social paradigm into a broader understanding of human functioning (Danermark et al., 2010).

This classification framework encompasses three domains of health conditions as a holistic approach in understanding health and disability. The first domain focuses on the "body component" and is concerned with the functioning of the body system and its structures. This component pertains to the physiologic functions and anatomic parts (Kostanjsek, 2010). The second domain is the "activity" a person engages in and certain situations they are involved in. Activity limitations relate to the difficulties the individual may have whilst executing these activities (Kostanjsek, 2010). The third domain refers to "participation" and involvement in life situations. A problem an individual may have with involvement is referred to as 'participation restrictions' (Stucki, 2005). Figure 1 illustrates the domains of the ICF in an interactive model. The image depicts how a health condition such as a disease or disorder may impact a person's functioning in the three above-mentioned domains. Personal and environmental factors should also be considered in the way the health condition impacts functioning. For example, if we look at hearing loss in terms of the ICF, the physical ear represents the body component that is impaired. This can include one or more of the following: outer ear, ear canal, ear drum, ossicles, Eustachian tube, cochlear and the auditory nerve. The activity limitations may vary depending on the severity of the hearing loss; however some may include limitations with any careers involving hearing (such as disk jockeys, call centers, doctors etc.) or societal activities such as attending live concerts. The participation restrictions a

person with a hearing loss may experience differs from person to person however these may include watching television, listening over the telephone, communicating in noisy environments or environments with background noise and listening to music amongst others.

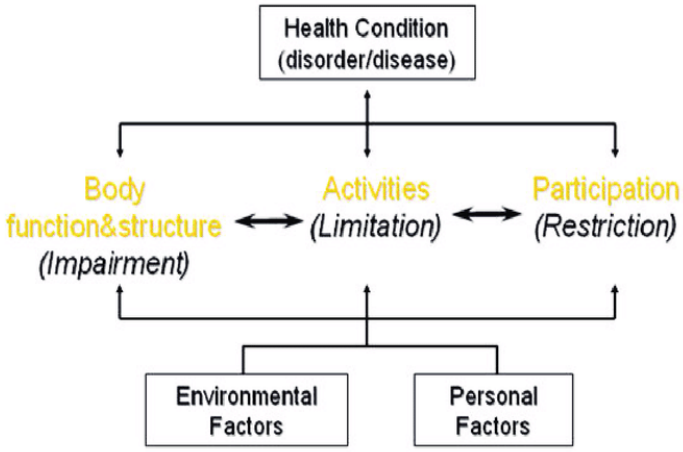


Figure 1: The interactive model of functioning and disability (Arnold et al.,2009).

During the rehabilitation process, the ICF framework is used to describe the impairments, activity limitations and the participation restrictions together with environmental and personal aspects associated with health conditions. To successfully describe and understand the difficulties experienced by an individual with a hearing loss, it is important to assess the individual's impairments, limitations and restrictions while taking into account the contextual factors affecting the individual (Danermark et al., 2010). Hearing restoration in adults, especially the elderly population, is very important in terms of maintaining QoL with hearing aids used as the main device world-wide to achieve this (Kormaz et al., 2016; Ferguson et al., 2016). Hearing aids are primarily fitted by audiologists in various settings such as hospitals, private practices and clinics.

REVIEW OF THE LITERATURE

Hearing loss

Alshuaib et. al. (2015) defines hearing loss as “the partial or total inability to hear sound in one or both ears” (p. 30). The term ’hearing loss’ will be used throughout this study to refer to ‘the loss of hearing’ in which an individual was once hearing and subsequently became hard of hearing (i.e. not able to hear well) in some way. Hearing loss is a sudden or progressive disorder that gradually becomes more severe with time depending on the cause of the hearing loss. It may be unilateral or bilateral, temporary or permanent and may also fluctuate or become stable with time (Alshuaib et al., 2015). For the purpose of this study, only the adult population (15 years +) with hearing loss will be considered.

The prevalence for hearing loss is increasing in the elderly population globally. As such, WHO (2010) reports that one-third of individuals over the age of 65 years are living with presbycusis. The presence of this specific hearing loss is increasing in longevity and rising in both developed and developing countries (Popelka et al., 2016). The individual and societal burdens associated with hearing loss are considerable in that hearing loss is strongly associated with a poor Quality of Life (QoL), difficulties with functional activities, increased co-morbidities and a lower social and work productivity (Popelka et al., 2016).

Types of hearing loss

There are three types of hearing loss namely conductive, sensorineural, and mixed hearing loss (Dillion, 2012). A conductive hearing loss occurs when bone-conducted signals perform better than air-conducted signals. The dysfunction typically occurs in the outer and/or middle part of the ear mechanism, while the inner ear functions normally. A sensorineural hearing loss occurs when the inner ear is damaged, particularly the outer and/or inner hair cells of the cochlea (organ of hearing) (Dillion, 2012). A sensorineural hearing loss can also occur when the damage is beyond the cochlea, along the auditory nerve (also known as the 8th cranial nerve) or in the brain; hence the term ‘sensori’ (cochlear) ‘neural’ (nerve). A sensorineural hearing

loss can cause a complete loss of hearing even though the outer and middle parts of the ear may be functioning normally (Dillion, 2012). A mixed hearing loss is evident when a combination of a conductive and sensorineural hearing loss occurs in the same ear (Bahmad, 2015). The majority of individuals with a sensorineural hearing loss benefit from conventional hearing aids. Hearing aids are devices designed to amplify sound for individuals who have a hearing loss (Food and Drug Administration [FDA], 2018).

Audiologists

There are currently 781 registered audiologists and 1450 dually qualified speech therapist and audiologists registered with the Health Professions Counsel of South Africa (HPCSA) to date (Health Professions Council of South Africa [HPCSA], 2020). Audiologists are health care professionals who identify, test, diagnose, monitor, manage and prevent disorders of the auditory and vestibular portions of the ear (Shilpa, 2017; ASHA, 2019). Audiologists provide personalized services with the aim to improve an individual's overall QoL, especially in terms of communication (Shilpa, 2017). Some of these services provided include: individual and family counseling for treatment and management options, referrals to the Ear-Nose and Throat (ENT) specialist, assessing candidacy for hearing aids and cochlear implants, and lastly, fitting and programming the assistive devices together with audiologic rehabilitation to ensure maximum hearing and communicative outcomes in all aspects (ASHA, 2019).

Hearing aids

Hearing amplification is a way to improve access to sound by increasing sound levels at different speech frequency regions to compensate for the individual's hearing loss (Tremblay et al., 2014). Hearing aids have improved significantly over the past decade from the analogue to the digital revolution. For individuals with hearing loss, the use of amplification is the heart of most rehabilitation programs (Tremblay et al., 2014). The Cochlear implant is another form of an assistive listening device used to amplify sounds as part of the rehabilitation program. For the purpose of this study, the focus is on hearing aids only.

A hearing aid usually comprises of the following components:

- a microphone (one or more) to convert sound into an electrical signal,
- an amplifier to enhance the strength of the electrical signal (Dillon, 2012),
- an analogue-to-digital converter for each of the amplified microphone signals,
- a digital signal processor (in other words a miniature computer) (Popelka et al. 2016),
- a receiver (miniature loudspeaker) to convert electricity back into sound,
- a battery to provide the power to the hearing aid needed by the amplifier,
- a casing to hold all the components either within the ear or externally behind the ear (Popelka et al. 2016), and
- Depending on the style of the hearing aid, and the severity of the hearing loss, an ear mould or ear shell may be required to custom fit into a person's ear (Dillon, 2012).

Hearing aids are electroacoustic devices that are designed to operate in many challenging environments such as humidity, hot, cold, water, wind, electric and magnetic fields with many restrictions such as limited power supply, size, and the proximity of the microphone to the receiver (Popelka et al., 2016). Any one of these factors (e.g. humidity and heat etc.) may affect the performance of a hearing aid if not looked after correctly and consistently.

Additionally, hearing aids can be classified into two categories namely custom in-the-ear hearing aids and behind-the-ear-hearing aids (Popelka et al., 2016). Custom hearing aids employ a single casing containing all the components. These include fitting either in-the-ear (ITE) that is visible in the concha, in-the-canal (ITC) that sits within the canal visible at the entrance of the ear canal, completely-in-canal (CIC) where the case is small enough to fit completely in the ear canal and invisible-in-canal (IIC) which sits so deeply into the canal it is not visible when looking into the canal. The second type is the behind-the-ear (BTE) in which most of the components fit in a casing that sits behind the pinna which is attached to a slim tube and/or dome/earmould that fits into the ear, or a receiver-in-canal (RIC) which also sits behind the pinna, however the receiver is attached to a slim tube and dome that sits within the ear canal (Popelka et al., 2016).

Hearing aids need to be fine-tuned post hearing aid fitting process. This should be done after the patient has had a few weeks to become accustom to the hearing aids. This ensures the hearing aids are functioning specifically according to the individual's hearing loss. Counseling the patient about the importance of hearing aids and reinstructing them on cleaning, battery operations, warranty and usage are just as important during the fitting process. Hearing aid fittings offer too much information in a short period of time, thus patients often forget vital information soon after (Abdellaoui & Huy, 2013). Therefore, counseling should be offered to ensure patient satisfaction and to improve the constant use of hearing aids.

With new technology and the benefits associated with hearing aids, researchers have studied the factors that influence the non-use of hearing aids to understand why some of the hearing aid users wear their hearing aids consistently while others do not. The most common factors as reported by McCormack and Fortnum (2013) include: appearance of the hearing aids, value/financial reasons, fit and comfort, features, health care professional's attitudes, maintenance of the hearing aid(s) and psychosocial/situational factors. Another study conducted by Ng and Lock (2015) examined the audiological and non-audiological factors that affect hearing-aid usage, these included: the type of hearing aid, the severity of the hearing loss, background noise, expectations of hearing aids, age, self-perceived benefit and satisfaction from the hearing aids. Hearing aids, if worn correctly and consistently, have been observed to provide benefits at a psychological, social and quality of life levels (Abdellaoui & Huy, 2013).

Satisfaction from hearing aids

According to Saunders et. al. (2009) individuals tend to wait a few years between the diagnosis of a hearing loss and acquiring hearing aid(s). During this time, users form preconceived expectations as to what hearing aids will do for them and how it will be like to wear them. Research indicates that preconceived notions affect the reported outcomes, the frequency to which they wear their hearing aids and the hearing aid satisfaction (Saunders et al., 2009). Although, hearing aids are the most effective method to alleviate communication difficulty in people with any degree of hearing loss (Chang et al., 2016), there is a dearth of studies on the lack of satisfaction with hearing aids, which ultimately determines whether potential users will use, or not

use, their hearing aids (Knudsen et al., 2010; McCormack & Fortnum, 2013). Knudsen et. al. (2010) argue that the psychological sequence of events leading up to seeking and obtaining help largely impacts the individual's decision when purchasing a hearing aid and thereafter being satisfied with it. According to the Review Hearing (2010) the return rates of hearing aids is attributable to poor benefit, hearing aid performance in noise, feedback, poor value, poor comfort/fit and an unsuccessful trialing period. Another key factor observed by Knudsen et. al. (2010) was that, those who could potentially benefit from hearing aids did not purchase them due to poor word-of-mouth experiences from their family and friends. Additionally, poor adherence to critical aspects of the fitting protocol such as testing in a sound booth/noise-controlled environment, aural rehabilitation, validation of the hearing aid fit and most importantly the counseling process involved pre and post fitting influenced the uptake of hearing aids (Knudsen et al., 2010).

A study conducted by Abdellaoui and Huy (2013) looked at socioeconomic, epidemiological, audiometric and environmental factors of success and failure for hearing aid outcomes in adults six to nine months after prescription in France. Findings revealed the following: 40.8% of patients did not purchase a hearing aid due to an unsatisfactory trialing of the hearing aids. 30% of fitted patients, due to financial consideration, opted for the cheapest mode of the hearing aid, despite their specific hearing needs. The majority of participants (37%) relied on their audiologist's advice on which hearing aid to purchase while 18% relied on the effectiveness of the hearing aid (Abdellaoui & Huy 2013). In addition, prior to purchasing the hearing aids, two out of three participants trialed hearing aids at a mean interval of 3 months. The result indicated that, in participants who opted for cheaper hearing aids and those who relied solely on trialing the aids before purchasing them, the success rate was 80%. In patients who opted for the fitting specialist's advice, there was a 59.2% success rate (Abdellaoui & Huy, 2013). Based on the overall findings of the study, the authors concluded that specialist advice plays an important role in hearing aid acquisition (Abdellaoui & Huy, 2013).

On the other hand, Dillon (2012) asserts that the following factors contribute to the uptake of hearing aids: attitude towards obtaining a hearing aid, acceptance of the presence of a hearing loss (intellectually and emotionally), self-image whilst wearing hearing aids, expected benefit, costs, communication needs, influence of

others, the physical hearing loss and the fear of uncertainty on how to operate the device. With the above said, the patient's own acknowledgement of their hearing difficulties and their motivation to try to do something about their problem is a strong indicator of how much they subsequently wear their hearing aids (Dillon, 2012). Additionally, hearing aid benefits are often realized approximately six weeks post fitting of the devices (Dillon, 2012).

McCormack and Fortnum (2013) gathered data and reviewed 10 studies on the reasons of non-use of hearing aids in adults from the year 2000-2013 and found the following reasons behind non-usage: fit/comfort and maintenance of the hearing aid, financial reasons, hearing aid value, device factors, healthcare professionals' attitudes, psychosocial factors, appearance of the hearing aids and ear problems. Audiological factors affecting non-use of hearing aids gathered included: self-perceived benefit, satisfaction with hearing aids, expectations of hearing aids, and self-perceived hearing problems. Another study conducted by Moroe and Vazzana (2019) on the elderly South African population of hearing aid users between the ages of 74 and 85 years diagnosed with presbycusis found that individuals stop using hearing aids for the following reasons: 1) discomfort (pain, background noise, tight fit), 2) lack of information about hearing aids (poor hearing aid orientation and unmet expectations) and 3) difficulty with function and maintenance of the hearing aid (such as placement, cleaning and user friendliness). Based on these reasons, it may be argued that lack of information about hearing aids and the lack of trialing hearing aids may also potentially contribute to people not wearing their hearing aids.

In a study conducted by Ferguson, Brandreth, Brassington and Wharrad (2015) on first time hearing aid users based on the concept of reusable learning objects. They looked at knowledge of practical and psychosocial aspects of hearing aids and communication using a free-recall method 6 weeks after the hearing aid fitting. Participants in this study commonly reported information overload during the initial hearing aid fittings which led to forgetting important information and details, This study reported that between 40 to 80% of information about hearing aids given verbally was forgotten afterwards (with no information such as pamphlets to take home) and 25% was forgotten one month later. In psychology, the constructivist learning theory recommends that physical learning materials together with verbal information promotes learning, thus the greater the interactivity the greater the

success (Ferguson et al., 2015). On the contrary, a study conducted by Abdellaoui and Huy (2013) found that 70% of their participants found their hearing aids beneficial and 70% satisfactory with only a 6% rate of difficulty of use. Conversely, this study did not mention the hearing aid orientation protocol or counseling methods used and did not provide the participants with physical materials to take home. In a study by Blood (1997) participants highlighted perceived stigmas and cosmetics as the main reason for not wearing their hearing aids. This stigma together with wearing the hearing aids may affect the commitment of hearing impaired individuals to use their hearing aids. This interchange of pride, social acceptance, together with other issues may play a crucial role in improving their QoL, where one of the most important reasons of purchasing hearing aids is to improve QoL (Barker et al., 2016).

Audiologists tend to focus more on the benefits of the hearing aids and do not mention the limitations (Ferguson et al., 2015). This is a concern because when patients experience these limitations, they are not prepared for them and start to formulate negative emotions towards the hearing aids. Nearly 20% of hearing aids end up in the individual's drawers and over 60% are used only half the time according to Ferguson et. al. (2015). Aural rehabilitation, which includes education and training, hearing aid orientation, improving overall communication skills, amongst others has been noted to minimize these returns.

Aural Rehabilitation

Aural Rehabilitation (AR) is a person-centered approach which creates a therapeutic environment to explore and reduce the impact of hearing loss on communication by focusing on the activity, function, participation and QoL as per the ICF framework (Boothroyd, 2007; ASHA, 2019). AR lessens the communicative and psychosocial consequences of a hearing loss through counseling and therapeutic techniques (ASHA, 2019) such as sensory management, instruction (in the use of technology and control of the sensory environment) and perceptual training (Boothroyd, 2007). The goal of AR is to reduce the deficits that accompany hearing loss as far as possible to his or her pre-loss state (ASHA, 2019).

AR usually includes the following three components (Jessen, 2015):

1. Sensory management for improvement of audibility such as hearing aids, assistive listening devices and cochlear implants
2. Auditory/auditory-visual speech perceptual training
3. Counseling

The combination of these components result in the most effective aural rehabilitation strategy with the aim to improve speech understanding to reduce the self-perception of an individual's activity limitations. AR is tricky, in that there is not a 'one-size-fits-all' approach. Thus, determining the individual's needs is the best form of intervention approach (Jessen, 2015). It is highly crucial for audiologists to provide a comprehensive and individualized AR program for each of their hearing aid users. A hearing aid alone is not enough to overcome the communication breakdowns that occur with hearing loss. After sensory management, auditory and/or visual speech perceptual training and counseling, long-term follow-up appointments are mandatory (Jessen, 2015). Additionally, offering hearing trials to potential hearing aid users goes a long way in promoting the uptake of hearing aids.

Counseling

When patients are fitted with hearing aids, they experience a new world of sound they could once hear but have forgotten through auditory deprivation. Therefore, it is vital that the audiologist help them to gradually increase their range of listening experiences, while paying careful attention not to overwhelm them with sound (Cienkowski & Saunders, 2013). Pre and post hearing aid fitting counselling is crucial in the process of fitting new hearing aids as this provides patients with a clear understanding of the process in relation to their expectations of the hearing aids (Blood, 1997; Cienkowski & Saunders, 2013).

Counselling is often overlooked during the rehabilitation process yet it is often considered the most important component of all (Sweetow, 1999). It is important because patients often make uninformed decisions regarding hearing aids based on their family or friends' own personal experiences or they misunderstood television advertisements as an example. Therefore a need for informative supportive

counselling is necessary, especially if the individual is a first time hearing aid user (Blood, 1997). Unrealistic patient expectations can lead to disappointment and in some cases, wasted money. During this informative supportive counselling, it is crucial for audiologists to ensure that their patients understand their hearing loss and how it impacts the individual both physically and mentally before discussing management options (such as a hearing aid). Without this vital step, the hearing-impaired individual may become in denial of their impairment because they don't understand it. If the patient is not motivated to wear the hearing aids from the start, the successful fitting and use of hearing aids is greatly reduced. The combination of hearing aids, counselling, and aural rehabilitation together helps to improve QoL or ensures it doesn't reduce QoL by becoming socially isolated, withdrawn or depended on family/friends (Sweetow, 1999).

Furthermore, counselling is an important part of the hearing loss management process, in order to gain insight into the hearing impaired individual's disability and to understand how to adjust to living with a hearing disorder (Blood, 1997).The stigma associated with wearing hearing aids is known as the 'hearing aid effect' (Blood, 1997). Individuals who wear hearing aids need to become more active in using them, become informed consumers, understand the benefits as well as limitations, and learn to adjust to their surroundings or experiences when wearing the hearing aids (Blood, 1997).

Pre-counseling interventions have been recommended to explore the expectations of the hearing aid user as well as acknowledgement of the hearing loss. Post-fitting interventions should also include more counseling while keeping track of their expectations, additional hearing aid orientation and communication training, such as aural rehabilitation (Sweetow, 1999). Audiologists are also advised to act in a more patient-centered manner by involving significant others during consultations and additionally taking note of the patient's attention and attitude, looking at their verbal and non-verbal cues towards the hearing aids (Barker et al., 2016; Sweetow, 1999). The patient-centred approach advocates for patients to be the centre of the counselling; while the audiologist is the facilitator not the director of the process. The emphasis is on encouraging the patient to make decisions and to take ownership of the process (Saweetow, 1999). With this patient-centred approach, the audiologist is required to determine the patient's needs, fears, hopes, and desires (Dillon, 2012).

This provides an individual problem-solving method rather than a set of rules to follow disconnected from their everyday lives (Dillon, 2012).

Lastly, Saunders and Forsline (2012) assert that while counselling improves hearing aid outcomes, the programs are often too resource-intensive to be clinically practical. This is due to information often been given all at once, which leads to information overload. Subsequently, patients often report not remembering certain crucial details about the hearing aids and their maintenance once they leave the room. Therefore, counselling should be aimed at giving information about hearing loss, improving listening skills, developing skills to operate and care for the hearing aids, and changing certain beliefs/stigmas/feelings towards the hearing aids. Providing adequate information and support during counselling increases the likelihood of successful hearing aid outcomes and communication difficulties will be minimized.

Despite this professional directive, there are still some audiologists who are reluctant to provide counselling services. According to Cienkowski and Saunders (2013) this could be attributed to time constraints and feasibility of including counselling to their already tight-knit schedules.

Trial period

A trial period can be defined as “a period of time in which you are able to try out hearing aids after purchasing them, with the option to return or exchange them” (ZipHearing, 2016, p. 1). According to literature, the most common duration of a trial period is a minimum of 30 days (Dalebout, 2009; Murray, 2009). However, there is no evidence-based practice to support this suggested time period. A trial period is usually conducted so that the audiologist can ensure the hearing aids fit comfortably, fine tune the hearing aids for customized sound quality input, ensure there is no feedback and allow the patient to wear the hearing aids in all their listening environments (Dalebout, 2009). Additionally, and most importantly, this period allows the user to become accustomed to a new way of hearing sounds after a period of deprivation. At the end of the trial period, the patient may choose to keep the hearing

aids indefinitely, be given the option to trial a new hearing aid(s) or return the hearing aids (Dalebout, 2009).

Hearing aid users need several weeks or more to acclimatize and ‘re-train the brain’ to identify certain frequencies and sounds (more detail will be provided on this later on). It is for this reason that in the United States, it is against the law to not offer trial periods to potential users as people with different types of hearing loss respond differently to hearing aids (ZipHearing, 2016). In countries where there are no laws or regulations pertaining to hearing aid trial periods, some audiologists establish their own trial periods (ZipHearing, 2016). This indicates that audiologists are aware of the need to have policies or regulation governing the evidence-based practice when dispensing hearing aids to potential users. Internationally, there are two governing bodies who enforce regulations pertaining to the sale and manufacturing of hearing aids; the Federal Trade Commission (FTC) and the Food and Drug Administration (FDA) (Campbell, 2012). According to these entities, any individual who feels they may struggle adapting to amplification should enquire about trialing or renting the hearing aids before making any decisions on purchasing them (Campbell, 2012).

Thirty days or the 30-day warranty is usually the most common of a standard trial period (Sweetow, 1999). For instance, in the United States there is a legally mandated trial period to protect patients from malicious sales practices. This is usually a 30-day trial period or ’30-day- adjustment phase’ as trial periods can often give patients the connotation or permission to fail (Sweetow, 1999). For some people, this period offers sufficient time to decide whether to keep the hearing aids. For others, some audiologists have been known to offer 45 and 75 day trial periods to give the patient enough time to adjust to the hearing aids and make more follow-up appointments (ZipHearing, 2016). Patients need to know that their brains need some time to adjust or adapt to hearing certain parts of speech or environmental sounds that they have not heard for some time (Dillon, 2012). Research, although very limited, shows that hearing aid wearers need to wear the hearing aids for at least 6 weeks to fully adjust to their new devices (Metz, 2014).

During a trial period, the audiologist ensures the hearing aids fit right into the ear regardless of the type of the hearing aid chosen; patient is satisfied with the hearing aid settings and programming and that the hearing aid performance is best

suited to the patients' needs (ZipHearing, 2016). Audiologists who offer trials report a higher success rate in hearing aid sales and patient satisfaction (Chalmers, 2011; ZipHearing, 2016). Metz (2014) described a study by Surr et. al. (1998) where a comparison of hearing aid benefit was explored between a 6-week period versus a minimum of 12 months post fitting hearing aids. This study was conducted on 15 patients who were fitted bilaterally with hearing aids. The results indicated no significant differences in hearing aid benefit with long term use and the 6-week adjustment period. This seems to support the maximum trial period before purchasing hearing aids should be between 30 and 60 days rather than the typical 30-day period (Metz, 2014). Arlinger et. al. (1997) described how several months of hearing aid use are needed for the patient to learn how to best use the auditory information that is available through the new hearing aid especially when increasingly complex signal processing algorithms are being used. In a study conducted by Abdellaoui and Huy (2013), on hearing aid success and failures, it was discovered that 80% of the participants who underwent hearing aid trials were satisfied with the process thus leading to a 60% hearing aid purchase rate in the study population.

Although technology has improved audibility and better signal-to-noise-ratios (SNRs), people who have a hearing loss continue to struggle when listening in noisy or 'difficult' environments. With that said, it is for this reason, that trial periods are recommended so that the individual can be exposed to all these difficult environments and return to the audiologist for fine-tuning to enhance perception of sound from the hearing aids (Anderson & Kraus, 2013). The effects of a normal conversational speech rate are more significant for individuals with hearing loss than for those with normal hearing. This highlights that effortful hearing drains the hearing-impaired individual as the processing load of speech is increased. For this reason older adults who wear hearing aids require longer trial periods due to slower processing abilities of incoming stimuli (Anderson & Kraus, 2013).

Most individuals with a hearing loss choose to not acquire hearing aids (Dillon, 2012). This is the case even when these individuals are given the opportunity to try them out. Some individuals find them beneficial and will continue to use them. Others, however, feel that the psychological disadvantages outweigh the benefits (Knudsen et al., 2010; Dillon, 2012). Research also indicated that the number of

individuals who could benefit from hearing aids is double than the number of individuals who currently own them (Dillon, 2012). These patients may be in denial of their hearing loss or in doubt as to whether they should purchase a hearing aid. Consequently, they consult audiologists' guidance and a recommendation. It is at this stage that audiologists should consider other factors such as case history information and speech discrimination results, besides the pure tone threshold results (Dillon, 2012).

Brain maturation

Although we hear with our ears, we listen with our brains, and our brains are very 'plastic' and highly adaptable to changes (Anderson & Kraus, 2013; Earlens, 2017). When sound leaves the hearing aid, the complex ear-brain neural network system kick starts. The acoustics of the amplified signal get altered by the hearing aid and subsequently get encoded at different stages of processing from the ear, brainstem, midbrain and the cortex (Tremblay et al., 2014). Little is known how the brain allows amplified sounds to be processed and how it contributes to perception from the use of the amplified device. What we do know is that the brain is an essential part of the rehabilitation process (Tremblay et al., 2014; Giroud et al., 2017). Stimulation via the hearing aids related to brain plasticity explains why some individual's speech understanding increases while wearing their devices (Tremblay et al., 2014).

Current information shows that there is a scarcity of studies on hearing loss and brain maturation or plasticity. In the auditory system, evidence of central nervous system (CNS) plasticity has been discussed in studies of frequency-specific experimentally induced peripheral hearing loss as well as monaural deafness in animals (mammals) (Ponton et al., 2001). Evidence from these studies together with findings from Ponton et. al. (2001) study on plasticity in the central auditory system has indicated changes in response properties of neurons with frequency-specific hearing loss at the level of the subcortical and cortical regions of the auditory system. Other studies have observed that regions which have been deprived of peripheral input in the auditory cortex have become responsive to intact adjacent frequencies (Ponton et al., 2001). According to Ponton et al (2001) these findings, together with studies of unilateral deafness, demonstrate that deprived sensory

pathways in the human brain of normal signals/sources of activation allow experience-based changes to occur in order to respond to other sources/signals of activity. Experience-based changes in the central auditory system therefore persists in the adult human brain.

Structural and functional neural systems are shaped by sensory experiences over an individual's lifetime and are most pronounced during infancy (Sharma et al., 2013). However, sensory neural plasticity is said to continue throughout adulthood, with the capability of neural representations to continue changing in response to reformed inputs related to peripheral injury or perpetual learning (Sharma et al., 2013).

Looking at sensory integration and the relationship that underlies neuroplasticity after sensory integration, it takes time to adapt to new incoming signals and sounds from hearing aids (Merabet et al., 2005). Besides sudden hearing losses such as trauma-induced hearing loss or hearing loss caused by a tumor on the auditory nerve (amongst others), hearing loss is usually gradual with the individual not realizing when it begins (Merabet et al., 2005). Awareness of a hearing loss usually starts by noticing the inability to hear certain sounds on the speech spectrum as well as general every day sounds such as the indicator in the car or birds chirping in trees (Plotnick, 2018). When the individual is fitted with hearing aids, an adjustment period is needed to re-familiarize the brain to these sounds. Initially one may feel overwhelmed, startled, agitated, or annoyed at certain pitches of sounds 'forgotten'. It is during the trial period where the individual learns how to make these connections again in order to selectively focus on and filter sounds (deWit & Kumagai, 2013). The audiologist is required to make the necessary adjustments (most times repeatedly) to the device to ensure optimal function of the device and the patient's satisfaction towards the incoming signals (deWit & Kumagai, 2013). Adjusting to the hearing aid is almost like re-training a muscle that hasn't been used for a certain period of time, it takes patience, practice, education and most importantly commitment and acceptance (deWit & Kumagai, 2013).

Traditionally, the system of choice for exploring the effects of the sensory experience on cortical plasticity has usually been vision (Merabet et al., 2005; Gilbert & Wu Li, 2012). These research studies have focused on stimulating the viable

neuronal tissue and/or the visual cortex in the aim to regain some level of functionality using micro-electronic devices (Merabet et al., 2005). This technique however may not work in regaining audibility, as the physical organ of hearing (such as the cochlea) may be damaged. Stimulating the auditory cortex would, therefore provide no benefit in improving hearing. Moreover, the invasiveness of surgery and risk of focal seizures prompted by cortical stimulation poses serious concerns for a patient's safety (Merabet et al., 2005).

Cochlear implants on the other hand have demonstrated how hard of hearing/ deaf individuals establish new associations between sounds that are generated by the implanted or artificial device and auditory objects (Dahmen & King, 2007). Cochlear implants have become a sustainable therapeutic option to allow patients to regain functional hearing and even comprehend speech (Dahmen & King, 2007). It is however important to consider that not all neuroplastic changes following sensory loss or deprivation, are beneficial or result in functional recovery. Merabet et. al. (2005) describe this as a 'doubled-edged sword' meaning it can contribute to functionally adaptive changes when a sensory modality such as vision or hearing is lost. On the other hand, neuroplasticity can also be considered a limit to the degree of adaption. To explain it more simply, re-introducing a single sensory input is not likely to be enough in restoring that deprived or lost sense. Wearing any type of prosthesis should depict its benefits for rehabilitation of a specific handicap. Moreover, compared to glasses, hearing aids are still in the process of portraying its worth in terms of rehabilitation of a handicap. The increased usage of hearing aids can be interrelated to the demand of the patients based on the highest satisfaction (Korkmaz et. al., 2016).

In any form of rehabilitation process, our brain, muscles, and senses, amongst others, require an adjustment period for the brain to relearn certain tasks. An example is the use of spectacles which requires a period of 2-3 days to adjust to normal change in prescription; however the full adjustment period takes up to two weeks in total (Hakim optical, 2019). For prostheses, a one to two-month adjustment period is required (Prosthetic and Orthotic care, 2019) and lastly, for orthotics, it takes two to six weeks on average to get used to (Pedorthic Association of Canada, 2015). Similarly, the brain needs to get used to hearing sounds again that it has been

missing since the start of a hearing loss. An adjustment period to the hearing aids is also therefore required.

Taking into account the above information on neuroplasticity, it can be concluded that the brain remains malleable through older adulthood as long as treatment algorithms are modified accordingly to allow for changes in learning with age (Anderson & Kraus, 2013). Neural changes in auditory processing are evident with improvements in speech-in-noise perception and cognitive function (Anderson & Kraus, 2013).

Rationale

The following analysis reflected from the literature review, revealed a common thread that, globally, there is limited amount of literature and research surrounding hearing aid trials. This is concerning because there is no standardized framework as to how long a hearing aid trial period should be in order for the user to make an informed decision. These studies are important to help audiologists facilitate the quality of services that can be provided, to expand on the importance of communication as well as to improve the quality of life in the affected population. This study aims to fill this hole in the literature by discovering the magnitude of how a hearing aid trial can possibly better hearing aid outcomes.

Additionally, there are no specific guidelines or protocols on hearing aid trialing practices in South Africa and across the globe, with the exception of the United States. Guidelines assist health care professionals such as audiologists to make decisions and take action (O'Daniel & Rosenstein, 2008). They provide a standardized means of practice which will not only benefit the patient, but also guide the audiologist when choosing a hearing aid best suited for their patients. Guidelines are important to minimize inconsistencies, and a failure to have them, impacts service provision which is in turn unfair to the individual's that the audiologists are servicing. Thus, this study may be the start to enforcing these guidelines by implementing the need for mandatory trial periods before the hearing aid user makes their decision on which hearing aid to purchase based on what is best suited for their individual needs.

Based on available literature, patient dissatisfaction with hearing aids is continuously increasing (Knudsen et al., 2010; McCormack & Fortnum, 2013; Moroe

et al., 2019). However, trialing hearing aids may be the key to improving the quality of life in the elderly population by providing them with options on which hearing aid benefits them most and by giving them time to adjust to the hearing aids before making their decision. Without trialing hearing aids first, this population of individuals' quality of life may be impoverished as their hearing aids often end up in drawers as described by Ferguson et. al. (2015). As human beings, we rely on communication to improve our quality of life in many ways such as: watching television, listening to the radio, communicating with family and friends etc. Adults with a hearing loss have described how their quality of life has been affected due to the decrease in communication abilities as well as social isolation. Trial periods may ensure their quality of life is restored with the provision of effective hearing aids chosen during their adjustment period.

In summary, more can be done to increase hearing aid outcomes and overall competence with hearing aid usage. This study uncovers the fact that hearing aid trials may be the key to increasing hearing aid usage and satisfaction if the hearing aid user is afforded the time to adjust to the hearing aids before making their decision. Lack of evidence-based practice could explain why some patients end up not using their hearing aids, as they did not have enough time to get used to the hearing aids to begin with, or to choose what is most suitable for them. Therefore, the aim of this study is to explore the need for hearing aid trials as part of the hearing aid fitting process as well as the in-depth knowledge of the current trialing practices of audiologists in South Africa. Lastly, this study will also highlight the hearing aid users' point of views of trial periods and their experiences within this process.

CHAPTER 3: METHODOLOGY

This chapter provides detailed methodology that was used to conduct this study. It consists of specific aims and sub-aims that were targeted, as well as the research design which was followed by a description of the participants. Thereafter the chapter concludes with data collection procedures and the ethical considerations that were adhered to throughout the study.

AIM

The overall aim of this study is to explore audiologists' hearing aid trialing practices and to describe hearing aid users' experiences from these hearing aid trials.

SECONDARY OBJECTIVES

In order to address the main aim of the study, the following sub-aims were formulated:

1. To explore audiologists' methods of trialing hearing aids.
2. To compare the duration of hearing aid trials with patient satisfaction.
3. To determine a suitable number of hearing aids to test per trial period.
4. To determine a preferred duration of a hearing aid trial.
5. To explore patients' decisions in choosing a hearing aid(s).
6. To explore patients' experiences with hearing aid trials.

RESEARCH QUESTION

What is the relationship between hearing aid satisfaction and hearing aid trials?

RESEARCH DESIGN

A sequential, explanatory, mixed method approach was chosen by the researcher to achieve the above-mentioned aims.

The mixed method approach was applicable with the focus on collecting, analysing, and mixing both quantitative and qualitative data. This design was chosen so that information could be presented in both numerical and narrative forms (Subedi, 2016; Tariq & Woodman, 2010). Additionally, it was chosen to address the research question more comprehensively rather than by using either quantitative or qualitative methods alone. A mixed method research thus has the ability to harness the strengths and counterbalance the weaknesses of either approach (qualitative and quantitative) with the ability to address multifaceted issues and incorporate the concept of complementarity (Tariq & Woodman, 2010). Sometimes combining these two methods has, however been viewed as problematic. There is an idea that qualitative and quantitative belong to separate and incompatible paradigms, and that

they essentially represent different and conflicting ways of viewing the world and how we gather information (Tariq & Woodman, 2010). The researcher chose to approach the view of many researchers in the world (Tariq & Woodman, 2010) in which quantitative and qualitative research complement each other and contribute equally to formulating the study based on the chosen research question. Additionally, mixed methods are also described as time consuming, which requires experience and skills in both quantitative and qualitative methods (Tariq & Woodman, 2010). Although the researcher concedes that conducting both approaches would be time consuming, a structured timeline of the research study was conducted and adhered to so that both quantitative and qualitative aspects were approached and attended to equally. All the data were integrated from the qualitative and quantitative aspects, from which interpretations were drawn to investigate and understand the research problem - in a manner that was better than if it were to be explained alone (Creswell, 2015). The researcher chose the mixed method approach to provide better inferences and minimize unimethod bias with the advantage of using numbers to add precision to words, pictures, and narratives (Subedi, 2016).

A sequential explanatory design was used to not only assess trends and relationships with the quantitative data but also to explain the reasoning behind the trends that were found by the researcher. This type of design gave equal priority to both design methods in a two-phased approach. Quantitative data were collected first and qualitative data were collected thereafter, making it easier to implement and less complicated to describe or report (Tashakkor & Teddlie, 2003; Subedi, 2016). The rationale for this approach is that “the quantitative data and results provide a general picture of the research problem; more analysis, specifically through qualitative data collection is needed to refine, extend or explain the general picture” (Subedi, 2016 p. 574). The steps utilized to implement this two-phased approach described by Creswell and Clark (2011) are as follows: the first step involved designing and implementing the quantitative (numeric) strand. The second step entailed identifying specific qualitative results which highlighted the need for additional explanation. This guided the development of the qualitative strand. In this step qualitative research questions and data collection protocols were refined so that they were shaped by the quantitative results. New questions were thus developed based on quantitative results. Lastly, step three implemented the qualitative phase

whereby data were collected and analyzed. From here, qualitative results were analysed to establish to what extent they added insight into the quantitative results and what was established overall (Creswell & Clark, 2011). Another strength of this research design is that the final report is written with the quantitative section first, followed by the qualitative section thereafter - making it simple for the readers to follow (Creswell & Clark, 2011).

DESCRIPTION OF PARTICIPANTS:

Sample size and sampling strategy

Data were collected via two separate databases – online survey with audiologists and interviews with hearing aid users.

Audiologists

Purposive sampling is conducted by selecting a sample on the basis of knowledge of a population (Babbie, 2008). Thus, the main purpose of this sampling strategy method is to produce a sample that is a realistic representation of the target population being researched (Lavrakas, 2008). The sample is selected on the judgement of which target population would be the most useful to represent the total population (Babbie, 2008). For the current study, purposive sampling was used to specifically target audiologists practising in South Africa. Audiologists who dispense and fit hearing aids were approached via professional platforms such as the South African Association of Audiologists (SAAA), South African Speech-Hearing Language Association (SASLHA) as well a social media platform- Facebook. A sample size of 95 audiologists was obtained from an online survey.

Hearing aid users

Snowball sampling is a form of non-probability sampling, also known as accidental sampling that is used when the target population is difficult to locate (Babbie, 2008). Data were collected on the few members of the targeted hearing aid user population that was the easiest to locate (Babbie, 2008) with the help from the audiologists. To recruit potential hearing users, audiologists who participated on the online survey were requested to act as gatekeepers (Lavrakas, 2008) and request potential

participants on behalf of the researcher. The audiologists were asked, on behalf of the researcher, to inform their existing patients who were hearing aid users about the research study and to provide them with the researcher's contact details if they wished to participate.

In total, a sample size of eight hearing aid users was successfully recruited for this study. These participants, at the time of the research study, were either undergoing a hearing aid trial or had recently completed a hearing aid trial within the last 12 months of the study. Research participants were recruited over a period of five months.

The participants had to meet the following inclusion criteria in order to be able to participate in the research study:

Table 1: Participant's inclusion and exclusion criteria:

	Phase 1: Audiologist inclusion and exclusion criteria	**Phase 2: Hearing aid users' inclusion and exclusion criteria**
Inclusion	Currently registered with the Health Professions Council of South Africa (HPCSA)	Must have had trialed hearing aids within the last 12 months of the study
	Registered and currently practicing audiologists from any institution (private practice, hospital, clinic, school, multidisciplinary center etc.)	May be currently ending their hearing aid trial(s) at the time of the study
	Currently practicing from any province and part of South Africa	Over the age of 18 to be classified as an adult.
Exclusion	Audiologists who do not dispense or fit hearing aids	Under the age of 18 years and not classified as an adult
	Audiologists who are not registered with the HPCSA	Hearing aid users residing outside of South Africa
	Practicing audiologists who are not situated in South Africa	Hearing aid users who have

		never undergone a hearing aid trial period or those who have trial a hearing aid more than one year before the study was conducted

Profile of the hearing aid user

Of the 11 participants recruited in this study, three were excluded from the interviews as they did not meet the inclusion criteria. These three participants had never undergone a hearing aid trial, the referring audiologist misunderstood the requirements when referring the hearing aid user to the researcher. The remaining eight participants were interviewed in the current study. Table 2 below summarizes the profiles of these participants. The participants were all adults ranging between the ages of 53 and 71. The table additionally includes the laterality of their hearing loss and when their trial period was conducted.

Table 2: Profile of the hearing aid users interviewed

Participant	Gender	Age	Area	Unilateral/bilateral hearing aid(s)	Trial period
1	Male	66	Seapoint, Cape Town, Western Cape	Bilateral	January 2020
2	Female	64	Seapoint, Cape Town, Western Cape	Bilateral	December 2019
3	Female	54	Welkom, Free State	Unilateral	November 2019
4	Male	59	Benoni, Johannesburg, Gauteng	Bilateral	May 2020
5	Male	63	Kempton park, Johannesburg,	Bilateral	May 2020

			Gauteng		
6	Male	71	Northcliff, Johannesburg, Gauteng	Bilateral	March to April 2020
7	Female	53	Hermanus, Western Cape	Unilateral	January to February 2020
8	Male	53	Centurion, Pretoria, Gauteng	Bilateral	August 2019

DATA COLLECTION

Data collection tools

Phase 1

Quantitative data were collected by means of an online survey conducted via Google Forms. Google Forms was chosen as it was freely accessible and user friendly. The researcher followed a deductive approach when drawing up the survey data for this study. The researcher found the concept of hearing aid trials compelling and then used a deductive approach to test its implications with the data. In essence, the researcher studied the literature and read existing theories, then tested the hypothesis using a survey to explore those theories (Blackstone, 2012).

The survey was self-developed, consisting of 24 closed-ended questions and 13 open-ended questions. The open-ended questions consisted of an elaboration of some of the closed-ended responses. The survey was divided into six sections: background information, hearing aids, hearing aid trials, counseling, patient satisfaction, and brain maturation to hearing aids. The questionnaire was developed in English; this language is widely used as a first or second language in South Africa. Additionally, it is the most common language of communication and is widely used in government, business, schools, and the media (Alexander, 2018). The survey was five minutes in duration. According to Kost and da Rosa (2018) shorter surveys are more likely to be completed with a higher response rate than longer surveys.

Phase 2

Qualitative data were collected by means of a self-developed, semi-structured telephonic or online (via Zoom) interview with current hearing aid users who had undergone a hearing aid trial. In the conceptualization of the study, it was envisioned that interviews would be conducted face-to-face. However, due to COVID-19 and the need to adhere to regulations such as social distancing, it became implausible to conduct face-to-face interviews. The interviews were therefore conducted telephonically or online. The advantages of telephonic interviews were: 1) interviews could be conducted over a wider geographical scope (i.e. throughout South Africa), 2) they can deliver similar quality of data such as in face-to-face interviews, and 3) they are more cost effective and easier to conduct than face-to-face interviews (Barrett, 2019). On the other hand, there were disadvantages of conducting telephonic interviews. These were: 1) behavior and body language could not be observed and commented on, 2) participants have to actually answer the call and they may hang up at any given time, and 3) telephonic interviews tend to be shorted than face-to-face interviews (Barrett, 2019). Furthermore, a deductive approach was also used in the second phase of the study since phase one of data collection informed and formulated phase two.

The interview questions consisted of six categories: four background questions, seven questions on experiences of having hearing aids, seven questions on hearing aid trials, four questions on satisfaction of hearing aids and hearing aid trials, four questions relating to hearing aid purchase, and lastly, two questions on counseling. The interview took 30-45minutes in duration because according to Irvine (2011) telephone or online interviews need to be shorter than face-to-face interviews to avoid fatigue and sustain concentration. Irvine (2011) further asserts that telephonic interviews restrict the development of rapport, therefore, telephonic engagements should be shorter and to the point. This principle was maintained in this study.

Data Collection Process

Data collection is a process where information is gathered and measured on variables of interest (Bhattacharyya, 2006). Data collection took place over a period of six months between February and July 2020 and was collected in a series of two phases.

Phase 1: Online survey

Post obtaining clearance from the Human Research Ethics Committee (Medical) (Protocol number: M191054) of the University of the Witwatersrand, professional organizations, namely SAAA and SASHLA were approached via email and requested to distribute the self-developed survey to audiologists on their emailing lists. Additionally, audiologists on social media platforms, such as Facebook groups, were included and targeted. The audiologists who were interested in participating in the study after reading the information sheet (Appendix A) were required to click on a link directing them to the online survey via Google forms. Proceeding with the online survey was assumed as informed consent to participate in the study. The survey consisted of closed ended questions together with a few open-ended questions (Appendix B). The survey took a total of five minutes in duration to complete. At the end of the survey, audiologists were asked whether they were willing to assist with the second phase of the study described below. Audiologists who were willing to assist were requested to provide their name and email address at the end of the survey. A total of twelve audiologists provided their contact details, however only seven audiologists agreed to participate in phase two after being contacted by the researcher.

Phase 2: Online and telephonic interviews,

Audiologists who agreed to assist in the second phase of the study were contacted via email. These audiologists were asked to act as gatekeepers by identifying and requesting, on behalf of the researcher, one or two hearing aid users from their caseload to participate in this phase. Audiologists were provided with the inclusion and exclusion criteria, as well as the information letter to share with the potential participants. This phase included a self-developed, semi-structured interview (Appendix C) with the hearing aid users who agreed to participate in the study. Semi-

structured interviews were used to gather focused, qualitative, textual data that uncovered rich descriptions on the personal experiences of the participants (McCammon, 2019). Furthermore, hearing aid users were provided with information sheets to the study (Appendix D) by the researcher, and were required to sign two forms: the consent form to participate in the study (Appendix E) as well as the permission form to record the interview via a digital tape recorder (Appendix F). The participants were informed that the interview duration would take approximately 30-45 minutes and were asked to provide a date and time that was most convenient for them to be interviewed.

All the interviews were conducted in English as per the participant's preference. Table 3 below provides a detailed description of the interviews conducted.

Table 3: Details of the interviews

Participant	via	Date	Length of interview
1	Phone call	20 April 2020	30:43 minutes
2	Phone call	21 April 2020	39:45 minutes
3	Zoom	24 April 2020	41:49 minutes
4	Zoom	10 June 2020	32:34 minutes
5	Zoom	15 June 2020	26:17 minutes
6	Zoom	29 June 2020	33:44 minutes
7	Zoom	08 July 2020	37:23 minutes
8	Zoom	26 July 2020	42:40 minutes

DATA ANALYSIS

Phase 1: Quantitative data analysis

Quantitative analysis included both descriptive and inferential statistical analysis. Descriptive statistical analysis summarizes data with large amounts of numbers that could not otherwise be comprehended by looking at them. Thus, it included smaller

sets of numbers that could be understood more easily. This is achieved by including measures of central tendency (such as the mean, median, mode, percentage, frequency and range) (Guest et al., 2012). Variability and associations were further presented both visually (graphs) and numerically (Goodwin, 2009). This method processes numerical data, without explaining the meaning or rationale behind the numbers. Thus, inferential statistics analysis was further conducted to draw conclusions from the data that was obtained (Goodwin, 2009). Inferential statistics were analysed using the Chi-square method of analysis. This method is used to test relationships between categorical data or count data. It commonly uses ~~a~~ cross-tabulation or contingency tables to evaluate the test of independence, and whether a significant association exists between two (or more) categorical variables (Statistics Solutions, 2016). Each cell in the cross-tabulation shows frequency of occurrence at one level of the first factor and one level of the second factor. The sum of all frequencies in all the cells must be equal to the valid sample size. Thus, cross-tabulation was the easiest way of summarizing the data and can be displayed in any size regarding the number of rows and columns (Singh, 2007). This Chi-Square test of independence was aimed at examining whether there was an association that existed between the two variables by examining the patterns within the cells (Singh, 2007). A Chi-Square test was applied to the following variables to determine the relationship between these variables and the audiologist's prescribed trial periods: the duration of practicing audiologists, audiologists who dispense hearing aids, and audiologists who provide hearing aid fittings.

Phase 2 Qualitative data analysis

The qualitative aspect of data analysis incorporated thematic analysis. This type of analysis identified themes and sub-themes which further developed codes/trends based on the data collected (Guest et al., 2012). This analysis is inductive in nature and provided rich information based on personal experiences of hearing aid users undergoing hearing aid trials (Guest et al., 2012). This method is known for identifying, analysing, and reporting patterns or themes within the data set. The researcher chose this method as it provided rich and detailed, yet complex, accounts of the data extending across the entire interview (Vaismoradi et al., 2013).

The researcher followed Braun and Clarke's (2012) six-phase approach to thematic analysis in order to gather deeper insights into the data by developing main

themes, subthemes and the interconnections between the themes and subthemes. The following steps as discussed by Braun and Clarke (2012) were followed in the analysis of the data:

1. **Familiarising yourself with the data**- the researcher immersed herself in the data by studying the transcripts of the interviews conducted.
2. **Generating initial codes**- the researcher then systematically analysed the data through coding. Codes are the building blocks of analysis which identify and provide a label for certain aspects of the data that were relevant to the research question.
3. **Searching for themes**- In this phase there was a shift from codes to themes. When the analysis started to take shape, themes emerged. A theme "captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2012, p. 63).
4. **Reviewing potential themes**- at this point in the analysis the researcher reviewed the developing themes in relation to the earlier coded data as well as the entire data set. The main purpose of this phase was quality checking.
5. **Defining and naming themes**- the researcher now defined and named all her gathered themes to clearly stipulate what was unique and specific about each theme. To put this more clearly, the researcher summed up the essence of each theme using words or short phrases and sentences.
6. **Producing the report**- this was the final step of the qualitative data analysis, whereby the current study was produced using the data, codes and themes from the interviews conducted.

ETHICAL CONSIDERATIONS

Ethical clearance was obtained from the Human Research Ethics Committee (Medical) (Protocol number: M191054) of the University of the Witwatersrand prior to the commencement of the research study (Appendix G). This was to ensure that the research led to beneficial outcomes. It ensured the research study was conducted in an ethically acceptable manner and, most importantly, it minimized the risk of harm

to any of the participants (Hanekom, 2019). Additionally, the following ethical considerations were taken into consideration throughout the study:

Informed consent and autonomy

Informed consent is the process whereby the researcher discloses appropriate information to a potential participant so that the participant is able to make an independent and informed choice whether to participate in the study or not (De Bord, 2014). Informed consent was obtained from the audiologists and hearing aid users who volunteered to participate in the study. Informed consent was further obtained from the hearing aid users giving permission to tape record the interview for easier and accurate transcription of their responses. All information pertaining to the purpose of the study, as well as expectations from the participants were provided in a detailed information letter. Additionally, informed consent ensured autonomy. Autonomy allows the participants to make their own decisions and prevents the imposition of unwanted decisions (Owonikoko. 2013). Furthermore, the researcher explained that participating was voluntary and that there were no benefits or risks associated with participating in this study. Participants were further informed of their right to withdraw from the study at any given point without any negative consequences.

Confidentiality and Anonymity

Confidentiality can be described as the guarantee by the researcher that any information provided by the participant cannot be attributed back to the participant (Jamison, 2007). All information and results obtained from the interviews would remain confidential.

In the online survey, participants were not asked to share any identifying information such as their names or where they work. Moreover, the link to the online survey was distributed by SAAA, SASHLA and posted on the relevant Facebook groups. Anonymity was therefore maintained, as the researcher does not know who participated in this study. Additionally, anonymity was guaranteed, except in the case of the seven therapists who recruited hearing aid users for the second phase of the study. Even with these participants, confidentiality was guaranteed as their responses cannot be traced back to them and their identities were not revealed at

any point in the study as the researcher only had their email addresses, thereby maintaining anonymity.

With the telephonic interviews, the participant's identities were hidden throughout the study by the researcher assigning a number to each participant thus replacing their name with a number in the order in which the interviews were conducted. The participants were informed of this method of confidentiality which would make the participants more likely to provide honest responses when knowing their identities would not be exposed. As a further security mechanism, all the tape-recorded interviews were kept on a password-protected computer with their prescribed numbers. Only the researcher had access to these recordings.

Pilot Study

A pilot study was conducted prior to the main study. The purpose of a pilot study was used to address any issues of reliability or validity by checking the content of the questions. The pilot study ensured that the proposed study was viable and significant enough to proceed with the main study (In, 2017). This was the first step of the entire research protocol: to assist in planning and modifying aspects needed before the main study could commence (In, 2017). The pilot study was conducted in three stages as seen in figure 2 below. The aims for the pilot study included:

- To determine the relevance of all questions pertaining to the content and language of the survey and the interview questions.
- To distinguish the accuracy of the duration set for the survey and the interview questions

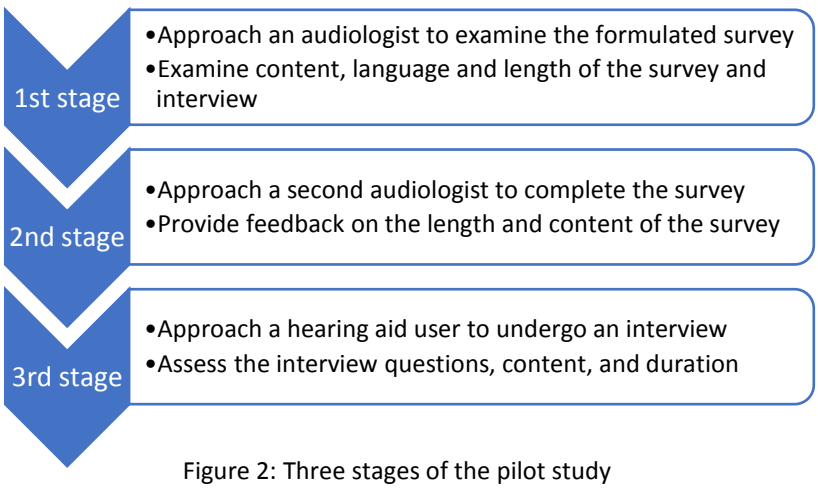


Figure 2: Three stages of the pilot study

In the first stage, the researcher approached one audiologist to examine the content, language and length of the survey and the interview to ensure they were appropriate for use. The following recommendations were then made:

- Include an option to explain why audiologists would choose the 'no' option for question 7, 8 and 12 of the survey.
- In questions 15, 16 and 17, include an option that more than 1 answer may be given.

In the second stage, another audiologist was asked to complete the survey and provide feedback on the length and content of the survey. The following recommendations and statements were made:

- Decrease the survey time from 10 minutes to 5 minutes
- The content and questions were straight forward.

In the third and final stage of the pilot study, one hearing aid user was recruited by an audiologist from stage one. This hearing aid user piloted interview questions, content and duration of the interview. The following changes were made:

- The researcher confirmed the proposed duration of 30-45 minutes.
- For the questions *'Did you feel you needed more time to adjust to the hearing aids to make your decision?'* and *'How long do you think would be enough time to get used to a hearing aid for a trial period?'* provided vague short answers thus a *'please elaborate'* was added to the questions.
- Questions pertaining to individuals who have never trialed a hearing aid before were removed, as only individuals who have had a hearing aid trial would be interviewed.

The two audiologists who participated in the pilot study were excluded from the main study as the survey was refreshed starting at zero participants once the survey was distributed. Due to the limited amount of hearing aid users who chose to participate in the study, the participant from the third stage of the pilot study was included in the

main study and became participant 1 due to the limited amount of hearing aid users provided by audiologists.

RELIABILITY AND VALIDITY

Phase 1: Online surveys

Reliability tells us how consistent a research study is (Brink et al., 2005). Validity determines whether the research truly measures what it is intended to measure. If there is validity then there is always reliability, however the opposite does not exist (i.e. no reliability without validity) (Brink et al., 2005). In this study, the test material (survey questions) remained standard for all participants throughout the study to ensure reliability and validity. Inclusion and exclusion criteria were strictly met so that the study was conducted accurately with no exceptions from any participants for validity and reliability purposes. Additionally, a pilot study was conducted prior to the main study to ensure reliability and validity of the current research.

Bias

Research is biased when people of equal ability or equal level of attribute don't have the same chance of participating in the research or answering an item in the same way (WHO, 2001). Research bias occurs when the researcher selects participants who are more likely to generate a certain result (Shuttleworth, 2009). With regard to the survey, all audiologists were invited to participate in the study who met the inclusion criteria. This way, bias was avoided as they all had the same chance of participating. However, it can be argued that the audiologist who acted as gatekeepers and recruited participants for the second phase of the study may have exercised selection bias. However, due to the nature of the study and the sensitivities around recruiting participants, selection bias could not be avoided.

Phase two: Interviews

Conducting an interview assisted with response reliability as participants were required to provide prompt responses at the time of the interview as opposed to consulting with a different source for answers before responding. In an attempt to

minimize the Hawthorne effect, the researcher made the participants aware that there were no correct or incorrect answers to the questions.

Trustworthiness

Qualitative research speaks of trustworthiness, which simply states the question 'can the findings be trusted?' (Statistics Solutions, 2020).

Credibility- Credibility of the research ensured that this study measured what it was intended to measure. It also ensured that this study is a "true reflection of the social reality of the participants" (Maher et al., 2018, p.3).

Transferability- Transferability is synonymous with external validity in quantitative research. Transferability provides readers or other researchers with evidence that the findings of the study could be applicable to other contexts/settings, situations, populations and times (Statistics Solutions, 2017). The researcher cannot prove that the findings from the study will be applicable. However, the researcher provided the evidence that could make it applicable through thick descriptions (Statistics Solutions, 2017).

Dependability- The researcher ensures that the process of the study is portrayed in enough detail so that another researcher can replicate the work (Mayher et al., 2018). It establishes the findings of the study to be consistent and repeatable (Statistics Solutions, 2017)

Confirmability- Confirmability of a study refers to how neutral the research study's findings are. The findings gathered from the interviews are based on the hearing aid users' responses and not any personal motivations or potential bias from the researcher. Thus, the research ensured that bias did not skew the interpretation of what the hearing aid users said to fit a certain narrative by the researcher (Statistics Solutions, 2020; Korstjens & Moser, 2018).

Reflexivity- The researcher acknowledged the importance of being self-aware and reflexive about her own role within the collecting, analysis and interpretation of the data as well as of any pre-conceived assumptions which may have been brought about into the research (Korstjens & Moser, 2018). Therefore, the interviews were supplemented with reflexive notes which documented the researcher's subjective

relationship with the hearing aid users throughout the interviews as well as while transcribing the digital recordings.

CHAPTER 4: RESULTS

This chapter provides a detailed overview of the results obtained from phase one and phase two conducted during this study. The results are further displayed, analysed, and discussed in detail addressing the initial aims and sub-aims of the study.

INTRODUCTION

This is a mixed methods study where data were obtained from 95 audiologists as well as eight hearing aid users. Quantitatively, data were obtained from an online survey, while qualitatively, data were sources from semi-structured interviews. The results are reported according to the phases of the study: In phase one, the following will be discussed: participant's demographics, hearing aids, trial periods, counselling and aural rehabilitation. In phase two, the following themes will be discussed: hearing aid characteristics, experience with hearing aids, hearing aid trials, counselling, and family, work, social.

RESULTS: PHASE ONE

Participant's demographics

A total of n=95 audiologists participated in this study of which the majority, n=36, (38%) have <5 years of experience, followed by n=34 (36%) who have <10 years of experience, n=17 (18%) who have ≤10 years experience, and lastly, n=8 (8%) with one-year community service, post university completion. Of these participants, n=58 (61.05%), are currently working in a private practice setting, followed by n=25 (26.32%) who are working in a public hospital setting. Only n=2 (2.11%) are working at a school while n=1 (10.5%) work at either a clinic or Multidisciplinary Team (MDT) centre. n=8 (8.42%) indicated that they work at a location not specified by the list provided.

Table 4: Location and duration of practice of audiologists

Location	n	%	Duration	n	%
Hospital	25	26.32	Community service	8	8
Private practice	58	61.05	≤5 years	36	38
Clinic	1	1.05	≤10 years	17	18

School	2	2.11	10+ years	34	36
MDT centre	1	1.05			
Other	8	8.42			
Total	**95**	**100**		**95**	**100**

Hearing aid characteristics

From the 95 audiologists who participated in the survey, 92.63% (n=88) participants reported selling and dispensing hearing aids as part of their audiological services, whilst 94.74% (n=90) of participants provided hearing aid fittings as part of their services. Locally, there is a wide variety of hearing aid brands that are available to audiologists including: Oticon, Starkey, Phonak, Signia, Widex, ReSound, Beltone, and Unitron, to name a few (Hearing Tracker, 2020). 76% (n=72) of audiologists in this study reported dispensing and fitting three or more of these brands as part of their practice, (Figure 3), providing their patients with a variety of options to choose from when selecting a hearing aid. 14% (n=13) of audiologists only supplied two brands and the remaining 5% (n=5) of audiologists only offered one preferred brand of hearing aid. Moreover, n=5 (5%) of participants indicated that they do not fit hearing aids.

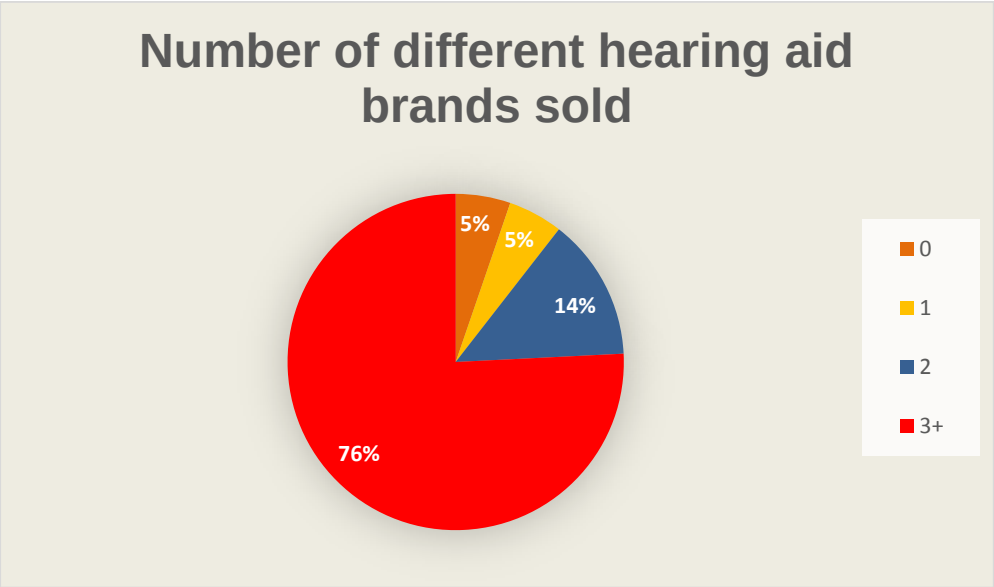


Figure 3: Number of different hearing aid brands sold:

Participants were asked whether they choose the hearing aid for their patients or if patients chose their own hearing aids. The results revealed that 16.84% (n=16) patients chose their own hearing aids, as they were aware of which brand and style they preferred beforehand, while 28.42% (n=27) audiologists chose the hearing aid for their patients based on their audiogram, and 54.74% (n=52) of audiologists chose the hearing aids, however, in consultation with their patients as they needed to consider the patient's needs as well as the situation (i.e. cost, appearance etc). The reasons that were given on which hearing aid to choose are listed below:

- Aesthetics and appearance chosen by the patient and technology range chosen by the audiologist.
- Finances (medical aid vs private or government)
- Hearing aid chosen according to the audiogram
- Some patients are brand specific from previous experiences
- Phone connectivity
- Information provided

Taking into account the patient's hearing loss when choosing a hearing aid is one of the most important decisions within the hearing aid fitting process. The current study revealed that the 'audiologists' recommendation' 45.31% (n=58) when choosing a hearing aid, is the most common determining factor for the hearing aid user when deciding on which hearing aid to choose from as seen in table 6 below. Audiological features of the hearing aid follow with 26.56% (n=34) and characteristic features with 20.31% (n=26). Finances came second to last with 7.03% (n=9) of audiologists who stated that their patients chose a hearing aid based on the cost and only 0.78% (n=1) reported that their patient's families' opinions and suggestions played a vital role in the decision of which hearing aid to purchase.

Table 5: Most common reported deciding factor when purchasing a hearing aid

	n	%
Characteristic features	26	20.31
Audiological features	34	26.56
Audiologists' recommendation	58	45.31

Finances	9	7.03
Family suggestion	1	0.78
Total:	**128**	**100**

Return rates on hearing aids

The results of this study indicated that n=23 (24.21%) audiologists stated their patients are satisfied with their hearing aids, as such, they have never returned their hearing aids, whilst n=26 (27.37) participants reported that 1 in every 5 of their patients returned their hearing aids. This is followed by n=12 (12.63%) who stated that 1 in every 20 of patients reportedly return their hearing aids followed by n=10 (10.53%) participants who stated that 1 in every 4 hearing aid users return the devices. The minority of return rates of hearing aids were indicated by 1 in every 10 patients (n=8, 8.42%), 1 in every 30 patients (n=7, 7.37%), 1 in every 2 patients (n=6, 6.32%), and 1 in every 3 patients (n=3, 3.16%). These figures are displayed in figure 4 below).

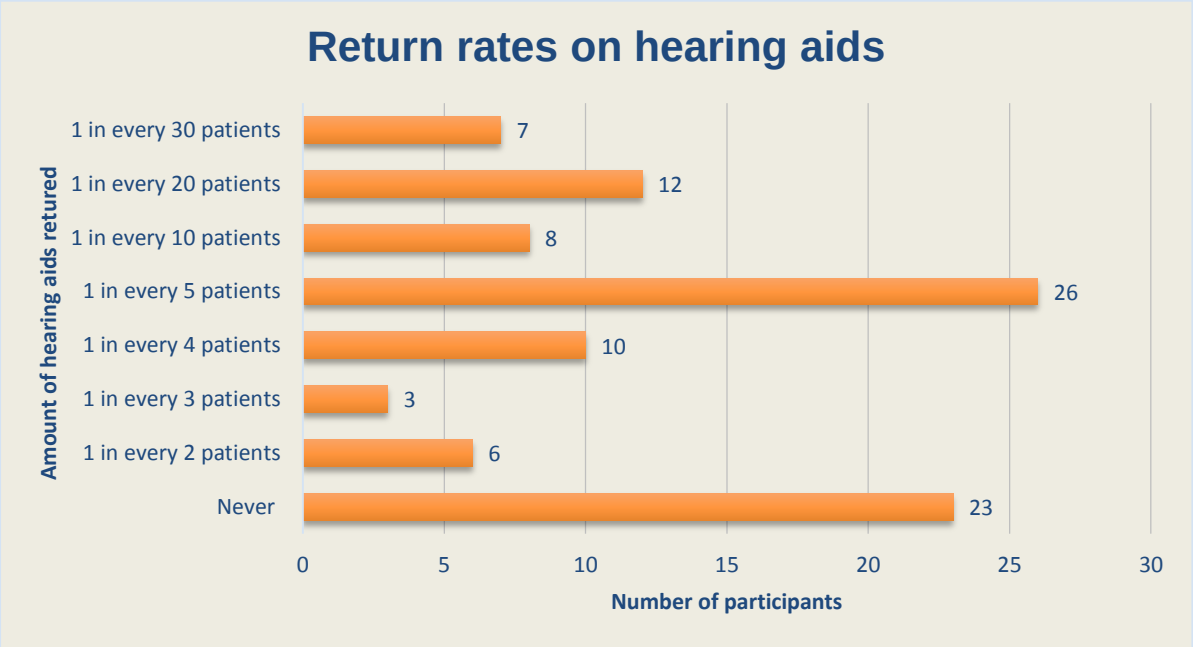


Figure 4: Return rates on hearing aids

The audiologists were further asked to state possible explanations as to why the hearing aids were returned with the option to choose more than one answer (Table

7). Top on the list were financial implications (24.22%, n=31), followed by not being psychologically ready for hearing aids (11.72%, n=15), finding no benefit from amplification (11.72%, n=15), the stigma attached to wearing hearing aids (9.38%, n=12), discomfort from the hearing aid (7.81%, n=10) and the sound quality of the hearing aids (7.81%, n=10).

Table 76: Reasons for hearing aid returns

Reasons	n	%
Death (the hearing aids were returned by a family member)	3	2.34
Discomfort of the hearing aid	10	7.81
Finding no benefit from amplification	15	11.72
Financial implications	31	24.22
The patients were not psychologically ready for hearing aids	15	11.72
The stigma attached to wearing hearing aids	12	9.38
Dissatisfaction form the hearing aid	8	6.25
The hearing aids did not reach their expectations	8	6.25
Medical aid did not cover any costs towards the hearing aid	5	3.91
No motivation for the use of hearing aids	4	3.13
Cosmetic issues that came with hearing aids	7	5.47
The sound quality of the hearing aids.	10	7.81
Total:	**128**	**100**

Table 8 below represents the physical and audiological complaints of hearing aids as described by the audiologists. Majority of their patients reported comfort (n=40, 33.33%), hearing aid size (n=37, 30.83%), and the battery size (n=26, 21.67%) as the most common complaint about the physical hearing aid itself. Colour (n=7; 5.83%) and style (n=6; 5%) were the least reported physical complaints of the hearing aids by the hearing aid users.

More than half (n=66, 33.67%) of the audiologists reported that their patients complained about background noise as a negative factor whilst wearing hearing aids

with feedback, echo and loudness (n=27, 13.78%) being the next most common complaint. The least reported complaints from hearing aid users were muffled, blocked and sharpness/tininess of the hearing aids.

Table 7: Physical and audiological complaints about hearing aids

Physical complaints	n	%	Audiological complaints	n	%
None	4	3.33	**Feedback**	27	13.78
Size	37	30.83	**Background noise**	66	33.67
Colour	7	5.83	**Muffled**	5	2.55
Style	6	5.00	**Clarity**	24	12.24
Comfort	40	33.33	**Echo**	27	13.78
Battery size	26	21.67	**Blocked**	3	1.53
			Sharp/Tinny	17	8.67
			Loudness	27	13.78
Total	**120**	**100**	**Total**	**196**	**100**

Trial period

Participants in this study were asked about their perceptions on whether or not audiologists in South Africa should be offering trial periods. The results revealed 93.68% (n=89) believe that audiologists should offer hearing aid trials as part of their service-delivery to the patients. On the other hand, 6.32% (n=6) audiologists believe that hearing aid users should not be given the option to undergo a trial period. As such, these audiologists reportedly do not provide this option for their patients. These audiologists provided the following reasons as to why they do not offer hearing aid trials:

- The hearing aid users may lose or break the hearing aid during the trial period.

- Audiologists do not have the opportunity to trial hearing aids in the government sector.
- Hearing aid trials were too expensive and time consuming.
- Hearing aid trials are an insurance risk to the practice.
- And lastly, as described by one participant: “the adjustment time for the brain to adapt to the new hearings as well as the multiple listening opportunities are not accommodated by the trial period”.

Relatedly, participants were asked if they thought that audiologists should be offering trial periods for hearing aids. n=89 (93.68%) responded ‘yes’ while n=6 (6.32%) responded ‘no’ stating that audiologists should not be offering trial periods. From the n=89 participants who felt that the trial period is a necessity, participants were further asked to recommend a suitable period for hearing aid trials. The recommended duration varied between two-weeks (n=39; 43.82%) and one a month duration (n=22; 24.72%). Only n=16 (17.98%) of audiologists believed three weeks was sufficient time for a trial period. Furthermore, a minority of participants (n=11, 12.36%) felt that one week was enough time to trial a patient with a hearing aid compared to n=1 (1.12%) of participants who believed patients should trial hearing aids for more than one month.

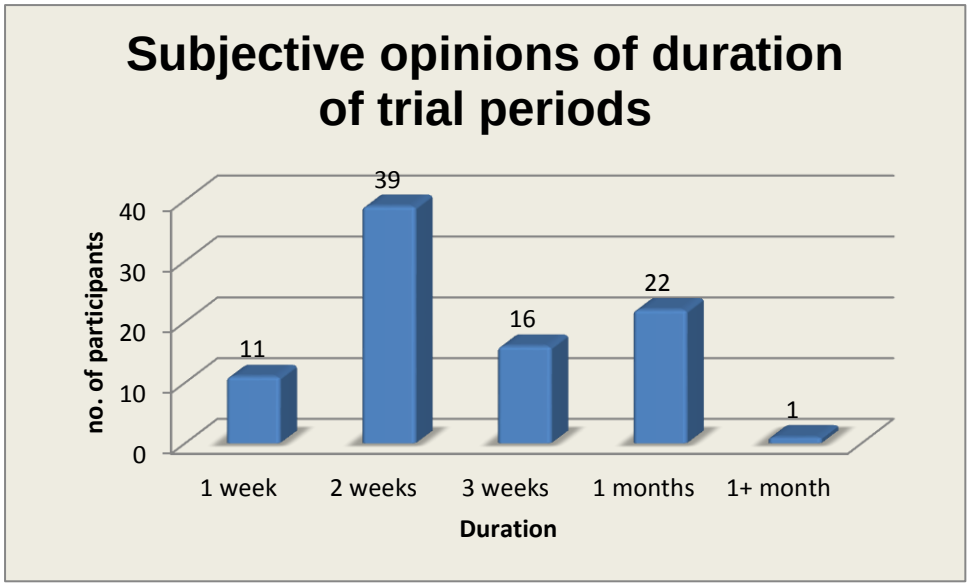


Figure 5: Subjective opinions of duration of trial periods

In establishing audiologists' methods of hearing aid trialing practices, the results indicated that only 72.63% (n=69) of audiologists' reported offering trialing of hearing aids as mandatory practice within their services, while 27.37% (n=26) did not. From those who did not offer hearing trials, n=15 reported working in a government hospital, clinic, or rural area where reportedly, hearing aid trials were logistically impossible and thus not feasible to conduct due to: a limited amount of available staff, long waiting lists, not being stated in the policy, not being permitted, financial implications, insurance purposes, and travel limitations from the patient's side.

Majority of audiologists who offered hearing aid trials chose to trial their patients with two different hearing aids (26.09%, n=18) while others preferred to trial only one (17.39%, n=12) hearing aid. Only n=1 (1.45%) participant reported trialing 3 or more hearing aids per trial period. More than half of the participants (55.07%, n=38) reported trialing between one to two hearing aids but it was patient-specific and circumstantial.

To determine a suitable number of hearing aids that could be tested per trial period, the results revealed a large number of audiologists offered more than one hearing aid trial to their patients which can be seen in figure 5 that depicts n=12 participants trialing their patients for two weeks with one or more hearing aid(s). The next most common chosen duration was a one-week trial with one or more hearing aid(s).

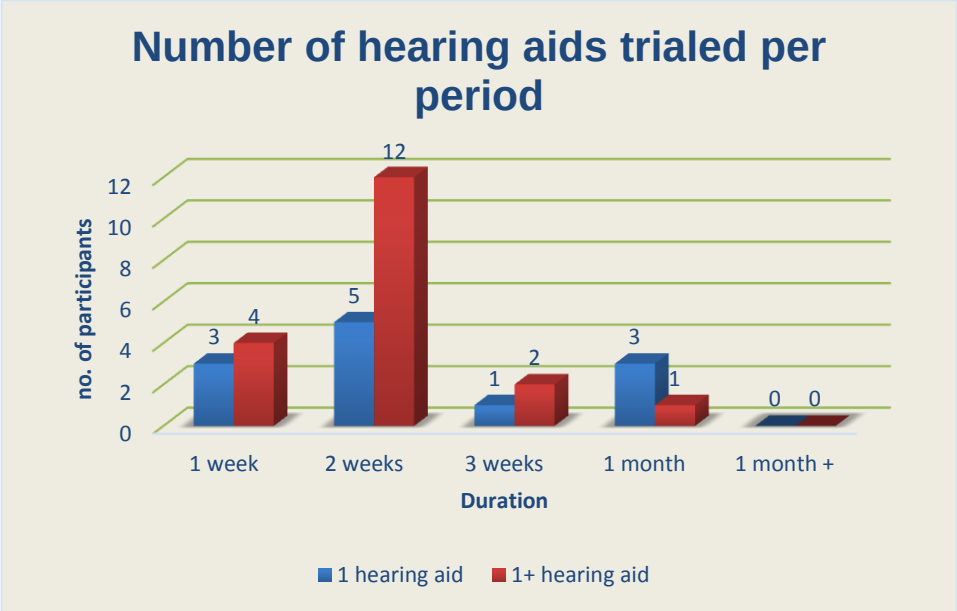


Figure 5: Number of hearing aids trialed per period

Audiologists' were further asked to describe their thought process when deciding to trial hearing aids. Only n=31 participants responded to this question. A few responses that stood out to the researcher are provided below:

54.84% (n=17) of audiologists reported only allowing patients to trial hearing aids on request while 45.16% (n=14) reported offering the hearing aid trial without it being requested by the patient. After having trialed one, two, or three hearings aids, audiologists reported that 77.42% (n=24) of patients end up choosing the first hearing aid they trialed. 9.68% (n=3) choose the second hearing aid and only 6.45% (n=2) choose the third or last hearing aid that they trialed. These results indicated a preference for the first hearing aid trialed.

The researcher identified the relationship between hearing aid trials and duration of practicing audiologists, audiologists dispensing hearing aids and audiologists who provided hearing aid fittings. The relationship between these factors was determined by a Chi-square test of analysis. Table 10 below illustrates the results obtained.

Table8: The relationship between hearing aid trials versus duration of practice, dispensing hearing aids and providing hearing aid fittings (α = 0.05) using the chi-square test of contingency.

Variable	**α = 0.05**	**p-value**	**Critical value**
Duration of practice	0.05	0.003	24.8842
Dispensing hearing aids	0.05	0.820	0.9222
Providing hearing aid fittings	0.05	0.365	3.1808

According to Chi-square results, there is a statistically significant relationship between hearing aid trials and duration of practice with a p-value of 0.003. However, there is not enough evidence as the 5% significance level to conclude that dispensing hearing aids and providing hearing aid fittings were related to the audiologist's trialing practices. These results therefore suggest that these two factors

may occur in isolation or in combination but will not influence hearing aid trials conducted by audiologists.

Adjusting to hearing aids/ brain maturation

Participants were further asked whether they believed hearing aid users need time to adjust to their hearing aids. 100% (n=95) of the audiologists unanimously reported that they believe hearing aid users need time to adjust to their hearing aid(s). This was informed by the audiologists' experiences in hearing aid fittings and their observations of their patients over time. Figure 6 below indicates the opinions of audiologist's experiences on how long it took their patients to retrain their brains using hearing aids(s) after being deprived from sounds caused by a hearing loss. More than half (n=60) reported that it took more than one month to adjust to wearing hearing aids and retraining their patient's brains from deprived sounds in order for positive satisfaction towards the hearing aids and optimal outcome. Only n=10 participants reported that two weeks was beneficial to adapt to new sounds, however as mentioned earlier, most audiologists believed two weeks is sufficient for a hearing aid trial and to make a decision on which hearing aid they would like to purchase.

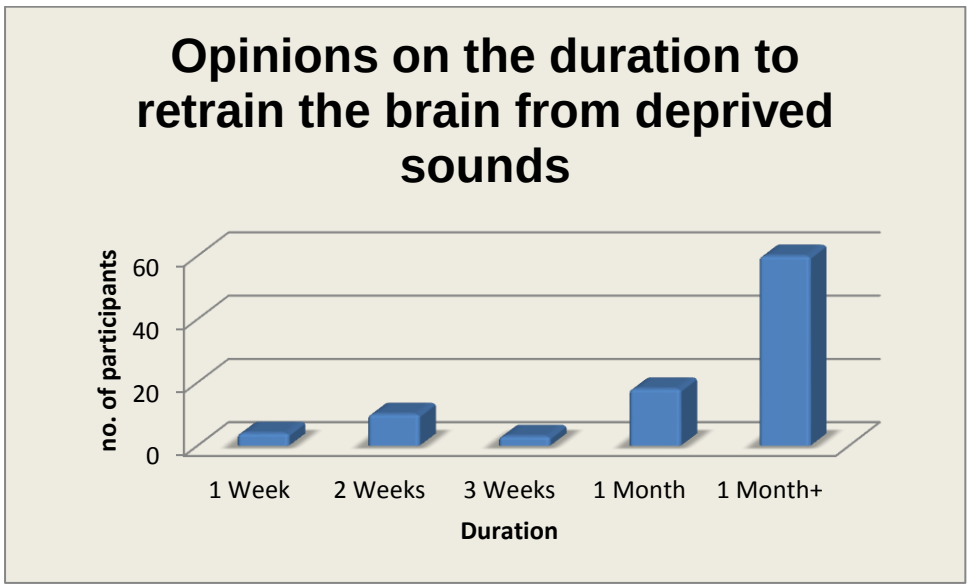


Figure 6: Duration to retrain the brain from deprived sounds

Counselling

The participants were asked whether they provided counselling services to their patients, and if they did, what was generally covered during these sessions. 5.79% (n=91) of audiologists reported providing counselling to their patients pre, peri and post hearing aid fitting whilst n=4 (4.21%) did not. The list of topics provided during these counselling sessions are depicted in table 11 below:

Table 9: Most common topics covered during counseling

Topics	n	%
Orientation/maintenance	43	8.69
Troubleshooting	36	7.27
Cleaning/care	46	9.29
Battery	27	5.45
Insertion and use of HA	34	6.87
Thoughts/emotions	8	1.62
Misconceptions	24	4.85
Technical aspects	13	2.63
Awareness and acceptance	18	3.64
Impact on relationships	15	3.03
Impact on work	7	1.41
Benefits	26	5.25
Aural rehab	17	3.43
Ear health	4	0.81
Adaption/adjusting to new sound	52	10.51
Communication strategies	28	5.66
Building rapport	2	0.40
Expectations	32	6.46
Information counselling	19	3.84
Hearing loss explained	21	4.24
Third party disability	6	1.21

Follow-up visits	17	3.43
Total:	**495**	**100**

Most of the counselling sessions incorporate adaption/adjusting to new sounds (10.51%, n=52), cleaning/care of the hearing aids (9.29%, n=46), hearing aid orientation and maintenance (8.69%, n=43), troubleshooting (7.27%, n=36), insertion and use of hearing aid (6.87%, n=34), expectations (6.46%, n=32), and communication strategies (5.66%, n=28). Some of the audiologists' responses are expressed below:

76.84% (n=73) of audiologists provide their patients with physical materials that they are able to take home with them during the hearing aid process, while 23.16% (n=22) do not provide any physical materials. The physical materials consisted of: information regarding cleaning and care for the hearing aid, troubleshooting guides, hearing aid orientation guides, the contract, pamphlets/brochures, accessories, user manuals, supplier booklets, reading materials, instruction booklets, websites, pictures (hearing aid and ear) and hearing aid details (warranty, service dates, serial numbers, make and model of hearing aid etc.).

Aural rehabilitation

50.53% (n=48) of participants reported that they provide aural rehabilitation to their patients, leaving 49.47% (n=47) of the participants who do not provide such services. From the audiologists who do provide aural rehabilitation, the following topics were listed and focused on during the sessions:

- Listening exercises
- Online training programs
- Communication strategies
- Adapting to their environment
- Auditory training
- Tinnitus programs
- Speech in noise

- Speech/sound discrimination
- Involving family members
- Compensation strategies
- Auditory processing
- Repair strategies
- Hearing aid functionality.

Table 12 below describes the reasons as to why n=47 audiologists do not provide aural rehabilitation as part of their practices.

Table10: Reasons why aural rehabilitation is not offered by audiologists

Reasons	n	%
Time constraints	6	12.77
Don't have proper training	11	23.40
Referred to more experienced professionals	7	14.89
Language barrier	5	10.64
Not necessary	7	14.89
Advised to use AR apps	2	4.26
Don't provide the service	9	19.15
Total:	**47**	**100**

From the data gathered in the table, it is evident that n=11 (23.40%) of audiologists felt they do not have the proper training to provide aural rehabilitation services. A further n=9 (19.15%) stated that they do not provide or offer the services and n=7 expressed that aural rehabilitation was not necessary if the hearing aid orientation was conducted correctly. Other audiologists n=7 (14.89%) expressed that when their patients do request aural rehabilitation, they would refer them to more experienced professionals. Moreover, the impact of time constraints, language barriers and the use of Apps were additional explanations as to why these services were not being provided to the hearing aid users.

It is also important to note that n=89 (93.68%) of audiologists do provide follow-up appointments for hearing aid orientation and counselling compared to n=6 (6.32%) audiologists who do not.

PHASE TWO

The next portion of this chapter presents the findings from the online and telephonic interviews conducted with eight hearing aid users across South Africa.

The main themes derived from the information gathered from the interviews were categorized into themes and subthemes which are represented in table 13 below. All the responses provided by the hearing aid users were based on hearing aid outcomes experienced during and after the participant's hearing aid trials. The thematic analysis revealed five significant themes that were identified by the researcher: 1) hearing aid characteristics, 2) experience with hearing aids, 3) hearing aid trials, 4) counseling, and 5) family, work, social. The themes and sub-themes that emerged are discussed below.

Table 11: Themes and subthemes categorized

THEMES	SUBTHEMES
Hearing aid characteristics	• Connectivity • Background noise • Physical appearance • Comfort • Price/expense
Experience with hearing aids	• Positive experience • Negative experience • Choosing the hearing aid • Good relationship with audiologist • Patient centred • Advice to audiologists
Hearing aid trials	• Finding the process of hearing aid trials beneficial • Duration of the trial period • Amount of hearing aids trialed

Counseling	• Physical hand-outs/ written information • Follow-up appointments
Family, work, social	• Hearing aids positively impacted relationships • Hearing loss negatively impacted relationships • Work

THEME 1: HEARING AID CHARACTERISTICS

The participants identified certain characteristics associated with their experiences with hearing aids during or after their hearing aid trial. Six sub-themes emerged as represented in figure 7 below. These sub-themes are discussed in further detail.

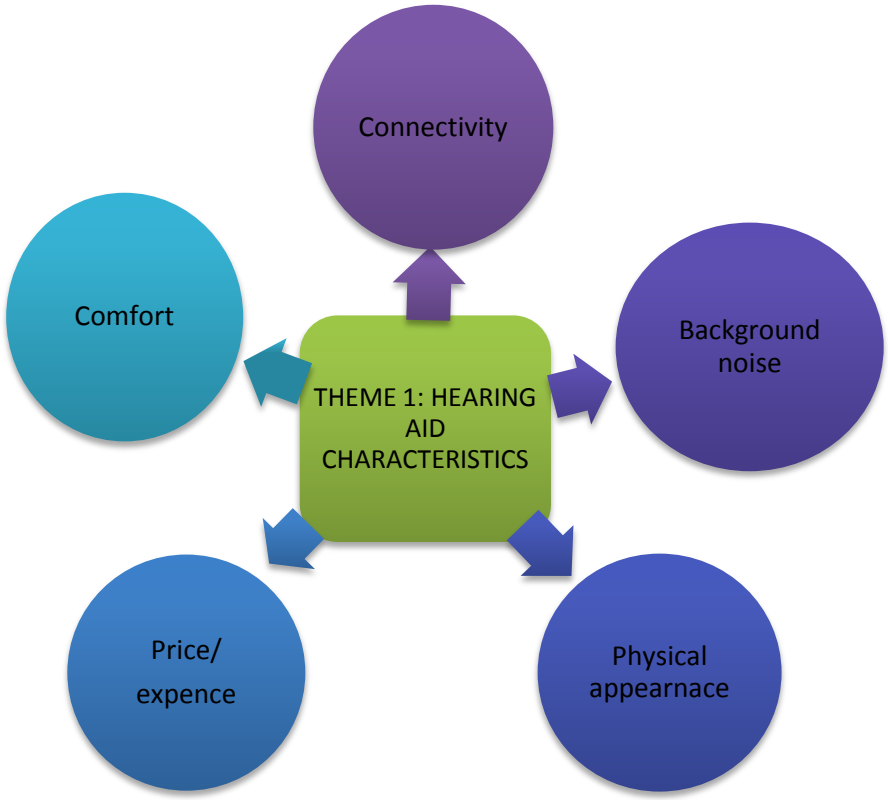


Figure 7: Diagrammatic representation of theme 1 and its subsequent sub-themes

Sub-theme 1: Connectivity

Technology is continuously changing and adapting to make our lives easier. Four of the participants reported that the connectivity of their hearing aids to their cell phones was their main beneficial feature. Participant three mentioned how she uses her phone connectivity to her hearing aids to change the programs in different environments such as restaurants and meetings with a lot of background noise.

Participant 3: *"She (audiologist) also put the app on my phone where I can change the different programs for the restaurant and cutlery so that you only hear the people around your table, its super, it's lovely… I can adjust if I'm at a restaurant or outside to cut the background noise or if I'm in a meeting to cut off the aircon. I'm so satisfied with that. And she explained to me everything, I can even go overseas and if I wear my hearing aids and they get lost they can find the hearing aids."*

Participant four stated that his benefit from phone connectivity is the ability to stream phone calls via his hearing aids as he often struggles to hear over landline telephones. Additionally, he too benefits from this feature in his working environment.

Participant 4: *"What I like about (company name) is the fact that it connects uh Bluetooth to my iPhone, you know, I hate the landline telephone call because I can't hear properly but uhm you know the cell phone its… its… uh… absolutely ideal. The thing is what I found from my (company name) is that I have more settings that I can manipulate from my phone. Especially my office in town we got a small switchboard and the sound quality is just so poor that I hate it I ask my ladies to rather take a message and I call them back on my cell phone. What I found it's not necessarily about the loudness (landline) the volume doesn't play as big a role as the sound quality… for me it was about the connectivity especially with the cell phone and you know uhm being so adaptable that I can switch between different programs and I can even manipulate with the (company name) I can manipulate even the programs that's pre-set, I can even change on my cell phone up volume, the treble or bass or whatever you know those levels I can still manage. So, the connectivity and features.*

For me it's about the mechanics."

Similarly, participant five uses his phone connectivity to enjoy music more clearly as well as for the ability to adjust volume and programs on his hearing aids.

Participant 5: *"It's connected to my phone and that's a huge… huge help. I love music uh with other hearing aids I struggle to hear music or the quality of music with this I hear it straight into the hearing aid devices I can listen to music. It's a blessing it's fantastic. And ja, it's also… I can control the volume and things like that and certain settings from my phone. So, for instance if I go to church I struggle to hear when the minister speaks over the microphone but there's a certain setting on my phone that improves the quality."*

Participant eight also mentioned the benefit of being able to change the volume and settings on his hearing aids via his cellphone.

Participant 8: *"But what's nice and what I liked about the technology with this is although you set the baseline, so we started at 60% then I think we went up to 80% and we left it there, but I have the ability on my cell phone through the app to actually increase it to 100% if I want to so that also helps. I chose them because they have certain capabilities that I was after... Bluetooth into the phone, you know stuff like that. I like the connectivity."*

Sub-theme 2: Background noise

As alluded to in phase one, background noise is the most common complaint expressed by hearing aid users. Relatedly, the interviews confirmed this as the participants mentioned that the background noise was the draw back when it came to wearing hearing aids. Participant one expressed how he previously trialed a pair of hearing aids, however opted not to purchase them due to significant background noise as seen in his statement below:

Participant 1: *"About 10-12 years ago, I once did a trial with another supplier and I didn't actually like the hearing aids because there was too much background noise. I tried them for a week; I think they were (company name). But it was quite a while ago and I think technology has moved on. Anyway, at that point in time I decided no,*

it's too irritating, so I stopped that trial."

Two participants mentioned background noise interfering with communication skills within their workplace/offices:

Participant 2: *"I mean you do have the problem in an open plan office or a big office with lots of people and people are talking to each other all the time and you don't know when they are talking to you or not. So, there could be a bit of a discrepancy there. Look I do still struggle. I work in an office that's open plan, so it does become a bit difficult when there are four or five people talking all at once so I do become a bit frustrated but I either get up and walk away from my desk or I just try and switch off completely and not listen to them."*

Participant 4: *"Something that I still do find a challenge is that, uhm, you know when I'm sitting in a boardroom or a restaurant and there is background noise, even with the different options that I can switch between programs and so on, you know you will never get back to 80% of normal hearing because the background noise just makes it so difficult to follow anybody."*

A further two participants pointed out difficulties with background noise within the restaurant environment:

Participant 6: *"Look there are a few issues in the noisy environments like restaurants but it's understandable."*

Participant 8: *"…Like in a restaurant setting. That's probably my worst environment to be in. that's when I use the noise filter features and stuff like that it really helps."*

Subtheme 3: Physical appearance

In analyzing the results, the researcher identified a theme of physical appearance of the hearing aids. This theme detailed positive and negative experiences from the hearing aids. The participants differed in their perspectives regarding the physical appearance of the hearing aid itself. For instance, participant two, seven, and eight

stated that size did influence their decision when selecting hearing aids. The findings revealed that participants preferred a smaller, more comfortable hearing aid that is less noticeable at first glance. The following participants shared their views:

Participant 2: *"I must be honest with you and say that the size is nice and the comfort."*

Participant 7: *"What I did ask her, and that something is very important to me, I wanted the smallest one. The one that is not the most visible. And that is why she said the (company name) is the one that you won't notice it when someone is wearing it. I don't know if that is the truth. Size played a big part for me."*

Participant 8: *" I think there is also a stigma attached to actually wearing a hearing aid that one has to consider. I'm used to them now. They're actually quite uhm easy to handle, easy to use, uhm… pop them in the morning and off you go so ja it's become part of the daily routine. I think for a man in particular it's a big thing to first of all wear hearing aids because as I said there's a stigma attached that you deaf. One, uh, two, you have to get used to something. Well, I suppose because I wear spectacles uhm having something behind the ear, uhm, im used to that. You know, so, that was the other thing just getting used to them. And that's what I like about the newer kind of technology, is that they are smaller and more compact and can pop behind your ear as opposed to the older massive thing where the battery that used to sort of stick out and really uhm… show everyone that you actually wearing hearing aids. These are quite uh discrete."*

On the contrary, participants three and four shared that size or appearance did not influence their decision in choosing a hearing aid. These participants were more interested in which hearing aid is most convenient to use as well as which hearing aid best suited their needs:

Participant 3: *"It's the newest one, slightly bigger than the previous one she wanted to give me. For me it's better it sits better on the ear as well, it goes behind the ear and then a small microphone in the ear… The previous one was smaller. The bigger*

one has a bigger battery that will last longer, for me that was fine. It's not a big difference in the size. "

Participant 3: *"Even if it was the old type of hearing aids, the big ones, I wouldn't even mind to tell you the truth because what I feel now, I can hear better now."*

Participant 4: *"I'm 59 I don't care what they look like as long as they work."*

Subtheme 4: Comfort

Comfort was another aspect that stood out whilst participants were descripting their experiences with hearing aids. Two participants expressed that after a period of time while wearing the hearing aids they felt some degree of discomfort.

Participant 1: *"When I have my hearing aids in for a longer time, I do have little bit discomfort inside my ear. Maybe the rubber thing inside the ear is a bit large maybe for my ear cavity."*

Participant 6: *"They don't seem to fit my ears, they always falling out. And if I wear them for too long my ear canal pains, it's almost inflamed. I need to go back to the audiologist for that I'm sure there is something they can do to help."*

Moreover, four participants mentioned how they found their hearing aids to be most comfortable.

Participant 2: *"The audiologist before did not have the correct cap size to fit into the ear and it was most uncomfortable and I just couldn't cope with that…. I must be honest with you and say that the size is nice and the comfort."*

Participant 3: *"it's so comfortable when you are wearing it."*

Participant 4: *"Even from a comfort point of view, uhm, the ones I'm wearing at the moment I have the hard moulds whereas the ones before that were soft silicone moulds you know that go into the ear. I think because of my hearing going down so much the hard moulds I find them to be much clearer and so much better."*

Participant 8: *"And as I said they were quite comfortable."*

Subtheme 5: price/expense

The cost of the hearing aid was an aspect that was not specifically asked from the participants; however it emerged during the interviews. Two of the participants considered whether their medical aid would cover the cost of the hearing aid or if they had to purchase them privately as seen below:

Participant 2: *"I also had to be selective in as much as what my medical aid limit was, so that was also a contributing factor towards what I could choose. The one with the remote button that makes it louder and softer was above my limit."*

Participant 6: *"I chose the hearing aid because of the price. We chose a hearing aid that fits the amount the medical aid said they would pay. I only had to pay a shortfall of R2000. But ja, the price… they expensive."*

Moreover, three of the participants stated that the price of hearing aids influenced their decision in terms of the brand and level/range (i.e. top vs. middle vs. bottom range) of hearing aid to choose from. They further stated that hearing aids are expensive.

Participant 4: *"I've spent 100s and 1000s of rands in my lifetime and uhm no its important to make a good choice and as much as an informed choice as possible…I could of gotten away with a much less expense or lower cost but when I listened to the new hearing aids like I said I took them for about a week, a week later I called and said 'listen the old ones I'll keep as a backup but I'm definitely*

going for the new ones' there was a mark difference."

Participant 5: *"But that in itself is a problem... the first hearing aids weren't that expensive it was still relatively affordable, the second set, the (company name) was hugely expensive and it didn't work. So, it took me the third time and spending an awesome amount of money to find a set of hearing aids that actually works for me."*

Participant 7: *"So, that also made me a bit reluctant just to pay R30 000 for something that's going to cause a problem whenever I enter a mall or you know when I'm going to be close or near to uhm Bluetooth."*

THEME 2: EXPERIENCE WITH HEARING AIDS

The participants were asked to describe their experiences with hearing aids. This included a description of any benefits and/or challenges they experienced during and after the hearing aid trial process. From the discussion, six sub-themes emerged as displayed in figure 8 below.



Figure 8: Diagrammatic representation of theme 2 and its subsequent sub-themes

Subtheme 1: Positive experience

Participants were asked to describe their positive experiences throughout the hearing aid trialing process. All participants reported having a good and positive experience whilst using hearing aids. Participants one, two and three all shared the same views that the main benefit received from their hearing aids is the ability to hear better. Participant three further added that she feels more balanced wearing the hearing aid (due to her unilateral hearing loss).

Participant 1: *"Well, I call them my two new best friends. It's been going very well… in social situations I obviously hear a lot better."*

Participant 2: *"Definitely being able to hear much better. I'm hearing you very clearly and very comfortable on a one-on-one basis. It's definitely made a difference to my life."*

Participant 3: *"Well to tell you the truth if I know what I know now I would of gone a long time ago, a year ago, to (audiologist) for help. People don't even notice, its small, I can hear, I don't have headaches from sounds mixing in my ear, there's no discomfort. It's super, like I said I was stupid not to go sooner to (audiologist) to do the test to see what's going on. Even if it was the old type of hearing aids, the big ones, I wouldn't even mind to tell you the truth because what I feel now, I can hear better now. It's embarrassing to keep asking people to repeat themselves, people think you stupid. I don't know how people cope who have very bad hearing loss with no hearing aids. I was very happy because for instance if there wasn't a difference, I would tell her (audiologist) I was unhappy but there was no unhappiness, I could immediately hear better and I was more balanced. I was always off balance but from the second day I was on track again."*

Participant four further expressed how his personal and business life was negatively affected without his hearing aids as he missed out on too much sound and speech without them.

Participant 4: *"Ok the benefits of course if I don't have them in, I can hear…well, I*

don't even think I can hear 20% so my hearing is really bad. So, without them you know, you expect… how can I say… your personal life, business life, wouldn't exist. I will definitely recommend hearing aids because you miss so much if you don't have them."

Moreover, participant five expressed improvements in his quality of life due to improved hearing from the hearing aids.

Participant 5: *"Ja, of course improve my hearing, a better quality of life, uh, ja, its mostly improving my hearing. When I don't have them, I don't hear a thing. Maybe sometimes it's a blessing (laughs)."*

Participants six, seven and eight stated that with the hearing aids, they can hear things they couldn't hear before, or without them. Lastly, participant eight expressed how hearing aids exceeded his expectations.

Participant 6: *"Look they're a great help, I don't have the TV so loud. My daughter used to complain that the TV was too loud but she doesn't any more. I can hear the piano I play clearly. I can hear the leaves crunching on the floor and the birds, the birds I haven't heard in a long time. The big difference is noticing how loud the keys are on my computer when I am typing then they are really loud but I didn't realize before."*

Participant 7: *"Uhm I think the only thing is that I could hear sounds from far away like a door slamming in the street, I could hear that. One thing that I can say is while I was testing the hearing aids, we went for a trip to Cape Town and my parents were with us and for the first time I didn't have to turn my head to the back when they were talking. I was looking straight In front of me and I could hear everything they were saying. So that was one thing that I thought 'wow this is worth buying it'."*

Participant 8: *"I hear things that I didn't hear before…uh... its crisp its clear, I feel like I'm more in control in a conversation I'm not guessing words or sort of completing sentences that I possible would have done in the past I was told I was*

doing that. Uhm, ja so it just gives you that clarity that you were looking for as I said the noise filter in a confined space where there's a lot of background noise, uhm, that's been a great… great advantage for me…They actually exceeded my expectations. Within minutes of having them in my ears it was like, uh… that wow factor. Like I said even the crinkling of a checkers packet that crispness which I couldn't hear before, not that I actually knew that I couldn't even hear it. I started hearing things literally, the door would open and I could hear the hinges working. Those kinds of things it was just amazing."

Subtheme 2: Negative experience

On the other hand, participants were asked if they had experienced any challenges with their hearing aids. Participant one expressed intermittent difficulties from the hearing aids. These issues could not be resolved due to the national Covid-19 lockdown as he was unable to visit his audiologist to rectify these issues as he normally would of under different circumstances.

Participant 1: *"My left hearing aid, and I need to speak to my audiologist about that when we come out of lockdown, um, it occasionally fails to work and um ja goes on and off when it shouldn't be on or off."*

Participant two stated how previously, without a hearing aid trial, she was not happy with the hearing aids and often packed them away in a drawer and did not use them. However, with the opportunity to trial the hearing aids first, she is happy with them and wears them since they are tailored to her individual needs.

Participant 2: *"I buy them and I wear them for a week or two then they get packed away in the cupboard…I struggled a lot and have been to a few audiologists and nobody has taken the trouble to actually help me understand and to fit them properly and understand how to work them properly so that I can get them into my ears. And this is the first time that I'm really feeling the most comfortable that I'm wearing them I would say most of the time."*

Participant three expressed forgetting to take the hearing aid out before showering or swimming and a fear of losing or breaking her hearing aid. Participant eight on the other hand raised issues related to stigma

Participant3: *"Well the only challenge is remembering to take it out before you dive into the swimming pool or not bath and shower with it and remember to take it out at night. And of course, you can lose it but it fits so nicely. Unless you take it out and put it on your desk then it can get lost, it's a very small thing."*

Participant 8: *"Uh… actually not… initially it was 'oh I'm wearing hearing aids who's going to notice' but I must be honest at first 2-3 months I kept asking my colleagues 'can you see my hearing aids?' because ja because of a stigma. But other than that, I didn't have any other issues I've gotten over that. I realised that they are there for a purpose and I've not heard anyone actually say anything, say hey 'I see you wearing hearing aids' and I suppose it has taken away that fear that people are noticing."*

Four of the participants described challenges towards the hearing aids such as: surrounding noise, higher expectations from the hearing aids that were not met, speaking over the telephone, and feedback.

Participant 4: *"it's very difficult, uhm, even with hearing aids if more than one person is talking at the same time, it's difficult for me to follow them. Something else that I've seen that I've recognized uh… uh… uh a couple of years ago already that without knowing I started to read lips as well so if a person talks away from me apart from the volume not being good enough and especially nowadays with everyone wearing masks I can't see what they say."*

Participant 4: *"Glasses is a very good comparison; I mean if you wear glasses you almost back at 20/20 vision but when you wear hearing aids, I think the closest you get is to about 80%. I must say I was a bit disillusioned at one stage because the hearing aids were not doing what they were supposed to for me, but you know I think at that stage it was 2-3 years between my last testing and uhm you know I was*

actually being irritated because I can't hear properly and you know they tried to adjust the older hearing aids but they didn't work as well, then I moved to a newer model which made a big difference. I don't think my expectations have gotten better over the years I think I have come to terms the fact that when it comes to hearing you will never hear better than 80%."

Participant 5: *"Ja uhm, speaking over the phone is a challenge. Ok well with the (company name) is nice I can hear inside my ear but with the previous ones I had to put my phone to my ears, uh I couldn't hear over the phone. And with the female voices I still struggle with the distinguishing female voices. Like female voices I can hear you very well but certain parts of the population I struggle to hear them."*

Participant 7: *"…but then I dono what went wrong then all of a sudden, I had this like a… a humming sound uhm… uhm… like, how can I say it...feedback. And that was one of the biggest problems I had because, because I'm so sensitive with my hearing I couldn't stand it when there was feedback. Then there were times where I couldn't make out where this sound is coming from. It was really confusing."*

Subtheme 3: Choosing the hearing aid

Participants were asked how they made their decision regarding the choice of hearing aid to trial or buy. Majority of participants happily reported that they put their trust in their audiologist to make the decision for them because they were the professional and knew better. Furthermore, the participants stated that the audiologists took into account the patient's hearing loss and budget.

Participant 1: *"She chose it for me. (audiologist) convinced me that the one behind the ear was or would be a better choice in terms the hearing improvement and I trusted her judgment on that one…She chose it… well she gave me the option because she said to me well this I can't recommend this one to you and I've got these and I've got those and I've got this but in your price range according what your medical aid will pay out. I could get a very nice one. That worked out*

well for me and I'm very happy with I so I can't complain."

Participant 2: *"My audiologist chose it for me."*

Participant 3: *"She introduced me to it and explained about the hearing aid... She showed me the technology and all the options and intensely described the differences between the hearing aids. Then she offered me the two-week trial and said if I didn't want it we would take it from there… I said to her, because of my glasses, I want something you suggest, you the professional so choose ones most suitable for me. So, she gave me this one because of my glasses to fit perfectly around my ear with the hearing aid and it worked perfectly. I trusted her opinion. "*

Participant 5: *"uhm… what she felt for my hearing loss or the type of hearing loss I have the specific (company name) model will be best suited. I've had the (company name) for 10 months now. Of the three brands this was by far the best… Well (audiologist) recommended it she had a lot of experience with it, and as I said number one it's a far better hearing aid than I've ever had, my hearing quality is much better so in terms of that it was a good choice."*

Participant 6: *"Well the audiologist chose it for me she tested my hearing and we discussed them together… She chose it based on my budget."*

Two participants stated that the decision was made together with their audiologist as seen below:

Participant 4: *"I would say the decision was made together."*

Participant 7: *"She chose it for me. No it was actually both our decisions because uhm I just couldn't…I...I have total hearing loss in my left ear and she just said to me because of my age I have to uhm you know start thinking about hearing aids just to save my other ear. So, but uhm, ja, we tried the hearing aid without the CROS, we tried the CROS."*

Only one participant chose the hearing aid himself as he already knew which hearing aid he wanted based on the features and capabilities he preferred.

Participant 8: *"I chose them because they have certain capabilities that I was after, uhh… Bluetooth into the phone, you know stuff like that. I like the connectivity."*

Subtheme 4: Good relationship with audiologist

Participants were further asked to give advice to audiologists when it comes to fitting hearing aids. Majority of participants expressed that having a good relationship with their audiologist is one of the most important aspects of the hearing aid fitting process. Participant 1 further explained how he appreciated that his audiologist explained everything correctly and that the audiologist was very clear and understanding throughout the hearing aid fitting process.

Participant 1: *"I think the specialist, her name was (audiologist), I think the way she promoted the hearing aid and explained everything was probably the best feature of the whole process in fact I'm talking about the process and not the equipment itself. I think she was very clear and understanding and a very nice person."*

Participant two described her audiologist to be kind, caring, knowledgeable, and calming. Additionally she appreciated how her audiologist ensured that she understood everything.

Participant 2: *"You know so they really were very… very kind and very caring and knowledgeable and I went back quite a few times before I had it 100%... My audiologist has a very soft and calming voice and she repeats herself and she speaks very clearly so that you can understand her well…This time round my audiologist was good and did everything right and she was very kind and sweet and followed up with phone calls."*

Moreover, participant three expressed how she did not feel rushed throughout this process as she normally feels when visiting a doctor. She too used traits such as trust and comfort to describe her audiologist.

Participant 3: *"Trust! Trust is a very big thing. If you can allow your patient to trust you they will be happy. (Audiologist) immediately comforted me which is why I trusted her. She explained everything to me and took her time through the process, it*

wasn't rushed like it always feels in a doctor's room, it wasn't hasty."

Participants five and seven described how their audiologists were very helpful, going out of their way to formulate a good professional relationship.

Participant 5: *"One of the most important things is the relationship you have with your audiologist. The one hearing aid started giving problems uhm and (audiologist) left no stone unturned to have this problem solved. Uh and she didn't just farm it off she went out of her way to get this problem sorted out. In the end they gave me a brand-new device, the other one was faulty but, in the end, she didn't leave me to my own devices. Even during lockdown, she came here mask on, gloves on, she came and collected the devices and take it straight to the manufacture to resolve it. So, it's important to have a really good relationship with your audiologist."*

Participant 7: *"she's a very… very helpful and beautiful person, I cannot complain about her service at all."*

Lastly, participant eight appreciated the good bedside manner from his audiologist and he felt that regular communication bought his loyalty.

Participant 8: *"There's an emotional journey and I think it's important for your practitioner to help you through those initial stages. And that's where the bedside manner, the caring, you know 'let's try it, come back in a week or two' 'how's it going'. Just holding my hand that it what I would expect. I dono how many audiologists would do this but uh, a call maybe one a week 'how's it going how you finding it are there any problems? Do you want us to turn it louder or softer' that kind of thing it just keeps you in touch and shows that someone cares. It's a correlation between a hairdresser and a dentist. You don't go to a new hairdresser every month or a new dentist every month or a doctor for that matter. Why? Because you find the one that you feel comfortable with. You can all diagnose; you can all sell me a hearing aid but that's not the point. The point is am I comfortable with you with your manner do I think or know that you care do I feel part of your practice from that perspective then I'll come back to you on a continuous basis. Make sure there is regular communication with all of your patients, it just buys loyalty."*

Subtheme 5: Patient centered care

While the participants' were expressing advice they would like audiologists to know, the theme of 'patient centered' came up. Interestingly, three hearing aid users pointed out that audiologists need to understand that the hearing aid fitting and purchasing process should be patient centered and not purely focus on selling a hearing aid:

Participant 2: *"Oh yes absolutely and one thing that (audiologist) said to me which was very comforting, if there is anything that I struggle with as far as cleaning is concerned or changing anything that her ladies in her office are very well clued up with that with the sponges and cleaning materials, whatever is needed."*

Participant 4: *"you know it's more about the patient and it should be more about the patient and their specific needs than just trying to sell a new pair of hearing aids. And that is unfortunately one of my previous experiences is that 'oh ja we've got new models why don't you come in and try them and so on' you know it's not about serving the patient's needs as much it's just trying to sell a new pair of hearing aids."*

Participant 5: *"I think it's more or less your relationship with your audiologist in the first place, uh you know the good relationship and he/she really sees your needs and what you need and fit your hearing aids around your need. Whereas with the other two it was just the sale, it was you know "let's fit this guy with the most expensive" and that's it. For me (audiologist) was the one that you know my needs came first, me the patient the clients whatever you want to call it, my needs were first. Whereas with the other ones I walked out there and just felt that they made a sale."*

Subtheme 6: Advice to audiologists

When asked to provide advice to audiologists for future references with regard to hearing aid fitting and trial periods, the following aspects were expressed by the participants: Participant one felt that he was not given enough written information about the hearing aid orientation and maintenance. He expressed that due to his age he tended to be forgetful and would have benefited with some form of physical material to take home. He proceeded to explain that he had to search for information on the internet himself.

Participant 1: *"I think it might have been useful to have some written information about maintenance of the hearing aid. I mean she did explain it to me but I'm 66 so I forget stuff so I went onto the website, the (company name removed) website and there was information there but it wasn't as complete as I would of liked to have seen it."*

Participants eight felt that audiologists should visually or graphically explain where the hearing loss is once diagnosed, as patients tended not to believe them if they are only told verbally. Additionally, participant eight expressed how a good "bedside manner" from the audiologist is crucial because buying a hearing aid is also an emotional transaction.

Participant 8: *"Ok well I'm going to talk about my experience. If you told me verbally that I have a hearing loss problem then I probably won't believe you. Versus, being shown graphically after a test or two or three test the actual level of the hearing in a certain range and how its decreasing over a period of time and that it's actually now at a point where you know you do need hearing aids. ja the scientific evidence really is the one thing and then a bedside manner. The ability to convince me in a professional way but also in a supportive way uhm, because it's an emotional thing. This is not a transactional thing. There's a test lets buy a hearing aid."*

Participants five, six and seven felt that hearing aid trials should be mandatory practice by all audiologists. They expressed how audiologists should offer hearing aid trials of more than one brand or style so that the user is afforded the opportunity to make an informed decision on which hearing aid brand or style they preferred.

Participant 5: *"Don't take the first set of hearing aids you get offered. They must*

continue to try different ones until they are happy. And then of course the audiologist you use must be willing to do that, I've found with the first two that was the brand they were pushing uh there was no choice with other brands or anything. Where (audiologist) looked at various different brands you know, I'm sure there's stacks of different brands of hearing devices but she didn't push one specific brand."

Participant 5: *"Again, uhm, you know, learn what your patient needs are, and don't just take words on face value, do some research, put in a little bit of extra effort to find the right set of hearing devices. Don't just pom off your latest best most profitable brand doesn't necessarily mean that your patient is going to benefit it. I worked for many hears in the pharmaceutical industry so I know how it works and everything. The patient is in the end the most important in the whole scenario. Uh so get to find that persons needs first and you know match the hearing aids to that persons needs and not your profit line."*

Participant 6: *"Make sure all your patients try out hearing aids first and allow them to try out different brands too. All audiologists should be offering it to their patients. We don't know what to look out for when wearing a hearing aid. I would also recommend you do a hearing test after we are given the hearing aids and show us the difference with and without the hearing aids because we don't know exactly."*

Participant 7: *"Regarding hearing aids definitely give me a choice of at least three. Let me try at least three so that I can make up mind to at least see which one is actually the best for me. I would like trying more than two brands at least. Just to see what the different is at least you know."*

THEME3: HEARING AID TRIALS

The participants were asked questions pertaining to hearing aid trials. Three sub-themes emerged as represented in figure 9 below. These sub-themes are discussed in further detail:

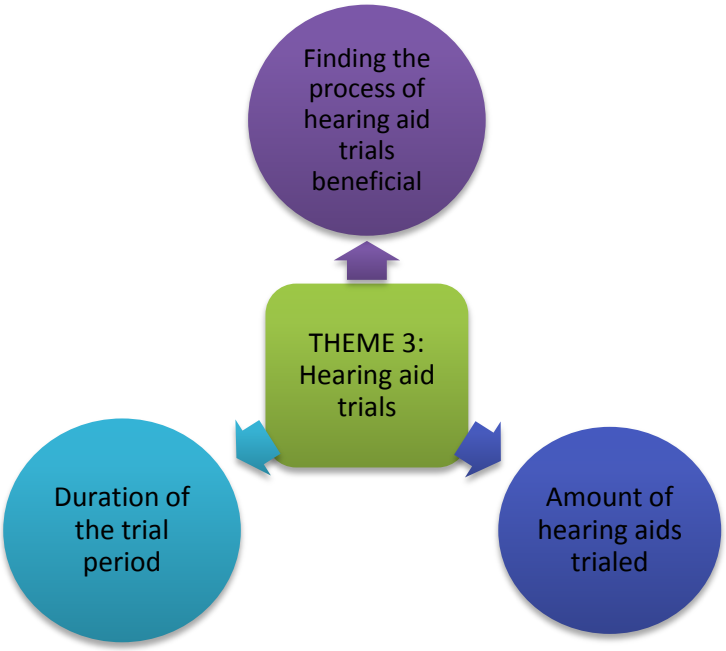


Figure 9: Diagrammatic representation of theme 3 and its subsequent sub-themes

Subtheme 1: Finding the process of hearing aid trials beneficial

Participants were further asked whether they found the process of trialing hearing aids beneficial. Interestingly, all participants found the process of trialing hearing aids beneficial. Overall, the participants unanimously felt that the success of the hearing aid fitting is attributable to their trialing periods.

Looking at the participants' responses, participant one and six described how the trial period allows the opportunity to make their own decision before committing to spending money on a hearing aid.

Participant 1: *"Yeah absolutely I mean if you can't trial hearing aids you can't just go and have some fitted and pay an enormous amount of money without being sure this is the right thing for you."*

Participant 6: *"Yes, without a doubt, I mean you don't know the difference until you put them on and you see for yourself. The audiologist explained everything to me and trying them out was a bonus because I was dealing with a lot of money so I didn't want to choose something and then it doesn't work because I didn't know better."*

Moreover, participants two, three, and seven expressed joy with their trialing periods.

Participant 2: *"Oh absolutely, very good, no problem whatsoever."*

Participant 3: *"I'm very satisfied, really… I'm a different person now."*

Participant 7: *"Ja no definitely…definitely because, uhm I… I… I uhm… tested the… the CROS and all of a sudden, I could hear, well, not like it is hearing form the good ear. I could hear sound on the deaf side that I couldn't hear before. So, it was definitely beneficial to do the trial."*

Participant four made two statements describing how trial periods should be enforced by all audiologists and that no user should be forced to make decisions on hearing aids they are unsure about. Additionally, participants eight shared the same views whereby he stated that he would not have bought the hearing aids without a trial period first.

Participant 4: *"I (laughs) uhm I'm not one to be very descriptive but I think it must be uhm almost enforced because you know not hearing properly and then getting a new set of hearing aids and you found WOW you can hear so much better, you know, uhm normally you just accept it because it sounds so much better but I think if you compare it uhm with something else that is also set properly, you look at how that influences your normal behavior around other people as well I think you can make a more informed decision."*

Participant 4: *"I think uhm… you know that you don't need to make a forced decision… split second decision, that you have the trial period that you can try this stuff out because you know like I say your expectations is inevitably a little bit more than what you going to receive in the end. But uhm to… to really make up your mind and see you know but this is better than that one. Even if you have to go back and retry the other one to… to… to just make 100% sure but I think it's important that one do make an informed decision and do take your time when doing that."*

Participant 8: *"Ja, I think it's more than helpful it's an essential, I think you have to do it like that. I wouldn't just buy it. I wouldn't just buy a car I would test drive it first. Let's be honest if they didn't give me the option to trial first I wouldn't of taken them*

because uh... I'm not gona just buy what they say if I haven't tried it and it hasn't work. And if it didn't work, if you know let's say I had to be forced to take them without a trial and there was something wrong then they would lose a returning customer and I probably would carry on using those hearing aids they would become obsolete, and uh.. I think it would be bad for the brand and for the practice."

Participant five expressed that he was not afforded the opportunity to trial hearing aids from previous audiologists thus he was generally not happy. This time round he felt like he was in the "driver's seat" of the process and did not feel like the audiologist was only interested in making a sale.

Participant 5: *"I didn't have this luxury with my other hearing aids. I didn't get the opportunity. The guys were quite eager to just sell it. Where (audiologist) had a different approach, she said if this doesn't work, we will try a different set. She kept on giving me the option to decide."*

Subtheme 2: Duration of the trial period

All the participants were asked how long their trial period was, the responses varied. Two participants (four and five) trialed the hearing aids for one week.

Participant 4: *"I think it was just one week."*

Participant 5: *"There wasn't really a limit on the time you know. The minute (audiologist) fitted them I could hear the difference and to me it made up my mind immediately. uh, you know and then I had it for about a week or so and we discussed to and fro, and you know, then I paid for them."*

Moreover, two participants (two and three) trialed the hearing aids for two-weeks.

Participant 2: *"I think it was a good two-week period."*

Participant 3: *"Two weeks."*

Furthermore, two participants (one and eight) trialed the hearing aids for three weeks.

Participant 1: *"About three weeks."*

Participant 8: *"I had them in for probably about 2-3 weeks that I tried them out."*

Lastly, two participants (six and seven) trialed the hearing aids for two months (due to lockdown and the Global covid-19 pandemic).

Participant 6: *"It was supposed to be one month but because of lockdown it was two months."*

Participant 7: *"It was long it was almost two months."*

Recommended duration of a trial period by the hearing aid user

Drawing from their experience with the trial period, participants were asked to recommend a suitable trial period. In other words, how long they thought would be enough time to trial a hearing aid in order to make an informed decision. Four of the participants stated that a one-week trial period is more than enough time to make a decision on a hearing aid. This is supported by their comments below:

Participant 4: *"You know I think you know in one weeks' time you can find yourself in a lot of different environments like at least go to a restaurant or try them out at the office or at home with the television all of that. I think a week is ample time to try out a set of hearing aids."*

Participant 5: *"One week or so was more than enough for me."*

Participant 6: *"My time with them was more than enough because I had two months even though I was only supposed to try them out for one month. One week is more than enough, maybe two maximum but in one week you can make your decision."*

Participant 7: *"I would at least want to wear them a month after the settings have been set perfectly for me. I…I would prefer wearing them for one month before buying them…But, I think within a week... agh…I mean seriously, within two or three days you will be able to hear exactly which one is actually…uh, sounds better. To get used to it and to make sure that this is actually the correct one I will need the most. But within a week you will be able to hear which one will work for you."*

Moreover, two participants felt that a two-week trial period would be enough time.

Participant 2: *"I was quite happy with the length of time. Two weeks was more than enough."*

Participant 3: *"Two weeks was good, I didn't need more time."*

Lastly, a further two participants stated that a three-week trial period would be sufficient for them.

Participant 1: *"Um probably I would say for each hearing aid probably a test of 1-2 weeks would be good. I was happy with the decision after three weeks."*

Participant 8: *"Look I think the first week, (researcher), takes a bit of getting used to. I could hear everything that I didn't hear before. Even if I open a fridge door, I could hear the hinges working. If I walk in a supermarket, I could hear the people's footsteps which I couldn't hear before. So, the first week was a bit of an adjustment. Second week you start getting used to them that's why by the third week I was...I was quite comfortable, uhm, with the hearing aids. So about three weeks ja. I suppose I could of made it sooner, but uhm, one always wants to be sure."*

Interestingly, no participants chose a trial period of longer than three-weeks.

Subtheme 3: Amount of hearing aids trialed

All the participants were asked to comment on the number of hearing aids they trialed during their trial period. Five participants trialed one set of hearing aid(s) as seen in their comments below:

Participant 3: *"Only that one she gave me, the smaller one. After two weeks when I decided to buy it… she gave me the same hearing aid just with the bigger battery. They were both (company name) hearing aids."*

Participant 4: *"Just the one…so when I went to her, she said 100% let's set your old pair of hearing aids according to the test which she uh conducted and there was an improvement. Then she said why don't you test drive another pair of hearing aids and… and… and I said let's try them."*

Participant 5: *"Only tried this one."*

Participant 6: *"Only this set, I didn't need to try another because when I stepped out the office, I already noticed the difference so this one worked and it was enough for me."*

Participant 8: *"I only tried out the one pair. I was shown two different sets in the practice and I…I opted for the ones I have right now which is the (company name)."*

Whilst three participants' trialed two pairs of hearing aid(s) as seen below:

Participant 1: *"Just two. The one without the wind reduction and the one with the wind reduction… Yes two options. She recommended (company name) from the start. She said there were other options that I could try and she was open to me trying other options as well but um she said for my particular circumstance (company name) would be the best. Clearly one doesn't know whether there are commercial interests involved in the recommendation from her side but ja, I was happy with the product so I wasn't too concerned about that."*

Participant 2: *"Well look I had tried out the (company name), first and then the (company name) and I decided to go with the (company name)."*

Participant 7: *"I haven't officially bought any yet but I have tried two brands. We tried the hearing aid without the CROS, we tried the CROS and we were still deciding between the (hearing aid model) and the (hearing aid model), and that was when she went on leave."*

<u>Recommended amount of hearing aids to trial by the hearing aid user</u>

Furthermore, all participants were then asked to recommend the number of hearing aids they would have liked to trial before making their decision (i.e. different brands or styles). Four participants felt that trialing one set of hearing aid(s) was more than enough as seen in their statements below:

Participant 3: *"Only that one. If I did not feel there was a difference, I would tell her I wanted to try more hearing aids but I was happy and comfortable with this one. She definitely asked me said to me she was going to give it to me for two-weeks and then*

I must come back and tell her how I feel about it. If I'm not comfortable she was going to give me another one to try."

Participant 5: *"And again, with my poor experience from the other ones, the change and improvements was so vast I didn't feel like looking any further to try another."*

Participant 6: *"The one was more than enough for me because it worked. If it didn't work, I would have asked to try others...I didn't need to try another because when I stepped out the office, I already noticed the difference so this one worked and it was enough for me… No but I only needed the one brand because it worked so I didn't need to try others. I think if someone tries out hearings aids and they are not happy then they must try another brand."*

Participant 8: *"Look I suppose if I… you know, listening to the options and what was available I think the ones I have are pretty much the best, but, you know, I would say top out of the three tiers, so uhm, I wasn't gona try something cheaper or you know, I was happy with… with the affordability that I could afford these, a, and b, because of the functionality."*

Whilst the remaining four participants felt that trialing two hearing aids is beneficial so that the individuals are afforded the opportunity to compare the different styles or brands.

Participant 1: *"Just two. I think I was very happy with the first two."*

Participant 2: *"Not too many because I find It boggles my brain, I become confused. 2 would have been sufficient for me."*

Participant 4: *"I tried different ones like I said before switching to (company name) I first tried the (company name) for about a week because that was when I switched from (company name) I tried (company name) for a week then went back to them and they then said do you want to try (company name) which I did and then you know when I made my final decision I decided to go for (company name). There was another one I tried at some stage the last time, (company name), ja, uhm… I only tried them for a couple of days and well maybe they were set 100% correctly, I didn't find them to work all that well."*

Participant 7: *"Ja, it's difficult to say because I was actually uhm ready to go for*

the (company name) but then there was a problem with the CROS again on the settings that she had changed, so, it's difficult to say, I mean if there is something better on the market with more natural sound I would have preferred to try that as well."

THEME 4: COUNSELING

All participants were further asked questions relating to counseling. Two sub-themes emerged and are represented and further discussed in figure 10 below.

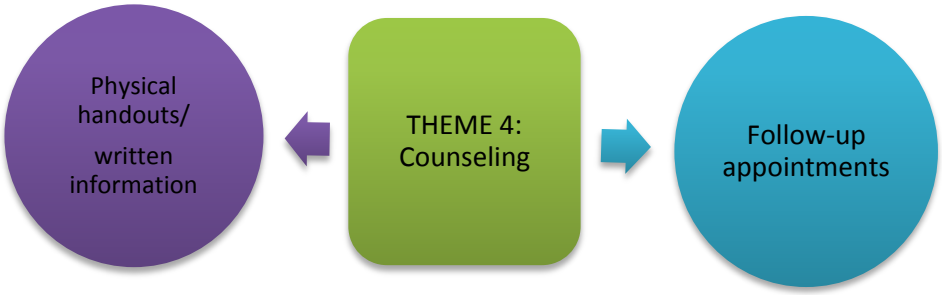


Figure 10: Diagrammatic representation of theme 4 and its subsequent sub-themes

Subtheme 1: Physical handouts/written information

Participants were asked whether they received physical handouts or any materials during the fitting and trialing process. Five participants reportedly did not receive sufficient information. Subsequently, they took matters into their own hands by searching online for information, particularly on hearing aid orientation. These are seen in their statements below:

Participant 1: *"I think it might have been useful to have some written information about maintenance of the hearing aid. I mean she did explain it to me but I'm 66 so I forget stuff so I went onto the website, the (company name) website and there was information there but it wasn't as complete as I would of liked to have seen it."*

Participant 4: *"Yes, ja you know and I could study it through in my own time and so*

on. Not only pamphlets but I even did some research on the internet and so on as well. The audiologists suggest I do that."

Participant 5: *"Oh yes, the pamphlets, the website, uhm and everything. And I did a real good study while we were in the phase of considering what to do because the options were two different makes. I read everything. I'm very analytical by nature so I read up and… and I really had all the information I needed to make my decision. I found the information on my own, the makes, the names and everything from the pamphlets and I took it from there. I had everything I needed."*

Participant 7: *"No…no...agh, I Googled it. I did my own research. But I don't have that much information about hearing aids to… to… to agree and say 'ok ja (company name) is the best on the market', that I don't know… I got no clue which one actually is the best on the market."*

Participant 8: *"Initially I did go on the internet to get additional information because I wanted to know how to connect it to my phone so uhm it was explained in the practice but my phone unfortunately as uh not compatible so I had to wait for android to upgrade. And then the minuet I had that I could connect then fully experience the benefit of this set of hearing aids."*

Additionally, five participants described the materials that they were given during the hearing aid orientation. These included pamphlets, user manuals, and cleaning tools.

Participant 1: *"The hearing aid comes in a box with all the bits and pieces and the batteries and cleaning apparatus and so on and there's a very short description on the hearing aid in there she did also obviously, when she did the test the hearing test she did provide that information to me but nothing further than wat I can actually recall right now."*

Participant 2: *"Cleaning material, she told me how to do it and what all the goodies in the box were for and she said to me 'if you struggle and don't*

remember anything, bring it round to my girls and they will do it for you free of charge'. I got a lot of things in my box and she did give me some paper work some reading material."

Participant 3: *"She gave me like a little booklet to go through and if I didn't understand anything, I was to contact her. She made it so simple and straightforward but at the end of the day I just had to wear it to experience it for myself. She explained very well how to take care of it and clean it and how to change the filters and keep it dry, and open it at night when it's not used and how to preserve battery life. She didn't just give me the booklet to figure it out on my own she showed me everything herself step-by-step. I'm a person who hates reading instructions, if I don't know how to work something then that will go into the cupboard and goodbye it won't be used. I don't want to read books I want something to work immediately. She said to me: 'when I'm finished with you, you won't need to read the book, I'm going to show you step-by-step'. And she did, it was super."*

Participant 6: *"I was given a lot of pamphlets that came with my box and instruction manual. The only thing I would have liked is if the audiologist wrote down what each program was for or when to use them. But I did eventually figure it out myself it would've been nice to have in the beginning. Oh yes, she explained everything to me but hearing aids are very simple and straight forward I didn't need much more information than what she told me."*

Participant 8: *"Uhm look I got little box with all the stuff and a pamphlet on what to do and uhm there was also like a list of their contact numbers if I need anything and ja that kind of stuff."*

Subtheme 2: Follow-up appointments

Furthermore, participants were asked whether they were offered follow-up appointments post hearing aid fitting, during and/or after the hearing aid trial. Only

one participant did not revisit his audiologist for a follow-up as he did not feel adjustments were needed. The audiologist did however keep in contact with him throughout the process via email.

Participant 5: *"Everything was right there was no adjustments needed whatsoever. I didn't go and see her but we communicated via email and via phone and so on, she checked up whether if I was fine and happy or if I needed adjustments and there was no adjustments needed."*

Majority of participants did follow-up with their audiologists for adjustments and counseling. Most participants visited their audiologist more than once throughout the trial period.

Participant 1: *"Ja, in that three-week period I think I visited her three times or four times in that period and made some adjustments and programming etc."*

Participant 2: *"I went in a few times in between with niggly things that I wasn't happy about and they immediately sorted them out."*

Participant 3: *"Ja, she even gave me her cell number to phone after hours if there was a problem or if I wasn't satisfied with something."*

Participant 7: *"Yes, oh yes… yes sometimes it was actually two times a week Uhm that she did adjustments and ja… ja I definitely did."*

Participant 8: *"Uhm obviously you know it's (audiologist). I pretty much was asked to come back into the practice, uh… just to have a check-up and to see if I as happy with them and to make sure the setting were where at how I want. And that happened after the three-week period ja so I would, I would... if you ask me for an opinion in terms of recommendation, I would say I think it's important that you do that, try it out and then go back in and ... I would give it 2-3 weeks and then go in and let them just check settings again. Because I think it's like probably listening to something that's like with a headset like music you know at first you think its loud*

and then the ears get used to it but they might need a little bit louder, so just to get those settings right. ja so I think you need to go back, you not gona be satisfied or get the full benefit from the hearing aid that you could be if you don't."

THEME 5: FAMILY, WORK, SOCIAL:

During the interviews, participants mentioned hearing aid attributes to their work, social and family relationships throughout the trialing and hearing aid fitting process. Thee sub-themes emerged as depicted in figure 11 below:

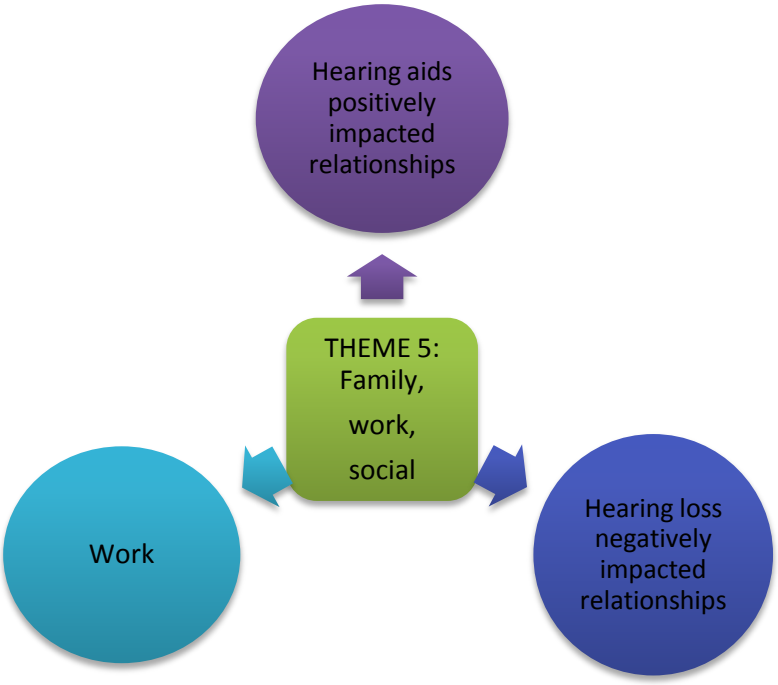


Figure 11: Diagrammatic representation of theme 5 and its subsequent sub-themes

Subtheme 1: hearing aids positively impacted relationships

Throughout the text, the researcher identified the theme of hearing aids positively impacting the participants' relationships. Four participants expressed benefits from their hearing aids in their personal relationships, work life and in social situations. Participants felt that hearing aids were the best option for them in making their lives easier in these departments.

Participant 1: *"My wife doesn't complain that she has to repeat everything that's*

the biggest benefit."

Participant 1: *"In social situations I obviously hear a lot better."*

Participant 2: *"But for work I do wear them and they are a big help there's no doubt about it."*

Participant 4: *"Without them you know, you expect… how can I say… your personal life, business life, wouldn't exist."*

Participant 8: *"I think between my wife and daughter and audiologist and my son to a degree telling me that it was ok to be wearing hearing aids. They couldn't see it. There wasn't a stigma and just uhm being able to hear and not be told listen that's not what we are talking about. I think the closest are your family and that would be the guys that give the support and encouragement to just wear it. If you go to the psychology of people, we all resist change, initially, and then gradually we then accept the change. So, I supposed initially denial I don't need them. Then rejecting them, one you experience the benefits you reinforce them from people around you argh well then its ok this is a great thing to have."*

Subtheme 2: Hearing loss negatively impacted relationships

Three participants expressed how their hearing loss negatively impacted their personal life especially with their family and their spouses. These issues related to the period before purchasing hearing aids or when their hearing aids were not fitted and programmed correctly from previous audiologists.

Participant 2: *"And often people talk to me when I'm not looking at them and then I don't hear and they can't understand why I'm not answering them back. And that's the same kind of problem I have at home with my husband. He will call for me and he talks to me and I don't hear him when he's not facing me and he can't understand that, he said to me but if you got them in you should hear me. I said I can't hear you if you not talking directly to me. The TV is on and his talking and his*

not talking clearly… we have a lot of fights and arguments about that."

Participant 2: *"I have taken a break at home my husband gets very fed up with me."*

Participant 4: *"I used to at one stage because my hearing aids not being set 100%, this is before moving to (audiologist), I think my hearing aids weren't tuned correctly and I missed so much with regard to normal conversation, not only at the office but I found myself to socially withdrawal a little bit. And from that perspective I think anybody that suspects that hearing is not good enough must get hearing aids it makes a big difference."*

Participant 8: *"The kids and my wife would say 'can't you hear what we are saying to you?'. We would be in a conversation and I would reply in conversation on a specific word and they would say 'we didn't say that' 'where did you come up with that'. My mind would make up its own conversation sometimes. That was the biggest criticism. And we used to joke about it because you don't think that you deaf. The spectrum of deafness is I can hear as opposed to I can hear nothing and that in-between stage is what you don't realise because its gradual and you adapt to it or you think you adapt to it. Until someone shows you. The moment I got the hearing aid that as confirmation that this was all the stuff I was actually missing out on."*

Subtheme 3: Work

One participant mentioned that her hearing aids benefited her in her work environment.

Participant 2: *"But for work I do wear them and they are a big help there's no doubt about it."*

Conversely, two participants expressed how even with the hearing aids, they still struggled to communicate in their working environment, especially in a busy or noisy

setting. Participant four described how he positions himself in meetings so that he can access speech from all directions in the room.

Participant 4: *"Without them you know… you expect, how can I say, your personal life, business life wouldn't exist… Being a professional architect I share meeting and building sites, all the people that work with me know already you know lengthwise the chair in the middle is mine so that I can reply to everybody, otherwise it very difficult uhm even with hearing aids if more than one person is talking at the same time it's difficult for me to follow them."*

Participant 7: *"…But in an office, in a room with people, it was actually not the experience I thought I would have… But what I wanted it for uhm to have better hearing in the office, my office situation. Uh, what I also experienced is that when I speak to two or three people at the same time so we a group. And maybe 2 of them start talking together I couldn't make out where this is coming from or what they are saying. So that was very disappointing because I thought wearing hearing aids, talking to a person in front of you, you will hear exactly what they saying and sometimes I still had to ask them 'sorry what did you say'? and although I had the hearing aids in the words and the sounds, it wasn't very clear."*

CHAPTER 5: DISCUSSION

The following chapter combines, addresses and discusses the results obtained from the online survey as well as the interviews as described in chapter four. The results from the two phases will be discussed in relation to literature from both local and international sources.

In South Africa, health care professionals such as audiologists and speech therapists in urbanized and densely populated provinces such as Gauteng and Western Cape tend to provide private services more than the public sector services (Pillay et al., 2020). For the less populated provinces like Limpopo, Northern Cape, North West and Mpumalanga, the converse is true with more health care workers in the public sector. Nationally, there are only 22% of audiologists and speech therapists employed in the public sector (Pillay et al., 2020).

To date, the private sector in South Africa dominates the healthcare sector, attracting majority of professionals, even though the country has a larger public sector (Breytenbach et al., 2015). The audiologists in this study compliment the findings by Swanepoel (2006), as well as Ward et al. (2014) who discuss a shortage of key healthcare workers in the rural-urban and public-private divides within in the country. Additionally, the public sector caters for approximately 84% of the population while only 16% of South Africans are served by the private sector. This inequality of services is unfortunately further worsened by unequal access to services between and within the urban and rural public sectors (Pillay et al., 2020).

Moreover, according to WHO (2019) approximately one third of individuals over the age of 65 are affected by a disabling hearing loss. The mean age of hearing aid users in the current study was 60.3, slightly younger than the 'typical norm'. This may be due to hearing loss presenting in the earlier stages of life due to occupational, recreational or medical reasons. In the United Kingdom, it is estimated that 12% of adults between the ages of 55-74 have a significant hearing loss that must have been present for at least a decade, with only 3% of those individuals actually using a hearing aid (Health24, 2017). A survey conducted in the United States found that more than half of the 'baby boomer' generation, between 41-59 years of age, have a hearing loss. The survey also revealed that only 42% of those individuals who had a severe hearing loss actually purchased and wore hearing aids (Health24, 2017). Locally, in 2017, approximately 10% of the population had a significant hearing loss, with only 2% of those individuals seeking help and treatment. Health24 (2017) also stated that, on average, it takes South Africans seven years to seek help for their hearing difficulties.

Looking at Louw et al. (2018) study on hearing loss in primary health care clinics in South Africa, the majority of individuals presented with a bilateral loss, as seen in this study, most commonly due to presbycusis (age-related hearing loss). The two participants (both female) who had a unilateral hearing loss were under the age of 60 years who had an acquired loss and thus not age-related. Men in particular, are more likely to acquire a hearing loss than woman (hearingaids.com, 2018). In fact, a study at the John Hopkins University in 2008 found that men are five times more likely to develop a hearing loss than women. This was observed in the current study, as more than half of the participants were male

Hearing aids

With new advances in technology such as the digital hearing aid, there are a number of advantages over the "old school" analogue hearing aids. These include: digital feedback and noise reduction, increased comfort, smaller size, open fit designs, and speech enhancement (McCormack & Fortnum, 2013). With this, audiologists now have greater flexibility when choosing the best technology for their patient's hearing needs. The majority of audiologists in this study supplied and fitted three or more brands of hearing aids during their fitting practices to provide their patients with a variety of options. This created the opportunity to problem solve which style or level of technology to recommend to their patients and which would benefit their personal needs the most. Furthermore, hearing aid manufacturers have provided audiologists with huge improvements in technology, hearing aid software, and tools - with a resultant increase in patient satisfaction (Purdy, 2001). Therefore, when it comes to choosing the right hearing aid the question of "who is the driving force behind the decision making?" was explored. The majority of audiologists in the study stated that decisions regarding the brand and style of the hearing aid is a collaborative decision between the audiologist and the patient. Only in situations where patients are uncertain do the audiologists make a decision on the behalf of the patient. This means that hearing aid users rely on the support, guidance and expertise of their audiologists when choosing a hearing aid. These results correlate with Abdellaoui and Huy's (2013) study on success and failure factors for hearing aid prescription, where audiologist's recommendation, followed by the price of the hearing aid, and the success of the hearing aid trial, were the factors leading to success. Turan et al. (2019) state that considering the degree, type and configuration of a hearing loss

when choosing a hearing aid increases the successful outcomes of hearing aid fittings with its useful implementation.

Purdy (2001) on the other hand, stated that the patient and the audiologist should be equally involved in the hearing aid fitting process and that they both have responsibilities regarding hearing aid selection and fitting. If each party participates and attends to their unique responsibilities, then it is more likely that the hearing aid fitting is successful. Majority of hearing aid users in the study happily reported that they put their trust in their audiologist to make the decision for them on which hearing aid to choose because, as the professional, they know better. Only two participants stated that the decision was made together with their audiologist, and one participant chose the hearing aid himself as he already knew beforehand which hearing aid he wanted, based on the features and capabilities he was seeking. Thus, according to the results, the researcher is in agreement with Abdellaoui and Huy (2013) whereby the audiologist's advice played an important role in hearing aid acquisition. The audiologist is therefore the driving force on the decision making when it comes to choosing the brand or style of the hearing aid for their patients.

Majority of audiologists in the current study reported that their patients most commonly complained about the comfort, hearing aid size, and the battery life of the hearing aid. Colour and style were the least reported physical complaints. The hearing aid users in the current study differed in their perspectives regarding the physical appearance of the hearing aid itself. Some stated that size did play a part in their decision making, in which hearing aid to choose as they preferred a smaller more comfortable hearing aid that was less noticeable at first glance. Gallagher and Woodside (2018) conducted a study on factors affecting hearing aid adoption in adults, where participants reported vanity and stigma as reasons for not using hearing aids. With different brands, styles, colours, and sizes of hearing aids available, there are many options to choose from, each providing unique characteristics for each specific patient. An elderly individual may prefer a bigger hearing aid with a bigger battery size due to manual dexterity or eye-sight deterioration, whereas a young adult may prefer a smaller less noticeable hearing aid. Some hearing aid wearers are reluctant to use the devices because of the stigma attached to hearing aid use. The users may feel that accepting hearing aids

can be seen as an admission to oneself (and others) that they are old, (Dawes et al., 2014) thus often choosing not to purchase or hearing aids for this reason.

Two of the participants expressed that their hearing aids were not fitted perfectly in terms of size, they were too big. After a period of time while wearing the hearing aids they felt some degree of discomfort. It can thus be argued why hearing aid trials are important so that the hearing aid users are afforded the opportunity to wear the hearing aids whilst they are on their trialing period. Additionally, they are able to revisit the audiologist to express their concerns on the discomfort and have the opportunity for their hearing aids to be altered accordingly. Moreover, most of the participants mentioned how they found their hearing aids to be most comfortable. Again, with advances in technology, comfort of the hearing aid is an area that has been improved over the past decade with the biggest change being the decreasing size of the hearing aid.

Hearing aid technologies have improved immensely over the past decade with advances in feedback suppression, trainable hearing aids, and Bluetooth connectivity (Starkey, 2017). These innovations have in turn shaped hearing aid provision and use. Bluetooth technology is the most recent advancement in hearing aids. The benefits of using Bluetooth hearing aids include: higher sound quality, hands free phone calls, customized control, greater flexibility, wireless technology, signal stability, binaural hearing, improved music listening experiences and communication (Hearing Better, 2012). To date, technology is continuously changing and adapting to make our lives easier. Half of the participants pointed out that the connectivity of their hearing aids to their cell phones was their main beneficial feature, especially when offered during the trial period. The participants' best reported feature from the connectivity is the ability to stream phone calls and music, adjust the programs/settings, as well as the volume of the hearing aids via their cell phones. These results show that there should be no assumption regarding age or level of technological knowledge. Hearing aid users want to be afforded the opportunity to connect to their smart phones and adjust their hearing aids accordingly. The current wave of technological advances and smartphone technologies provides the hearing aid users with greater opportunities to improve subjective outcomes (Starkey, 2017).

Audiologists in the study stated that their patients rarely return their hearing aids once fitted, or, that one in every five returned their hearing aids at most. Audiologists reported the following reason for the return of hearing aid: death (the hearing aids are returned by a family member), discomfort of the hearing aid, financial implications, dissatisfaction from the hearing aid and that the hearing aids didn't reach their expectations. Some similarities can be seen in Hong et al's. (2014) study on clinical reasons for hearing aid returns in Korea from 1138 hearing aid users who were prescribed hearing aids over a three-year period. They found that ineffectiveness of the hearing aid, noise (such as feedback), over-amplification, managing and handling the devices, and lastly, financial aspects were the most common reported reasons for hearing aid returns. Despite advances in technology 3-16% of individuals in their study returned the hearing aids over the three-year period.

Additionally, Gallagher and Woodside (2018) found that, in certain situations, most hearing aid users experienced difficulties with background noise when using a telephone, or in a crowded place. Many of the hearing aid users still struggled when using hearing aids and did not always find maximum benefit from wearing them. Some of their reasons for not wearing hearing aids included stigma, not providing enough benefit, vanity, discomfort, and not feeling the need to use it. More than half of the audiologists in the current study reported that their patients complained about background noise as a negative factor whilst wearing hearing aids with feedback, echo and loudness being the next most common complaints. Dawes et al. (2014) found that background noises and surrounding sounds were the most common complaints reported by hearing aid users. Additionally, some of their participants developed listening strategies to help with their aided listening. For example, one of their participants reported sitting with his back to a wall to minimise noise in a crowded area. Other participants chose restaurants with good acoustics and low levels of background noise to optimise their listening environments. In the current study, one of the participants described how he positions himself in the middle of a boardroom table during meetings so that he can receive equal levels of amplification from all the colleagues surrounding him. According to Health24 (2017) in the workplace, hearing aid users experience difficulties hearing and understanding phone calls and conversations with co-workers, with around 23% of individuals who wear hearing aids reporting that their hearing loss affected their work. Earlier on it

was discovered that the majority of audiologists reported background noise as one of the most common complaints of the hearing aids expressed by their patients. Similarly, more than half of the hearing aid users from the interviews expressed background noise as their main downfall when it came to wearing hearing aids. On the other hand, one participant expressed how her only challenge experienced with hearing aids was not with regard to the functionality of the hearing aid itself but rather towards remembering to take the hearing aid out before she showered or swam as she had a fear of losing or breaking it. Another participant added that he had no issues with the hearing aid itself, his challenge lied with the stigma attached to wearing hearing aids. Comparing the current study to Dawes et al. (2014), participants reported that becoming used to the hearing aid involved extensive learning on how to maintain and manage the devices. Practical challenges stated by these participants included: 1) Remembering hearing aids and integrating them into their daily routines. 2) Hearing aid comfort- something that was problematic at first but was reduced with use. 3) Manipulating the hearing aid- such as inserting them. 4) Cleaning and maintenance, and lastly 5) Managing the batteries.

McCormack and Fortnum (2013) further conducted a systematic review of a few studies on the potential reasons of why people with a hearing loss did not use their hearing aids. The current study found similarities in the results obtained, these included: fit and comfort of the hearing aid, the hearing aid not being effective in noisy situations thus poor benefit and sound quality. Additional reasons included manual dexterity in terms of handling the hearing aid and manipulating the hearing aid batteries, and lastly, financial reasons. Surprisingly, appearance was found to be one of the least reported reasons for non-use of hearing aids. Dawes et al. (2014) also said that their participant's first experience of hearing aid users reported background sounds that were previously inaudible or quiet were now amplified to distracting or intrusive levels. Some participants reported that they had to wear the hearing aids consistently in order to adjust to the amplified background sounds and after time these sounds became more natural and were no longer troublesome. Four of the participants in the current study however did express challenges towards the hearing aids. These challenges include: surrounding noise, higher expectations from the hearing aids that were not met, speaking over the telephone, and feedback.

The relationship between the audiologist and the patient is considered to be an important aspect. Patients look to their audiologist for their expertise whilst learning about their hearing loss and journeying through the hearing aid acquisition process. Audiologists are expected to provide their patients with the best level of care and services. There is a high level of trust that a patient puts into their audiologist as they seek the best hearing solutions for their lifestyle (Hearing Like Me, 2019). In return, audiologists also learn from their patients by observing their patients' needs and wants with regard to which technology would benefit them the most. This unique relationship between audiologists and patients is a two-way street (Hearing Like Me, 2019). Because hearing loss is an emotional journey and patients look to their audiologists for help and guidance, audiologists play a huge role throughout their journey. In this study, majority of participants expressed that having a good relationship with their audiologist is one of the most important aspects from the whole hearing aid fitting process. Kindness, care, and trustworthiness were the most significant traits that stood out by the hearing aid users when describing their audiologists. In Dawes et al. (2014) study on getting used to hearing aids from the hearing aid users' perspectives, one of their participants also reported that a good relationship with their audiologist was beneficial during the hearing aid acquisition process. The participants found the audiologist to be sympathetic, considerate, and warm which led to the participants being more likely to persist with the hearing aid fitting and follow-up appointments. "The best practice employed by hearing healthcare professionals play a significant role in the success of the patient's hearing aid experience and journey" (McCormack & Fortnum, 2013, p. 367).

The quality of the audiologist's services during an initial appointment has vital implications for the hearing aid user's rehabilitation outcomes. For example, a survey by MarkeTrak (2010) found that hearing aid success outcomes were attributed to audiologist's empathy, professionalism, knowledge and care. Ekberg et al. (2014) assert that interpersonal skills of audiologists such as empathy, a caring nature, and good listening and communication skills have been found to help with patient-centered care and a good therapeutic relationship. Almost half of the hearing aid users in this study pointed out that audiologists need to remember that the hearing aid fitting and purchasing process should be patient centered and not about focusing solely on selling a hearing aid. Hearing aid users want to be empathized and guided

on the process of purchasing a hearing aid, because accepting a hearing loss and acquiring a hearing aid is a life changing event. The right hearing aid for the individual is crucial to successful hearing aid outcomes, thus the users want the audiologists to provide them with the best level of care and services throughout this process.

Ekberg et al. (2014) study examining recording of initial consultations between audiologists and their patients found that audiologists tend to focus on providing the technical information to their patients such as a discussion about hearing aids, rather than responding to the emotional aspects of the patients concerns. Secondly, when the patients raised their concerns, they did not feel like they were responded to in an empathetic manner. One hearing aid user in this study expressed how a good bedside manner from the audiologist is crucial because buying a hearing aid is also an emotional transaction. Research states that an emotionally focused communication dynamic is the key element towards patient-centered care, with the ability to acknowledge the patient's psychosocial needs (Ekberg et al., 2014). This key factor is indicative of a trustworthy, caring health care professional and is the building block for a good therapeutic relationship.

Trial period

After years of experiencing communication difficulties, which undoubtedly impacts a person's life, the decision to try hearing aids brings about all kinds of expectations and fears. These occur due to the hearing loss, and not the hearing aids (Ross, 2002). This study aimed to determine whether the availability of a trial period would influence the next step in the process, which is the decision to then actually purchase hearing aids.

A hearing aid trial period may convince individuals to try amplification who otherwise would not do so. Almost all of the audiologist participants in this study reported that audiologists should be offering trial periods for hearing aids in South Africa as part of their practices. However, only 72.63% of audiologists in the study actually provide hearing aid trials to their patients. 54,84% of these audiologists reported only allowing patients to trial hearing aids on request, while the other 45,16% reported offering the hearing aid trials without it being requested by the patient. These results indicated that approximately 50% of audiologists offer hearing

aid trials to their patients as part of their daily practices. Audiologists who offer trials reported a higher success rate in hearing aid sales and patient satisfaction (Chalmers, 2011; ZipHearing, 2016). Chang et al. (2016) describes how the benefits of hearing aid amplification continue to increase after the initial experience with the amplified signal over a period of 6-12 weeks. This means that the initial adjustment period to hearing aids is one of the most important processes to achieve successful hearing aid outcomes. With this said, not enough audiologists provide the opportunity for their patients to adjust to their hearing aids in order to achieve these satisfactory outcomes. Some users may not even be aware of the opportunity to trial hearing aids if not offered directly by their audiologist.

According to The Hearing Review (2001), some audiologists felt that a trial period is 'counterproductive' giving people who are not ready for hearing aids an 'out', so the only way for a hearing aid to work is if the hearing aid user makes the decision themselves without a choice to return them as characterised in a trial process. Some audiologists in the current study were concerned that they cannot guarantee the safe care and return of hearings aids, which poses insurance risk to their practices. Additionally, audiologists working in public hospitals in particular do not provide trial periods because of staff shortage, long waiting lists for hearing aids, no guarantee of return of hearing aid, and trials not being part of their standard practice. There is a shortage of staff in the rural and government sectors which unfortunately leads to trial periods not being provided.

Hearing aid users in this study found the process of trialing hearing aids beneficial and felt that it should be mandatory. These participants described how the trial period allowed the opportunity to make their own decisions before committing to buying a hearing aid, which in most cases are expensive. Participants who did not undergo a hearing aid trial before reported feelings of dissatisfaction with their hearing aids. Overall, participants expressed that audiologists should offer more than one brand of hearing aids for trialing so that potential users are afforded the opportunity to make an informed decision on which brand and style they prefer. On the whole, participants unanimously agreed that success in using hearing aids is linked to a comprehensive hearing aid trialing. In a study by Ratanjee-Vanmali et al. (2020) on hearing health services, all of their participants indicated that they 'agreed'

and ‘strongly agreed’ that hearing aid trials were beneficial and helped them experience the differences that hearing aids could make in their lives.

The population of individuals who have a hearing loss could suffer from communication difficulties and a restricted social life. These negative effects of hearing loss on QoL can be improved with the use of hearing aids. The hearing aid users who adjust successfully to hearing aids typically experience higher self-esteem compared to those who do not wear their hearing aids regularly and consistently (Chang et al., 2016). All of the audiologists reported that they do believe hearing aid users need time to adjust to their hearing aid(s). If this adjustment period is known, then according to the results, not enough audiologists are providing this service of hearing aid trials to their patients before they make their decision on which brand/style works best for them.

In Abdellaoui and Huy’s (2013) study, 67% of their patients trialed a hearing aid and had a success of 80.6% of cases. Additionally, 59.2% participants purchased a hearing aid after satisfactory trials leaving only 15% who did not purchase a hearing aid. All of the participants reported having a good and positive experience whilst using hearing aids during their trial periods. The hearing aid users stated many benefits in social situations such as being able to hear more clearly all round, improvements in their QoL, as well as benefits in their work, social and home environments. These findings are collaborated by Gallagher and Woodside (2018) whose participants described the increased ability to hear better and decrease communication errors. Considering both of the results, the hearing aid users appear to have greater reported outcomes from their hearing aids when they are afforded the opportunity to a trial period.

According to literature, the most common duration of a trial period is a minimum of 30 days (Dalebout, 2009; Murray, 2009). However, there is no evidence-based practice to support this suggested time period. What is known is that the hearing aid manufacturing companies offer a 30-day return policy for users who wish to return their hearing aids. This period is separate to a hearing aid trialing period.

Gallagher and Woodside (2018) state that hearing aid users have difficulty adjusting to the hearing aids and individuals who did not wear their hearing aids regularly needed a longer time to adjust to them and should persevere during the

initial period of obtaining hearing aids. Audiologists in the current study reported that based on their experiences and practices, hearing aid users require an average of a two-week trial period or a one-month trial period before purchasing the devices. This is evident in their practices as majority of audiologists reported that, on average, they offer a two-week trial period.

Interestingly, hearing aid users in this study reported being given the opportunity to trial a hearing aid up to two months. What is even more intriguing is, four out of eight hearing aid users in this study reported that a one-week trial period is sufficient to make a decision on a hearing aid. The remaining participants felt that two to three weeks is adequate. This provides them with enough opportunity to wear their hearing aids in all environments. A further two participants chose two weeks and another two participants chose three weeks. Looking at both the audiologist's and hearing aid user's responses, one can conclude that a two-week trial period is the most significant duration for a trial period conducted by audiologists and preferred by the hearing aid users. This provides both the hearing aid user and the audiologist enough time to test-drive their chosen hearing aid before the 30-day return policy from the manufacturing company ends.

In cases where up to three brands of hearing aids are trialed, audiologists reported that more than half of patients end up choosing the first hearing aid they trialed. These results indicate a preference for the first hearing aid trialed. This may be due to the users remembering the immediate benefits achieved from their first trial. Audiologists further stated that the average number of hearing aids they trial their patients on is two hearing aids, thus giving their patients a choice between two different brands or styles to choose from. However, majority of hearing aid user participants in the study reported trialing one hearing aid with an amount of two hearing aids to trial coming in second. Furthermore, most of the hearing aid user participants stated that if it were their decision, trialing one hearing aid was more than enough, agreeing with the audiologist's responses above. Additionally, there were some hearing aid users who expressed that trialing two hearing aids is beneficial so that they are afforded the opportunity to compare the different styles or brands. These results indicated that trialing only one hearing aid is sufficient for them to make their decision if they would like to buy a hearing aid or not, however, they

would still like to be afforded the opportunity to try a second set of hearing aids in case they want to compare brands or styles.

Hearing aids are said to improve QoL. Hearing difficulty may be reduced with an effective, well programmed, hearing aid. This will also reduce the negative effects of social and emotional interactions caused by a hearing loss (Lotfi et al., 2009). With the use of an effective trial period and the correct duration and amount of hearing aids to trial, this may in turn add to the increase in QoL of hearing aid wearers as they will be able to assess the benefits of the hearing aids in all their social and working environments. In conclusion, as stated by Ross (2002, p.1) “it is only the supervised and positive experience with amplification that converts them from deniers into users. In this perspective, trial periods will increase rather than decrease the number of people who purchase hearing aids”.

Counseling

There are a number of interventions for a person with a hearing loss such as amplification (or assistive listening devices), aural rehabilitation programs, counselling and education (McCormack & Fortnum, 2013). Most of audiologists in this study reported providing counselling to their patients pre, peri and post hearing aid fitting. This counselling incorporated adaption/adjusting to new sounds, cleaning/care of the hearing aids, hearing aid orientation and maintenance, troubleshooting, expectations, and communication strategies. More than half of the audiologists in this study reported providing their patients with physical materials to take home during the hearing aid process. These included: Information on cleaning and care for the hearing aid, troubleshooting guides, hearing aid orientation guides, the contract, pamphlets/brochures, accessories, user manuals and supplier booklets, websites, and details about the hearing aid (warranty, service dates, serial numbers, make and model of hearing aid etc.). This was confirmed by the hearing aid user participants who reported that they were given enough materials during the hearing aid orientation. These included pamphlets, user manuals, and cleaning tools. In the Gallagher and Woodside (2018) study, their hearing aid users reported very little or no instructions on how to care for their hearing aids. These findings correlate with one participant who felt that he was not given enough written information about the hearing aid orientation and maintenance. He expressed due to his age he tended to

be forgetful and would have liked some physical materials to take home with him and instead resorted to searching for information on the internet himself. Lewis et al. (2019) study findings revealed that the bulk of counselling sessions involved realistic expectations and communication strategies. These authors further investigated that very few if any audiologists discussed the psychosocial consequences of hearing loss with the hearing aid users and often did not adequately address these concerns when raised by their patients. This may be due to audiologists feeling less prepared to have these types of conversations. The current study agrees with the finding by Lewis et al. (2019) as very few audiologists from this study included topics on thoughts and emotions, impact on relationships and work, and third-party disability in their counselling. Additionally, patient-centred care was mentioned earlier in which hearing aid user participants felt that audiologists needed to be more empathetically involved in the process of acquiring hearing aids because it is a life changing phenomenon that needs to be discussed.

Adult hearing aid users who receive counselling are more likely to wear their hearing aids consistently with reported positive outcomes in reduction in hearing handicap (participation restriction as per the ICF) (Cienkowski & Saunders, 2013). A study by Hawkins (2005) found that a group of participants displayed a reduction in hearing handicap, improvements to quality of life and better adjustments to hearing loss when counselling was enforced as part of the rehabilitation process. Cienkowski & Saunders (2013) further stated that a lack of training in the area of counselling has contributed to patient dissatisfaction as well as poor adherence to rehabilitation as recommended. Individuals who received counselling addressing expectations showed small but significant changes in expectations compared to those who received no counselling on expectations (Cienkowski & Saunders, 2013). Saunders et al. (2009) also stated that higher expectations were directly associated with better hearing aid outcomes and more hours of hearing aid user a day. Therefore, expectations on hearing aids were directly correlated to hearing aid benefit. Additionally, individuals who received pre-fitting counselling regarding the psychosocial impacts of hearing loss on family relationships as well as communication difficulties, proved to wear their hearing aids more than those who did not receive these forms of counselling (Cienkowski & Saunders, 2013).

There are many factors that affect success and satisfaction from hearing aids such as the user's expectations from the devices, social and psychological factors, general health issues, cost, acoustic characteristics, cosmetic issues created by them and the physical properties of the hearing aids (Turan et al., 2019). Majority of participants in this study agreed that the price of the hearing aids influenced their decision on which brand and level/range of hearing aid to purchase. They also had to take into consideration whether their medical aid would cover the cost or if they were purchasing them privately. In Abdellaoui and Huy (2013) study, financial considerations impacted roughly 30% of the patients fitted with hearing aids, with the cheapest model always chosen. The costs associated with purchasing a hearing aid may be covered by: private insurance, public insurance, out-of-pocket payments by the hearing aid user or a combination of these. However, out-of-pocket and private insurance are the main means of purchasing hearing aids worldwide (Yong et al., 2019).

Five of the participants did further research about their hearing aids above the hearing aid orientation and explanations from their audiologists. They searched for further information from the internet and the manufacturing company's websites. Participants in Gallagher and Woodside's (2018) study reported that a lack of information and support were contributing factors to not using their hearing aids. Some of their participants felt like they did not receive enough information and others felt like they could not follow the instructions even if they were given the information. Some individuals were provided with pamphlets and some were not, but in both cases, they felt that more explanation could have been provided. The current study found similarities as some of the participants did request additional information. Additionally, participants in Dawes et al. (2014) stated that information about hearing aids such as maintenance and what to expect from them would be helpful.

During the hearing aid orientation, new hearing aid users might have difficulty remembering all the crucial information given. The hearing aid user's ability to retain information presented by their audiologist is often limited with 40%-80% of the information being forgotten (Reese & Hnath-Chisolm, 2005). Factors that affect the user's memory ability included: the amount of information provided in one sitting, how organized the provided information is, the use of written and pictorial information and the types of memory tasks used. Reese and Hnath-Chisolm (2005) also stated

that as the amount of information provided increases, the ability to retain that information decreases. Using written or pictorial cues can improve the users recall abilities, however one can argue that the trial period is the ideal time for the hearing aid user to explore the use of their hearing aids, asks questions, return for follow-up visits to be re-educated on the orientation of the hearing aids and to ensure that their knowledge on up keeping the hearing aids is correct.

Regular follow-ups are considered essential to provide support and encouragement to individuals struggling to adjust to their hearing aids (Gallagher & Woodside, 2018). McCormack and Fortnum (2013) also reported that follow-up counseling on hearing aid use can significantly increase the benefit obtained from wearing a hearing aid. 68% (n=89) of audiologists in this study provided follow-up appointments for hearing aid orientation and counselling. This is in agreement with the hearing aid user participants statements as majority of participants reported attending follow-up sessions for adjustments and counseling during and after their trial periods. The same findings were reported in Abdellaoui and Huy's (2013) study, where 89% of the participants returned to their audiologist at least once during the trial period. The reasons for follow-up visits were for adjustments to the settings and difficulty cleaning the devices.

In Gallagher and Woodside's (2018) study on factors affecting hearing aid adoption, the biggest factors included the lack of scheduled follow-up appointments unless initiated by the hearing aid users themselves; audiologists being too busy and thus did not have time for the patients; lack of information on how to look after their hearing aid and lack of support services available to participants. Although some hearing aid users in the current study felt like they could have received more information regarding their hearing aids, there were no complaints regarding follow-up appointments.

Aural rehabilitation

Amongst sensory management devices, in South Africa, hearing aid interventions is the most provided service for aural rehabilitation (Makhoba and Joseph, 2016). Only half of the audiologist participants reported providing aural rehabilitation to their patients in this study. Considering Jessen's (2015, p.2) study on aural rehabilitation in private practices, "audiologists don't have the time or financial resources; clients

are unwilling or unable to commit time, effort, and payment; and audiologists may not have the training or expertise to provide aural rehabilitation". In this study some of the audiologists stated that they did not have the proper training to provide aural rehabilitation services to their patients while others referred their patients to more experienced professionals or did not provide this service at all due to time constraints. In line with Jessen's above-mentioned statement, although aural rehabilitation is part of the undergraduate curriculum in the training of audiologists, it would seem that this training does not adequately equip audiologists for 'real world' settings where these skills will be needed. Only a few (but not enough) audiologists have the necessary training/resources and time to provide these services.

Additionally, in Makhoba and Joseph's (2016) study on the practices of 45 audiologists on aural rehabilitation practices, most of the participants reported that they were poorly trained on aural rehabilitation, particularly, on auditory training, psychosocial adjustment counseling, FM systems, frequent communication partner training and speech reading training. Informational counseling was the most provided counseling compared to the other mentioned types of counseling within the aural rehabilitation program. Participants in Makhoba's study had an interest in aural rehabilitation, however since this interest has not directly translated into current audiology practices, it must be assumed that service provision within this area may possibly be due to limited undergraduate training and/or few available courses. These factors included limited time, resources and training (Makhoba & Joseph, 2016) agreeing with the current study results. Additionally, language barrier and cultural diversity in South Africa are illustrations for the need to develop contextually relevant resources (Makhoba & Joseph, 2016) so that the 11% of participant audiologists in the current study and the rest of audiologists in South Africa who do not provide aural rehabilitation services due to language barrier are able to do so.

Forward thinking, the use of computer-based aural rehabilitation interventions could optimize service delivery in South Africa to save time (Makhoba and Joseph, 2016) and benefit the hearing aid user at home without the extra expense. The lack of resources, tools and staff in South Africa to provide aural rehabilitation is not something that is unknown as many audiologists would rather provide services on what they could and not what they should (Makhoba and Joseph, 2016). There is a limited use of technology such as apps to aid aural rehabilitation provision. Perhaps

if the hearing aid users were made aware of these apps and programs and were counselled on the importance of using them, they would have felt more positive towards their hearing aids. Chisolm, Abrams and McArdie (2004) showed that providing communication programs in addition to the hearing aids increased participants short-term memory gains on outcome measures than those who did not receive these programs. Hearing aid users are often overwhelmed with information during the fitting stages and initial rehabilitation processes. They are expected to remember copious amount of information. This is why it is important to provide consistent and long-term follow-up appointments as part of the AR program (Jessen, 2015).

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

This following chapter provides a summary of the significant findings established from the research. It further describes the strengths and limitations of the research, as well as includes a final conclusion and discussion of the recommendations for further research.

Conclusion

In essence, this study aptly captures the sentiments by Ross (2002) - “I suggest that hearing aid dispensers think of trial periods as an opportunity and not a burden, a way to convince fence-sitters that the water’s fine, come jump right in” (p.3).

In line with the assertions above, this study aimed to determine whether audiologists should offer hearing aid trial periods as part of their hearing rehabilitation process. Additionally, this study explored hearing aid user’s personal experiences of undergoing a hearing aid trial prior to purchasing a hearing aid(s). The results of the online survey (n=95 audiologists) as well as the in-depth interviews with eight hearing aid users confirmed the need and importance of routinely providing hearing aid trials as part of the rehabilitation process. In this regard, audiologists concurred that offering a hearing aid trial prior to purchasing a hearing aid may yield desired outcomes - such as consistent use of the hearing aid, patient satisfaction, low rate of hearing aid returns post-purchase; improved quality of life and active integration of people with hearing loss into social activities, just to mention a few. Similarly, the hearing aid users confirmed that the success of their hearing aid fitting and satisfaction is a result of their hearing aid trials. Moreover, the findings of this study confirmed that hearing aid users want to be afforded the opportunity to explore all their options before investing in hearing aid(s), which are often expensive. They wanted to ensure that they are satisfied and can experience all the benefit these devices have to offer.

Both audiologists and the hearing aid users agreed that a trial period of two weeks is the most suitable duration for a trial period in order to adapt to wearing hearing aids in all environments for optimal hearing aid outcomes and patient satisfaction.

The role of an audiologist is key and influential in facilitating and guiding the aural rehabilitation process. Therefore, audiologists must possess qualities such as trustworthiness, kindness, care, and guidance as these hearing aid users value these qualities in their audiologist. They want to be empathised with and offered the best possible level of care to facilitate this life-changing process from struggling to hear, to hearing better.

Additionally, the hearing aid users emphasized the importance of embracing a patient-centred approach from the beginning to the end of the aural rehabilitation process. Hearing aid users must be offered the space to make decisions regarding their aural rehabilitation journey, in consultation with audiologists as experts. Audiologists must recommend the best level of technology according to the audiogram and their hearing needs of the user, without the user feeling that acquiring the hearing aid was more of a financial transactional benefit rather than rehabilitative benefit. A patient-centered approach is thus crucial because, even though the audiologists are experts; the hearing aid users need to feel part of the process. They need to feel that their views are taken into account and that they are empowered to make decisions about their journey in the rehabilitation process. Ethically, if hearing aid trials are established as improving hearing aid outcomes and QoL, audiologists should be including hearing aid trials into their practices for maximum service delivery as health care professionals. Hearing aid trials should be offered, and thus become standard practice not only within South Africa but internationally as well.

Ultimately, in line with Ross' (2002, p1) "the realization that the sale of these expensive aids will not be finalized until after a successful trial period, it can't help but add a further incentive for dispensers to respond to people's problems and complaints during that period", the provision of a hearing aid trial is not only beneficial to the users, but to the audiologists as well, as they stand to benefit with every hearing aid purchased and successfully fitted. Therefore, identifying factors that affected hearing aid usage is important for formulating appropriate rehabilitation strategies in order to ensure greater use of hearing aids. The research revealed that both the audiologists and hearing aid users needed to be empowered to achieve optimum outcomes from the hearing aids. In return, patient satisfaction from amplification is more likely to be increased with a decrease seen in hearing aid returns.

Furthermore, being cognizant of keeping up with the demands of the twenty-first century society, so much more can be achieved with modern hearing aids and advanced technology. Additional follow-ups are therefore necessary to ensure patient satisfaction and to improve performance of the hearing aid(s). If these follow ups are provided, the incidence of hearing aid returns during a trial period should be significantly reduced. Moreover, it will be more likely that patients will come for their

follow up appointments during their trials periods as opposed to no trial period. Counselling has been noted to be a crucial part of the hearing aid acquisition process and should be conducted pre- peri- and post hearing aid fitting.

In summary, audiologists need to provide an active role in offering hearing aid trials to their patients, especially first time hearing aid users. While returning hearing aid users may not feel the need for a hearing aid trial as they are already used to hearing aid(s), technology is continuously advancing with manufacturers providing more features, improved sound quality, accessories, better comfort and size, these trials should still be offered to all hearing aid users regardless of the patients experience with hearing aids. There is a definite need to provide hearing aid trials. Two weeks seems to be the preferred period and audiologists need to be attentive to the needs of their patients. The process of purchasing hearing aids should be patient-centered with the importance of counselling throughout the whole journey.

Strengths of the study

- To the knowledge of the researcher, this study is the first study conducted on hearing aid trials in South Africa. This study therefore contributes to the field of aural rehabilitation and thus adds value to the importance of hearing aid trials in the field of audiology both locally and globally.
- The study incorporated thematic analysis which is known for its flexibility and has the advantage of being able to highlight similarities and differences throughout the data, bringing about unforeseen insights to reflect on. This study was inductive in nature in that it provided rich information based on personal experiences of hearing aid users undergoing hearing aid trials.
- With the combination of quantitative and qualitative data analysis, any contradictions in terms of the qualitative data against the qualitative data could be described and made sense of. With this triangulation of results, validity of the research was assured.

Limitations of the study

- The themes identified by this population of hearing aid users in South Africa may not be transferable to other populations such as younger adults, children, and individuals from minority groups or other countries.
- During qualitative interviews, although the questions were open-ended and worded neutrally to reduce any interviewer bias, it is possible that the participants may have adapted their responses to how they perceived the researcher would like them to respond.
- Due to the global pandemic of Covid-19, a small sample size of hearing aid users was attained. Additionally, interviews were thus required to be conducted telephonically/online instead of face-to-face.
- A small study sample of eight hearing aid users who have undergone hearing aid trials cannot be generalized to the greater hearing aid population who have experienced a hearing aid trial.

Implications

Findings from this study will provide audiologists with evidence-based knowledge on the importance of doing hearing aid trials, how many hearing aids are recommended to trial per trial period as well as expectations hearing aid users may have during their hearing aid trial(s). It will additionally provide audiologists with a better understanding on what patients are looking for when purchasing hearing aids. It can aid in limiting the number of dissatisfied patients with regard to using and wearing hearing aids. It can inform policies and guidelines on trialing of hearing aids which will not only benefit the patient but also guide the audiologist when choosing a hearing aid best suited to the user's needs. Lastly, this study will contribute to the scarce literature of hearing aid trials both locally and globally.

Recommendations for future research

Owing to the limited literature on hearing aid trials both locally and globally, it may be beneficial to replicate the current study with a greater study sample of audiologists,

and definitely a greater sample of hearing aid users who have experienced a hearing aid trial. By doing this, there will be a broader demographic of hearing aid users undergoing hearing aid trials across South Africa.

Future studies may look at the hearing aid trial protocols employed by practicing audiologists in South Africa. This information will provide more evidence-based practice of hearing aid trials being conducted and additionally be a source for other audiologists to refer to if they want to conduct hearing aid trials.

This study can be seen as a pilot study as it had a small sample; therefore, studies with larger samples are required in order to establish the effectiveness of hearing aid trials.

Lastly, future research may look at private vs public hospitals with regard to hearing aid trials. Relating to this, further studies may consider looking at providing solutions to the limitations presented by audiologists in public hospitals in relation to hearing aid trials.

REFERENCES

Abdellaoui, P., & Huy, T. B. (2013). *Success and Failure Factors for Hearing-aid Prescription: Results of a French National Survey.* Elsevier Masson.

Alexander, M.C. (2018). The 11 languages of South Africa. 2020. https://southafrica-info.com/arts-culture/11-languages-south-africa/

American Speech-language-Hearing Association. (2019, July 18). *Aural Rehabilitation for Adults*. South Africa Gateway. https://www.asha.org/Practice-Portal/Professional-Issues/Aural-Rehabilitation-for-Adults/

American Speech-language- Hearing Association. (2019). *Audiologist Roles and Responsibilities.* https://www.asha.org/Students/Audiologist-Roles-and-Responsibilities/

Anderson, S., & Kraus, N. (2013). Auditory Training: Evidence for Neural Plasticity in Older Adults. *Perspect Hear Hear Disord Res Res Diagn*, 17, 37-57.

Arnold, S., Riches, V.C., Parmenter, T.R., & Stancliffe, R.J. (2009). The I-Can: Using e-Health to get People the Support they Need. *Electronic Journal of Health Informatics, 4(1), 1-7.*

Babbie, E. (2008). *The Basics of Social Research* (4th Ed.). Thomson Wadsworth.

Barker, F., Mackenzie, E., & de Lusignan, S. (2016). Current process in hearing-aid fitting appointments: An analysis of audiologists' use of behavior change techniques using the behavior change technique taxonomy. *International Journal of Audiology*, 55(1), 643-652.

Barrett, J. (2019, June 14). *Telephone Interviews- Advantages and Disadvantages.* Priority Metrics Group: https://pmgco.com/blog-telephone-interviews-advantages-and-disadvantages/

Bhattacharyya, D.K. (2006). *Research Methodology* (2nd ed.). Excel Books.

Blackstone, A. (2012). *Principles of Sociological Inquiry: Qualitative and Quantitative Methods*. Saylor Foundation.

Blood, I.M. (1997). The Hearing Aid Effect: Challenges for Counseling. *Journal of Rehabilitation,* 1, 59.

Boothroyd, A. (2007). Adult Aural Rehabilitation: What is it and does it work?. *Trends in Amplification*, 11(2), 63-71.

Braun, V., & Clarke, V. (2012). *Thematic analysis.* In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbooks in psychology®. APA handbook of research methods in psychology, Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological* (p. 57–71). American Psychological Association. https://doi.org/10.1037/13620-004

Breytenbach, D., Kritzinger, A., & Soer, M. (2015). Audiology practice management in South Africa: What audiologists know and what they should know. *South African Journal of Communication Disorders*, 62(1), Art. #114, 9 pages. http://dx.doi.org/10.4102/sajcd.v62i1.114

Brink, H., Van der Walt, C., & Van Rensburg, G. (2005). *Fundamentals of research methodology for health care professionals*. Juta and Company Ltd.

Campbell, E. (2012). Federal Regulation of Hearing Aids. *Audiology Today,* 66-69.

Chalmers,C. (2011, October 12). *Consumer Protection Laws and Regulations for Hearing Aid Purchases*. Agx Hearing. https://www.agxhearing.com/2011/10/12/consumer-protection-laws-regulations-for-hearing-aid-purchases/

Chang, Y.S., Choi, J., Moon, I.J., Hong, S.H., Chung, W.H., & Cho, Y.S. (2016). Factors associated with self-reported outcome in adaption of hearing aid. *Acta Oto-Laryngologica,* 136(9), 905-911

Chisolm,T., Abrams, H., & McArdie, R. (2004). Short-and-long-term outcomes of adult audiological rehabilitation. *Ear and Hearing*, 25, 464-477.

Cienkowski, K., & Saunders, G.H. (2013). An Examination of Hearing Aid Counselling Implemented by Audiologists. *ASHA Wire*, 20(2), 67-76. https://doi.org/10.1044/arii20.2.67

Creswell, J.W., & Clark, V.L.P. (2011). *Designing and Conducting Mixed Methods Research* (2nd Ed.). Sage Publications.

Creswell, J.W. (2015). *A Concise Introduction to Mixed Methods Research*. Sage Publications.

Dahmen, J.C., & King, A.J. (2007). Learning to hear: plasticity of auditory cortical processing. *Current Opinion in Neurobiology*, 17, 456-464.

Dalebout, S. (2009). *The Praeger Guide to Hearing AND Hearing Loss: Assessment, treatment & prevention*. Greenwood Publishing Group.

Danermark, B., Cieza, a., Gange, J., Gimigliano, F., Granberg, A., Hickson, L., Kramer, S.E., McPherson, B., Moller, C., Russo, I., Stromgren, J.P., Stucki, G., & Swanepoel, D. (2010). International Classification of Functioning, Disability, and Health Core Sets for Hearing Loss: A discussion Paper and Invitation. *International Journal of Audiology*, 49, 256-262.

Dawes, P., Maslin, M., & Munro, K.J. (2014). 'Getting used to' hearing aids from the perspective of adult hearing-aid users. *International Journal of Audiology*, 53, 861-870

De Bord, J. (2014). *Informed Consent.* UW Medicine. https://depts.washington.edu/bioethx/index.html

deWit, S.C., & Kumagai, C.K. (2013). *Medical-Surgical Nursing Concepts and Practice*, (2nd ed.). Elsevier Saunders.

Dillon, H. (2012). *Hearing Aids*. Thieme.

Ekberg, K., Grenness, C., & Hickson, L. (2014). Addressing Patients' Psychosocial Concerns Regarding Hearing Aids Within Audiology Appointments for Older Adults. *American Journal of Audiology*, 23, 337-350

Emmett, S.D., & Francis, H.W. (2015). The Socioeconomic Impact of Hearing Loss in US Adults. *Otol Neurotol*, 36(3), 545-550.

Ferguson, M., Brandreth, M., Brassington, W., & Wharrad, H. (2015). Information Retention and Overload in First-Time Hearing Aid Users: An Interactive Multimedia Educational Solution. *American Journal of Audiology*, 24, 329-332.

Ferguson, M.A., Woolley, A., & Munro, K.J. (2016). The impact of self-efficacy, expectations, and readiness on hearing aid outcomes. *International Journal of Audiology,* 55, S34-S41

Food and Drug Administration (2018, January 16). *Types of Hearing Aids*: U.S. Food and Drug Association. https://www.fda.gov/medical-devices/hearing-aids/types-hearing-aids

Gabriel, D. (2013, March 17). Inductive and deductive approaches to research. https://deborahgabriel.com/2013/03/17/inductive-and-deductive-approaches-to-research/

Gallagher, N.E., & Woodside, J.V. (2018). Factors Affecting Hearing Aid Adoption and Use: A Qualitative Study. *J Ann Acad Audiol,* 29, 300-312

Giroud, N., Leme, U., Reich, P., Matthes, K.L., & Meyer, M. (2017). The impact of hearing aids and age-related hearing loss on auditory plasticity across three months- An electrical neuroimaging study. *Hearing Research*, 353, 162-175.

Goodwin, C.J. (2009). *Research in Psychology: Method and Design* (6th ed.). John Wiley & Sons.

Guest, G., MacQueen, K.M., & Namey, E.E. (2012). *Applied Thematic Analysis*. Sage Publications.

Hanekom, S. (2019, October). *The importance of ethical clearance in research*. University of Stellenbosch business school.https://www.usb.ac.za/usb_food_for_thought/the-importance-of-ethical-clearance-in-research/

Hawkins, D. (2005). Effectiveness of counselling based aural rehabilitation programs: A systematic review of the evidence. *Journal of the American Academy of Audiology, 16*, 263–272.

Health24. (2017, December 14). *An epidemic of deafness is spreading.* https://www.health24.com/Medical/Hearing-management/Noise/An-epidemic-of-deafness-is-spreading-20120721

Hearing Better. (2012, November 23). *Hearing Aid Reviews: Benefits of Bluetooth.* People Hearing Better. http://phb.secondsensehearing.com/content/hearing-aid-reviews-benefits-

bluetooth#:~:text=Binaural%20Hearing%2D%20Bluetooth%20technology%20allows,just%20one%20but%20both%20ears.

Hearing Like Me. (2019, February 13). *Why is the audiologist-patient relationship so important?.* HearingLikeMe.com. https://www.hearinglikeme.com/why-is-the-audiologist-patient-relationship-so-important/#:~:text=The%20relationship%20between%20an%20audiologist,hearing%20solutions%20for%20their%20lifestyle.

Health Professions Council of South Africa. (2020). *Statistics.*: https://www.hpcsa.co.za/?contentId=412&actionName=Publications

Hearingaids.com. (2018, June 21). Why hearing loss affects men and woman differently. Hearingaids.com. https://www.hearingaids.com/2018/06/21/why-hearing-loss-affects-men-and-women-differently/

Hearing Tracker. (2020, August 31). *Hearing Aids. The Ultimate Guide: Types, Features, Prices, Reviews, and More.* https://www.hearingtracker.com/hearing-aids#a-hearing-aid-brands

Hong, J.Y., Oh, I-H., Jung, T.S., Kim, T.H., Kang, H.M., & Yeo, S.G. (2014). Clinical Reasons for Returning Hearing Aids. *The Korean Audiological Society,* 18(1), 8-12

In, J. (2017). Introduction of a pilot study. *Korean Journal of Anesthesiology*, 70, 601-604

Jamison, W. (2007). *Confidentiality in Social Science Research*. Worcester Polytechnic Institute. https://www.wpi.edu/academics

Jessen, D. (2015). Aural Rehabilitation in Private Practice. *Perspectives on Aural Rehabilitation and its Instrumentation*, 22, 15-25, American Speech-Language-Hearing Association. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589943779&section=References

Knudsen, L.V., Oberg, M., Nielsen, C., Naylor, G., & Kramer, S.E. (2010). Factors Influencing Help Seeing, Hearing Aid Update, Hearing Aid Use and Satisfaction With Hearing Aids: A Review of the Literature. *Trends in Amplification*, 3, 127-154.

Kormaz, M.H., Bayir, O., Er, S., Isik, E., Saylam, G., Tatar, E.C., & Ozdek, A. (2016). Satisfaction and compliance of adult patients using hearing aid and evaluation of factors affecting them. *Eur Arch Otorhinolaryngol*, 273, 3723-3732

Kost, R.G., & da Rosa, J.C. (2018). Impact of survey length and compensation on validity, reliability, and sample characteristics for Ultrashort-, Short-, and Long-Research Participant Perception Surveys. *Journal of Clinical and Translational Science*, 2, 31-37

Kostanjsek, N. (2010). Use of the International Classification of Functioning, Disability and Health (ICF) as a conceptual framework and common language for disability statistics and health information systems. *BMC Public Health*, 11, 1471-2458.

Lavrakas, P.J. (2008). *Purposive Sample. Encyclopedia of Survey Research Methods*. Sage Research Methods. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n419.xml

Lavrakas, P.J. (2008). Gatekeeper. *Encyclopedia of Survey Research Methods.* Sage Research Methods. https://methods.sagepub.com/reference/encyclopedia-of-survey-research-methods/n200.xml

Lewis, S., Hungerford, M., & McMillan, G. (2019). Audiological Counseling Practices: Survey of VA Hearing-Aid-Dispensing Audiologists. *Audiology Today*, 31(4), 14-27

Lin, F.R., Metter, E.J., O'Brien, R.J., Resnick S.M., Zonderman, A. B., & Ferrucci, L. (2011). Hearing loss and incident dementia. *Archives of Neurology*, 68, 214-220. http://dx.doi.org/10.1001/archneurol.2010.362

Lotfi, Y., Mehrkian, S., Moossavi, A., & Faghih-Zadeh, S. (2009). Quality of Life Improvement in Hearing-Impaired Elderly People after Wearing a Hearing Aid. Archives of Iranian Medicine, 12(4), 365-370

Louw, C., Swanepoel, D-W., Eikelboom, RH., & Hugo, J. (2018). Prevalence of hearing loss at primary health care clinics in South Africa. *Afri Health Sci.* 18(2): 313- 320. https://dx.doi.org/10.4314/ahs.v18i2.16

Makhoba, M., & Joseph, N. (2016). Practices and views of audiologists regarding aural rehabilitation services for adults with acquired hearing loss. *South African Journal of Communication Disorders,* 63(1), a155. http://dx.doi.org/10.4102/sajcd.v63i1.155

McCammon, B. (2019). *Semi-Structured Interviews.* MeriemKBlog. http://designresearchtechniques.com/casestudies/semi-structured-interviews/

McCormack, A., & Fortnum, H. (2013). Why do people fitted with hearing aids not wear them? *International Journal of Audiology*, 52, 360-368.

McCormick, B. (2016, January 19). *Top 5 benefits to wearing hearing aids*. Starkey. https://www.starkey.com/blog/2016/01/5-benefits-of-hearing-aids

Merabet, L.B., Rizzo, J.F., Amedi, A., Somers, D.C., & Pascual-Leone, A. (2005). What blindness can tell us about seeing again: merging neuroplasticity and neuroprostheses. *Neuroscience,* 6, 71-76.

Metz, M.J. (2014). *Sandlin's Textbook of Hearing Aid Amplification: Technical and Clinical Considerations* (3rd Ed.). Plural Publishing Inc.

Moroe, N., & Vazzana, N. (2019). *Ageing and the disuse of hearing aids in elderly people diagnosed with presbycusis at an old age home*. African Health Sciences. 19 (2), 2183-2188

Murray, N.T. (2009). *Foundations of Aural Rehabilitation: Children, adults, and their family members* (3rd Ed.). Delmar Cengage Learning.

Ng, J.H., & Loke, A.Y. (2015). Determinants of hearing-aid adoption and use among the elderly: A systematic review. *International Journal of Audiology*, 54, 291-300.

O'Daniel, M., & Rosenstein, A.H. (2008). *Professional Communication and Team Collaboration*. NCBI. https://www.ncbi.nlm.nih.gov/books/NBK2637/

Oregon State University. (2016). *Deception in Research*. Oregon State University. https://research.oregonstate.edu/irb/deception-research

Owonikoko, T.K. (2013). Upholding the Principles of Autonomy, Beneficence and Justice in Phase I Clinical Trials. *The Oncologist,* 18(3), 242-244.

Peer, S. (2015). Turning up the volume on hearing loss in South Africa. *South African Medical Journal*, 105(1), 31-32

Pillay, M., Tiwari, R., Kathard, H., & Chikte, U. (2020, July). Sustainable workforce: South African Audiologists and Speech Therapists. Research Gate. https://www.researchgate.net/publication/342608844_Sustainable_workforce_South_African_Audiologists_and_Speech_Therapists

Plotnick, B. (2018). *Hearing loss symptoms.* https://www.healthyhearing.com/help/hearing-loss/symptoms

Ponton, C.W., Vasama, J., Tremblay, K., Khosla, D., Kwong, B., & Don, M. (2001). Plasticity in the adult human central auditory system: evidence from late-onset profound unilateral deafness. *Hearing Research*, 154, 32-44.

Popelka, G.R., Moore, B.C., Fay, R.R., & Popper, A.N. (2016). *Hearing Aids*. ASA Press.

Preminger JE, Oxenbøll M, Barnett MB, Jensen LD, Laplante- L´evesque A. (2015). Perceptions of adults with hearing impairment regarding the promotion of trust in hearing healthcare service delivery. Int J Audiol 54(1):20–28.

Purdy, J. (2001). *Roles in Successful Hearing Aid Fitting: Consumers, Audiologists and Manufacturers.* Retrieved on: 03 September 2020. Retrieved by: https://www.audiologyonline.com/articles/roles-in-successful-hearing-aid-1230

Ramma, L., & Sebothoma, B. (2016). The prevalence of hearing impairment within the Cape Town Metropolitan area. *South African Journal of Communication Disorders*, 63(1), a105. Available at: https://sajcd.org.za/index.php/sajcd/article/view/105

Ratanjee-Vanmali, H., Swanepoel, D.W., & Laplante-Levesque, A. (2020). Patient Uptake, Experience, and Satisfaction Using Web-Based and Face-to-Face Hearing Health Services: Process Evaluation Study. Journal of Medical Internet Research, 22(3), 1-9

Reese, J.L., & Hnath-Chisolm, T. (2005). Recognition of Hearing Aid Orientation Content by First-Time Users. *American Journal of Audiology*, 14, 94-104.

Ross, M. (2002). Case *for* a Trial Period. Hearingresearch.org. http://www.hearingresearch.org/ross/considering_a_hearing_aid/case_for_a_trial_period.php

Saunders, G.H., & Forsline, A. (2012). Hearing-aid counseling: Comparison of single-session informational counseling with single-session performance-perceptual counseling. *International Journal of Audiology,* 1-11.

Saunders, G.H., Lewis, S.M., & Forsline, A. (2009). Expectations, Prefitting Counseling, and Hearing Aid Outcome. *J Am Acad Audiol*, 20, 320-334

Sharma, N., Classen, J., & Cohen, L.G. (2013). Neural plasticity and its contribution to functional recovery. *Handbook of Clinical Neurology*, 110, 3-12.

Shilpa, L.P. (2017). Role of an Audiologist. *Global Journal of Otolaryngology*, 5(3), 1-7.

Shuttleworth, M. (2009). *Research Bias.* Explorable. https://explorable.com/research-bias

Singh, K. (2007). *Quantitative Social Research Methods*. SAGE Publications.

Starkey. (2017). Hearing Aid Technological Advancements Over Time Have Improved Subjective Outcomes. https://starkeypro.com/research/publications/white-papers

Statistics Solutions. (2016). *Using Chi-Square Statistics in Research*. http://www.statisticssolutions.com/using-chi-square-statistic-in-research/

Statistics Solutions. (2017). What is dependability in qualitative research and how do we establish it?. https://www.statisticssolutions.com/what-is-dependability-in-qualitative-research-and-how-do-we-establish-it/

Statistics Solutions. (2017). What is transferability in qualitative research and how do we establish it?. https://www.statisticssolutions.com/what-is-transferability-in-qualitative-research-and-how-do-we-establish-it/

Statistics South Africa. (2012). *Census 2001: Prevalence of Disability in South Africa.*: http://www.statssa.gov.za/

Statistics South Africa. (2019). *World Population Day: How does SA compare?.* http://www.statssa.gov.za/?p=12324

Stuckie, G. (2005). International Classification of Functioning, Disability, and Health (ICF): A promising Framework and Classification for Rehabilitation Medicine. *American Journal of Physical Medicine & Rehabilitation*, 84, 733-740.

Subedi, D. (2016). Explanatory Sequential Mixed Method Design as the Third Research Community of Knowledge Claim. *American Journal of Educational Research*, 4(7), 570-577.

Swanepoel, D. (2006). Audiology in South Africa. *International Journal of Audiology, 45*(5), 262–266. https://www.tandfonline.com/doi/full/10.1080/14992020500485650

Sweetow, R.W. (1999). Counseling: It's the key to successful hearing aid fittings. *The Hearing Journal,* 52(3), 10-17.

Tariq, S., & Woodman, J. (2010). Using mixed methods in health research. *J R Soc Med Sh Rep*, 0, 1-8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3697857/

Tashakkor, A., & Teddlie, C. (2003). *Handbook of Mixed Methods in Social & Behavioral Research*. Sage Publications.

The Hearing Review. (2010). *MarkeTrak VIII: The Impact of Hearing Healthcare Professional on Hearing Aid User Success*. https://www.hearing.org/marketrak/marketrak-publications/

The Hearing Review. (2001). The Case for a Trial Period. https://www.hearingreview.com/inside-hearing/research/the-case-for-a-trial-period

Thompson, S.K. (2012). *Sampling* (3rd ed.). John Wiley & Sons, Inc.

Tremblay, K.L., Scollie, S., Abrams, H.B., Sullivan, J.R., & McMahon, C.M. (2014). Hearing Aids and the Brain. *International Journal of Otolaryngology*, 2014, 1-5.

Turan, S., Unsal, S., & Kurtaran, H. (2019). Satisfaction assessment with Abbreviated Profile of Hearing Aid Benefit (APHAB) questionnaire on people

using hearing aid having Real Ear Measurement (REM) eligibility. *International Tinnitus Journal*, 23(2), 97-102

Vaismoradi, M., Turunen, H., & Bonda, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences,* 15, 398-405

Whitney. C.W., Lind, B.K., & Wahl, P.W. (1998). Quality assurance and quality control in longitudinal studies*. Epidemiologic Reviews*, 20(1), 71-80.

World Health Organization. (2019). *Prevention of bBlindness and Deafness.* https://www.who.int/pbd/deafness/estimates/en/

World Health Organization. (2017). *Ear Health.* https://www.afro.who.int/health-topics/ear-health

Yong, M., Willink, A., McMahon, C., McPherson, B., Nieman, C.L., Reed, N.S., & Lin, F.R. (2019). Access to adults' hearing aids: policies and technologies used in eight countries. *Bull World Health Organ*, 97(10), 699-710

ZipHearing. (2016). *Hearing Aid Trial Periods*. https://www.ziphearing.com/blog/hearing-aid-trial-periods/

APPENDICES

Appendix A: Participant information sheet to the audiologist



Hello,

My name is Angie Heliopoulos, I am doing a Master of Arts in Audiology at the University of the Witwatersrand. For my research, I am conducting a study entitled: **An investigation into hearing aid trials: Audiologist practices' and adult patient experiences.**

As part of this study, I would like to invite you to participate by completing a survey that will take roughly 5 minutes to complete via the below link to Google forms. The questions will include hearing aid fitting and trialing practices. You may further be contacted to participate in the second phase of my study whereby you may be asked to act as a gatekeeper in allowing me to interview 1-2 of your patients who have been fitted with hearing aids.

Your identity will remain confidential. Participation in voluntary thus there are no penalties should you not wish to participate or decide to withdrawal from the study. No compensation will be received by participating in this study and there will be no payment or cost associated with participation in the study. Your participation will contribute to hearing aid statistics in South Africa as well as information that is scarce in this area of audiology. A summary of the results obtained will be shared with you if you are interested once the study has been completed.

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg. A principal function of this Committee is to safeguard the rights and dignity of all individuals who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, you may contact the below listed individuals.

Chairperson- Clement.Penny@wits.ac.za Tel: 011 717 2301

Committee secretariat- Zanele.Ndlovu@wits.ac.za Tel: 011 717 2700/1234

Thank you for taking time to read this information sheet.

Should you require any further information, feel free to contact myself or my supervisor directly. Our contact details are as follows:

Student - Angie Heliopoulos: angie.heliopoulos@gmail.com Cell: 079 340 0466

Supervisor - Nomfundo Moroe: nomfundo.moroe@wits.ac.za Tel: 011 717 4501

Yours faithfully,

Angie Heliopoulos

Appendix B: Survey for audiologists

General

1. How long have you been practicing as an audiologist?

   ☐ Community service ☐ ≤5 years ☐ ≤10 years ☐ 10+ years

2. Where do you practice?

☐ Hospital ☐ private practice ☐ clinic ☐ school ☐ MDT ☐ centre

☐ other

Hearing aids

3. Do you dispense hearing aids?

   ☐ Yes ☐ No

4. Do you do provide hearing aid fittings?

   ☐ Yes ☐ No

5. Do you offer one or more hearing aid brands? (e.g Phonak, Oticon, Starkey etc)

   ☐ 1 ☐ 2 ☐ 3+

6. When fitting a patient with the hearing aid, do you choose for them or do they choose themselves?

   ☐ Patient chooses ☐ I choose ☐ Depends

   a. Please elaborate further

      _____
      _____

Hearing aid trials

7. Do you think audiologists should be offering trial periods for hearing aids?

   ☐ Yes ☐ No

   a. If yes, how long do you think is an ideal trial period?

   ☐ 1 week ☐ 2 weeks ☐ 3 weeks ☐ 1 month ☐ 1 month +

b. If no, why not?

_____

8. Do you offer trialing of hearing aids? (If yes, continue. If not, why not?)

☐ Yes ☐ No

_____

a. How many hearing aids do you allow a patient to trial?

☐ 1 ☐ 2 ☐ 3 ☐ depends

i. If you chose depends, please elaborate further

_____

b. If you only offer one hearing aid to trial per period, how long is the trial period?

☐ 1 week ☐ 2 weeks ☐ 3 weeks ☐ 1 month ☐ 1 month +

c. If you trial more than one hearing aid, how long is the total trial?

☐ 1 week ☐ 2 weeks ☐ 3 weeks ☐ 1 month ☐ 1 month +

d. What made you decide to trial your patients with 1, 2 or 3 hearing aids? Explain_____

_____

e. Do you only allow patients to trial hearing aids on request?

☐ Yes ☐ No

f. If you are trialing more than one hearing aid, out of the 1st, 2nd or 3rd hearing aids, on average which one do patients usually choose?

☐ 1st ☐ 2nd ☐ 3rd ☐ none

<u>Counselling</u>

9. Do you provide counselling to your patients pre, peri, and post fitting?

☐ Yes ☐ No

10. If yes, what topics do you cover during counselling? Please elaborate.

_____

_____

11. Do you provide any physical materials for patients to take home?

☐ Yes ☐ No

a. If yes, list the types of materials given

_____

12. Do you provide aural rehabilitation?

☐ Yes ☐ No

a. If yes, what do you focus on during these sessions?

_____

_____

b. If not, why not?

_____

13. Do you offer follow up appointments for hearing aid orientation and counselling?

☐ Yes ☐ No

Patient satisfaction

14. On average, what are the return rates on hearing aids?

☐ 1 in every 2 patients
☐ 1 in every 3 patients
☐ 1 in every 4 patients
☐ 1 in every 5 patients
☐ Other

a. Please specify a few reasons for hearing aid returns

_____

_____

15. What are the most common complaints about the physical hearing aids? (You may choose more than one).

☐ Size ☐ colour ☐ style ☐ comfort ☐ battery

☐ Other

specify_____

16. What are the most common audiological complaints from patients?

☐ Feedback ☐ background noise ☐ muffled ☐ clarity

☐ Echo ☐ blocked ☐ sharp ☐ loudness

17. What do you think is the most common deciding factor for your patients in purchasing their hearing aid?

☐ Characteristical features
☐ Audiological features
☐ Your recommendation
☐ Other
(Specify):_____

Brain maturation to hearing aids

18. Do you feel patients need time to adjust to a new hearing aid?

☐ Yes ☐ No

a. If yes, how much time do you feel is sufficient to retrain the brain from deprived sounds

☐ 1 week ☐ 2 weeks ☐ 3 weeks ☐ 1 month ☐ 1 month +

b. If no, why not?

_____

_____

In order to complete the second phase of this study. Im required to interview patients who have received hearing aid trials within the last 12 months or who are currently undergoing a hearing aid trial.

Would you allow me to contact and interview 1-2 of your patients chosen by you to participate in this second phase of the study? If yes please provide your name and email address below so that I can contact you.

Name and email address:

_____

Thank you for participating!

Appendix C: Participant information sheet to the hearing aid users



Hello,

My name is Angie Heliopoulos, I am doing a masters degree in Audiology at the University of the Witwatersrand. For my research, I am conducting a study entitled: **An investigation into hearing aid trials: Audiologist practices' and adult patient experiences.** My interest is to find out about your experience wearing hearing aids and if you have ever received a hearing aid trial period.

If you are interested in participating in this study, I would like to meet with you for an interview which will take roughly 30-45minutes at a venue of your choosing. The interview will be done in English unless a translator is requested. Additionally, with your consent, the interview will be audio-recorded so that I can listen to it afterwards to write up my research. I am aiming to get a better understanding of how satisfied you are with your experience wearing hearing aids and the process you went through to buy them. The recordings will be kept on a password protected computer for 5 years.

Should you choose to participate in this study, your identity will remain anonymous and your responses will be confidential, only your audiologist and I will know you have participated in this study. However, your name will not be mentioned when I write up the results. Your participation is voluntary so there will be no penalties should you not wish to participate or decide to withdrawal from the study. No compensation will be received for participating in this study and there will be no payment or cost associated with participation in the study. Your participation will contribute to hearing aid statistics in South Africa as well as information that is scarce in this area of audiology. A summary of the results obtained will be shared with you if you are interested once the study has been completed.

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg. A principal function of this Committee is to safeguard the rights and dignity of all individuals who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, you may contact the below listed individuals.

Chairperson- Clement.Penny@wits.ac.za Tel: 011 717 2301

Committee secretariat- Zanele.Ndlovu@wits.ac.za Tel: 011 717 2700/1234

Should you require any further information, feel free to contact myself or my supervisor directly. Our contact details are as follows:

Student - Angie Heliopoulos: angie.heliopoulos@gmail.com Cell: 079 340 0466

Supervisor - Nomfundo Moroe: nomfundo.moroe@wits.ac.za Tel: 011 717 4501

Thank you for taking time to read this information sheet.

Yours faithfully,

Angie Heliopoulos

Appendix D: Consent form for participation in the study

This document is to state that I, _____, read and understood the requirements of the study titled "**An investigation into hearing aid trials: Audiologist practices' and adult patient experiences"**. I acknowledge that my participation in the study is voluntary (of my own choice) and I am allowed to withdraw from the study at any time without any negative implications. I understand that all information attained from this study will be confidential and anonymity will be guaranteed. I am aware that I may ask for extra information about this study at any time.

_____ _____

Signature Date

_____

Witness

Appendix E: Consent form to tape-record the interview

For the study titled "**An investigation into hearing aid trials: Audiologist practices' and adult patient experiences",** I understand that the interview will be tape-recorded so that the researcher can use to analyze after the interview. The recordings will be stored on a password protected file on a computer and that all information on the tapes will be confidential including my identity.

_____ _____

Signature Date

_____

Witness

Appendix F: Interview questions

General

- When did you lose your hearing?
- When did you buy your first hearing aid after losing your hearing?
- How many hearing aids have you had?
- What brands of hearing aids have you used?

Experiences

- Currently what hearing aid are you using?
- How did you choose this hearing aid?
- Describe your experience with hearing aids so far
- What are some of the benefits you have noticed?
- What are some of the challenges you have faced?
- What made you buy the hearing aid? (size, price, what it can do etc)
- How were your hearing aids fitted and programmed?

Hearing aid Trials

- How long was your trial period?
- How many hearing aids did you try out during the trial period?
- How many hearing aids would you have liked to try out until you made your decision? Please explain
- Did you feel you needed more time to adjust to the hearing aids to make your decision? Please elaborate
- How long do you think would be enough time to get used to a hearing aid for a trial period? Please elaborate
- Were you able to visit your audiologist during your trial period to make any follow-up adjustments or ask any questions?
- Did you find the process of trialing hearing aids beneficial? Please elaborate.

Satisfaction

- Did the hearing aids reach your expectations? Please explain
- Why would you/wouldn't you recommend hearing aids to others who are interested in buying them?
- What do you think was most useful to you during the hearing aid process? Please elaborate
- Were you given enough information about the hearing aids before and after you bought them? Please elaborate

Hearing aid purchase

- Did you choose your hearing aid or was it suggested by your audiologist?
- Were you given more than one option when choosing your hearing aid (e.g. different styles and brands)?
- If you could give advice to first time hearing aid users what would it be?
- What would you want audiologists to know regarding hearing aid trials or when recommending hearing aids?

Counselling

- What information did your audiologist provide you with during the purchase of your hearing aid?
- Did you receive any physical hand-outs for additional information?

Do you have any questions?

Appendix G: Ethics certificate

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R14/49 Ms AA Heliopoulos

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M191054

NAME: (Principal Investigator)	Ms AA Heliopoulos
DEPARTMENT:	School of Community Development Department of Speech Pathology and Audiology University
PROJECT TITLE:	An investigation into hearing aid trials: audiologist practices and adult patient experiences
DATE CONSIDERED:	2019/10/25
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr N Moroe
APPROVED BY:	CB Penny Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2020/01/13

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the 3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **October** and will therefore reports and re-certification will be due early in the month of **October** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

14/01/2020
Date

PLEASE QUOTE THE CLEARANCE CERTIFICATE NUMBER IN ALL ENQUIRIES