

**AUDITORY PROCESSING DISORDERS IN CHILDREN:
THE PERSPECTIVES AND PRACTICES OF SOUTH AFRICAN
AUDIOLOGISTS/ STA'S**

SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
MASTERS OF COMMUNICATION PATHOLOGY (AUDIOLOGY)
DISCIPLINE OF AUDIOLOGY
SCHOOL OF HEALTH SCIENCES
UNIVERSITY OF KWAZULU-NATAL
WESTVILLE CAMPUS
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JANUARY 2015

DECLARATION

I, CLAIRE FOUCHÉ- COPLEY, declare that the research and information obtained for the development of this thesis is of my own original research. The following research has not been submitted to any other university or institute for examination purposes. The following information obtained from other sources has been referenced accordingly and where direct quotes and definitions have been used, direct quotations have been documented and have further been referenced accordingly.

Signed _____ at _____ on _____

Day of _____ 2015

Signature: _____

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to:

- God, for giving me the patience and wisdom I needed to guide me through this challenging adventure.
- My husband, Kevin, for being my pillar of strength and my motivation through this time.
- My parents, Johan and Colleen Fouché, for your continued support, your guidance, and for showing me how to persevere through the good, and the bad times.
- My brother, Mark Fouché, for teaching me to never give up or lose sight of my goals.
- My supervisors, Ms Nasim Khan and Mrs Samantha Govender, for your invaluable knowledge, your valuable time, your patience and your encouragement that pushed me to the finishing line.
- Dr Henry Moolman, for your continued advice and patience.
- Mrs Carrin Martins, for your assistance.
- Ms Nicola Haw and Mrs Carmen White, for your editorial support and assistance.
- Samantha Chaythram, Amirah Hussain and Candice Scheepers, for your continued administrative assistance when desperate measures called for it.
- All audiologists/ STA's, participants and colleagues that contributed towards this thesis and made this research possible.

ABSTRACT

Audiologists/ Speech Therapists and Audiologists (STA's) practicing in the field of Auditory Processing Disorders (APD) globally, encounter several challenges that include but are not limited to conflicting definitions, variable diagnostic criteria, several classification profiles and lack of standardised guidelines for screening, assessment and intervention. In South Africa, audiologists/ STA's experience further challenges related to working within a diverse multicultural and multilingual context when attempting to manage children with APD. This study investigated the perspectives and practices of South African audiologists/ STA's in screening, assessing and providing intervention for children with APD. A descriptive survey design, with quantitative methods of analysis, was used to obtain information from audiologists/ STA's registered with the Health Professions Council of South Africa (HPCSA, 2014), of which 156 responded. The data was analysed using descriptive and inferential statistics. Overall 68% (n = 106) of the participants did not feel adequately prepared to practice in the field of APD. Seventy five percent (p = 0.00) of audiologists and 35% of STA's reported their level of experience as being '*limited*', which was statically significant. Forty percent (n = 62) of the sample felt that they were either '*poorly*' or '*very poorly*' informed to screen for APD, 44% (n = 68) to assess for APD, and 53% (n = 82) to provide intervention. Sixty percent (n = 93) screened for APD, whilst only 42% (n = 66) assessed for APD. Some of the reasons cited include; lack of exposure to APD during their undergraduate programme, inappropriate screening and assessment material due to cultural and linguistic barriers and limited resources to manage children with APD. Eighty five percent (n = 133) received referrals from other practitioners for the management of APD, yet only 43% (n = 67) of the participants offered intervention. Similar findings were reported in studies conducted locally and internationally. It can therefore be concluded that service provision in the area of APD in South Africa, is limited which is exacerbated by several contextual constraints. Based on the study findings of the current study, relevant research and clinical implications were recommended.

Keywords: Audiologist/STA, Auditory Processing Disorders, Screening, Assessment, Intervention, Practices, Perspectives

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CHAPTER 1

BACKGROUND AND ORIENTATION

“Like the parable of the four blind men who, while each is feeling a different part of an elephant, disagree over what the animal actually is, leaders in the field of CAPD seemed to hold so closely their viewpoints that they failed to recognize that each was describing a different part of the same animal.”

(Bellis, 2003. p. 398)

1.1 Introduction

This chapter presents the problem statement and rationale for the study, briefly highlighting the critical challenges facing the audiologist/ STA in the screening, assessment and intervention of children with Auditory Processing Disorders (APD). These are investigated further in Chapter Two, together with supporting research evidence. Key definitions utilised in the study are presented, together with the abbreviations. A summary of all the chapters are also outlined.

1.2 Problem statement and rationale

Despite a growing interest and robust discussions in the field of APD, limited consensus exists amongst audiologists/ STA's, as arguments revolve around conflicting definitions, complicated assessment batteries and intervention strategies, and context specific issues (Bellis, 2003). Challenges regarding inappropriate and non-standardised screening and assessment tools, non-availability of uniform guidelines informing the practice of audiologists/ STA's, minimal research-based intervention strategies, as well as several classification profiles, makes the management of APD complex, worldwide (Baldry & Hind, 2008; Logue-Kennedy, Lyons, Carroll, Byrne, Dignan, & O'Hagan, 2011). Differential

diagnosis is difficult as APD may co-exist in the presence of other concomitant childhood developmental disorders, such as Attention Deficit Hyperactivity Disorders (ADHD) and most learning disorders (Pottas, 2015). The heterogenic nature of the disorder requires flexible test batteries, with variable diagnostic criteria and the involvement of several practitioners (Emanuel, Ficca & Korczak, 2011; Dillon, Cameron, Glyde, Wilson, & Tomlin, 2012). This presents considerable difficulty with regards to the screening, assessment, diagnosis and offering intervention in the area of APD.

The prevalence of APD has grown considerably over the years, with an international prevalence in the paediatric population of approximately two to five percent (Chermak, Silva, Nye, Hasbrouck & Musiek, 2007). Arguably this increase in prevalence may be attributed to the increase in awareness amongst practitioners, teachers, and parents over the years, thus, enabling them to better identify APD. There can be considerable differences in estimates across studies as prevalence statistics depend on the sample studied, tools used, and the criteria used for labelling APD (Chermak, 2001, in Bantwal, 2011). Children presenting with mild symptoms of APD appear discreet, and often, the undiagnosed learner tends to compensate for his or her difficulties, particularly once they reach adulthood. It is therefore likely that the exact prevalence of APD in children today is unknown, due to the overwhelming discrepancies surrounding the definition, the criteria by which an APD is measured, and the associated childhood disorders that cloud the diagnosis of APD.

To date, there are no clear, standardised criteria by which APD can be measured, nor are there effective quick and easy check boxes into which children with APD can be categorised. Instead, the screening and assessment of APD involves a comprehensive, dynamic and thorough investigation by the audiologist/ STA, which is often a tedious and time consuming task (Witton, 2010). Scattered scores and discrepancies across test results, leave the

audiologist/STA feeling despondent, whilst they continue to seek additional information often obtained through consultation with teachers and hidden in psychological and medical reports. Notwithstanding, Bellis (2003) advises that only once all other areas of behavioural and social manifestations, such as speech and language difficulties have been addressed, should an APD evaluation be considered. Due to the ongoing controversies surrounding APD, several guidelines have emerged with a number of screening and assessment tools. Whilst these developments are encouraging, it does contribute further to the confusion facing audiologists/ STA's when managing children with APD. Bellis (2003) further reports that several training institutes do not offer adequate training in the area of APD, and as a result, students may experience challenges when managing children with APD. It can only be assumed given these concerns that the identification and management of children with APD must be challenging for audiologists/ STA's in general. In South Africa, audiologists/ STA's managing children with APD are faced with a variety of other contextual, linguistic and cultural issues which further complicates the approach to the disorder.

In 1994, the first democratic government was elected in South Africa, leading to the development of various enabling legislation to transform service delivery. One of the most progressive of these was the Constitution of the Republic of South Africa (1996) that upholds the right of children to health, education and a good quality of life. The responsibility is therefore on health care providers to ensure that appropriate and ethical medical services are accessible and equitable to all children of South Africa. However, a total of 1 802 audiologists and Speech Therapists and Audiologists (STA's) registered with the Health Professions Council of South Africa (HPCSA, 2012), providing services to a population of about 54 million people (Statistics South Africa, 2014) of diverse multicultural and multilingual backgrounds, makes access to audiology services difficult. Of this estimated 54 million people, 80.2% are Black African, 8.8% are Coloured, 8.4% are White and 2.5% are of

Indian origin (Statistics South Africa, 2014). There are 11 official languages spoken in South Africa, with the majority speaking isiZulu (22.7%), followed by isiXhosa (16%), Afrikaans (13.5%) and English (9.6%) (Statistics South Africa, 2014). However, the majority of audiologists/ STA's in South Africa either speak English or Afrikaans (Pascoe & Norman, 2011). As a result, the mismatch between audiologists/ STA's and their clients in terms of language, impacts on service delivery (Pascoe, Rogers & Norman, 2013).

Most audiology services are also unequally distributed in urban areas and are provided mainly through the private sector (Pascoe & Norman, 2011). According to the Department of Health, KwaZulu-Natal (DOH, 2010), 54% of the population live in rural settlements, suggesting that more than half of the population do not have access to basic services. An increase in non-communicable diseases, injuries, maternal and perinatal conditions, nutritional deficiencies and burden of disease, such as the Human Immunodeficiency Virus /Acquired Immune Deficiency Syndrome (HIV/AIDS) and Tuberculosis (TB), means that South Africa is facing a quadruple burden of disease, further exacerbating poverty and under-development (Pascoe, Rogers & Norman, 2013). Furthermore, health care resources are directed towards fighting these diseases and conditions, whilst persons with communication disorders receive low priority and limited resource allocation (Pascoe & Norman, 2011). This places a significant demand on health care providers (DOH, 2010). Given the association between these diseases and hearing loss, audiologists/ STA's, especially those working within the public health sector are overwhelmed with the burgeoning demands for service delivery with the focus being placed on the management of more commonly occurring conditions.

Audiologists/ STA's attempting to provide services within the education sector in South Africa, also encounter many challenges due to the poor socio-economic conditions that the

majority of children are faced with. These include limited access to schools, overcrowded classrooms, poor teacher-child ratios, and poor scholastic learning environments, to name a few (Department of Basic Education [DOE], 2014). This learning environment is of particular concern for children already presenting with an APD or a learning disorder. Teachers are typically the first people to refer a child with APD to the audiologist/ STA (Hlabangwane, 2002). Audiologists/ STA's managing children with APD therefore need to work in collaboration with the teacher. According to Flexer (1989, as cited in Pottas, 2005), a child spends an average of 45% of their day on listening activities and therefore the learning environment plays a significant role in determining the child's academic and communicative development. However, audiologists/ STA's attempting to conduct classroom intervention strategies are faced with challenges mentioned above that further jeopardise the learning environment of the child already presenting with an APD. Teachers are not always willing to assist the management process for the specific reasons stated above, and are not always adequately equipped to handle the demands of the curriculum, or address the requirements of learners with special education needs (Pottas, 2005). The challenges presented to the audiologist/ STA's in attempting to facilitate team collaboration, often results in a lack of carryover to the real life context, such as the classroom.

Cultural beliefs and perceptions of a given society, regarding the causes and management of disability, often impacts on service delivery provided by the audiologist/ STA (Komaric, Bedford & van Driel, 2012). Audiologists/ STA's need to be sensitive to the cultural and linguistic differences, as this could affect the overall management of children with APD. Test batteries available for the screening and assessment of APD are not culturally or linguistically appropriate for the diverse South African context, as these are normed on western populations. Thus, there is a lack of standardised normative data to meet the requirements of children presenting with APD, irrespective of whether they are English first or second

language speakers. This affects the reliability and validity of screening and assessment measures (Saleh, Campbell & Wilson, 2003). However, in the absence of contextually relevant resources, audiologists/ STA's have to adapt these measures to make them culturally and linguistically appropriate and acceptable (Pascoe & Norman, 2011). Audiologists/ STA's are unsure as to how to administer and interpret assessment tools, whilst poorly recorded test materials are also a concern (Saleh et al., 2003). According to Pascoe and Norman (2011), not only should assessment be culturally appropriate, but culturally relevant intervention strategies need to be provided. Culturally appropriate practice can only be achieved if accurate assessment tools are available that account for cultural and linguistic aspects. This places a huge responsibility on the audiologist/ STA managing children with APD.

Only a glimpse of the overview and context of South Africa has been presented; however further explanation will be provided in Chapter Two. One cannot exclude the above barriers as a challenge which often hinders and restricts South African audiologists/ STA's from being able to practice in South Africa. Unlike other audiological services, where policies have shed light for audiologists/ STA's in many other countries, South African audiologists/ STA's are required to rely on their own understanding of their context and pre-existing training to make clinical decisions to accommodate for a heterogeneous disorder, not yet clearly defined. Given the challenges, it is worthwhile to understand how audiologists/ STA's in South Africa are coping with the child with APD, and what practices they employ in the screening, assessing and being able to provide intervention in the area of APD.

The intention of the study was therefore to describe the perspectives and practices of South African audiologists/ STA's regarding the screening, assessment and intervention of children with APD. The results obtained from the study will be able to inform key role players on several matters pertaining to these audiological practices in APD, as well as the provision of

intervention within the South African context. The study attempts to gain an understanding into the present protocols, guidelines and service delivery practices that South African audiologists/STA's currently employ in the area of APD. It further aims to recommend guidelines for future curricula development in the field in which Continued Professional Development (CPD) activities may be applied.

1.3 Definitions and abbreviations

Definitions

The following terms and definitions apply for this study:

Assessment: "The ongoing procedures used by qualified personnel to identify the child's unique strengths and needs and the early intervention services appropriate to meet those needs throughout the period of the child's eligibility...and includes the assessment of the child...and the assessment of the child's family." (American Speech-Language and Hearing Association [ASHA], 2005, p.x.).

(Central) Auditory Processing Disorders: Auditory Processing Disorders (APD) or alternatively, Central Auditory Processing Disorders (CAPD) is a particular type of hearing difficulty occurring along the auditory pathway that involves the Central Auditory Nervous System (CANS), and typically presents with normal hearing sensitivity (ASHA, 2005; Bellis, 2008) or normal audiometric thresholds (MacDonald & Nicoloff, 2008). The term Auditory Processing Disorder (APD) will be used for the purpose of this study.

Culture: "A set of guidelines which individuals inherit as members of a particular society, and which tells them how to view the world, how to experience it emotionally, and how to behave in it in relation to other people, to supernatural forces or Gods, and to the natural

environment. It also provides them with a way of transmitting these guidelines to the next generation- by using symbols, language, art and ritual.” (Helman, 1994, in Balton, n.d., p. 8).

Dichotic Listening: The processing of auditory information presented to both ears simultaneously. Esplin and Wright (2014) describe that dichotic listening “Occurs when two messages are presented to separate ears, and refers to the ability to bring together, or ignore, differing stimuli presented simultaneously to each ear.” (p. 68).

Intervention: “Is an encompassing term referring to one or more actions taken in order to produce an effect and alter the course of a disease, disorder, or pathological condition.” (Emanuel et al., 2011, p. 59).

Management: “Involves all aspects of evaluating, treating, counselling, and discharge planning” (ASHA, 2005, p. x). For this particular study, management will encompass the screening, assessment, diagnosis and intervention of children with APD.

Neuroplasticity: “The nervous system’s ability to undergo organizational changes in response to internal and external factors.” (Bellis, 2003. p. 132). Therefore the term neuroplasticity refers to the transition and adaptation processes of the brain and/or CANS, in response to variable influences.

Screening: “A method by which the determination of need for further testing can be made for children who are already exhibiting some type of learning or communicative difficulty and for whom the issue of CAPD has already been raised.” (Bellis, 2003, p. 144).

Abbreviations

AAA:	American Academy of Audiology
ABR:	Auditory Brainstem Response
ACPT:	Auditory Continuous Performance Test
ADHD:	Attention Deficit Hyperactivity Disorder
ADHD-PI:	Attention Deficit Hyperactivity Disorder- Predominantly Inattentive Type
APD:	Auditory Processing Disorders
ASD:	Autism Spectrum Disorders
ASHA:	American Speech and Hearing Association
AWMA:	Automated Working Memory Assessment
BSA:	British Society of Audiology
CANS:	Central Auditory Nervous System
CAPD:	Central Auditory Processing Disorder
CAP:	Central Auditory Processing
CELF:	Clinical Evaluation of Language Fundamentals
CHAPPS:	Children's Auditory Processing Performance Scale
CISG:	Canadian Interorganizational Steering Group for Speech-Language Pathology and Audiology
CPD:	Continue Professional Development
CTOPPS:	Comprehensive Test of Phonological Processing
DDT:	Dichotic Digits Test
DPT:	Duration Pattern Test
DSTP:	Differential Screening Test for Auditory Processing
ENT:	Ear Nose and Throat Specialist
HPCSA:	Health Professions Council of South Africa

ITPA:	Illinois Test of Psycholinguistic Abilities
LD:	Learning Disorder
L.I.F.E:	Listening Inventory for Education
MLD:	Masking Level Difference Test
OAEs:	Otoacoustic Emissions
OCD:	Obsessive Compulsive Disorder
PPDT:	Psychoacoustic Pattern Discrimination Test
PPT:	Pitch Patterns Test
SAAA:	South African Audiologists Association
SASHLA:	South African Speech-Language and Hearing Association
SBMPL:	Simultaneous Binaural Median Plane Localisation
SLP:	Speech-Language Pathologist (split qualification)
SPIN:	Speech-in-Noise Test
SSW:	Staggered Spondaic Word Test
STA:	Speech Therapist/ Audiologist (dual-certification)
TAAS:	Test of Auditory Analysis Skills
TAPS-R:	The Test of Auditory Perceptual Skills-Revised

1.4 Summary of chapters

The study is comprised of five chapters. A summary of each chapter is presented.

1.4.1 Chapter One: Background and orientation

This chapter outlines the background and orientation to auditory processing disorders. The problem statement and the rationale of the study will be discussed, and will provide a brief overview of the challenges that audiologists/ STA's face regarding the management of children presenting with APD, particularly within the South African context.

1.4.2 Chapter Two: An overview of auditory processing disorders, the scope of the audiologist/ STA, and the management thereof

Chapter Two discusses the definitions, signs and symptoms of APD, and the manifestations thereof. The prevalence and concomitant childhood disorders associated with APD will be considered, whilst the anatomical site of pathology of APD provides insight into some of the classification systems, guidelines, screening, and assessment tools available to audiologists/ STA's. A literature review pertaining to both international and national studies of audiologists'/ STA's perspectives and practices in the area of APD will be discussed in the chapter.

1.4.3 Chapter Three: Research methodology

The methodological framework of the study will be presented, which includes the aim and objectives of the study, the study design, as well as a description of the study sample. The research tool, the method of data collection and the ethical considerations will be addressed in this chapter, further detailing study reliability and validity factors.

1.4.4 Chapter Four: Results and discussion

This chapter consolidates and discusses the results of the present study, whilst meeting the objectives of the study. The discussion will draw upon previous literature to compare and support these findings.

1.4.5 Chapter Five: Conclusion, implications for future research, strengths and limitations of the study

The final chapter will provide a synopsis of the results and discussion of the study. It will discuss future clinical and research implications, whilst addressing the limitations of the study.

1.5 Conclusion

There appears to be an emerging interest sparked in the area of APD, as is evident by the number of research projects and papers being presented at recent workshops and seminars. Many practitioners find themselves questioning their own roles in the field of APD, and envisage ways in which they can engage in further APD testing and/or intervention. Unfortunately, many audiologists/ STA's are discouraged by the overwhelming challenges and barriers that arise with regards to the management of APD in children. It is therefore valuable to gain an understanding of the perspectives and practices of South African audiologists/ STA's regarding the management of APD in children. Such information may facilitate the development of more standardised guidelines and protocols.

CHAPTER 2

AN OVERVIEW OF AUDITORY PROCESSING DISORDERS AND THE SCOPE OF THE AUDIOLOGIST/ STA IN THE MANAGEMENT THEREOF

2.1 Introduction

Chapter Two provides an overview of auditory processing disorders that includes; a discussion related to prevalence, definition and classification of APD, the scope of the audiologist/ STA in the management of children with APD, as well as the several challenges faced by audiologists/ STA's practicing in South Africa when managing children with APD.

2.2 An overview of auditory processing disorders

The field of APD has become a rather unfamiliar and uncomfortable domain of practice for audiologists/ STA's, and as a result, fewer audiologists/ STA's are practicing in the area of APD both on an international and a local level. Therefore trained and skilled professionals are in demand to accommodate the increasing numbers of communication disorders, including APD, worldwide (Hugo, 1998, in Naidoo, 2006; Logue-Kennedy et al., 2011).

The prevalence of APD has grown considerably over the years. A recent study performed by Esplin and Wright (2014) reported that up to five percent of the New Zealand paediatric population presents with APD, whilst on an international basis, prevalence is estimated to be between two to five percent (Chermak & Musiek, 2007). Emerging research further indicates that the numbers may even be as high as six times greater in the Pacific Island in New Zealand (Esplin & Wright, 2014). Approximately 12% of the South African population present with some form of communication disorder (University of Witwatersrand, 2015). However, it is unknown as to how much of this is attributed to children with APD. The

services of audiologists/ STA's practicing in South Africa are therefore essential to assist the large numbers of individuals already presenting with communication disorders, which may include APD (Geffner & Ross-Swain, 2007). Considering the complexities associated with the diagnosis of APD, the lack of consensus regarding the definition and the anatomical location of APD makes the measure of prevalence difficult, whilst the heterogenic nature makes the disorder a challenge to diagnose. It is thus assumed that the prevalence is higher than currently projected. However, it is envisaged that as more acceptable definitions emerge and appropriate test batteries evolve, more accurate data about the prevalence of APD should become available (Whitelaw, 2008, in Madell & Flexer, 2008).

The audiologists'/ STA's role extends beyond the peripheral mechanism, as the backdrop of APD focuses on several anatomical structures, from the peripheral auditory mechanism, along the CANS, through the brainstem to the cortical regions of the brain. The nature of the disorder, being multimodal and multifaceted, gives evidence to the reasoning that an APD cannot always be limited to one specific anatomical site (Eelgeti, 2008, in Witton, 2010). APD is idiopathic in nature and some authors suggest that it may even have no anatomical site of pathology (American Academy of Audiology [AAA], 2010). It is therefore needless to say, that the audiologist/ STA require at least a basic understanding of the intricate networking pathways prior to effectively diagnosing an APD or determining intervention (AAA, 2010).

Research suggests that the child's auditory system only fully develops between the ages of 10-12 years, as the child's brain continues to go through a transitioning process of neuroplasticity, constantly reshaping their way of thinking as they learn new information on a daily basis (Matson, 2005). Auditory processing difficulty is therefore expected in younger children until about seven years of age. It is only after this age that an APD should be

considered based on auditory difficulties, as testing before the age of seven may show great variability in test results (AAA, 2010; Pottas, 2015). Whitelaw (2012) suggests that children develop with initially wider auditory bands than the adult, therefore allowing more noise to enter the auditory system and thus, they are more exposed to auditory noise, up until 12 years of age. Despite the human auditory system only fully reaching adult-like processes from the age of 12 years and onwards, APD can occur across all ages. APD typically manifests as; poor attention to auditory stimuli, difficulty attending to foreground acoustic information in the presence of background noise, difficulty with auditory memory, difficulty with auditory sequencing, and delayed receptive language development (AAA, 2010; Bantwal, 2011; Medwetsky, 2011; Witton, 2010). Initially stemming from a single entity, APD branches into a number of pathways, manifesting as listening, reading, spelling and even attention difficulties, often affecting their ability to cope with every day activities, whether it be in the classroom for the school-going child, or in the office as the working adult (AAA, 2010). Therefore, it is common that children start presenting with these manifestations from the age of six, the same age at which literacy is introduced at school.

Cunningham (2013) suggest that any dysfunction in the processing of auditory information along the Central Auditory Nervous System (CANS) may result in higher order dysfunction, such as attention, memory and cognition, known as the ‘Bottom-up’ Approach. However, researchers further motivate that the skill of auditory processing requires the effective use of these higher order systems in order to develop a complete auditory concept i.e. the ‘Top-Down’ Approach (Miller, 2011). In order for one to effectively listen and process auditory information, both systems need to be fully intact and working in harmony with one another, whilst one’s hearing abilities present as normal (Miller, 2011). Therefore, in a situation where the CANS is challenged by poor redundancy of speech stimuli, or when a competing signal starts to jeopardise the primary auditory signal, the individual tends to respond

inappropriately, typically giving the impression of a hearing impairment. In the case of children, their academic development becomes completely compromised, and the 'passive' or 'inactive listener' (Chermak & Musiek, 1992, p.2) becomes frustrated and withdrawn, and has a tendency to show poor self-esteem, which affects their social development (Witton, 2010). Additional signs include; lack of concentration, irritability, frustration, poor cooperation towards test procedures and the inability to follow instruction (Jerger & Musiek, 2000). According to Chermak et al. (2002), children presenting with APD appear sluggish and are often disorganised with their daily routines, as well as their schoolwork. It is therefore common that parents complain of their child being disorganised and forgetful. The problem faced by health care professionals is the ability to differentially diagnose APD amidst other childhood disorders, such as Attention Deficit Hyperactivity Disorder (ADHD) or other co-morbid conditions (Pottas, 2015). APD is therefore not an easy diagnosis to make, particularly given the lack of consensus surrounding the definition of APD.

There is no single, agreed-upon definition to APD. This is concerning, particularly since APD is not a new disorder. In 1954, Myklebust evaluated the anatomical background of auditory processing and recognised that the higher cortical regions of the auditory system played a significant role in the processing of auditory information, more so than the lower, peripheral regions (Miller, 2011). Katz (2002, as cited in Khan, 2005) concurred with Myklebust (1954, as cited in Miller, 2011) and introduced the term Central Auditory Processing Disorders (CAPD). CAPD emerged as a new clinical condition in the 1960's, describing a difficulty with the neurophysiological transmission of acoustic energy through the CANS, which included the brainstem and auditory cortex (Weisberg & Katz, 1978, in Richard, 2011). The Consensus Conference on the Diagnosis of Auditory Processing Disorders in School Aged Children (Jerger & Musiek, 2000), replaced the term Central Auditory Processing Disorder (CAPD), with Auditory Processing Disorder (APD), as the word 'central', suggested an

anatomical location, which is still inconclusive to many audiologists/ STA's today (Medwetsky, 2011). Katz (2002, as cited in Khan, 2005) reported that APD should not be defined as a medical or diagnostic entity, but rather should be evaluated holistically in terms of its educational manifestations and supported through effective remediation. In congruence to Katz' theory, Bellis (2003) supported the Information Processing Theory, suggesting that incoming auditory information passing through the auditory nervous system is processed simultaneously in a manner of several parallel and sequential patterns, and that even although APD may not depend on higher order/ linguistic factors, it may very well contribute to these deficits. Instead of focusing on the disorder, ASHA (2005) viewed APD from a different angle and defined Auditory Processing (AP) as the ability of the central nervous system to effectively and efficiently convey an auditory signal, through means of neurobiological processes. Wilson (2014) recently reversed the acronym of CAPD to describe it as a disorder of processing auditory information in the central nervous system. Therefore, a common definition for (C) APD could be, a particular type of hearing difficulty occurring along the auditory pathway that involves the CANS, and typically presents with normal hearing sensitivity (ASHA, 2005; Bellis, 2008; MacDonald & Nicoloff, 2008). Despite these discrepancies, the terms APD and (C) APD have been accepted synonymously amongst audiologists/ STA's; however for the purpose of this study, the term APD has been applied.

A handful of audiologists/ STA's, such as Bellis (2003); Chermak & Musiek, (1992); and Keith (1981, as cited in Richard, 2011), believe that APD is a well-defined and distinct disorder. However, Khami (2004) disagreed when he argued that APD is not an isolated disorder but a mere entity amongst others, such as language and literacy, and that the focus should be placed on the learner's weaknesses, such as reading, writing or spelling, rather than the higher order functions. Due to the perplexing conclusions regarding the definition and anatomical location of the disorder, Bamiou, Musiek and Luxon (2001) stated that the focus

has shifted from identifying where the lesion may exist anatomically to “the identification of the impaired individual’s difficulties and their appropriate remediation” (p. 361).

Chermak and Musiek (1992) were the first to develop a profile system, characterising the nature of APD as either; disease of the CANS, maturational delay of the CANS, or disorganisation of the CANS. Similarly, Katz, Stecker and Henderson (1992) explored the scores of the Staggered Spondaic Word test (SSW; Katz, 1962, in Katz, Stecker & Henderson, 1992), a diagnostic tool, initially administered to explore the anatomical loci of lesions in adults presenting with a history of stroke or tumours. As a result, clients were categorised and profiled according to their site of lesion and/or concomitant sites of lesions; being, a decoding deficit, a temporal fading memory deficit, or an integration deficit. Similar trends and patterns were identified in children presenting with learning difficulties, which appeared to spark an interest in the relationship between learning disorders and APD in children (AAA, 2010). Bellis and Ferre (1999) stirred the development of a model which suggests that children presenting with APD fall into one or more of the following profiles; an Auditory Decoding Deficit, a Prosodic Deficit, an Integration Deficit, an Associative Deficit (secondary) and/or an Output Organisation Deficit (secondary) (Bellis, 1996, 1999, Bellis & Ferre, 1999, Ferre, 1997, cited in Bellis, 2003). Due to the heterogeneity of the disorder, the diagnosis of APD is therefore not always clear, and so the diagnosis may be allocated according to; a specific classification profile, the deficits within a particular auditory process, or both (Bellis, 2003). Further studies suggest that structural changes often occur along the auditory mechanism and higher order functions of the child presenting with a history of otitis media within their first years of life (Maruthy & Mannarukishnaiah, 2008). Another challenge in both defining and managing APD, are the shared similarities between APD and other childhood pathologies or co-morbidities. Research suggests that perhaps APD is multimodal and that a significant relationship exists between somatosensory touch, visual

input and auditory stimulation, in such a way that tactile input encourages auditory stimulation and visual input supports auditory localisation (Ortique, et al., 2005, cited in Dodds, 2008). APD should therefore be evaluated holistically in terms of its educational manifestations, thus, necessitating the role of several health care practitioners (Khan, 2005). A multidisciplinary team is of particular importance given the relationship between APD and many other childhood disorders, such as ADHD. Researchers have provided evidence that suggests that there are many similarities and overlaps between the diagnostic make-up of ADHD and APD, with the two most common concerns; being, distractibility and inattentiveness (Miller, 2011; Witton, 2010). Attention Deficit Hyperactivity Disorder - Predominantly Inattentive (ADHD-PI) is the type of ADHD that commonly compares to APD in nature (Chermak et al., 2002). APD therefore creates further confusion, as the child diagnosed with ADHD-PI by the psychologist may also be diagnosed with APD by the audiologist.

Similarly to ADHD, the relationship between learning disorders and APD has also been documented amongst several researchers. This adds further complexities to the management of APD. According to Geffner and Ross-Swain (2007), learning disorders can be profiled into four subtypes; namely, decoding (blending single units together to make a meaningful word or concept), spelling, reading comprehension and written language error patterns. An effective inter-hemispheric relationship between the two hemispheres of the brain allow for the effective development of spelling, reading, writing, decoding, blending of words, rhythm and any other non-linguistic and linguistic skills required for effective communication and most importantly, academic development (Geffner & Ross-Swain, 2007). As a result, similarly to ADHD, the child presenting with a learning disorder may also present with APD (AAA, 2010).

APD is concomitant with other childhood disorders, such as reading disorders, Obsessive Compulsive Disorder (OCD), sensory integration disorder (Emmons & Anderson, 2005; Krüger, Krüger, Hugo & Campbell, 2001), dyslexia (McArthur, 2009), stuttering (Kathard, 1992) and Autism Spectrum Disorder (ASD; Emmons & Anderson, 2005; McArthur, 2009). Bellis (2003) emphasises that the interdependency between several practitioners, such as the speech-language therapist, psychologist, social worker, teacher, physician and even parents, is significant in determining the child's difficulties, strengths and progress. The audiologist/ STA play a significant role in the management of the APD programme and therefore needs to ensure collaboration amongst the different team members (Bellis, 2003).

2.3 The scope of the audiologist/ STA in the management of children with auditory processing disorders

The scope and role of the audiologist/ STA in the assessment and implementation of an effective APD intervention programme is highlighted by the American Speech-Language and Hearing Association (ASHA, 2005), the American Academy of Audiology (AAA, 2010), the British Society of Audiology (BSA, 2011) and more locally, by the Health Professions Council of South Africa (HPCSA, 2008). Although APD was first discovered in 1954 by Helmer Myklebust, the first ASHA Taskforce document was only initiated much later in 1996, which developed consensus and standardisation amongst audiologists/ STA's, with a clearer definition of APD as a disorder (Richard, 2011; ASHA, 2005).

According to the HPCSA (2008), an audiologist's/ STA's role is to prevent, identify and provide treatment and/or intervention for auditory and vestibular disorders, including the evaluation and management of persons with auditory related processing disorders. The HPCSA serves as the statutory board in which the professional practices of South African healthcare practitioners are regulated and standardised in order to ensure that all practitioners

maintain an ethical and consistent manner of practice. Audiologists/ STA's in South Africa are therefore required to identify and treat hearing disorders across the age range, from babies to adults, and services should not be limited to a specific culture, ethnic, gender or socio-economic background (Lubinski & Frattali, 2001, in Naidoo, 2006). It is important to note that the SLT, as per their scope of profession, is also involved in providing intervention and support services for children diagnosed with APD (HPCSA, 2008). However, for the purpose of this study the focus is on the audiologist and STA.

Despite the HPCSA's view on the audiologist's/ STA's role in APD, the HPCSA also states that audiologists/ STA's should only participate in the field of practice in which they feel competent, based on their level of training and their qualifications (HPCSA, 2008). This was also in agreement with the ASHA (2005) Position Statement on (Central) Auditory Processing Disorders: the Role of the Audiologist. The shortfall remains that there appears to be little consensus amongst documented guidelines with regards to the effective screening, diagnosis and intervention practices in the area of APD (Bellis, 2003). Instead, audiologists/ STA's across the globe rely purely on their own understanding, and administer screening and assessment tools where they feel comfortable, with minimal supporting documentation (Richard, 2011). Audiologists/ STA's therefore may be inadequately prepared and incompetent to manage APD effectively, thus resulting in late diagnosis and unnecessary referrals. In this regard, countries have been addressing the knowledge gap in various ways, as the qualification requirements for an audiologist/ STA differ across the globe. Audiologists/ STA's practicing in the United Kingdom and New Zealand require a master's degree to practice as an audiologist/ STA (Esplin & Wright, 2014; Logue-Kennedy et al., 2011). However, the degree of audiology in the United States of America transitioned from a master's-level qualification, to a doctoral-level qualification between 1998 and 2007, thus encouraging further training in the area of APD (Logue-Kennedy et al., 2011). Third- world

countries, such as India and South Africa, require a bachelor's degree in the field of audiology, with the potential to expand on their expertise (Bantwal, 2011; HPCSA, 2008). Both international and national studies indicate that there is a need for additional training of audiologists/ STA's in the field of APD at a post graduate level, despite having a master's or doctoral degree in audiology (Baldry & Hind, 2008; Chermak et al., 1998; Chermak et al., 2007; Khan, 2005; Logue-Kennedy et al., 2011).

2.4. Challenges regarding the management of auditory processing disorders within the South African context

The quality of the present clinical services provided by South African audiologists/ STA's can partly be measured by the training received during their undergraduate education. Khan (2005) performed a study amongst five 'authoritative voices' in the field of APD based at various training institutes, and attempted to identify the training curriculum for South African audiologists/ STA's and SLTs, using a curriculum analysis framework. The training institutes of South Africa carry their own identity, based on their cultural backgrounds, social context, availability of resources and common theoretical and clinical practices. Therefore, the multicultural nature of South Africa calls for the sensitivity of clinical practice to accommodate the South African context, which is often challenging for the audiologist/ STA. Khan (2005) confirmed that overall, the curricula were acceptable and were sufficient to adequately equip South African undergraduate audiologists/ STA's with the skills needed to manage a client with APD. However, there appeared to be minimal information pertaining to the existing challenges within the South African context, or how to equip the undergraduate audiology students to overcome these challenges. Vaughn, Jacquez and Baker (2009) suggested that in order for healthcare providers to follow an ecological approach to assessment and intervention, additional training regarding culturally sensitive practice is crucial. Unless the training available at an undergraduate level is standardised across the

board on an international basis, the training available to student audiologists/ STA's, as well as the experiences of clinically practicing audiologists/ STA's, cannot be compared.

Khan (2005) suggested that training programmes have to reflect the realities of the country. As a result, several guidelines have been introduced on a local as well as an international level, to assist audiologists/ STA's in the provision of ethical services. Some of the well-established international and locally developed guidelines include the ASHA Taskforce (ASHA, 2005) document, the AAA Clinical Practice Guidelines (AAA, 2010) document, the BSA (2011) document, the Canadian Interorganizational Steering Group for Speech-Language Pathology and Audiology (CISG, 2012) document, as well as the South African CAPD Taskforce (2001) document, which was developed and approved by the South African Speech-Language and Hearing Professional board in February 2000 (Khan, 2005). All of the above guidelines concur that a multidisciplinary team is necessary in the diagnosis of APD and that the case history plays a significant role in paving the way forward. Psychologists and SLT's are able to offer comprehensive information pertaining to the child's expressive and receptive language abilities, learning potentials, attention and memory, which cannot be overlooked during the diagnosis of an APD (Bellis, 2003). According to the AAA (2010) and the ASHA (2005) document, both verbal and non-verbal assessment tools are recommended in order to paint a clearer picture of the CANS, the underlying processes and the possible location of dysfunction. However, despite having these tools available, most audiological assessment tools for APD are not suitable for the linguistically- rich context of South Africa, and the country's 11 different languages, making the assessment and diagnosis of APD challenging. Not only is the language barrier a concern, but recordings of tests on cassettes are also of poor quality. APD tests are also not standardised to suite the South African population, questioning the reliability and validity of the screening and assessment measures within the South African context (Saleh et al., 2003).

As a result, the South African Taskforce was developed in 2001, which attempted to fill in some of the gaps for South African audiologists, whilst maintaining an appropriate test battery for both the fluent first-language, English-speaking child, as well as one that is non-proficient in English i.e. second-language English speaker. Attempting to develop 11 different protocols for all of the official languages, proved challenging. As a result, the Low Linguistically Loaded CAPD Test Protocol (2001) document was created in the interim, which attempted to cater for any individual with a basic understanding of the English language (Saleh et al., 2003). To date, this test protocol is still under criticism, as it was developed in the United States of America and was influenced by foreign data, with sufficient linguistic load to disadvantage South Africa children (Campbell & Wilson, 2003; RSA CAPD Taskforce, 2001).

The Low Linguistically-Loaded CAPD Test Protocol (2001) comprises of two test batteries being; one serving individuals of first-language English speakers, whilst the other, serving second-language English speakers. The first test battery comprises of one linguistically-loaded dichotic test, such as the SSW (Katz, 1962, as cited in Katz et al., 1992), one non-linguistically loaded dichotic test, such as the Dichotic Digits Test (DD; Musiek, 1983, as cited in Bellis, 2003), one temporal ordering test, such as the Frequency (Pitch) Pattern Test (PPT; Pinheiro & Ptacek, 1971, as cited in Bellis, 2003), one monaural low-redundancy test, such as a Low Pass Filtered Speech Test and one binaural fusion test, such as the Band-Pass Filtered Binaural Fusion Test (Willeford, 1978, as cited in Katz et al., 1992). The second test battery, developed for individuals who are second-language English speaking, comprises of non-linguistically loaded tests only, such as the DDT, the PPT, the Duration Pattern Test (DPT), the Psychoacoustic Pattern Discrimination Test (PPDT) and the Masking Level Difference Test (MLD; RSA CAPD Taskforce, 2001). Electrophysiological tests, such as the P300 test, have also been recommended to improve objectivity measures. However, Jerger

and Musiek (2000) reported that the cost and time to administer these electrophysiological tests are not always deemed to be feasible when measured against the benefit and minimal clinical value attained. Katz et al. (2002, as cited in Schow, Seikel, Brockett & Whitaker, 2007) recommended that despite the fact that electrophysiological tests play some part in the differential diagnosis of APD, electrophysiological measures are not easily administered within school contexts, particularly the P300. Furthermore, electrophysiological measures have little statistical value when comparatively measuring the results between those children presenting with an APD, and those children without an APD (Bellis, 2003; Schow et al., 2007).

Audiologists/ STA's are therefore faced with several challenges restricting them from practicing in the area of APD; from non-standardised assessment tools, to a lack of normative data, inappropriately recorded tests materials as well as language barriers amongst various populations. It can therefore be inferred that audiologists/ STA's are placed in a challenging, ethical dilemma when the demands for the audiologist/ STA to practice in the area of APD increase. Given some of the country's contextual challenges as previously discussed in Chapter One, the challenges for South African audiologists/ STA's are exacerbated.

The contextually specific challenges of South Africa; which include poverty, malnutrition, limited access to medical and educational facilities, increase in burden of disease, culturally and linguistically inappropriate test materials; all restrict effective service delivery. These findings were similar to a study performed in India, a linguistically enriched country, where the audiology clinics primarily identified and managed hearing disorders whilst fitting hearing aids, despite very little practice in APD (Bantwal, 2011). In addition, India, with a population of 1.2 billion, consisting of 22 different languages and served by 1 750 audiologists/ STA's registered with the Indian Speech and Hearing Association, presents with

similar challenges to South Africa (Krishna, 2011, in Bantwal, 2011). The challenges include linguistic and cultural issues, similar to the present study. The majority of the South African population (22.7%) are first-language isiZulu speakers, whilst only 13.5% are first-language English speakers (South Africa Demographics Profile, 2014). These stats differ to those of a survey reported on the United States of America which indicated that more than 80% of the population spoke English as their first language (United States Census Bureau, 2011). Based on the above findings, practitioners need to consider the linguistic background of the client prior to administering the test battery. The popular SCAN-C (Keith, 2000) and the SCAN-A (Keith, 1994) APD screening test batteries, initially stemming from Bellis (1996), are based on the performance of American adults and children, with the normative data therefore not being linguistically suitable for the South African population (Saleh et al., 2003). The AAA (2010) states that “tests should be selected that have appropriate normative data. No matter how efficient a test may prove to be, it is of no clinical utility if appropriate norms are not available” (p. 3). Based on the latter statement, it can be inferred that inappropriate normative data, or a lack of normative data, may result in inappropriate referrals resulting in children either being referred from one practitioner to another in order to receive a diagnosis which can be costly, or alternatively may be misdiagnosed from the start. Therefore, interpretation of assessment findings should be approached with caution.

In an attempt to determine normative data for South African children, a research study performed by Campbell and Wilson (2003) sought to determine the performance levels of South African children and American children on an APD linguistically loaded test known as, the Tonal and Speech Materials for Auditory Perceptual Assessment Disc 2.0. The participants were between eight and 12 years of age, with English being their first language. The South African children performed significantly poorer than the American children, when compared to the normative data developed by Bellis in 1996, despite having English as their

first language (Wilson & Strauss, 1998, in Campbell & Wilson, 2003). The Low Pass Filtered Speech Test (linguistically loaded in nature), proved to be the most challenging assessment for the group consisting of South African children. The findings therefore suggest that the linguistic and dialectal barrier is a concern whilst administering APD assessments on South African children (Wilson & Strauss, 1998, in Campbell & Wilson, 2003). Despite the implementation of the South African Taskforce, the details pertaining to appropriate test battery administration, normative data and universal standardisation continue to remain a controversial matter in South Africa.

Whilst language barriers continue, one cannot ignore the contextual background of South Africa as a country and how it restricts the practices of South African audiologists/ STA's, which poses an additional challenge. The HIV pandemic in South Africa continues to rise, particularly amongst the paediatric population, with 360 000 children younger than the age of 14 years living with HIV/AIDS, further affecting all avenues of the child's academic development (UNAIDS, 2013). Therefore, life-threatening diseases, such as HIV/AIDS in children, are often prioritised over non-life-threatening diseases and disorders, such as APD (DOH, 2010). The services of the audiologist/ STA have become scarce to Black communities, limiting the access of service delivery to majority of the population (Hlabangwane, 2002). South African audiologists/ STA's attribute inadequate service delivery to the challenging conditions a third-world country has to offer, such as financial strains, scarce equipment and insufficient and unskilled staff (Naidoo, 2006).

Poverty is rife in South Africa (DOE, 2014). Bray, Gooskens, Kahn, Moses, and Seekings (2010) described that in several of the poorer areas in Cape Town, South Africa, children acquired the role of being the primary caregiver. Children between the ages of five to nine years old were looking after their younger siblings, and/or sickly family members. In 1999,

according to Kritzinger and Louw (1999, as cited in Popich, 2003), 60% of mothers in South Africa worked, whilst only 40% were able to stay at home and care for their children, leaving their children in the care of other family members and/or other caregivers who may not necessarily understand the child's disorder and the intervention thereof. Over a decade later, it can only be assumed that due to the demands required from a developing country, the numbers have increased. The above lifestyles may be considered as child labour to one culture, yet other cultures perceives it as a stage of development into adulthood (Balton, n.d.). Bray et al. (2010) further described how illiteracy amongst adults and marginalisation amongst the community members within the poorer communities, tend to create negative attitudes towards education, which can very often stem from role models at home. As a result, the child's self-esteem and enthusiasm to succeed at school is jeopardised, with little moral support from the community. Many families living in South Africa are made up of multiple generations and/or extended families living under one roof, whilst all sharing the same income (Balton, n.d.). It is therefore not surprising if South African children already presenting with an underlying APD, have difficulty academically, socially and emotionally, whilst living under these conditions.

The contextual challenges discussed above, delay timeous intervention as there are no adult figures to identify health problems, nor will they adhere to intervention programmes. Parents and caregivers need to understand the assessment and intervention programmes recommended by health care providers in order for them to fully invest into the programme (Popich, 2003). It can further be inferred that the identification and management of children with APD, particularly those living in poor socio-economic backgrounds, where intervention programmes are not deemed necessary by family members and caregivers, may prove to be challenging for the audiologist/ STA. Taking aspects of culture, socio-economic conditions

and ethical considerations into deliberation, working within an appropriate model of care is therefore necessary.

Bellis (2003) emphasises the importance of the role of the parent and the family, particularly with regards to intervention. A family-centred approach acknowledges and considers the familial context, their values, beliefs, religions and cultures, and recognises that the development of a child is moulded according to these values (Turnbull, Turbiville & Turnbille, 2000, in Balton, n.d.). Despite the fact that child healthcare is on the rise in South Africa, the country continues to follow Westernised, traditional, biomedical methods of assessment and intervention, which cannot always be effectively applied to the context of South Africa (Vaughn et al., 2009). The Westernised methods tend to believe that illness is often caused by natural influences, whilst the Africanised methods attribute illness and disease to supernatural forces or higher powers (Vaughn et al., 2009). Vaughn et al. (2009) have reported some of the benefits of following the Westernised beliefs of self-bias, whereby the client takes responsibility for his or her own fate. However, several cultures believe that their fate rests in the hands of a God, supernatural powers and/ or spiritual influences, and therefore, relies on prayer. It can therefore, be challenging for audiologists/ STA's to engage with clients on a professional and ethical basis, if they do not have a clear understanding of their client's cultural values and beliefs. It is for this very reason why health care providers should take on an ecological approach to APD management.

According to Balton (n.d.), the ecological approach is based on the theory that anything can be created by the influences of the environment in which it is embedded. According to Bronfenbrenner's Bioecological model, health care providers should consider the child within a setting that represents their true world, as their culture generally determines their day-to-day activities and how they view the world in general (Howe, 2011). The community and context

in which an individual is raised, influences their beliefs, attitudes and actions in life, as well as their attitudes towards healthcare (Balton, n.d.; Howe, 2011). These influences include but are not limited to schools, religious organisations, occupation, relationships, cultures, socioeconomic status, ethnicity, poverty and family dynamics (Howe, 2011). Not to mention, whilst some cultures in South Africa believe in community support and interconnectedness between the members of a community, other cultures believe in autonomy and independence. Therefore, Balton (n.d.) recommends that by understanding the family's cultural beliefs, the health care provider may understand the child's daily and lifestyle activities which may aid in shaping intervention programmes based on these differences. Balton (n.d.) describes that often families avoid intervention plans that do not fall within their general routine of lifestyle. Audiologists/ STA's are further required to make ethical decisions, whilst considering the client's autonomous decision, particularly with regards to APD intervention.

The contextual issues presented, raise further questions with regards to the present practical experiences of South African audiologists/ STA's as well as the quality of service provision available in the area of APD. As the controversies escalate, there continues to be a reported increase in the number of referrals of APD clientele to audiologists/ STA's within the South African context and the challenges continue (Khan, 2005). The current study aims to not only focus on the practices of audiologists/ STA's regarding APD management, but further attempts to describe the perspectives of audiologists/ STA's by taking the context of South Africa into consideration. In addition, based on the researcher's knowledge of the literature review, the present study is the first to create an open-ended, descriptive analysis, allowing the participants to report on their own personal opinions in view of the challenges restricting them from practicing in the area of APD, and giving the participants the opportunity to provide recommendations to better the provision of APD services in South Africa. Such information can be utilised in policy formulation to improve service delivery.

2.5. Conclusion

APD is a complex disorder to define and is one that practitioners cannot approach simplistically. It is also noted that challenges with determining the anatomical origin of APD, further complicates management of the condition. It can be deduced, based on a perusal of literature that audiologists/ STA's face several challenges with regards to the management of APD, particularly within the South African context. A number of studies indicate that several challenges, related to ineffective guidelines, inadequate protocols, inappropriate test material, contextually specific challenges, including language diversity, as well as service delivery issues, have all contributed to limited practice of audiologists/ STA's in the field of APD. Poorer areas present with dilapidated roads and buildings, making service delivery scarce for many, whilst the classroom environments are not conducive for learning, particularly for children presenting with APD where favourable learning environments are necessary. More children nowadays are becoming caregivers at home, to family members who are ill or may have no adult care whatsoever (DOE, 2014). It is therefore imperative that audiologists/ STA's take on an ecological approach to management.

The following study, therefore attempted to describe the perspectives and practices of audiologists/ STA's regarding APD. The research question therefore raised is; what are the perspectives and practices of South African audiologists/ STA's regarding the management of children with auditory processing disorders?

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

This chapter discusses the aims and objectives of the study. The research design is motivated for and the study participants are described. The data collection tool and methods are explained, whilst measures for reliability and validity are documented. The data analyses as well as the ethical considerations are discussed.

3.2 Aim and objectives

3.2.1 Aim of the study:

The aim of the study was to:

1. Describe the perspectives and practices of South African audiologists/ STA's regarding the management (screening, assessment, diagnosis and intervention) of children presenting with auditory processing disorders.

3.2.2 Objectives of the study:

Based on the aim above, the following objectives emerged:

1. To describe the perspectives of audiologists/ STA's regarding their overall preparedness in the management (screening, assessment and intervention) of children with APD.
2. To describe the practices of audiologists/ STA's regarding the screening for APD.
3. To describe the practices of audiologists/ STA's regarding the assessment of children with APD.
4. To describe the practices of audiologists/ STA's regarding the intervention of children with APD and the referrals thereof.

5. To describe the challenges and recommendations provided by the study participants with regard to the management of APD in South Africa.

3.3. Research design

The study is situated within a positivist paradigm. A quantitative, non-experimental descriptive survey design was used, as the researcher attempted to describe the experiences of the sample and the relationships that may exist between several variables, without manipulating the variables in any way (Maxwell & Satake, 2005). Quantitative research attempts to attain numerical data often obtained through polls, surveys and questionnaires from a particular population and analyses the data accordingly (Maxwell & Satake, 2005). The study was further able to attain a vast quantity of information across a broad population in order to describe a phenomenon (Maxwell & Satake, 2005). The research therefore, describes a particular way of practice of a sample population, and reports information in present, 'real life' scenarios (Drummond, 1996). The following design therefore supports the aim of the current study as the researcher attempted to describe the current perspectives and practices of audiologists with regards to the management of children presenting with APD. An open- ended question allowed the participant to elaborate on their responses. Suggestions provided by the participants may also serve as a foundation for future research studies (Ballou, 2008).

3.4. Study population

A total of 1 802 audiologists and STA's on the national HPCSA register formed the target population for the present study and were invited to participate in the study. A desired response rate of 541 participants (30% - 40%), was the target for the present study, which is the recommended response rate for a descriptive study (University of Wisconsin Survey Centre, 2010).

The following inclusion criteria were applied to this study,

- Participants registered either as an audiologist or STA with the HPCSA
- Any audiologist/ STA practicing in South Africa

The decision to omit the criterion to include only audiologists specifically experienced with APD was based on the premise that the results should represent the perspectives of audiologists having qualified with an honours degree in audiology. By doing so, rich information pertaining to the audiologists perspectives of their experience in the field of APD during their undergraduate training will be provided. All 1 802 audiologists/ STA's received a questionnaire (Appendix A), an information letter (Appendix B) and a consent form (Appendix C) via post. Thus, a response rate of approximately 10% was obtained. Of the 1 802, a total of 189 participants consented to participate. A total of 78 postal questionnaires were received; however only 67 postal questionnaires were used. The outstanding 11 could not be included; as the participants indicated that they had either retired, stopped practicing, or were of late submissions. A total of 111 participants completed the online survey; however 22 questionnaires had to be excluded from the total, as the questionnaires were incomplete i.e. only the consent form was completed. A total number of 156 questionnaires were considered for analysis. Consultation with a statistician confirmed that according to the formula described by Watson (2001) from the Pennsylvanian State University, the small to moderate variability of 10-30% suggests that 156 participants is an adequate sample size for the study. An illustration on how the final study sample was obtained is depicted in 3.1 overleaf.

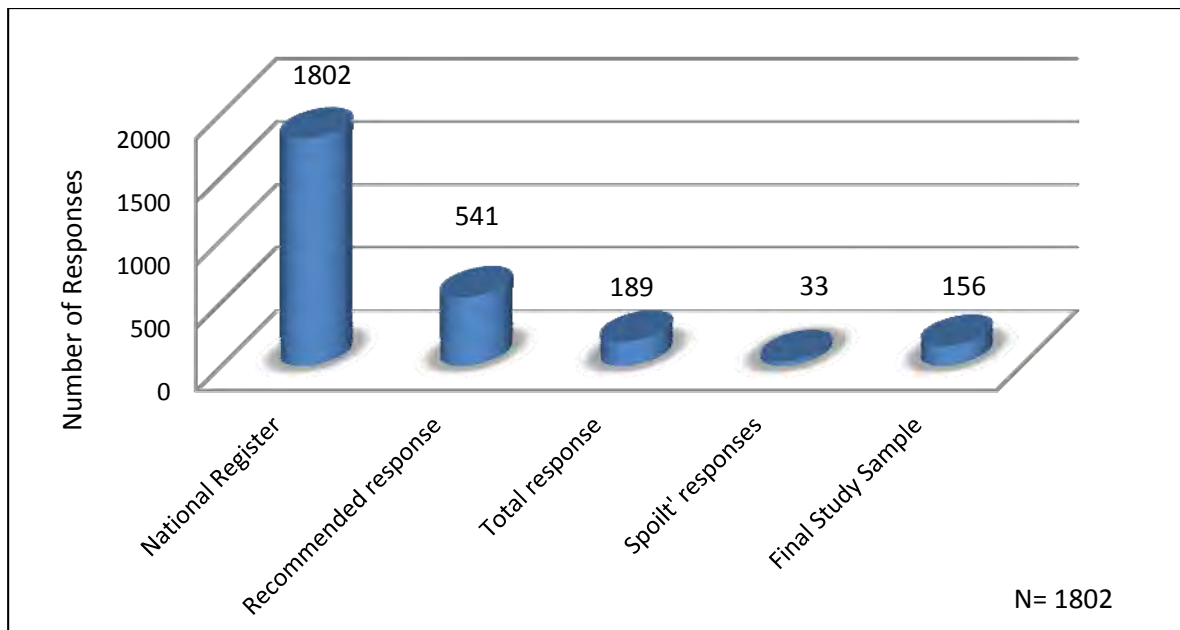


Figure 3.1 Description of how the study sample was obtained.

3.5. Demographical profile of the study sample

The study sample consisted of 156 participants. Eighty percent of the participants qualified with a bachelor's degree ($n = 125$). These participants had been practicing for either less than five years, or more than 15 years. The remaining master's and PhD graduates made up the minority of the study sample, having more than 15 years of experience. Most of the participants in the study graduated prior to the year 2006, and obtained their qualification through the University of Pretoria (39.1%, $n = 61$). Other participants obtained their degrees at the University of KwaZulu-Natal (18.6%, $n = 29$), the University of Witwatersrand (18.5%, $n = 29$), the University of Cape Town (14.7%, $n = 23$), and the remaining from other universities. The demographical details of the study sample are reflected in Table 3.1, overleaf:

Table 3.1**Demographical profile of the study sample.**

	<i>Year of Experience</i>				<i>Year of Qualification</i>					<i>Institute</i>					
	0-5	6-10	11-15	>15	After 2006	2000-2005	1990-1999	1980-1989	Prior 1989	UCT	Stell.	PTA	KZN	Wits	Other
<i>BA.</i> <i>n=12</i> <i>5</i>	38 30%	31 25%	17 14%	39 31%	51 41%	26 21%	25 20%	19 15%	4 0%	16 13%	9 7%	51 41%	26 21%	20 16%	3 2%
<i>MA.</i> <i>n= 29</i>	3 10%	9 31%	3 10%	14 48%	6 21%	7 24%	9 31%	5 17%	2 7%	7 24%	2 7%	8 28%	3 10%	9 31%	0
<i>PhD.</i> <i>n=2</i>	0	0	0	2 100%	0	0	0	1 50%	1 50%	0	0	2 100%	0	0	0
<i>n =</i> <i>%</i>	<i>41</i> <i>26.3</i>	<i>40</i> <i>25.6</i>	<i>20</i> <i>12.8</i>	<i>55</i> <i>35.3</i>	<i>57</i> <i>36.5</i>	<i>33</i> <i>21.2</i>	<i>34</i> <i>21.8</i>	<i>25</i> <i>16</i>	<i>7</i> <i>4.5</i>	<i>23</i> <i>14.7</i>	<i>11</i> <i>7</i>	<i>61</i> <i>39.1</i>	<i>29</i> <i>18.6</i>	<i>29</i> <i>18.5</i>	<i>3</i> <i>1.9</i>
<i>Codes</i>	<i>BA.</i> <i>Bachelor Degree</i>				<i>MA.</i> <i>Master's Degree</i>					<i>PhD.</i> <i>Doctorate Degree</i>					

The participants predominantly practiced in Pretoria, the Western Cape and KwaZulu-Natal, with fewer responses from the neighbouring provinces. The common languages spoken by the audiological caseload included that of English, Afrikaans and isiZulu. There appeared to be an equal percentage of responses from audiologists and STA's. Three participants (2%) indicated they were not practicing during the time of the study, but completed the questionnaire and were included in the sample. An overall total of 49% (n = 75) of the study sample practiced in private practice, whilst a fairly equal distribution of the remaining participants practiced in either a hospital (19%) or a school (17%). The remaining participants were either not practicing, or working within an industrial setting or academic institute. A total of 57% (n = 89) of the audiologists and 43% (n = 67) of the STA's were based in a private practice, as illustrated in 3.2, overleaf.

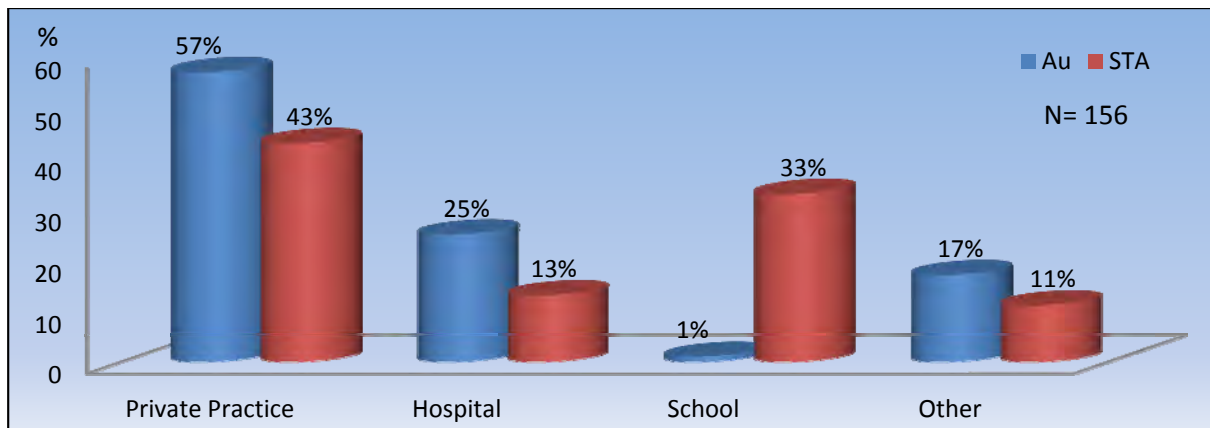


Figure 3.2 Clinical setting of the study sample.

3.6. Data collection method

A descriptive, questionnaire survey was used for this research. A survey has been reported to be the most cost-effective and time-saving method (Stein & Cutler, 1996, in Naidoo, 2006). According to Irwin, Pannbacker and Lass (2008), a survey makes use of questionnaires in order to gain a better understanding and description of a particular population, rather than an observation. A questionnaire was adapted from a survey entitled: Current and Future Service Provision for Children with Auditory Processing Disorder in Ireland (APD Ireland Research Group, 2008). A letter was sent to the APD Ireland Research Group requesting permission to adapt the questionnaire for the current study (refer to Appendix D), and permission was granted. The various sections included in the questionnaire and motivation thereof is summarised in Table 3.2, overleaf.

Table 3.2**Description of the questionnaire.**

<i><u>Sections and Questions</u></i>	<i><u>Areas</u></i>	<i><u>Motivation</u></i>
<u>Section A:</u> Biographical information of the study sample <i>Questions 1-11:</i>	The participants' biographical information included geographical location of practice, the number years of experience, profession, and biographical details of their client caseload.	The biographical details of the participants will assist in determining the perspectives and practices of audiologists/ STA's, regarding children with APD, through a descriptive and inferential analysis (USC, 2013).
<u>Section B:</u> Objective 1 To establish the perspectives of audiologists/ STA's regarding their overall preparedness in the management of children with APD. <i>Questions 12-21:</i>	To establish the participants' perspectives and levels of preparedness regarding the management (screening, assessment and intervention) of children with APD.	This section investigates whether the roles are being carried out by South African audiologists/ STA's, as recommended by the HPCSA (2008) document, whilst focusing on several challenges that may be restricting the management of APD in South Africa.
<u>Section C:</u> Objectives 2-4 To describe the practices of audiologists/STA's in terms of managing children with APD <i>Questions 22-28:</i>	Questions have been included to address the practices of South African audiologists/ STA's pertaining to the management (screening, assessment and intervention) of children with APD, and the referrals thereof.	The study attempted to describe the provision of services in the area of APD, within the South African context.
<u>Section D:</u> Objective 5 A summary of the Challenges and Recommendations that emerged from the above themes. <i>Question 29:</i>	An open-ended question allowed the participants to state any challenges experienced in the management of APD, and provide any recommendations thereof. Several themes were derived	By identifying the challenges and the needs of South African audiologists/ STA's, the efficacy of older and newer assessment and intervention programmes is evaluated and reviewed accordingly. By doing so, new evidence-based research policies and revised screening and assessment tools are developed. (Bellis, 2003)

According to Maseko & Kaschula (2009), the majority of universities and technikons use either English or Afrikaans as the sole medium of instruction and/ or learning. The questionnaire was only made available in English, being South Africa's primary language for

business, politics and media (CENSUS, 2012, in SouthAfrica.info, 2012). Furthermore, the questionnaire targeted a population of qualified health care practitioners who required English to enter a tertiary level education in South Africa (Maseko & Kaschula (2009). The questionnaire was accompanied by an information letter, further detailing their anonymity and confidentiality, as well as a letter of informed consent for the participant to complete.

3.7. Data collection procedure

A letter was addressed to the HPCSA (refer to Appendix E), detailing the research aims and procedures, and requesting permission to access the postal addresses of the members registered as an audiologist or STA. The University of KwaZulu-Natal funded the purchasing of the HPCSA national register. The questionnaire, information letter, with an electronic link to Survey Monkey, as well as the consent form, was posted by the researcher to all the audiologists and STA's on the HPCSA register. The participants were given a choice of either responding by means of an electronic questionnaire, or a hardcopy questionnaire. The information letter advised the participants to choose only one method of responses, outlined below, to avoid duplicating responses:

- A) An online electronic questionnaire developed by Survey Monkey software programme.
- B) A hard copy of the questionnaire made available for postal responses accompanied by a self-addressed, prepaid envelope.
- C) Alternatively, the questionnaire could be scanned and emailed back to the researcher.

An acknowledgment of consent had to be completed on the Survey Monkey electronic questionnaire, prior to proceeding with the questionnaire. Respondents were given a time frame of 12 days to complete the questionnaire. Bailey (1997) reported that the participants seldom return questionnaires after the two week period. A final email was distributed

detailing that an additional five days were to be offered to any remaining participants who had not yet completed the survey (Emanuel et al., 2011). Electronic questionnaires are cost-effective, time-efficient and provide the research with rich, valuable information, based on a broader population (Maxwell & Satake, 2005). Electronic questionnaires also avoid ‘researcher effect’ (the relationship between the researcher and the subject), which limits any compromise to the validity of the study (Bailey, 1997). The survey required no longer than 20 minutes for the participant to complete, as recommended by Drummond (1996).

3.8. Reliability and validity

Various measures were undertaken to ensure reliability and validity. A pilot study was conducted, and amendments to the questionnaire were made accordingly. The pilot study was performed in order to ensure that the research tool was linguistically appropriate to prevent any unclear statements or ambiguous questions reflected on the questionnaire (Thabane et al., 2010). The participants of the pilot study met the inclusion criteria of the main study. Questions were short and easy to comprehend, whilst avoiding any ambiguity. The questionnaire was further reviewed by a qualified audiologist with experience and expertise in the field of APD to ensure that the research questionnaire presented as a rich instrument tool, and that the questionnaire covered the scope of APD, therefore, avoiding any gaps. A questionnaire was utilised and adapted from a previous study presented by the APD Ireland Research Group (2008). The research tool comprised of 11 questions (38%) which were adapted and reworded to suit the context of the study, whilst the additional 18 questions (62%) were formulated based on extensive literature and research studies performed in the field of APD. Seven of the open-ended questions from the previous study were converted into closed-ended questions. The sequences of the questions were amended to match the objectives of the current study, whilst several words were amended in order to ensure the participants were familiar with the terminology used by South African audiologists. The APD

Ireland Research Group (2008) questionnaire comprised of two phases (first phase being quantitative in nature and second phase being qualitative in nature). The current research only utilised and adapted the first phase of the APD Ireland Research Group (2008) questionnaire, thus making the research questionnaire entirely quantitative in nature.

3.9. Pilot study

A pilot study was conducted on four participants practicing at the University of KwaZulu-Natal prior to the main study. The purpose of the pilot study was to identify any confounding factors and, address them beforehand. The participants were provided with the information form, the consent form, as well as the electronic link directing the participant to the online research questionnaire, as developed by the computer software, Survey Monkey. Once the participant had completed the questionnaire, the efficacy of the software was also observed to determine whether the software was able to record the participant's response in an effective, confidential manner. The participants were requested to provide feedback and comments on the survey, as well as the consent letter and the information letter (Thabane, 2010). Areas taken into consideration included the ambiguous wording of the questionnaire, the time taken to complete the questionnaire and the costs (if any) involved to complete the study (Thabane, 2010) (refer to Appendix F). The participants involved in the pilot study were not included in the main study.

3.9.1 Results of the pilot study

The results of the pilot study indicated that the method of gathering electronic, participant responses, as well as the recording of information, appeared standardised, with no identified technical or software faults. No concern was raised with regards to the time taken to complete the research tool, and the participants reported that the questionnaire was completed with ease. The wording was linguistically appropriate and non-ambiguous. One participant

suggested that the researcher correct minor spelling errors identified in the questionnaire. Subsequent to the pilot study, appropriate amendments were made.

3.10. Data analysis

The data was analysed by administering descriptive and inferential statistics. Data was analysed by using the Statistical package for the Social Sciences (SPSS, version 19) with the assistance of a research statistician. Inferential statistics were used to analyse the relationship between variables, as reflected in Section A of the questionnaire, such as the relationship between the level of preparedness in the management of APD, the qualification obtained, as well as the number years of clinical experience obtained by each participant. Descriptive statistics on the other hand, were used to analyse frequency responses and percentage calculations obtained from the ‘Yes’/ ‘No’ questions and the rating scales reflected in Sections B and C. Responses pertaining to the audiologists’ and STA’s perspectives were depicted by a Likert scale e.g. ‘*very poorly informed*’ to ‘*very well informed*’. The assessment, intervention and challenges related to APD were translated into frequencies and percentages, and analysed accordingly. The open-ended question, depicted in Section C, was analysed by drawing on themes and was descriptively quantified.

The Pearson Chi-Square test was administered to determine if any correlations existed between the clinical training, qualification and experience of South African audiologists/ STA’s and their perspectives and practices pertaining to APD (Bailey, 1997). The Mann-Whitney Test was able to analyse the different mean scores on a group that presents with similar characteristics (Bailey, 1997). These results were analysed accordingly, and have been presented in the form of bar graphs and pie charts that have been adapted from the primary APD Ireland Research Group (2008) study. Themes were identified for the open-ended questions depicted in Section C and were quantified accordingly.

3.11. Ethical considerations

The proposal was submitted to the Humanities and Social Sciences Research Ethics Committee for review, prior to proceeding with the study (refer to Appendix G). Ethical clearance was obtained on 26 February 2014, and as a result, no further amendments were made to the proposal (Certification Number: 1186567).

The current study follows the recommendations provided by Alcser, Antoun, Bowers, Clemens and Lien (2011) which supports the participant's rights of free will, privacy and confidentiality. The study further minimises the burden of participating in the study by making the questionnaires comprehensive and is not time-consuming for the participant to complete. The information document provided the participant with a detailed overview of the research study including the aims of the study, the procedures involved and the potential benefits the study had to offer. There were no risks involved in the study. Informed consent was obtained from all of the participants prior to implementing the study, and participant confidentiality was addressed to all of the participants in the information and consent form, attached to the research questionnaire. Permission was obtained from the APD Ireland Group (2008), before adapting the questionnaire. Confidentiality and anonymity was, and continues to be maintained as names have not been reflected on the questionnaire surveys or any documentation throughout the research, but instead this information has been profiled by using research participant numbers, and coded accordingly. The respondents' surveys have been kept confidential on the researcher's computer, which has also been password protected and is only available to the researcher. All documentation from the research will be kept in a locked cabinet for five years, with only the researcher and supervisor having access to the information. It will thereafter be destroyed with the permission of the researcher's supervisor.

The participants were requested to complete their surveys anonymously, and will continue to remain anonymous throughout the research process and in any publication thereof (Alcser et al., 2011). Responses offered by each participant will be used for the purpose of the research only. Participation in the study was voluntary, and the participants were entitled to withdraw from the study at any stage. All documentation was developed so that the content was comprehensible and clear to the reader, avoiding any technical terms (Alcser et al., 2011). The researcher completed an online ethics course in order to ensure that all ethical issues pertaining to the study had been addressed (refer to Appendix G). A summary of the findings will be made available upon request by interested participants.

3.12 Conclusion

A descriptive survey design was used to meet the aims and objectives of the study. The study aimed to describe the perspectives and practices of South African audiologists/ STA's with regards to their training in the area of APD, and to determine the need for further training. Both descriptive and inferential statistics were used. All ethical requirements were adhered to throughout the research process.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This chapter will present the results, and discusses each objective of the study by drawing on relevant literature. The aim of the study was to describe the perspectives and practices of South African audiologists/ STA's regarding the management of children presenting with APD. By doing so, several challenges and recommendations provided by the participants, pertaining to the management of children with APD will be discussed.

4.2 Results and discussion

4.2.1 Objective One:

To describe the perspectives of audiologists/ STA's regarding their overall preparedness in the management (screening, assessment and intervention) of children with APD.

For the current objective, the participants were required to provide their perspectives of their overall level of preparedness to manage children with APD. In particular they had to indicate on a five point Likert scale their preparedness to screen, assess and intervene with children with APD. They could choose either of the following options: '*very poorly informed*', '*poorly informed*', '*adequately informed*', '*well informed*' or '*very well informed*'.

The results indicated that overall 68% (n = 106) of the participants did not feel adequately prepared to practice in the field of APD, whilst only 32% (n = 50) of the participants felt they were adequately prepared. The findings are illustrated in Figure 4.1, overleaf.

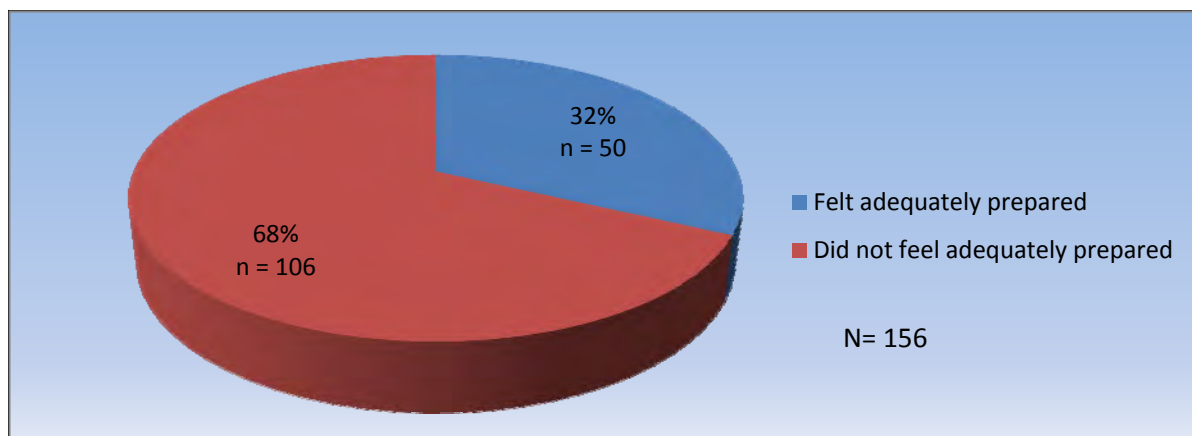


Figure 4.1 The perspectives of audiologists/ STA's regarding their level of preparedness in the management of APD.

The findings of the present study further indicated that 40% (n = 62) of the participants felt that they were either '*very poorly*' (11%, n = 17) or '*poorly*' (29%, n = 45) informed to screen for APD, whilst 44% (n = 68) felt that they were either '*very poorly*' (16%, n = 25) or '*poorly*' (28%, n = 43) informed to assess children for APD. The intervention of APD also appeared to be of concern as 53% (n = 82) of the participants reported that they were either '*very poorly*' (16%, n = 25) or '*poorly*' (37%, n = 57) informed to provide intervention to children presenting with APD. The findings are depicted in Figure 4.2, overleaf.

With regards to their undergraduate training, 33% (n = 52) of the participants did not have the opportunity to manage children with APD whilst, 60% (n = 93) of the participants indicated that their clinical training exposure was very limited as they had seen no more than five clients in view of APD management. In terms of their current caseload, a total of 51% (n = 80) of the participants from the study sample, reported to have between 1%- 25% of their clientele presenting with APD, 11% (n = 17) between 25-50% and as few as 10% (n = 16) between 50-75% presenting with APD.

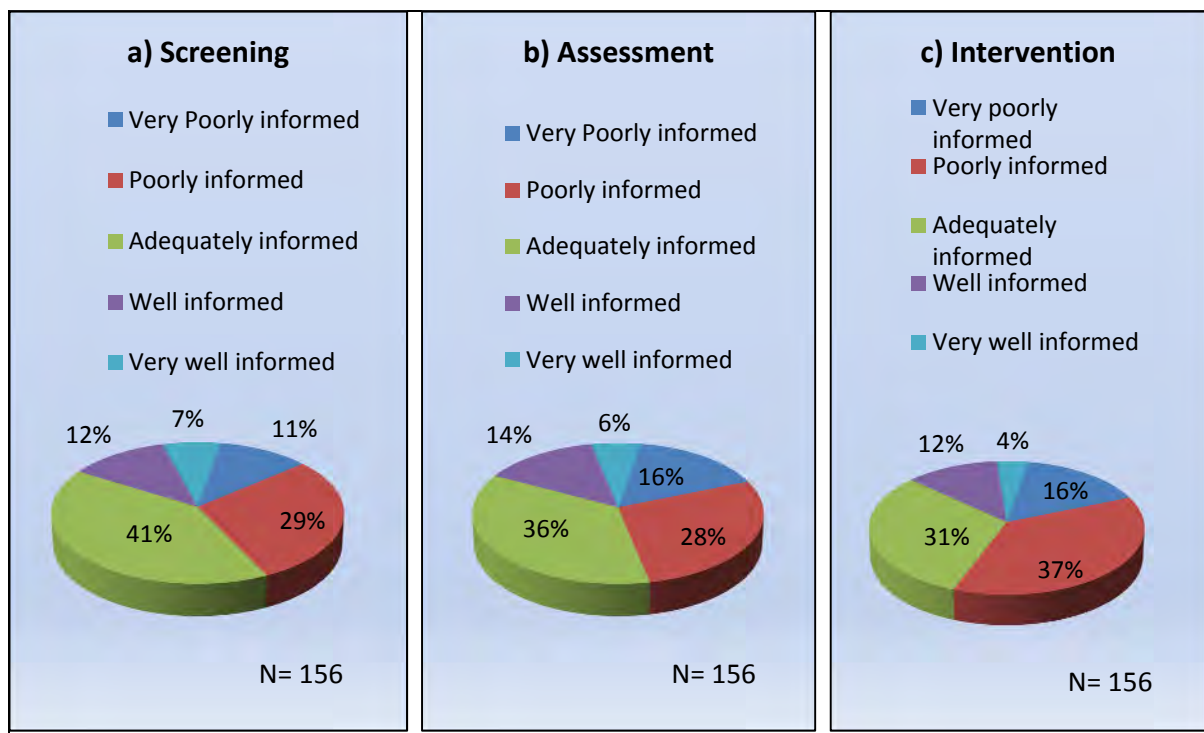


Figure 4.2 The overall perspectives of audiologists/ STA's regarding the management of APD being, a) screening, b) assessment, and c) intervention.

An overall 26% ($n = 40$) of the participants reported that they did not have any clients on their caseload presenting with APD, whilst only 2% ($n = 3$) of the participants reported that they had over 75% of their clientele caseload presenting with APD. Interestingly when comparing the professional experience between audiologists and STA's, 75% of the audiologists, as opposed to 35% of the STA's, described their experience in working with APD as being '*limited*'. This was statistically significant ($p = 0.00$).

With regard to further education and training in the area of APD, a total of 89% ($n = 139$) of the participants in the present study felt that there was a need for additional training. Of the 89%, a total of 87% ($n = 121$) of the participants felt that additional coursework during their undergraduate training would have improved their level of preparedness in the management

of APD, whilst a further 90% (n = 125) felt that additional practical experience would have been beneficial. This is illustrated in 4.3, below.

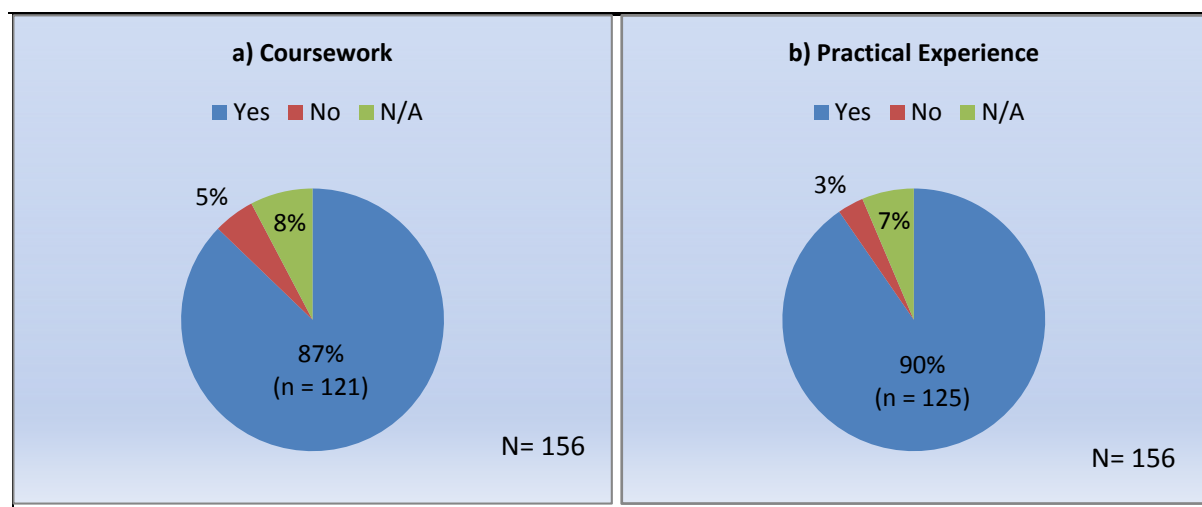


Figure 4.3 The perspectives of audiologists/ STA's regarding their need for additional training in a) coursework, and b) practical experience in APD.

Nearly half (43%, n = 67) of the participants stated that they required training in all areas of APD i.e. screening, assessment, intervention, and counselling clients with APD. Interestingly, majority of the participants felt comfortable to screen for APD, when compared to the assessment and intervention practices of APD.

When comparing the relationship between the number of years of experience, to the audiologists/ STA's perceived level of preparedness to practice in the field of APD, a statistically significant difference ($p = 0.049$) was seen in that participants with more than 10 years of experience, who were more prepared to practice in the area of APD, as opposed to those with fewer than 10 years. In addition, those participants having qualified as a STA were more ($p = 0.03$) prepared to practice than the audiologists who comprised the sample, which was statistically significant. The participants who felt adequately prepared to practice in the area of APD indicated that clinical preparation had only been achieved through ongoing

workshops and conferences in order to improve their own clinical experience, and was not achieved during their undergraduate training programme. If the training that is provided to students during their undergraduate programmes is not adequate to prepare audiologists/STA's to confidently manage children with APD, then intervention and diagnosis becomes even more challenging.

Similarly to the present study, Chermak, et al. (1998) investigated the Professional Education and Assessment Practices in the United States of America, and compared the results to a second study performed almost ten years later: An Update on Professional Education and Clinical Practices in Central Auditory Processing, completed by Chermak et al. (2007). In 1998, the participants were asked to rate their training as well as their level of satisfaction with regards to the administration of screening and assessment tools. Despite 80% of the participants receiving training in the field of APD, less than half of the participants felt confident practicing in the area, having spent an average of as little as three clinical contact hours throughout their training in APD. A total of 78% of the participants rated their satisfaction to practice in APD, as less than 50%. Only 41% of the audiologists felt competent to administer APD assessments, whilst 80% of the audiologists had not received any training dedicated to the CANS or auditory processing at an undergraduate level, (despite having a master's degree in audiology). This was rather addressed as an inclusive entity as part of their other training modules (Chermak, et al, 1998). These findings correlate with those in the present study, where 68% (n = 106) reported that they did not feel adequately prepared to practice in the field of APD, also with minimal theoretical and practical experience obtained during their undergraduate program, with most participants seeing no more than five clients during their APD clinic.

Between 1998 and 2007, the degree of audiology in the United States of America had transitioned from a master's degree to a doctoral degree. Significant improvement was noticed in the academic preparation of audiologists; however there still appeared to be a lack confidence amongst the audiologists in the clinical practice of APD (Chermak et al., 1998; Chermak et al., 2007). The comparison between the Chermak et al. (1998) study and the Chermak et al. (2007) study suggested that an overall improvement was noticed when 69% of the participants had received training specifically dedicated to the CANS and auditory processing since 1997, whilst only 31% indicated that they had not received any training. Transitioning from a master's degree to a doctoral degree suggested that an improvement from 20% of the audiologists being adequately trained in the area of APD, to 69% being adequately trained, is a promising progress in the field of APD. Chermak et al. (2007) postulated that the training during audiologists' undergraduate level was not providing sufficient clinical and/or practical experience in the field of APD, unless additional training was provided beyond a master's level. It was also noted in the literature that the audiologist tends to become biased towards certain audiological practices based on what training was prioritised during their undergraduate level and therefore focus should be shifted towards prioritising APD at an undergraduate level (Emanuel, 2002).

Similarly, according to a study conducted by Baldry and Hind (2008) in the United Kingdom, 58% of the participants perceived that they were not adequately informed to practice in the area of APD, and indicated that further training was necessary, despite having a master's degree qualification. In the study conducted by Logue-Kennedy et al. (2011), 73% of the study sample, consisting of audiologists, SLTs and educational psychologists in Ireland, reported that they were either '*poorly*' or '*very poorly*' informed in the area of APD, whilst according to the Canadian Interorganizational Steering Group for Speech-Language Pathology and Audiology (2012), a total of 37% of the participants were not comfortable to

practice in the field of APD, attributing these concerning figures to the perceived lack of training provided during their undergraduate training programme. These findings are also similar to those of the present study, whereby a total of 68% ($n = 106$) of the participants reported that they did not feel adequately prepared to practice in the field of APD.

Overall, audiologists/ STA's both on an international and national scale attribute their level of preparedness and willingness to practice in the area of APD, to their undergraduate training programmes. Prioritisation with regards to the content of information provided during audiologists'/ STA's undergraduate programmes may result in preferred practice at the professional level. It is stated that a professional tends to focus on aspects within their scope of practice in which they feel adequately trained and experienced (Emanuel, 2002; Chermak et al., 1998; Chermak et al., 2007).

When determining the level of preparedness of audiologists/ STA's, it is however necessary to thoroughly investigate the detail of these curricula. Khan (2005) suggested that in fact, the undergraduate training of audiologists/ STA's in the area of APD in South Africa is generally appropriate and is able to equip audiologists/ STA's with the necessary knowledge and skills to practice in APD. However, diversities exist amongst the training institutes and it may be for these particular reasons why certain audiologists/ STA's feel inadequately trained to practice in the area of APD. According to Khan (2005), out of the five South African training institutes that were included in the study, one training institute had only offered a total number of four and a half hours of theoretical training when compared to another institute receiving a total of 53 hours of theoretical training. Only two of the training institutes provided 34 hours of clinical training, as recommended by Bellis (2005). This may suggest that the perceived lack of theoretical training in the area of APD may have been attributed to the few hours of time allocated to APD theoretical training. Clinical training was also limited,

from as few as seven hours to up to 48 hours obtained across the institutes, with two out of the five not offering practical experience in APD at all (Khan, 2005). However, as the latter study was conducted in 2005, the situation may have changed since and needs further investigation.

It is hypothesised that the findings regarding training and education in the area of APD, could be attributed to the fewer number of clinical hours allocated to the theoretical and/or clinical training provided at 3rd and 4th year level (Khan, 2005; Wemmer, 2007). In addition, the discrepancies across the various South African training institutes in the content of training, could possibly impact on the level of preparedness of audiologists/ STA's to practice in APD. It is plausible to assume, based on the perspectives provided by the participants that focus is not given on contextually specific challenges faced by the South African audiologist/ STA, as well as providing possible options in dealing with linguistic and cultural challenges within the clinical context. Perhaps in order to notice a positive change in APD service provision, standardisation needs to occur, addressing the gaps at the undergraduate level across the training institutes, whilst prioritising APD, and adding theoretical and clinical value to the APD curricula. Despite audiologists/ STA's seeking additional training from CPD activities, such as workshops and conferences, the participants in the present study reported that additional training may have been beneficial during their undergraduate programmes. This appears to be a realistic suggestion, considering that due to the increased burden of disease and associated health challenges, audiologists/ STA's find themselves managing large caseloads, immediately upon embarking on their community service year. Therefore, skills are required at a very early stage in their professional career.

4.2.2 Objective 2:

To describe the practices of audiologists/ STA's with regards to the screening for auditory processing disorders.

A total of 60% (n = 93) of the participants reported to have screened for APD throughout their entire working career, whilst 40% (n = 63) had not. Forty two percent (n = 36) of the participants reported that the common age screened was between six and seven years, with little or no screening from 10 years onwards (refer to Figure 4.4, below).

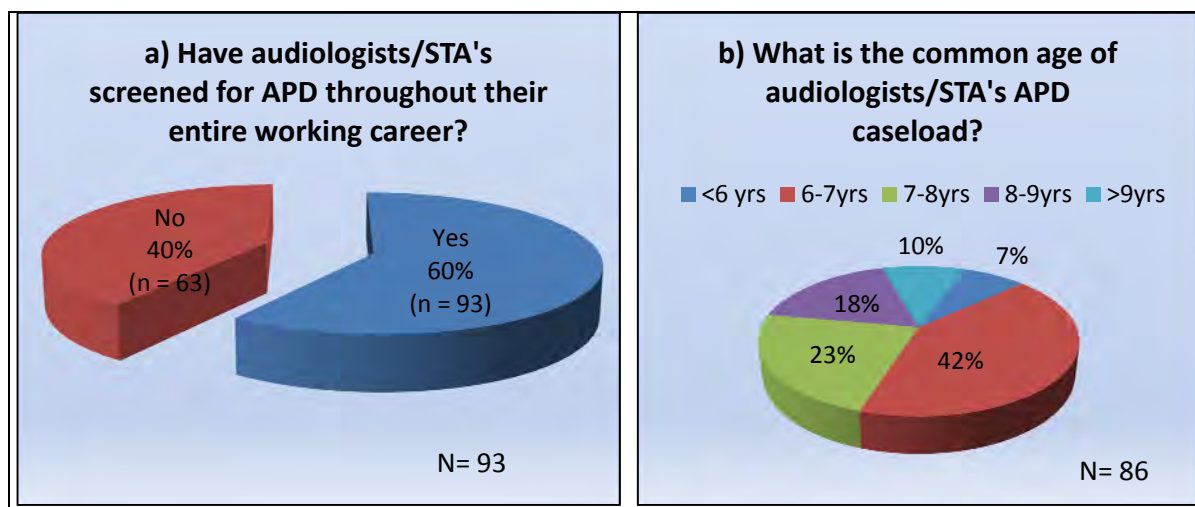


Figure 4.4 The practices of audiologists/ STA's regarding the screening for APD.

An overall 40% (n = 37) of the participants, currently practicing in the field of APD, indicated that they did not follow any guidelines and/or policies, whilst 29% (n = 27) reported to have followed the RSA CAPD Taskforce (2001) document, 31% (n = 28) the ASHA (2005) guideline, and 33% (n = 30) used the guidelines recommended by Bellis (2003). These were used either in isolation or in combination. Only 10% (n = 9) of the study sample used the AAA (2010) guidelines. The findings are illustrated in Figure 4.5, overleaf.

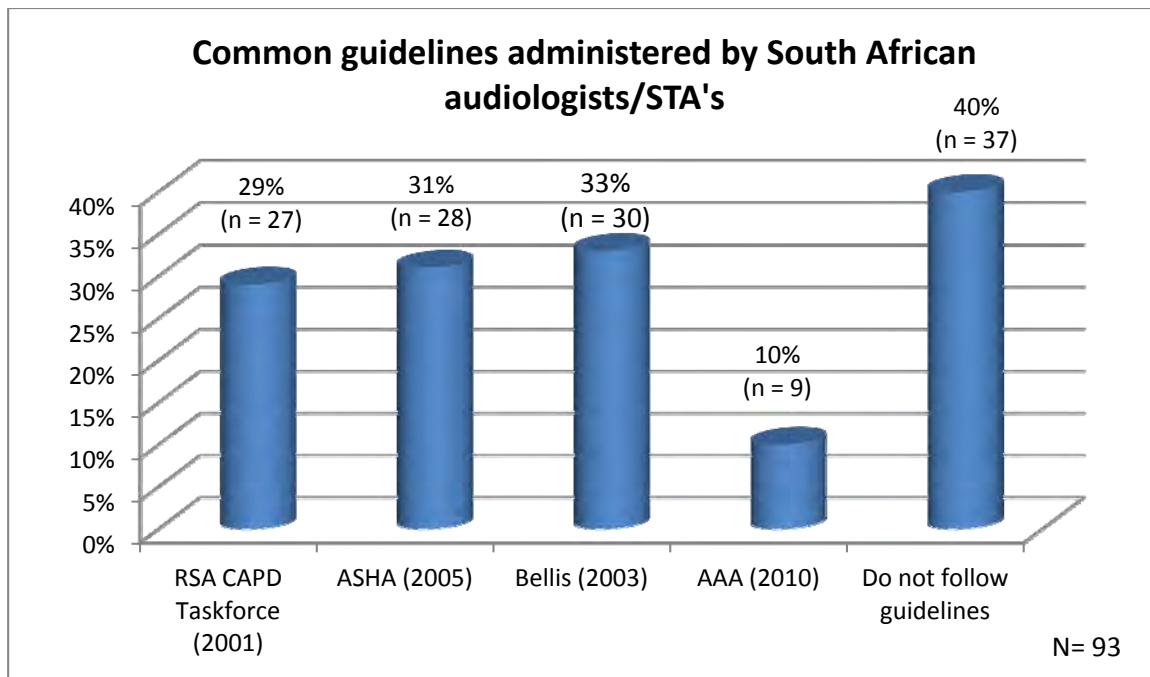


Figure 4.5 Common guidelines administered by South African audiologists/ STA's.

Despite having several guidelines available for APD, no single screening protocol was obvious. The participants used several combinations of formal and informal screening tools which included; the Children's Auditory Processing Performance Scale (CHAPPS¹, 48%, n = 45), the Fisher's Auditory Processing Checklist² (29%, n = 27), the SCAN:C³ (28%, n = 26), the Screening Instrument for Targeting Educational Risk (S.I.F.T.E.R⁴, 16%, n = 15), SCAN:3C⁵ (16%, n = 15), the SCAN:A (15%, n = 14), the Auditory Continuous Performance Test⁶ (ACPT, 12%, n = 11), and the Listening Inventory for Education Checklist⁷ (L.I.F.E, 11%, n = 10). Case history was performed by 91%, (n = 85) of the participants, whilst 77% (n = 72) further stated that they used informal observation, and 39% (n = 36) used self-

¹ CHAPPS (Smoski, 1990)

² Fisher's Auditory Problems Checklist (Fisher, 1976)

³ SCAN C (Keith, 1986)

⁴ S.I.F.T.E.R (Anderson, 1989)

⁵ SCAN3:C (Keith, 2009)

⁶ ACPT (Keith 1994)

⁷ L.I.F.E (Anderson & Smaldino, 1998)

developed, informal checklists.⁸ The above informal and formal techniques were used in a combination with each other.

Taking the findings of objective two into consideration, it can be concluded that many of the South African audiologists/ STA's did not follow any standard screening test battery. The participants tended to collate a number of different, internationally developed normative screening tools, to identify those at risk for an APD or not. The value of these tools must be taken into consideration given the cultural and linguistic diversity of the South African paediatric population. Similarly, in a study performed by Emanuel et al. (2011) on audiologists registered with the American Speech-Language-Hearing Association, just over half (52%) of the participants, indicated that they did not screen for APD. According to Chermak et al. (2007), the most common formal screening tools administered in the USA included the SCAN, the CHAPPS, the Fisher's Auditory Problems Checklist, the S.I.F.T.E.R, and the ACPT screening tools. These screening tools were similar to those used in the present study; however the Emanuel (2002) research study included classroom observation as an option for informal screening measures, which was not recognised by any of the participants in the present study.

With regard to other aspects of the screening battery, the case history was a common method of informal screening in the present study. This was reassuring to note, considering that literature indicates that the case history interview with the parents can outline critical factors (Bellis, 2003). Furthermore, Bellis (2003) reported that a medical and developmental

⁸ . 'Other' included speech-language screening tools, such as the Pendulum test, the TAAS, Speech Reception and Discrimination tests, TAPS, Early Speech Perception Test, TROG, Phonological Awareness Test, CELF-4, ASA, PhaB and CTOPP, ABR, OAEs, acoustic reflexes, SPIN, DSTP and MAPA.

background on the child's hearing is not the only factor to consider during the case history interview (e.g. history of otitis media), but more than likely, either parent will admit to having some form of learning difficulty during their school years, and therefore the family history is a significant component to the case history interview.

The participants of the study were also questioned about reasons for referrals made to them. A total of 96% (n = 89) of the participants in the present study suggested that the primary reason for an APD screening referral has been shown to be as a result of poor academic performance at school. Sixty four percent (n = 59) of the participants reported inattentiveness and/or distractibility as the primary reason for screening, whilst 45% (n = 42) of the participants reported poor speech and language development as the primary reason. According to Bellis (2003), the common reason for referral is when a child behaves as if they present with a peripheral hearing loss, particularly within a noisy environment, which may have been considered as inattentiveness and/or distractibility to any of the participants that comprised the study sample. These findings are comparable to those obtained in the study conducted by Chermak et al. (2002) which attempted to describe the common behavioural characteristics of APD, as reported by audiologists and paediatricians, with the three most common behavioural manifestations; being, asking for repetition, inability to listen, and difficulty following instruction particularly in the presence of background noise.

In addition, the participants of the present study were asked about the common concomitant disorders they found in children presenting with APD. Three common concomitant childhood disorders often associated with their APD caseload was that of Attention Deficit Hyperactivity Disorder, (90%, n = 83), learning disorder (83%, n = 77), followed by speech and language disorders (78%, n = 72). These findings are depicted in 4.6, below.

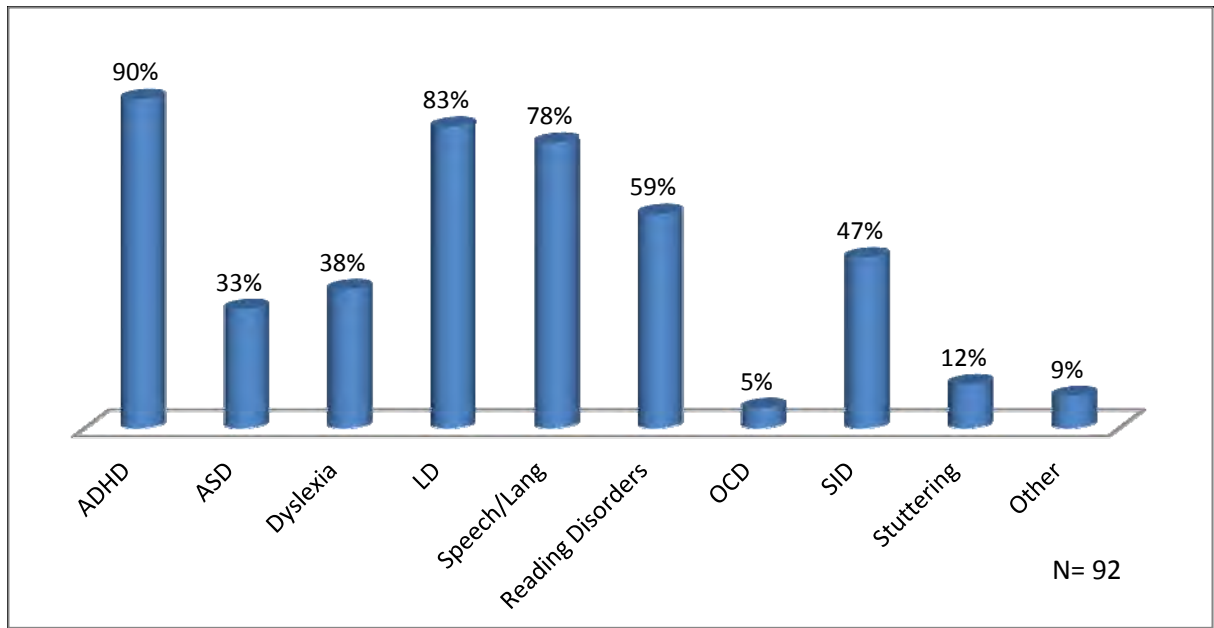


Figure 4.6 Common concomitant childhood disorders associated with APD.

The findings of the present study therefore confirm the research literature supported by Pottas (2015), suggesting that a relationship may exist between APD, ADHD, learning disorders and speech and language disorders. Poor academic achievement, inattention, and poor speech and language development presented in APD, have not only been reported by the participants as the three common reasons for a referral to an audiologist/ STA, but are also clear predictors of other childhood disorders, such as ADHD, learning disorders and speech and language disorders (Bellis, 2003; Chermak et al., 2003). This stands to reason as to why ADHD, learning disorders and speech and language disorders are the three common disorders identified with an APD for this particular study. Based on the above findings, it is clear that Bellis' multimodal approach to screening for APD is deemed necessary (Bellis, 2003).

In summary, findings of the present study related to screening practices, revealed that there are a variety of different procedures being used by audiologists/ STA's. The above findings are related to the lack of standardised protocol available to the South African audiologist/ STA. Inconclusive screening results based on inappropriate screening tools, may also lead to either over-referral of children who do not have an APD or worse, non-referrals of children

that actually do present with APD but go undiagnosed. Finally, Bellis (2003) states that screening for APD should only be administered by audiologists/ STA's if a comprehensive assessment and intervention plan is available, should the screening results warrant the need for further diagnosis and intervention. Failure to do this results in "Nothing short of futile expenditure of time and effort" (Bellis, 2003, p. 189).

The findings of the present study were also similar to those of the study conducted by the British Society of Audiology (2003), and Logue-Kennedy et al. (2011). The common screening tool administered included the SCAN:C, speech and language screening tools and psychometric tools. More than half of the participants in the study performed by Logue-Kennedy et al. (2011) expressed that very few screening tools were used due to insufficient training offered in the area of APD, as well as the limited resources available. Similar perspectives were expressed by the participants in the present study.

There is much criticism regarding many of the informal and formal screening tools used today. The CHAPPS (being the most common screening tool both internationally and locally), the S.I.F.T.E.R and the TAPS-R, do not serve as clear indicators as to whether a full diagnostic evaluation is warranted in the area of APD, but rather only highlight areas of the child's weaknesses (Emanuel, 2002). The Fisher's Auditory Problems Checklist was criticised for its limited categorical organisation (Wilson, Jackson, Pender, Rose, Wilson, Heine, & Khan, 2011). Despite the SCAN being one of the most popular formal screening tools administered on an international level, with 50% sensitivity, the test has been criticised in the past due to its poor test-retest reliability, its linguistically-loaded nature (Amos & Humes, 1998; Elsisy, 2013), and its inability to adapt to other cultures and languages across the board (Logue-Kennedy et al., 2011). Bellis (2003) cautioned that children with APD may pass the SCAN tests, and therefore a pass on the SCAN should not suggest that further

investigation is not necessary, but should rather be considered in conjunction with other screening results. Therefore, based on the above recommendations, many of the study participants in the present study may have considered administering several screening tools, prior to recommending an audiological evaluation, due to the lack of test reliability and validity.

Lampe (2011) reported that when comparing the effectiveness between pre-packaged APD tools, such as the SCAN, and the individually selected APD tools based on the case background, such as the SSW test, the individually selected tools have proven to be more effective than those that have been pre-packaged. Audiologists/ STA's however tend to select tests that cover a range of processes that are quick and easy to administer, and contain supporting documentation.

4.2.3 Objective Three:

To describe the practices of audiologists/ STA's regarding the assessment of children with auditory processing disorders.

The trends following the lack of assessment in the area of APD appear to escalate on an international level. The possible reasons for South African audiologists/ STA's not assessing for APD are described. However, as the study sample only comprised of less than 10% of the population of South African audiologists, the results are not a true representation of the profession of audiology in South Africa.

Only 42% (n = 66) of the participants in the present study assessed for APD, whilst a total of 58% (n = 90) of the study sample did not. A total of 57% (n = 51) of the 58%, indicated that they did not have the correct assessment tools, 36% (n = 32) did not feel adequately informed to practice in the area of APD, 23% (n = 21) did not see clients with APD, 7% (n = 6) had no

interest in APD, whilst 19% (n = 17) reported other factors, such as caseload and/or resource prioritisation. These findings are illustrated in 4.7, overleaf.

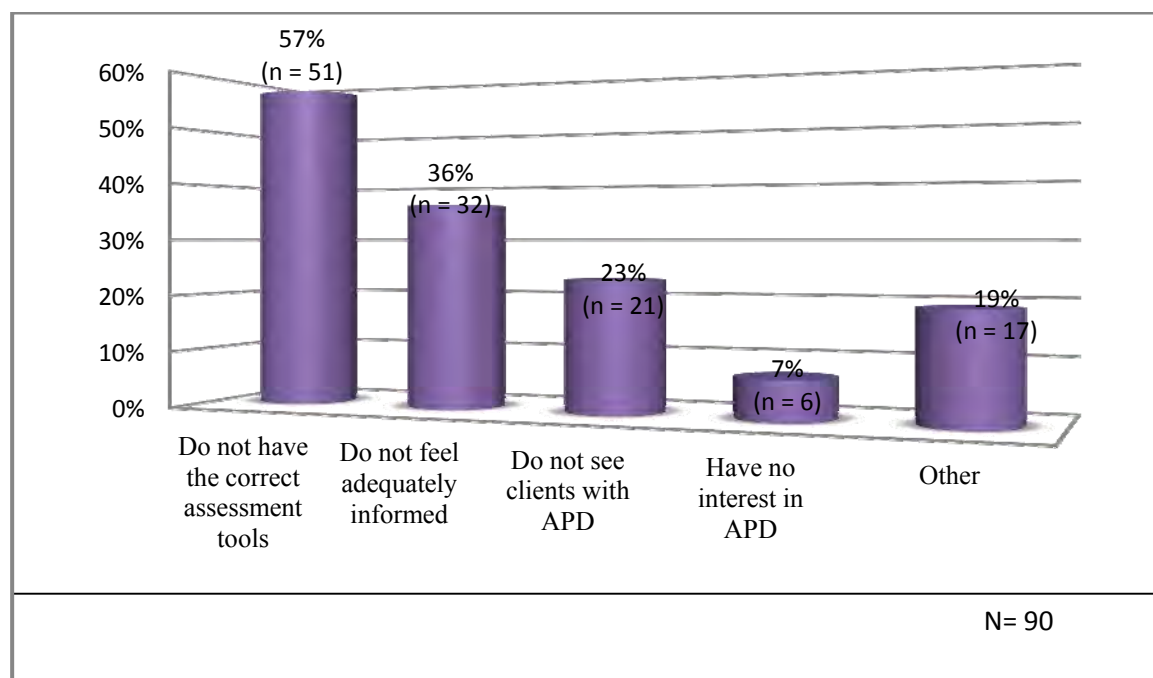


Figure 4.7 The practices of audiologists/ STA's regarding the assessment of children with APD.⁹

Not only have the various studies discussed under objective one, suggested that audiologists/ STA's require further training in the field of APD, and that little consensus already exists across policy documents and screening techniques, but the studies further suggest that the participating audiologists/ STA's did not feel adequately trained in the clinical administration of APD assessment tools, nor were there commonalities amongst these tools.

The South African Taskforce (2001) document recommends a test battery which includes two dichotic digits test (one being linguistically loaded, and another non-linguistically loaded), one monaural low redundancy speech test, one temporal pattern test, and one binaural

⁹ **Other** included caseload and resource prioritisation, lack of audiological equipment, working in disease-specific hospitals, such as Tuberculosis, where the management of Ototoxicity is priority, assess as a SLT with speech-language based tests

interaction test for those whose first language is English. According to the results obtained from the present study, the four common assessment tools included the low linguistically loaded Dichotic Digits Test (32%, n = 24), the Frequency Pattern Test (31%, n = 23) that assesses temporal patterning, a monaural low redundancy speech test; being, the Low Pass Filtered Speech Test (28%, n = 21), and the linguistically loaded Dichotic Sentence Test (25%, n = 19). It appears that the participants attempted to follow the recommendations provided by the South African Taskforce (2001) document; being, two dichotic speech tests, one monaural low redundancy speech test, a test of temporal patterning, with the exception of the test of binaural interaction which was administered by only 17% (n = 13) of the participants. Twenty percent (n = 15) of the participants administered electrophysiological tests as an APD diagnostic indicator, whilst additional tests included those that were more speech and language driven (refer to Figure 4.8, below).

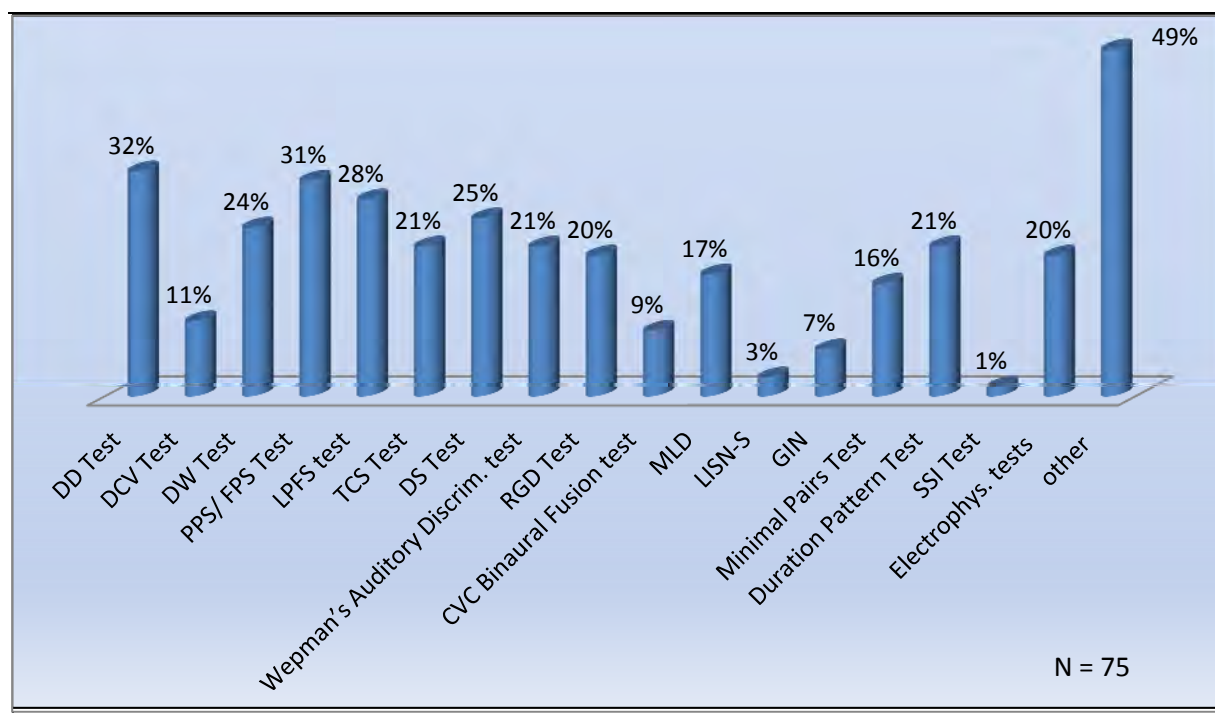


Figure 4.8 The practices of audiologists/ STA's regarding the assessment tools administered by audiologists/ STA's in the diagnosis of APD.¹⁰

¹⁰ **Other** included the ITPA, the Pendulum, TAPS SPIN tests, TROG, Phonological Awareness Test, SBMPL, DSTP, SWT, ASA, CTOPP, PASP, AWM

The AAA (2010) guidelines state that speech-language and psychological assessment tools should not be used to diagnose an APD. However, the SLT needs to collaborate with the audiologist/ STA to ensure their assessment findings, guide the SLT's intervention strategies. In addition, both assessment findings may complement each other to provide a comprehensive picture of the child's abilities (Katz, Medwetsky, Burkard & Hood, 2009). Bellis (2003) and Jerger & Musiek (2000) recommend that in order to determine the assessment of central auditory function, the audiologist/ STA should include a comparison between the client's auditory tasks and visual tasks, particularly with regards to pattern perception. Researchers postulate that there is a strong relationship between auditory and visual perception, and as a result, recommendation was deemed towards the development of visual tasks as part of the APD test battery. However, limited visual- based versions of these tests exist today (Bellis, 2003).

Having considered the above findings, no single guideline or assessment tool stands out as a common procedure amongst the participants. Instead, audiologists/ STA's are selecting a range of tests and creating their own test batteries, potentially allowing for gaps in the assessment of APD. As a result, speech and language assessment tools are being administered to account for the gaps. Vanniasegaram Cohen and Roesen's (2004) criticism of speech and language assessment tools is that unless the auditory signal of the test material is degraded, speech assessment tools in view of auditory perceptual difficulties are not effective in the comprehensive assessment and diagnosis of APD. The researchers therefore suggested that there was a perceived lack of education in the area of APD (Logue-Kennedy et al., 2011). Jerger and Musiek (2000) on the other hand, emphasise that an assessment tool should not be used in isolation to determine the presence of an APD, but in conjunction with others that can serve as a test battery. Again the importance of a comprehensive case history interview cannot be over-emphasised, together with records obtained from other assessments, such as

speech, language, audiologic evaluation, medical or psychological, as these assist in providing a better understanding of the presenting concerns. Additional information from teachers and parents can also provide significant insight; therefore Whitelaw (2008, as cited in Madell and Flexer, 2008) recommends that authentic assessments be conducted in order to evaluate a child's abilities in the real world environment.

According to one of the larger USA studies performed by Emanuel et al. (2011), audiologists tended to follow an APD test battery which included; the SSW Test (63%), the Speech-in-Noise Test (56%), the SCAN (53%), the Dichotic Digits Test (43%), and the Frequency (Pitch) Pattern Test (46%). These tests differed to those of the present study as very few of the participants in the present study administered the SSW Test, or the Speech-In-Noise Test. Notwithstanding, the participants in the study conducted by Emanuel et al. (2011) followed the AAA (2010) guidelines, whilst only 10% of the participants from the present study followed the AAA (2010), in combination with other guidelines. Electrophysiological tests were administered by 6% of the participants. According to Logue-Kennedy et al. (2011), only 3% of the participants diagnosed APD, all of which were qualified as SLTs. These findings are interesting as Bellis, (2003), the AAA (2010) and the ASHA (2005) document stipulates that the diagnosis of APD falls on the shoulders of the audiologist, and not the SLT.

According to the CISG (2012), 45% of the audiologists in Canada assess children for APD. The 55% of the participants, who did not offer APD services, reported that they tended to prioritise other audiological disorders and focused on services such as hearing aid fittings, which were considered a priority over APD. Twenty percent of the study sample were not comfortable with regards to administering APD tests, (often due to their poor sensitivity and specificity) and did not agree upon the supporting evidence provided by these assessment tools. Elsisy (2013) recommends that assessment tools should reflect valid sensitivity and

specificity and should account for subject variables, such as higher order functions, chronological age, and language, which are often not documented in the common assessment tools of today. Language appears to be a significant barrier, preventing audiologists/ STA's from assessing children with APD (Elsisy, 2013), whilst Chermak et al. (2007) suggests that the amount of time taken to assess APD through behavioural and electrophysiological testing, versus the inadequate reimbursement provided by insurance companies and medical aids, is a concern.

The findings presented above, concur with those of the present study, whereby the participants reported a lack of test materials contextually, linguistically and culturally appropriate for the South African population. Similarly to the CISG (2012) study, 58%, (n = 90) of the participants from the present study, also reported that they did not assess children with APD, possibly suggesting that prioritisation of services was placed in other areas of practice, such as hearing aid fittings. The practice of APD may be a time-consuming practice, and therefore audiologists/ STA's become discouraged to manage children with APD, particularly when their case load is already considered large enough (Bellis, 2003).

To date, there is still much criticism with regards to the administration of several common assessment tools (Emanuel, 2002). The two popular APD diagnostic tests; namely, the Dichotic Digits Test and the Frequency (Pitch) Pattern Test, were developed over 40 years ago, and do not provide adequate supporting documentation and normative data, thus making the administration and interpretation of the test challenging (Keith, 2009). The Dichotic CV test is not appropriate for younger children or for populations with a high degree of linguistic diversity, and is proven to show a great degree of variability in school-aged children (Bellis, 2003). Electrophysiology tests have shed light for audiologists/ STA's, as a result of their ability to assess young children as well as populations that may be difficult to test. They offer

a reliable, objective means to audiological testing, and are non-invasive to the child. Bellis (2003) describes electrophysiological testing as a measure of the CANS' ability to respond to auditory input, particularly through the auditory neurons. A disruption in the conveyance of auditory information at any level along the CANS would therefore result in a disruption of the auditory signal, including speech. Bellis (2003) discusses some of the advantages of including electrophysiological testing as part of the test battery for APD, yet also cautions that despite being able to objectively determine the site of dysfunction of the CANS, the test is unable to provide insight into the presenting audiological processes. The cost and time taken to administer these electrophysiological tests are not always deemed to be feasible when measured against the benefit and how much clinical value is attained (Bellis, 2003). It is therefore up to the audiologist/ STA to determine whether further electrophysiological testing is required (such as in the cases where a neurological disorder may be evident), or whether other APD assessment tools will suffice.

Bellis (2003) warns that several other factors may negatively compromise the assessment of children with APD. These include a lack of funding, limited assessment tools, as well as a lack of intervention resources made available to audiologists/ STA's practicing in certain geographical areas, restricting the assessment, diagnosis and intervention of APD. Bellis (2003) also describes that a lack of trained professionals in the area of APD may compromise the identification and diagnosis of APD in children. Baldry & Hind, (2008) state that:

It is reasonable to assume that, generally, lack of awareness may impact upon attitudes. It is therefore possible that a health professional with little awareness of APD may not appreciate the potential impact of the disorder upon a child and therefore, not recognize the need, or may be reluctant to refer a child for assessment (p. 194).

Based on the literature already presented, South African children are already lacking access to schools and/or medical facilities, whilst tackling dreaded diseases, poverty and malnutrition. The audiologist/ STA is placed in an ethical dilemma where the basic services rendered become inconsistent, as a result of transportation issues and/or family struggles. Early diagnosis and intervention is therefore not always realistic, given the context of South Africa. The challenge in assessment therefore is to ensure that the test battery yields adequate information of the child's abilities for the purposes of a differential diagnosis and to guide intervention.

4.2.4 Objective Four:

To describe the practices of audiologists/ STA's regarding the intervention of children presenting with APD, and the referrals thereof.

Bellis (2003) emphasises on several accounts that audiologists should not screen a child for APD if they cannot support the child with the necessary assessment procedures and/ or intervention tools, should an APD be suspected. Developing an intervention plan is a complex process that has to be linked to the assessment findings. Are South African audiologists/ STA's able to provide intervention programmes for children with APD?

A total of 43% (n = 67) of the participants provided intervention for APD, which is fewer than the number of the participants who screened for APD (60%, n = 93). Whilst it is acknowledged that intervention strategies should be geared to each child's specific needs as they present differently, for the purpose of this study, information was obtained on common, generic strategies that are utilised. Eighty three percent (n = 55) of the sample providing intervention, reported to have used preferential seating as an intervention strategy, 80% (n = 54) emphasised the importance of gaining the child's attention prior to speaking, and 77% (n = 52) recommended repeating and rephrasing the instruction. A total of 61% (n = 41) of the

participants recommended the use of FM systems, whilst 51% (n = 34) recommended compensatory strategies, which should include cognitive problem solving to some degree. Additional strategies recommended by the sample participants included computerised therapy programmes, such as *Earobics* (Cognitive Concepts, 2000, as cited in Bellis, 2003), and *Fast ForWord* (Scientific Learning Corporation, 1999, as cited in Bellis, 2003). These findings are depicted in Figure 4.9, below.

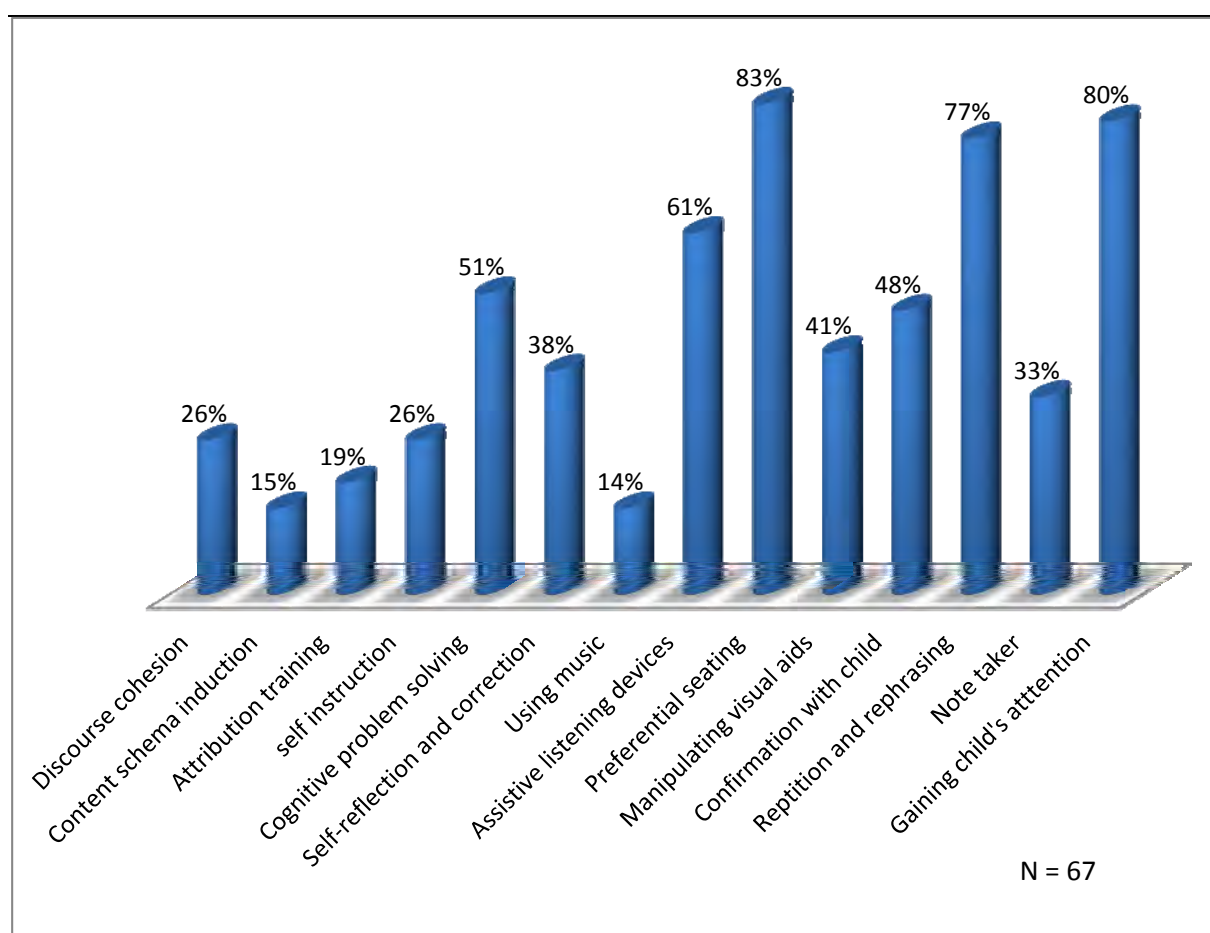


Figure 4.9 Intervention strategies provided by audiologists/ STA's.¹¹

A total of 43% (n = 67) of the audiologists/ STA's offering APD intervention, appear to be following the guidelines regarding the intervention of children with APD, as recommended

¹¹ **Other** included: Parents are provided home programmes to reinforce therapy; *Fast ForWord*, *Hearbuilder* and *Earobics* computerised auditory training software; therapeutic intervention; auditory training, language therapy and active listening strategies.

by Bellis (2003), despite there being an imbalance between the environmental modification strategies, the compensatory strategies and the remediation strategies. Little focus has been placed on the remediation of auditory skills, necessary for effective intervention. There appeared to be a statistically significant relationship between the number of years of experience and the provision of intervention for APD, as 59% ($p = 0.00$) of the participants with more than 10 years of experience, whilst only 31% of the participants with less than 10 years of experience, provided intervention in the area of APD. The results revealed that the participants providing intervention were either based in private practice (49%, $n = 33$), in a hospital (21%, $n = 14$) or within a school setting (19%, $n = 13$). However, some STA's based in private practice, regularly visit schools and offer services to the school. This poses to be a convenient method of therapy for working parents. A total of 30% ($n = 20$) of the participants felt APD intervention strategies to be '*somewhat effective*', 30% ($n = 20$) felt them to be '*adequate*', and 30% ($n = 20$) regarded them as '*effective*'. A few of the participating audiologists/ STA's felt that additional clinical contact hours allocated to the APD clinic may have been beneficial in providing a suitable foundation for confident practice in the area of APD. This is illustrated in Figure 4.10, below.

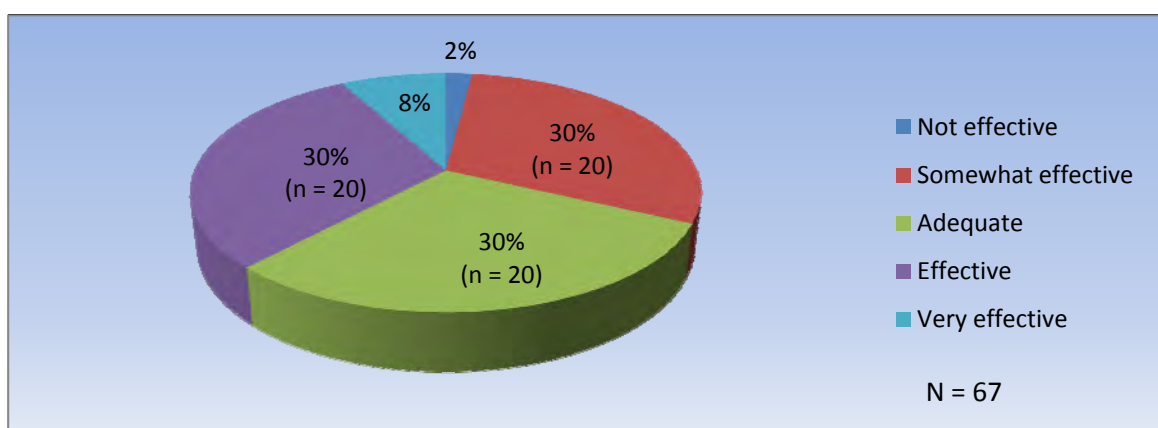


Figure 4.10 The perspectives of audiologists/ STA's regarding the intervention of children presenting with APD.

It was interesting to note that 46% (n = 72) of the participants provided onward referral to other practitioners, with the common referrals being made primarily to the occupational therapist (56%, n = 40). The psychologist and a second audiologist/ STA were the following referrals for 51% (n = 37) of the participants, whilst 50% (n = 36) referred to the ear nose and throat specialist. Fewer referrals (49%, n = 35), were made to the SLT. This is surprising as the role of the SLT plays a significant role in the provision of intervention strategies (Bellis, 2003). The above findings may provide reasoning as to why intervention that targets the child's auditory skills was insignificant, when compared to the environmental modifications and the compensatory strategies. These findings are depicted in Figures 4.11 (a) and (b), below.

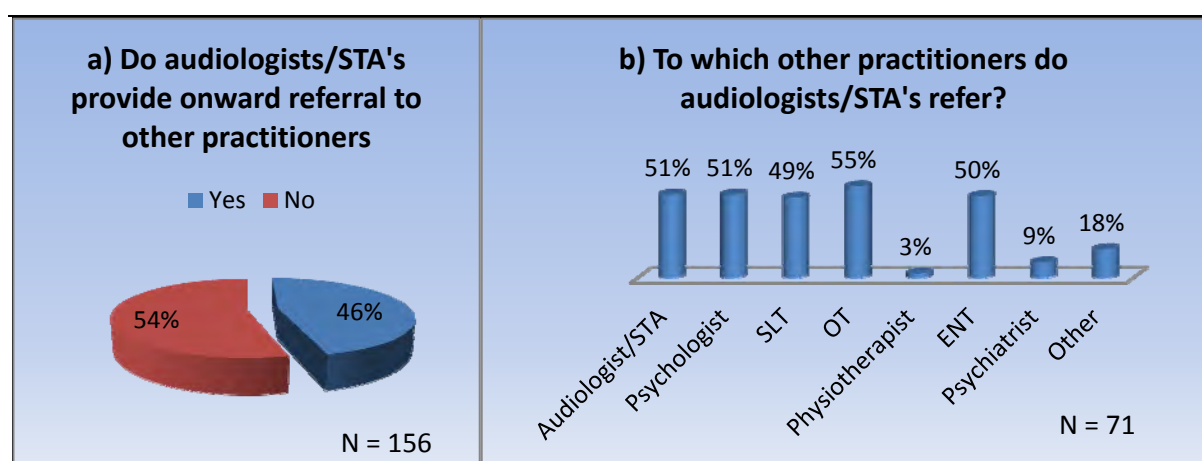


Figure 4.11 The practices of audiologists/ STA's regarding their referrals for APD.¹²

A total of 47% (n = 73) of the participants discussed intervention with other practitioners, whilst 59% (n = 43) of the participants indicated that intervention options were discussed with primarily, the SLT, 49% (n = 37) with the psychologist, 49% (n = 36) with the occupational therapist, and 44% (n = 32) with a second audiologist/ STA. These findings can be viewed in Figure 4.12, (a) and (b), overleaf.

¹² **Other** included: Paediatric Neurologists; Optometrists; Paediatrician; remedial teacher; dyslexia specialists; General Practitioners and educational psychologist

In more than three-quarters of the cases, APD intervention was discussed with more than one practitioner. It was interesting to note that the 53% of the study sample with more than 10 years of experience ($p = 0.026$), referred to other practitioners, more than the 40% who had practiced for less than 10 years.

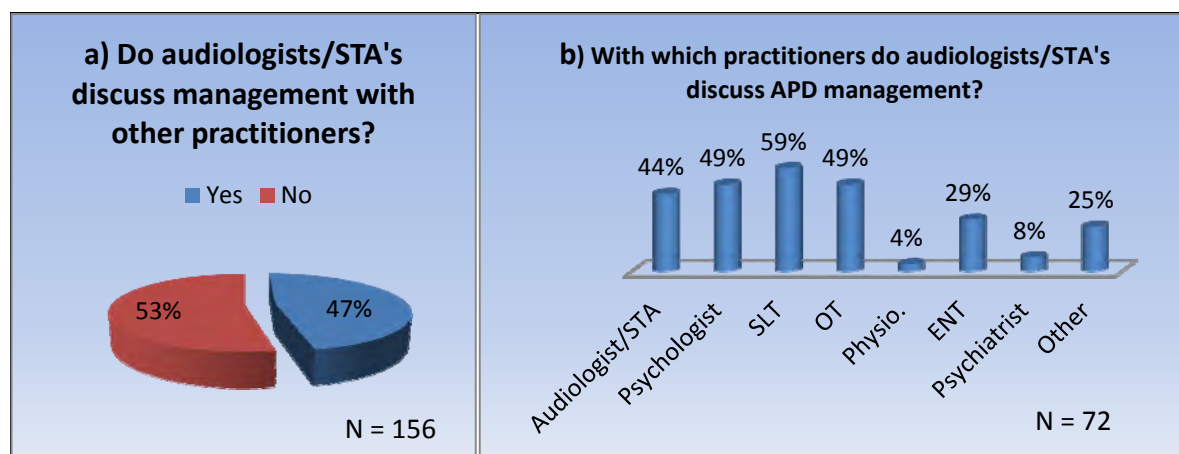


Figure 4.12 The practices of audiologists/ STA's regarding their interaction with other practitioners in view of APD.

A total of 85% ($n = 133$) of the participants indicated that they received referrals from other practitioners. The teacher making up 52% ($n = 69$) of the responses, appeared to be the primary referral source. Following these findings was the psychologist (36%, $n = 48$) and the SLT (35%, $n = 47$). Interestingly, only 22% ($n = 29$) of the referrals were received from other audiologists/ STA's. The findings of the present study revealed that less than half of the sample provided intervention services. These findings are illustrated in Figure 4.13, overleaf.

The above findings are similar to that of a study conducted by Logue-Kennedy et al. (2011) where 52% of the study sample indicated that they did not offer intervention in the area of APD, and the 48% of the participants who did, indicated that intervention strategies only consisted of offering advice to the client, with no formal intervention protocol.

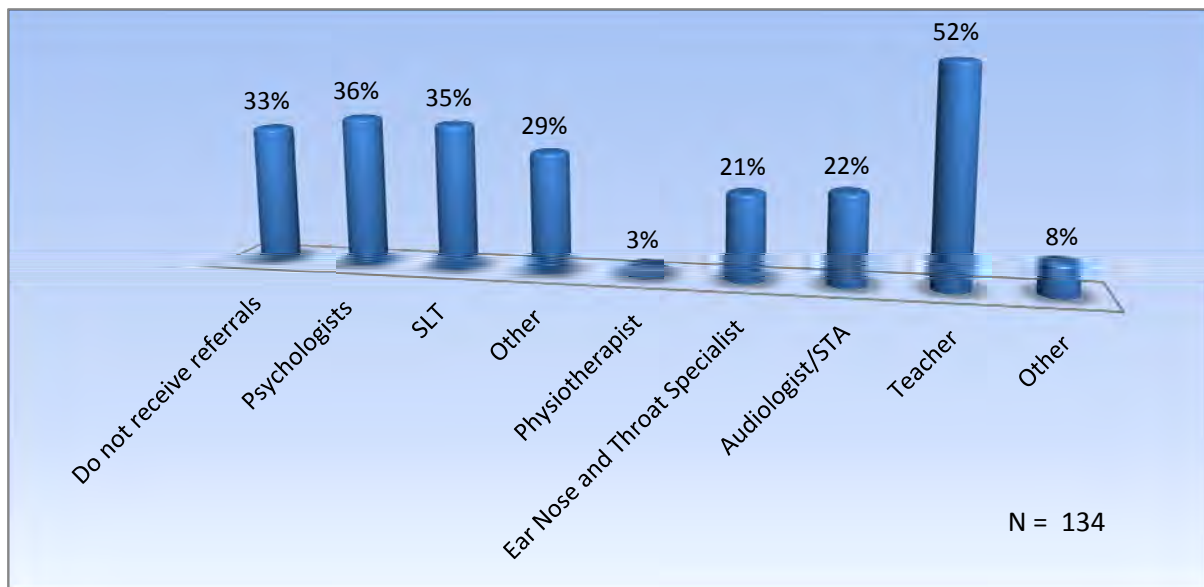


Figure 4.13 The practices of audiologists/ STA's regarding their source of referrals for APD management.

The findings of Logue-Kennedy et al. (2011) indicated that the educational psychologists expressed more confidence in managing APD, than the 79% of the audiologists who felt incompetent working in the field of APD. Majority of the participants, being audiologists, SLT's and psychologists, did not offer intervention in the area of APD, and the 48% percent of the participants who did, indicated that the intervention strategies were '*adequately effective*', and that it only involved offering advice to the client (Logue-Kennedy et al., 2011). Unlike the findings in the present study, where more screening in the area of APD is practiced than intervention, very few of the participants screened for APD, whilst just less than half of the sample provided intervention strategies (Logue-Kennedy et al., 2011). Most of the participants offering intervention strategies in the form of advice, were SLT's, with intentions to manage underlying speech and language impairments, rather than manage the APD itself (Logue-Kennedy et al., 2011).

Similarly to the present study, according to the study performed by Emanuel et al. (2011), in the USA, over 95% of the participants recommended preferential seating to their clients with

APD, 91% recommended gaining the child's attention prior to speaking, 89% recommended rephrasing and/or repeating auditory information to the child, and 85% recommended FM systems. However, 82% of the participants included listening skills training, which was not a significant practice of intervention in the present study. Limitations restricting the provision of intervention strategies in the USA, were created by school district policies and procedures, lack of training, poor reimbursement and time constraints (Emanuel et al., 2011). APD intervention strategies are currently being reviewed by several authors (Bellis, 2003; MacDonald & Nicoloff, 2008; Slauterbeck, 2009). However, despite the several intervention strategies available to audiologists, parents are desperate for effective intervention programs and are not prepared to wait until a consensus has been reached. It is therefore recommended that parents are provided with the necessary intervention programmes in the interim, whilst making them aware of the existing challenges with regards to intervention (Slauterbeck, 2009). According to Logue-Kennedy et al. (2011), the United Kingdom presents with very few referral systems in place for the wide range of referring practitioners (which included parents, schools, ear, nose and throat specialists, SLT's and paediatricians in the field of APD). Based on the researcher's knowledge, there is currently no documentation available detailing the care pathway and/or any APD multidisciplinary team services available in South Africa.

Based on the findings from the present study, it is concerning that 60% (n = 93) of the participants screened for APD, whilst only 43% (n = 67) of the participants were able to provide intervention. However, Bellis (2003) states that a screening programme should not be implemented, unless assessment and intervention plans are available and in place for the child presenting with APD. Given that 60% (n = 93) of the participants screen for APD, 42% (n = 66) assessed for APD and yet only 46% (n = 72) of the participating audiologists/ STA's are providing onward referrals to other practitioners, what is happening to these children that

appear to be at risk of an APD? However, as the study sample only comprised of less than 10% of the population of South African audiologists, the results are not a true representation of the profession of audiology in South Africa.

The findings of the present study clearly illustrate that a referral obtained on an APD screening test battery, is not followed up with appropriate assessment and management. According to the study conducted by Chermak et al. (2007), audiologists are unfamiliar with identifying which practitioners to refer to once a child had been screened for APD, or once a diagnosis had been made. Bellis (2003) suggests that audiologists may not wish to practice in the area of APD due to the time taken to screen, assess and diagnose APD. Whitelaw (2012) on the other hand, believes that audiologists avoid practicing in the area as they become despondent with the perception that APD cannot be cured. Whitelaw (2012) also suggests that audiologists are frustrated with the lack of supporting documentation in the screening and assessment tools for APD. It is postulated that similar aspects are contributing factors to the almost 57% of participation in the present study that are not providing intervention services.

As previously discussed, South Africa's contextual challenges cannot be ignored, as audiologists/ STA's practicing in more rural areas spend more time and efforts on life-threatening diseases and may not necessarily invest in screening and assessment tools for a condition that is not well known, such as APD. Saleh et al. (2003) further report that audiologists/ STA's in South Africa are provided with poorly recorded test materials, which are both linguistically and culturally inappropriate to suite the South African community, comprising of 11 diverse languages. Audiologists/ STA's are therefore, required to collate screening and assessment tools, which may not necessarily be suitable for their context and may also be a costly affair if local tools are scarce. The above factors may therefore account

for the many reasons as to why APD is not commonly managed in South Africa. The finding of this objective is concerning, as ethical and responsible practice is aligned to timeous and effective intervention strategies.

4.2.5 Objective Five:

To describe the challenges and recommendations provided by the study participants with regards to the management of auditory processing disorders in South Africa.

The following objective was to provide a ‘snapshot’ of the present **challenges** faced by the participants of the study, with regards to the management of APD in South Africa. An open-ended question was included where the participants could document further concerns, and provide recommendations to address these concerns. A detailed synopsis is provided in Appendix H. A total of 51% (n = 79) of the participants documented their perspectives, and the following key elements emerged which are illustrated in the Table 4.1, below.

Table 4.1 Challenges provided by the study participants with regards to the management of children with auditory processing disorders.

Area of concern (N = 80)	n =	%
Screening, assessment & intervention tools:	39	49%
Equipment and availability of resources	15	19%
Scope of practice, training and CPD –accredited activities	14	18%
Intervention practices and referrals	10	13%
Integration between the SLT and audiologist/ STA	5	6%
Time taken to administer the tests	4	5%
Lack of literature regarding the definition of APD	4	5%
Lack of guidelines and/or policies	4	5%
Cost to client	2	3%

- **Screening, assessment and intervention tools**

Regarding the screening tools, 49% (n = 39) of the participants were concerned with the pass/fail criterion provided by certain screening tools and the reliability thereof. Many of the recommended assessment tools recommended by the Bellis (2003), ASHA (2005), and AAA (2010) documents, were not linguistically, and dialectally suitable for South African children presenting with variable native languages, nor were they able to target preschool children at risk of an APD. According to the study sample, APD screening and assessment tools were considered to be '*too complicated*', '*too long to administer*' and '*too boring for children*'. The participants further reported that the time taken to assess the child and write a full APD report could not be justified for the amount charged for an APD evaluation, which most medical aids do not cover.

The participants were concerned with the delivery costs of screening and assessment tools, particularly tests ordered from other countries. Many of the participants did not actively partake in APD management due to the lack of standardised screening and assessment tools. APD tools did not provide sufficient, suitable documentation and/or normative data. The participants further reported that evidence-based resources for intervention programs were scarce.

The present study reported that more than half (60%, n = 93) of the participants are screening for APD, but are not assessing children with APD due to these above factors. According to Bellis (2003), audiologists are clearly faced with an ethical dilemma due to inappropriate management tools. Findings from the present study, as well as other similar studies, suggest that the participating audiologists/ STA's are concerned about the management tools not being reliable, valid, sensitive or specific enough, in view of the unique characteristics of the

population. These findings are however representative of less than 10% of the entire population of South African audiologists.

- **Equipment and availability of resources**

Nineteen percent (n = 15) of the participants expressed concern regarding the lack of resources within their own clinics to manage children with APD. The audiologists/ STA's of the present study who practiced in specialised settings, such as Tuberculosis (TB) hospitals, did not see children presenting with APD, whilst others did not see APD as a genuine disorder, when compared to other life-threatening diseases, such as HIV/AIDS. This was also observed in India, another developing country where mortality rates are growing, resources are scarce and poverty is rife (Bantwal, 2011). Therefore, priority is placed on improving disease-stricken departments, more so than those with non-life threatening disorders, such as APD. Several clinics and hospitals focus on providing basic audiological equipment, which is deemed necessary.

- **Scope of practice, training and CPD –accredited activities**

The participants of the present study felt that they would have benefited from additional theoretical and practical experience across all areas of APD, including the practices of screening, assessment and intervention. A total of 18% (n = 14) of the participants expressed concern with regards to the perceived lack of practical experience obtained during their undergraduate level, and conveyed that one will only acquire additional confidence in the area through attending additional workshops and seminars. The above concerns were initially raised by Khan (2005). Little guidance has been directed toward the hearing impaired child presenting with an APD, whilst the lack of CPD accredited workshops presents as a concern. Further concerns were raised with regards to practitioners not being qualified as an audiologist or STA, and diagnosing APD out of their scope of practice, often leading to

misdiagnosis or the lack thereof. The participants reported that a collaboration between the audiologist/ STA and the SLT was necessary, as often intervention was seen as null and void if the intervention occurred without the diagnosis of APD by the audiologist or STA. The audiologists/ STA's, being the primary practitioners responsible for the diagnosis of APD, reported that very little training was provided with regards to the audiologist/ STA's role in the intervention of APD, from an audiological viewpoint. The findings of the present study confirm that little collaboration exists between the team members, as only 46% (n = 72) of the participants referred to other practitioners, yet 85% (n = 133) received referrals from other health care providers.

- **Intervention practices and referrals**

Based on the participants' responses, 13% (n = 10) of the participants reported a lack of adherence from parents and teachers to comply with the assessment and intervention program of APD. Parents do not always follow through with home programmes provided by the audiologist/ STA, whilst some of the study participants reported that teachers don't often comply with the intervention process. Questionnaires are often delivered incomplete, and teachers don't always see the need for classroom modifications, particularly when accommodating larger classes. A few of the participants attributed poor adherence, to the lack of awareness amongst teachers, parents and other practitioners. Bellis (2008) emphasises the importance of the role of the teacher in the identification and management of APD with school-going children. South Africa, being a country with disjointed educational policies and a lack of clinical and educational resources, as a result of financial strain, has therefore deferred the necessary training to teachers and further restrict the resources provided to children presenting with special needs including APD (DOE, 2014). Notwithstanding, uniformed teachers may therefore only hinder the development of an effective referral framework for the APD population in South Africa. The participants reported an overall lack

of support from the education system. Strict pass/ fail criteria systems and policies in place, do not always accommodate the child with APD. The increase in the teacher-to-child ratio is a concern for children presenting with an APD, as the listening environments become more unfavourable (Hlabangwane, 2002). The participants raised the concern that parents' and teachers' expectations of the child have escalated, thus creating additional pressures for the child to stay above par.

Misdiagnosis has also been raised as an obvious concern. Due the heterogenic makeup of the disorder, practitioners may misinterpret an APD as an ADHD, and are unfamiliar with regards to the referrals of a client presenting with an APD. A lack of communication between the multidisciplinary team members is also seen as common, particularly between the teacher and the audiologist/ STA. The participants have admitted to being unfamiliar with which practitioner to refer to, often resulting in delayed intervention or none-whatsoever. This therefore answers the question raised in the previous section as to why out of the 85% (n = 133) of participants receiving referrals, do only 46% (n = 72) make further referrals? Further education may deem necessary for future workshops.

- **Integration between the SLT and the audiologist/ STA**

Approximately 6% (n = 5) of the participants expressed concern regarding the discrepancies between the role of SLT and the role of the audiologist/STA, as well the assessment tools administered to screen and/or assess for an APD. The participants reported that there was a need for further collaboration between the audiologist/ STA and the SLT, and that intervention should occur from both the SLT and the audiologist/ STA, in cohesion with one another.

Based on the literature review, the discrepancies between definitions, classification systems, and anatomical location continue to exist. Bellis (2003) emphasises the role of the multidisciplinary team, as well as the interdependency amongst practitioners, particularly between the audiologist/ STA and the SLT. The SLT assessments provide valuable information pertaining to the child's language capabilities, whilst several subtests are able to discern between several auditory perceptual processes. The findings from the present study concur with the challenges presented by the participants, as only 46% (n = 72) of the audiologists/ STA's provided onward referral to other practitioners in view of APD management, and the SLT was considered by only 49% (n = 36) of the audiologists/ STA's, when compared to the number of audiologist/ STA's referring to occupational therapists (55%, n = 72) and psychologists (51%, n = 38). Scarcity in the assessment, diagnosis and intervention of APD, will continue unless collaboration between practitioners is created (Bellis, 2003).

- **Time and cost factors**

Bellis (2003) suggests that audiologists perceive the time taken to screen, assess and diagnose APD as not warranted. Only 5% (n = 4) of the participants expressed concern with regards to the time taken to administer the test battery and as well as the time taken to write the report. As little as 3% (n = 2) of the participants felt that the time taken to administer the full battery was not worth the cost charged to the client. The concerns raised were particularly attributed to the level of training provided during their undergraduate programme and the efficacy of the test materials.

- **Lack of definition, guidelines and policies regarding APD management**

Universally, there appears to be an unrelenting level of concern with regards to the discrepancies surrounding auditory processing disorders, making the management of children

with APD challenging for the audiologist/ STA. Surprisingly, this was not prioritised as a challenge for the participating audiologists/ STA's, as only 5%, (n = 4) of the participants reported this to be of a concern over several other contextual issues, already discussed above.

Stemming from these challenges, the participants were asked to provide **recommendations** to overcome some of the drawbacks South African audiologists/ STA's face regularly with regards to the management of APD in South Africa. A total of 78 participants provided recommendations, which were categorised into five common themes and are presented in Table 4.2, below.

Table 4.2 Recommendations provided by the study participants with regards to the management of children with auditory processing disorders

Recommendations (N = 127)	n =	%
Reassessing the curricula of training audiologists/ STA's, and prioritising training at an undergraduate level	29	37%
Creating standardised assessment tools, intervention strategies and policies, whilst reintroducing the South African APD Taskforce	24	31%
Collaboration between the SLT and audiologist/ STA	11	14%
Creating awareness within the education system	8	10%
Introducing more CPD Activities	6	8%

- **Reassessing the curricula of training audiologists/ STA's, and prioritising training at an undergraduate level**

According to the present study, 37% of the participants (n = 29), felt that little opportunity was made available to screen, assess and provide intervention in the area of APD during their undergraduate programme. Few clinical hours dedicated to theoretical and practical training within the APD curricula, were also reported. According to one of the participants,

“Training in APD gave relatively good guidelines regarding the roles, but unable to practice and therefore feel inadequate in this area.”

A re-evaluation of the audiological undergraduate training curricula, in view of prioritising APD, should be considered. The participants of the study indicated that they may have benefitted from additional theoretical coursework and clinical training. One of the participants reported that,

“Lecturers are not always equipped to deal with proper explanations to students therefore my training was insufficient.”

- **Creating standardised assessment tools, intervention strategies and policies, whilst reintroducing the South African APD Taskforce**

A total of 31% (n = 24) of the participants suggested that by reinstituting the South African Taskforce, standardised policies and guidelines may encourage confident training and practice amongst audiologists/ STA's in the field of APD. A team steering the development of appropriate screening and assessment tools to suite the South African context, may improve the provision of APD services amongst audiologists/ STA's in South Africa. The following was reported by one of the participants,

“No golden standard / universal definition - so what exactly are we testing and managing? Pass-Fail criterion - some recommend 2 Standard Deviations (SD's) and others 3 SD's; so are our tests really sensitive enough for APD identification and diagnosis?”

To date, there are no single criteria by which APD screening and assessment results can be measured, due to the heterogeneity of the disorder and the network of childhood disorders often associated with APD. This therefore makes it difficult for audiologists/ STA's to

determine the extent to which an APD exists, and the nature thereof. Assessment directs intervention, and if assessment is inappropriate or fails to take into account cultural and linguistic variability, then the results may be inaccurate and biased. Therefore, audiologists/ STA's should consider the development and adaptation of assessment tools and procedures to meet the diverse needs of the population. Intervention should also be culturally appropriate and relevant for the population served (Pascoe & Norman, 2011).

- **Collaboration between the speech-language therapist and the audiologist/ STA**

SLT assessment tools and the assessment tools administered by the audiologist/ STA should complement each other in order to determine whether an APD diagnosis exists (Bellis, 2003). The participants recommended that audiologists/ STA's and SLT's work in cohesion with each other, rather than arguing the disorder from two different perspectives. One of the participants reported the following,

“The speech therapy and audiology approaches to APD are so very different and my perception is that the SLT's role is much better known and there are more test and assessment materials for the SLT management of APD, other than FM systems. I would recommend that the SLT be the main profession doing APD assessments and therapy”

- **Creating awareness within the education system**

Approximately 10% (n = 8) of the participants recommended creating an awareness amongst educators. The participants felt that children presenting with signs of APD, are often referred to other practitioners first, and are unaware of the audiologists/ STA's role in the management of APD. Bellis (2003) emphasises the importance of early identification and the implications on the child's academic and social development. Awareness created amongst teachers may therefore encourage the early identification of children at risk for an APD, as

teachers are often the first to make a referral to health care practitioners (Hlabangwane, 2002). One participant stated that the,

“Main concerns are that other allied professionals are conducting management that is often eg. educational psychologists. They are even offering courses to train teachers and ignoring the scope of practice of the SLT and audiologist”

Ironically, based on the present study, teachers were the common source of referrals, which suggests that perhaps teachers are becoming more aware, with regards to APD. In fact, based on the findings of the present study, audiologists/ STA's appear to be screening for APD, yet are the ones that are not referring further. However, as the study sample only comprised of less than 10% of the population of South African audiologists, the results are not necessarily a true representation of the profession of audiology in South Africa.

- **CPD activities**

There has been an increasing interest in the area of APD of late, with a mounting number of workshops, online seminars and CPD activities; available from both the audiological perspective, as well as the speech therapists' perspective e.g. the South African ENT Congress 2014. The following was reported by one of the participants,

“I attended a two day course led by Dr Wayne Wilson which was very helpful to understand APD and current issues. Such courses are needed to stay informed”.

Only 8% (n = 6) of the participants reported that by attending additional workshops and courses providing training in the area of APD, will help drive the management of APD in South Africa. However, according to the results obtained in objective one of this study, 89% of the participants were in favour of further education and training. Despite having information available at the audiologists'/ STA's fingertips, few assessment tools are linguistically or culturally appropriate to accommodate the South African population.

Previous results, as reported in Chapter Four, suggests that often audiologists/ STA's avoid practicing in the area of APD, not only because of their perceived inadequate training provided during their undergraduate training programme, but also due to the lack of standardised and contextually appropriate assessment tools available to South African audiologists/ STA's.

Upon personal observations, there appears to be a developing awareness amongst other practitioners, teachers and parents in the area of APD, as the numbers of referrals to the audiologist/ STA's increase. However, contextually and linguistically appropriate assessment tools are still a concern. It can therefore be inferred that soon enough, South African audiologists/ STA's may be placed in an ethical dilemma if the numbers of referrals from teachers and health care practitioners start to increase, whilst the paucity of contextually and linguistically inappropriate guidelines and assessment tools continue.

4.3 Conclusion

The results from the present study suggest that the participating audiologists/ STA's regard themselves as unprepared to provide overall management in the area of APD. In particular, the participants stated that their clinical preparation during their undergraduate level of training and with their theoretical understanding of auditory processing disorders, has contributed to the level of unpreparedness. Unfortunately, the universal challenges, such as lack of definition in the field of APD, are even more aggravated by South Africa's contextual challenges, such as poverty, lack of medical and educational resources, and languages differences, to name a few. An imbalance in the number of referrals made to the audiologist/ STA for APD, versus the minimal numbers of audiologists/ STA's participating in the study that are able to diagnostically assess and manage this population, creates further concern. The heterogeneity of the disorder, and the concomitant childhood disorders associated with APD,

clouds the accurate diagnosis, often relying on the role of the multidisciplinary team. Lack of service provision in the area of APD, may result in many of these children ‘falling through the gaps’, and remaining undiagnosed or incorrectly diagnosed.

The participants have therefore recommended that the undergraduate audiology training programmes be addressed in view of developing the APD module, to provide further theoretical training and practical experience. Other recommendations encompassed the reinstitution of the APD Taskforce, creating awareness amongst educators, whilst involving them in the multidisciplinary team, the provision of CPD-accredited workshops, as well as creating cohesion between the SLT and the audiologist/ STA in the management of APD.

CHAPTER 5

CONCLUSION, IMPLICATIONS FOR FUTURE RESEARCH, AND STRENGTHS AND LIMITATIONS OF THE STUDY

5.1 Introduction

Chapter Five provides the concluding remarks for the study. The results and discussion provide a basis for the clinical and research implications recommended. Finally, the study limitations are highlighted.

5.2 Concluding summary

Audiologists/ STA's providing services to children with APD, face many challenges stemming from the heterogenic nature of the disorder, inclusive and conflicting definitions, variable diagnostic criteria, several classification systems and the involvement of several practitioners to name a few. In South Africa, additional contextual, cultural and linguistic issues, exacerbate the management challenges experienced. This study aimed to determine the perspectives and practices of South African audiologists/ STA's pertaining to children presenting with APD.

The findings revealed that overall, there appears to be a perceived lack of preparedness amongst audiologists/ STA's practicing in South Africa to screen, assess and intervene with children with APD. Sixty eight percent ($n = 106$) of the participants reported that they did not feel adequately prepared to manage children with APD. One of the reasons cited for this, is the limited theoretical and clinical exposure during their undergraduate training. Seventy five percent ($p = 0.00$) of the audiologists, with only 35% of the STA's, reported their level of experience as being '*limited*', which was statically significant. The participants who had practiced for more than 10 years, showed greater confidence to offer intervention in the field

of APD, as opposed to those who had practiced for less than 10 years. Based on the participants' responses, there appears to be a need for additional theoretical coursework and practical experience in the area of APD.

The participants from the present study reported that they were '*poorly*' or '*very poorly*' informed to screen (40%, n = 62) for and assess (44%, n = 68) APD, whilst most of the participants felt '*poorly*' or '*very poorly*' informed (53%, n= 82) in terms of providing intervention in the area of APD. These findings concur with the results discussed in the literature review (Chermak et al., 1998; Chermak et al., 2007; Logue-Kennedy et al., 2011). However, the management of children with APD is more challenging for South African audiologists/ STA's. Screening and assessment tools are not easily available due to resource limitations. The tools that are available are not necessarily appropriate for the South African context, presenting with diverse languages and cultural issues. No single guideline, screening, or assessment tool appeared to be prominent in the present study, but instead, the participants collated several screening and assessment tools and created their own test battery based on three common guidelines, the Bellis (2003) guidelines (33%, n = 30), the ASHA (2005) document (31%, n = 28), and the South African Taskforce (29%, n = 27) document. This therefore may allow for gaps in the management of APD in children, as the differential diagnosis of the heterogenic disorder, and the intervention thereof, becomes restricted and inaccurate.

The audiologists/ STA's received referrals in view of the child's poor academic performance at school (96%, n = 89), concentration difficulties (64%, n = 59) as well as their poor speech and language development (45%, n = 42). The participants further reported that the most common childhood disorders associated with APD included; ADHD (90%, n = 83), learning disorders (83%, n = 77) and speech and language disorders (78%, n = 72). These findings

concur with the studies presented by Chermak et al. (2002), and Katz et al. (1992). Interestingly, 85% (n = 133) of the participants received referrals for the management of APD, primarily from the school teacher (52%, n = 69), yet, only 46% (n = 72) of the participants made further referrals to other practitioners, with the most common being the occupational therapist (56%, n = 40). The above thus highlights the importance of teamwork and collaboration to address the needs of the child presenting with APD.

By drawing on some of the challenges and recommendations provided by the present and previous studies, it can be deduced that the curricula at an undergraduate level across institutes, should be reassessed on a regular basis. Prioritisation should be placed on the neuroanatomy of the central auditory nervous system and auditory processing disorders, whilst supporting theory with sufficient practical experience. A relationship should be created between the theoretical content and the practical experience of APD, rather than keeping the two separated. A reinstitution of the South African Taskforce has been recommended in order to update the APD guideline, thus standardising the practices of audiologists/ STA's in APD, based upon newly developed research and contextually, culturally and linguistically appropriate test materials. Continuing professional activities are recommended on a regular basis to introduce newer research and assessment tools, not only to develop the theoretical knowledge, but to stir the interest of audiologists/ STA's in the field of APD, whilst keeping abreast with updated developments in the field of APD, globally. In addition, the curriculum should address contextual issues and provide options on addressing these within the clinical context.

Being a country where 12% of the population already presents with some form of communication disorder, there is a great need for the services of the audiologist/ STA (University of Witwatersrand, 2015). Therefore, several implications including financial and

human resources for service provision, come to the forefront. However, as APD grows, and as further awareness is created amongst practitioners, teachers and parents, the area of APD still remains largely underserved in South Africa. The following research and clinical implications have thus been recommended.

5.3 Research implications

Bellis (2003) discusses the significance of applying clinical research skills to the audiologists' everyday clinical environments, as opposed to separating the two. South African audiologists/ STA's are encouraged to engage with future research, as it not only allows for further theoretical and academic stimulation, but also enhances their own clinical skills and confidence within their own clinical setting. Audiologists/ STA's are furthermore able to question the efficacy of older and newer assessment tools and intervention programmes (Bellis, 2003). The area of APD therefore holds significant potential for hope of future research, particularly within South Africa. The following research implications have emerged from the present study:

- 1) The research study will assist in developing reliable, contextually appropriate and linguistically suitable normative data for the South African paediatric population. South Africa is a country comprising of 11 different languages. Creating standardised and reliable assessment tools that are culturally appropriate and linguistically suitable for South African children, may aid in future development in the scope of APD, and equip audiologists/ STA's with the necessary tools to make an accurate diagnosis. Further research is required in order to facilitate evidence - based practice. Research projects should be dedicated toward developing, standardising and validating test materials.

- 2) As the present study sample comprised of audiologists/ STA's only, very little information has been provided offering the present perspectives and practices of SLT's, from a linguistic angle. SLT's are able to provide a significant service in the intervention of APD, and follow similar training curricula to that of the audiologist; however it can be assumed that the South African SLT faces similar challenges to that of the audiologist/ STA. Further research from the perspective of the SLT may represent either similarities or discrepancies to the findings of the present study. Similarities and/or discrepancies between the SLT and the audiologists'/ STA's perspective will be able to offer rich information for future curricula development, particularly at those institutes offering a split-qualification.
- 3) The present study was based on a quantitative paradigm. Future research using a mixed-method design of both qualitative and quantitative information may provide the researcher with richer data with regards to the perspectives and practices of audiologists/ STA's in the management of children with APD. The present study attempted to attain a vast amount of information over a broad population, with minimal detail focusing on the meaning of the social context and how it influences audiologists'/ STA's level of practice. Given the responses provided by the participants, the context of South Africa (such as poverty and the lack of medical and educational facilities) cannot be ignored. A mixed-method approach to research therefore takes into account the deeper meanings of the social context, as well as the experiences of the participant, whilst focusing on attaining detailed and richer information as to how and why audiologists/ STA's practice the way they do (De Lisle, 2011).

- 4) An updated, follow up study would be beneficial in order to make comparisons between the two studies and to determine if the APD curricula have improved in any way. By doing so, the undergraduate curriculum is reviewed regularly, further providing information where prioritisation is required for future training.

5.4 Clinical implications

The following clinical implications have emerged from the present study:

- 5) Reinstating the South African Taskforce encourages the steering of new and updated policies and guidelines in South Africa, with regards to the present APD intervention trends. Notwithstanding, new definitions and guidelines available to audiologists/ STA's may equip them with the tools to promote effective diagnosis and intervention of children presenting with APD in South Africa. The mandate of the taskforce could be extended to promote multidisciplinary teamwork and collaboration between different sectors, thus ensuring appropriate and comprehensive management for APD, including referrals and referral systems. The taskforce may also serve as a lobbying body for resource allocation and awareness creation in the area of APD. This should include lobbying for additional human resources, training of therapists from diverse backgrounds to address the issues of linguistic and cultural issues and post creation.
- 6) Most of the participants practicing in the above study indicated that despite having felt that additional training and clinical experience during their undergraduate training may have been beneficial, most supported the notion that they only felt confident to practice in the area of APD only as a result of attending several workshops and ongoing seminars. It is hoped that the present study will attract audiologists/ STA's into the field of APD, if training workshops on a theoretical and practical level are supported.

- 7) Several medical aids and insurance companies in South Africa do not support the provision of reimbursement for the management of APD. Medical aids do not see APD as a clear, distinct disorder, and as a result, the clients are responsible for the payment for the services rendered. Notwithstanding, intervention programmes requiring FM systems and weekly therapy programs, are often unrealistic in a country where poverty is high. Therefore, educating medical aids and insurance companies on the present state of APD as a disorder, and motivating for the effective implementation of APD procedure codes, may shed light for effective practice in the area of APD.

5.5. Strengths and limitations of the study

The study performed a survey on a sample of audiologists/ STA's practicing in South Africa. As the literature suggests, South Africa presents with several contextual concerns which cannot be ignored. Notwithstanding, the present training curricula are not able to adequately equip students to overcome these challenges, whilst still providing an ethical service (Khan, 2005). The study was therefore able to provide a comprehensive view of the current practices of a sample of South African audiologists/ STA's with regards to the management of children with APD. An open-ended question at the end of the survey further enabled the participants to provide their own challenges experienced with regards to the management of APD and the lack thereof. The participant was provided with the opportunity to make further recommendations that may improve or accelerate the practices of audiologists/ STA's in the management of children with APD. By providing an open-ended question, rich information was attained, whereby future recommendations can be made, and policies and guidelines can be created, based on the context of South Africa.

A total of 1 802 audiologists/ STA's were currently registered with the HPCSA during the time of this study, all of who made up the target population (HPCSA, 2014). However, a study sample of 156 was extracted from the total population, which comprised of less than 10% of the total desired response rate recommended by the University of Wisconsin (2010). Therefore, the above study serves as a fraction of the total population of audiologists/ STA's in South Africa and may not necessarily serve as a true representation of the present perspectives and practices of South African audiologists/ STA's. As a smaller sample was obtained that did not reach the desired response rate, the research is limited in terms of its generalizability. Information bias may also have occurred, as the responses obtained were dependant on the participants' willingness to complete the research tool. Due to the lack of consensus with regards to the definition of APD and the training thereof, the participants' responses were based on their own understandings of APD, and therefore, variable responses may be expected.

5.6 Conclusion

To date, there has been mounting chapters of research, evolving assessment tools and exciting evidence-driven management strategies in the area of APD, yet, few audiologists/ STA's partake in this venture and are restricted to carry out their professional scope. The concluding statement was reported by Bellis (2003):

“Unless and until clinicians within the educational setting become involved in asking and answering questions related to CAPD, the area of CAPD in children will remain as much a mystery as it is today”

(Bellis, 2003. p. 445).

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LIST OF APPENDICES

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AUDITORY PROCESSING DISORDERS IN CHILDREN:
THE PERSPECTIVES AND PRACTICES OF AUDIOLOGISTS IN SOUTH AFRICA

Questionnaire

Dear Participant

- The following document contains a number of questions relating to your perspectives and practices pertaining to Auditory Processing Disorders (APD) in children.
- Kindly complete every question to the best of your ability by selecting the appropriate answer.
- Please be advised that confidentiality and anonymity will be maintained throughout the research and therefore it is not necessary to include your name.
- There are no correct or incorrect answers.
- Participation is entirely voluntary and you are welcome to withdraw from the study at any stage.
- The questionnaire consists of 29 questions and will take approximately 20 minutes to complete.

Thank you for your participation.

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SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

Please answer the following questions by circling your selection.

SECTION A: Biographical Information

Q1. What is your highest qualification in audiology?

Bachelor	Master's	Doctorate
1.	2.	3.

Q2. How many years of professional experience do you have?

0-5	6-10	11-15	>15
1.	2.	3.	4.

Q3. What year was your undergraduate qualification obtained?

2006-present	2000-2005	1990-1999	1980-1999	Prior to 1979
1.	2.	3.	4.	5.

Q4. At which institute did you receive your undergraduate education?

University of Cape Town	University of Stellenbosch	University of Pretoria	University of KwaZulu-Natal (UKZN)
1.	2.	3.	4.
University of Witwatersrand	University of Limpopo (Medunsa Campus)	Other. If Other, please specify.	
5.	6.	7.	

Q5. During your undergraduate programme, how many potential clients with APD did you have the opportunity to assess and manage?

I did not assess, treat or manage any APD clients	1-5 clients	5-10 clients	10 or more clients
1.	2.	3.	4.

Q6. In what province are you currently practicing?

Eastern Cape	Free State	Gauteng	KwaZulu- Natal	Limpopo
1.	2.	3.	4.	5.
Mpumalanga	Northern Cape	North West	Western Cape	
6.	7.	8.	9.	

SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

Q7. In which clinical setting are you currently practicing?

Private practice	Hospital	School	Industrial	Academia	Hearing Aid Manufacturer	Other
1.	2.	3.	4.	5.	6.	7.

Q8. Which profession are you currently practicing as?

Audiologist	Speech-Therapist/Audiologist	I am currently not practicing
1.	2.	3.

Q9. Are you currently completing your community service?

Yes	No
1.	2.

Q10. What first language does the majority of your caseload speak? You may select more than one option.

English	isiZulu	Afrikaans	isiXhosa	Sesotho	Xitsonga
1.	2.	3.	4.	5.	6.
Setswana	Sesotho SaLeboa	siSwati	isiNdebele	Tshivenda	
7.	8.	9.	10.	11.	

Q11. What percentage of your caseload comprises of clients with APD?

I do not have any clients with APD	1-25%	25-50%	50-75%	75% +
1.	2.	3.	4.	5.

SECTION B: Perspectives of Auditory Processing Disorders (APD) in Children

Level of Preparedness

Q12. If you did postgraduate training in the area of APD, at what institute did you receive your postgraduate education?

I have not done any postgraduate training in the field of APD.	University of Cape Town	University of Stellenbosch	University of Pretoria	University of KwaZulu-Natal (UKZN)
1.	2.	3.	4.	5.
University of Witwatersrand	University of Limpopo	Other (If other please specify)		
5.	6.	7.		

Q13. In your opinion, do you feel that you are adequately prepared to practice in the field of

SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

APD?

Yes	No
1.	2.

Q14. In your opinion, do you feel that you may have benefitted from additional coursework addressing APD?

Yes	No	N/A
1.	2.	3.

Q15. In your opinion, do you feel that you may have benefitted from additional practical experience in APD?

Yes	No	N/A
1.	2.	3.

Q16. In your opinion, which areas do you feel you require further education and training with regards to APD? You may select more than one option.

Nothing, I am comfortable working with APD.	Screening APD	Assessing APD	Managing APD	Counselling clients with APD	I require further education in all areas of APD
1.	2.	3.	4.	5.	6.

Screening

Q17. In your opinion, what is your professional experience with regards to working with APD?

Very Limited	Limited	Adequate	Good	Extensive
1.	2.	3.	4.	5.

Q18. In your opinion, how well informed are you with regards to the screening of APD?

Very poorly informed	Poorly informed	Adequately informed	Well informed	Very well informed
1.	2.	3.	4.	5.

SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

Assessment

Q19. In your opinion, how well informed are you to assess individuals with APD?

Very poorly informed	Poorly informed	Adequately informed	Well informed	Very well informed
1.	2.	3.	4.	5.

Management

Q20. In your opinion, how well informed are you to manage individuals with APD?

Very poorly informed	Poorly informed	Adequately informed	Well informed	Very well informed
1.	2.	3.	4.	5.

Challenges

Q21. In your opinion what are some of the challenges pertaining to APD screening, assessment and mx?

SECTION C: Professional Practices of APD

Screening

Q22. Have you screened for APD at any stage throughout your entire working career?

Yes	No
1.	2.

Q23. How many children in your caseload have you screened for APD?

I do not screen for APD	1-10	11-20	More than 20
1.	2.	3.	4.

If you screen for APD, please answer questions (a) to (h). If you do not screen for APD please answer (i)

Q24. (a) What is the common age group of your current APD caseload?

<6 yrs.	6-7yrs	7-8yrs	8-9 yrs.	9-10 yrs.	10 <yrs.
1.	2.	3.	4.	5.	6.

SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

Q24. (b) Which APD Guidelines and/or policies do you follow? You may choose more than one option.

I do not use any standard Guidelines or Policies	RSA CAPD Taskforce (2001)	American Speech and Hearing Association (ASHA, 2005)	American Academy of Audiology Clinical Practice Guideline (AAA, 2010)	The British Psychological Society APD Position statement (BPS, 2000)
1.	2.	3.	4.	5.
The Canadian International Guidelines		Bellis (2003)		Other. If Other, please specify)
6.		7.		8.

Q24. (c) What formal screening techniques do you use, if any? You may choose more than one option.

SCAN: A	SCAN: C	SCAN: 3C	Auditory Continuous Performance Test (ACPT)	Children’s Auditory Performance Scale (CHAPS)	Fisher’s Auditory Processing checklist
1.	2.	3.	4.	5.	6.
Screening Instrument for Targeting Educational Risks (SIFTER)		Listening Inventory for Education		Other. If Other, please specify	
7.		8.		9.	

Q24. (d) What informal screening techniques do you use, if any? You may choose more than one option.

Case history	Informal observation	Summarized checklist	Other. If other, please specify
1.	2.	3.	4.

Assessment

Q24. (e) What are some of the co-occurring conditions your APD caseload consists of? You may select more than one.

Attention Deficit Hyper-activity Disorder (ADHD)	Autism Spectrum Disorders	Dyslexia	Learning disorders	Speech/ Language Disorders
1.	2.	3.	4.	5.
Reading Disorders	Obsessive Compulsive Disorder	Sensory Integration Disorder	Stuttering	Other (Please specify)
6.	7.	8.	9.	10.

Q24. (f) What is the most common referral reason identified in your APD caseload? Please tick all that apply.

Suspicion of hearing loss	Poor school academic performance	Poor speech & language dev.	Social concerns	History of chronic otitis media	
1.	2.	3.	4.	5.	
Poor fine and gross motor development	Sensory integration difficulties	Inattentive and distracted	Sensitive to loud sounds	Behavioral concerns	Other (please specify)
6.	7.	8.	9.	10.	11.

Q24. (g) What tests do you do to confirm a possible diagnosis of APD? You may select more than one. If other, please state.

Dichotic Digits test	Dichotic CV test	Dichotic Words Test	Frequency Pattern Sequence Test
1.	2.	3.	4.
Filtered Speech test	Time compressed speech	Dichotic Sentences Test	Wepman's Auditory Discrimination test
5.	6.	7.	8.
Random Gap Detection Test	CVC Binaural fusion test	Masking level difference test (MLD)	Listening in Spatialized Noise-Sentences Test (LISN-S)
9.	10.	11.	12.
The Gaps-In-Noise Test (GIN)	Minimal Pairs Test	Duration Pattern Test	Synthetic Sentences Identification Test
13.	14.	15.	16.
Electrophys. tests such as ABR, AMLR, MMN	Other. If Other, please specify		
17.	18.		

Q24. (h) If you do not assess, please explain why not.

I have no interest in APD	I do not have the APD screening tools	I do not feel well informed in this area	I do not see clients with APD	Other. If Other, please specify.
1.	2.	3.	4.	5.

SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

Management

Q25. Do you provide management for individuals suspected of APD?

Yes	No
1.	2.

If yes, please answer parts (a) - (h). If No, please go to Question 27.

Q26. (a) What is the total number of individuals diagnosed with APD over the number you suspect of APD?

Less than $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	Most of my caseload
1.	2.	3.	4.	5.

Q26. (b) Do you provide management and support strategies for patients with APD?

Yes	No
1.	2.

Q26. (c) If you do provide management and support strategies for clients with APD, which strategies do you apply? You may select more than one strategy. Please tick all the relevant boxes.

<u>Remediation of auditory skills</u>	<u>Compensatory strategies</u> (Bellis, 2003)	<u>Environmental modifications</u> (Bellis, 2003)	Other. If other, please specify
<input type="checkbox"/> Discourse cohesion devices <input type="checkbox"/> Content schema induction	<input type="checkbox"/> Attribution training <input type="checkbox"/> Self-instruction <input type="checkbox"/> Cognitive problem solving <input type="checkbox"/> Self-reflection & correction <input type="checkbox"/> Use of music	<input type="checkbox"/> Assistive listening devices <input type="checkbox"/> Preferential seating <input type="checkbox"/> Manipulating visual aids <input type="checkbox"/> Confirmation with child <input type="checkbox"/> Repetition & rephrasing <input type="checkbox"/> Note taker <input type="checkbox"/> Gaining child's attention prior to speaking	

Q26. (d) How effective do you feel these support strategies are?

Not effective	Somewhat ineffective	Adequate	Effective	Very effective
1.	2.	3.	4.	5.

SURVEY OF AUDITORY PROCESSING DISORDERS IN CHILDREN

Q26. (e) Do you provide onward referral to other practitioners?

Yes	No
1.	2.

Q26. (f) If yes, please specify to which practitioners you refer to. You may select more than one option.

Audiologist/STA	Psychologist	Speech/ Language Therapist	Occupational therapist	Physiotherapist
1.	2.	3.	4.	5.
Ear Nose & Throat Specialist	Psychiatrist	Other. If other, please specify		
6.	7.	8.		

Q26. (g) Do you discuss possible management with other professionals?

Yes	No
1.	2.

Q26. (h) If yes, please specify to which practitioners you discuss APD management with.

Audiologist/STA	Psychologist	Speech/Language Therapist	Occupational therapist	Physiotherapist
1.	2.	3.	4.	5.
Ear Nose & Throat Specialist	Psychiatrist	Other. If other, please specify		
6.	7.	8.		

Q27. Do you have children on your caseload with a formal diagnosis of APD?

Yes	No
1.	2.

Q28. From which of the following professionals do you get referrals for APD screening, assessment and management? You may select more than one option.

I do not get referrals for APD	Psychologists	Speech/ Language Therapist	Occupational therapist	Physiotherapist
1.	2.	3.	4.	5.
Ear Nose & Throat Specialist	Audiologist/STA	Teacher	Other. If other, please specify	
6.	7.	8.	9.	

Challenges

Q29. Please state the concerns and any recommendations regarding the audiologists' role in the screening, assessment and management of APD.

Thank you for taking the time to complete this questionnaire.

Would you like to be informed about the results of the study?

* No thank you

* Yes, please send me the results to the following email address:

School of Health Sciences
Discipline of Audiology
University of KwaZulu-Natal
Westville Campus
Private Bag X54001
Durban 4000
Tel: 031 260 7438
Fax: 031 260 7622

Information Document:

Auditory Processing Disorders in Children:

The Perspectives and Practices of Audiologists in South Africa

As a master's student in the field of Communication Pathology (Audiology), at the University of KwaZulu-Natal, I am currently conducting a research project which aims to determine the perspectives and practices of South African audiologists pertaining to Auditory Processing Disorders (APD) in children.

The rationale of the study will be to determine the current perspectives and practices of South African audiologists, with specific reference to the training, level of preparedness and professional practice of APD screening, assessment and management. As the HPCSA (2005) stipulates, the role of the audiologist is important in the provision of APD services. It is therefore necessary to investigate whether these roles are being carried out within the South African context; the APD policies implemented, as well as the challenges thereof. International studies indicate that a majority of audiologists feel unskilled and ineffectively trained to assess and manage individuals with APD. By performing this study, one will further be able to determine the team members audiologists collaborate with when assessing and treating APD.

Your participation in this study will be beneficial to the field of audiology as it will inform the key role players involved in:

- a. Continuing Professional Development (CPD)
- b. The development of an effective service delivery model in South Africa
- c. Adapting protocols, policies and procedures in the field of APD
- d. Establishing the necessary guidelines in terms of curricula improvement to facilitate effective training amongst audiologists.

In order to obtain the necessary information, I hereby respectfully request your participation in the study. Your participation in this study will consist of the completion of a questionnaire consisting of 29 questions that will take approximately 20 minutes to complete.

Should you wish to participate in the study, kindly choose one of the following methods of return, in order to avoid any duplication:

- a) To complete the questionnaire online, kindly proceed to survey site
<https://www.surveymonkey.com/s/auditoryprocessing>
- b) To complete the hardcopy, kindly find the attached questionnaire and send your responses via the self-addressed envelope provided.
- c) To scan and email your responses, kindly send the hard copy questionnaire to clairefouche@afrihost.co.za or alternatively fax to 086 546 9816

The research project is being supervised by Mrs N. Khan and Mrs S. Govender, lecturers in the Discipline of Audiology at the University of KwaZulu-Natal-Westville campus. The researcher and supervisors can be contacted at the University on 031 260 7438. Furthermore, you are welcome to contact the School of Health Sciences research office (Phindile Nene 031 260 8280) should you have any further queries pertaining the postgraduate research procedures and protocols.

Your participation will be greatly appreciated.

Yours sincerely,

Student Researcher
Claire Fouché - Copley
074 658 5805
clairefouche@afrihost.co.za

Supervisor
Ms Nasim Khan
Khanna@ukzn.ac.za

Co Supervisor
Mrs Samantha Govender
Munsamys@ukzn.ac.za

Humanities and
Social Sciences
Research Ethics
Committee
Ms P Ximba
Tel: 031 260 3587
ximbap@ukzn.ac.za



School of Health Sciences
Discipline of Audiology
University of KwaZulu-Natal
Westville Campus
Private Bag X54001
Durban 4000
Tel: 031 260 7438
Fax: 031 260 7622

Consent Document:

Dear Participant,

You have agreed to participate in a research study titled, Auditory Processing Disorders In Children: “The Perspectives and Practices of Audiologists in South Africa.”

The research project is being supervised by Mrs N. Khan and Mrs S. Govender, lecturers in the Discipline of Audiology at the University of KwaZulu-Natal-Westville campus. The supervisors can be contacted at the University on 031 260 7438.

Should you have any queries regarding your rights as a participant, you are welcome to contact the Social and Human Sciences Research Ethics Office on 031-260 4769 or 031 260 1074 as well as the School of Health Sciences research office (Phindile Nene 031 260 8280).

It is noted that your participation in this study is voluntary. You will not be penalized or discriminated against if you do not wish to participate or choose to withdraw from the study at a later stage. Your details will remain anonymous throughout the study and confidentiality will be maintained.



I _____ hereby record that I understand the content of the research study as explained and undertake the following:

- 1) I am well aware of what the research study expects of me,
- 2) I wish to participate on a voluntary basis and am well aware that I may withdraw from the study at any stage without penalty,
- 3) All information leading to my identity will be withheld from the results,
- 4) All data will be accountable to the researcher and supervisor,
- 5) I have been informed of all the necessary contact details of the researcher as well as the supervisors.

Signature of Participant

Date

Signature of Witness

Date

PERMISSION LETTER:
APD IRELAND RESEARCH GROUP
RESEARCH OF AUDITORY PROCESSING DISORDER



School of Health Sciences
Discipline of Audiology
University of KwaZulu-Natal
Westville Campus
University Road
Westville

Private Bag X54001
Durban 4000
South Africa

Date: 6 May 2013

APD Ireland Research Group
Department of Speech and Language Therapy,
School of Health Sciences,
Aras Moyola,
National University of Ireland,
Galway

PERMISSION TO ADAPT A QUESTIONNAIRE FOR A RESEARCH STUDY
PREVIOUSLY DEVELOPED BY THE APD IRELAND RESEARCH GROUP

This letter serves as an application requesting permission to adapt a questionnaire initially developed by the APD Ireland Research Group during the study of Current and future service provision for children with Auditory Processing Disorder in Ireland in November 2008.

The aim of the current study will be to determine the perspectives and practices of South African audiologists pertaining to auditory processing disorders in children. The main objectives of the study will be to determine their perspectives regarding the causes, signs and symptoms of APD, the current screening, assessment and treatment protocols South African audiologists apply when managing APD, and to determine the challenges South African audiologists face when assessing and managing APD.

The research project is part of a master's degree dissertation in audiology and will be supervised by Mrs N. Khan and Mrs S. Govender, lecturers in the Discipline of Audiology at the University of KwaZulu-Natal-Westville campus. I will be following the University of KwaZulu-Natal's protocol for ethical clearance prior to distributing any questionnaires.

Your permission to adapt a survey based on your previous study will be much appreciated. The source of reference will be published at the bottom of the questionnaire acknowledging the primary researchers work.

Your contribution and assistance in this study will be highly appreciated.

Should you require any further information, please do not hesitate to contact me or my supervisor.

Yours sincerely

Student Researcher
Claire Fouché - Copley
0746585805
clairefouche@afrihost.co.za

Supervisor
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Khanna@ukzn.ac.za

Co Supervisor
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School of Health Sciences
Discipline of Audiology
University of KwaZulu-Natal
Westville Campus
University Road
Westville
Private Bag X54001
Durban 4000
South Africa

Date: 30 July 2013

Health Professions Council of South Africa (HPCSA)
P O Box 205
Pretoria
0001

PERMISSION TO ACCESS HPCSA REGISTER OF SOUTH AFRICAN
AUDIOLOGISTS

Dear Sir/Madam,

This letter serves as an application requesting permission to access the HPCSA register of South African audiologists for a research study in the field of audiology towards a master's degree research in the field of audiology with the University of KwaZulu-Natal.

The aim of the current study will be to determine the perspectives and practices of South African audiologists pertaining to auditory processing disorders in children. The main objectives of the study will be to determine the perspectives of the participants regarding the training and level of preparedness in the field of APD screening, assessment and management as well as the professional practices South African audiologists apply in the screening, assessment and management of APD.

The research project is part of a master's degree dissertation in audiology and will be supervised by Mrs N. Khan and Mrs S. Govender, lecturers in the Discipline of Audiology at the University of KwaZulu-Natal-Westville campus. I will be following the University of KwaZulu Natal's protocol for ethical clearance prior to distributing any questionnaires. Participation is entirely voluntary for audiologists. Furthermore, participants are welcome to withdraw from the study at any stage. Confidentiality and anonymity will be maintained throughout the research study.

Questionnaires will be used as the research tool for this particular study and it is with this intention that I respectfully request access to the postal addresses of South African audiologists currently registered with the HPCSA. Kindly confirm the cost and procedure entailed in accessing this.

Your assistance will be highly appreciated.

Should you require any further information, please do not hesitate to contact me or my supervisor.

Yours sincerely,

Student Researcher
Claire Fouché - Copley
074 658 5805
clairefouche@afrihost.co.za

Supervisor
Mrs Nasim Khan
Khanna@ukzn.ac.za

Co Supervisor
Mrs Samantha Govender
Munsamys@ukzn.ac.za

Humanities and Social
Sciences Research Ethics
Committee
Ms P Ximba – 0312603587
ximbap@ukzn.ac.za

No.	Language of Questionnaire	Was the length of the questionnaire suitable?	Were the questions comprehensive and easy to understand?	Were there any ambiguous questions? If yes, please indicate which number	Was the time taken to complete the questionnaire suitable?	Do you have any further comments or feedback





26 February 2014

Ms Claire A Fouche (205518056)
School of Health Sciences
Westville Campus

Protocol reference number: HSS/1540/0UM

Project title: Auditory Processing Disorders in children: The perspectives and practices of South African Audiologists

Dear Ms Fouche,

Full Approval-Expedited /Amendments

With regards to your response to our letter dated 14 January 2014, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted FULL APPROVAL.

The following amendments have also been approved:

- Research Methodology
- Research Instruments

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its Implementation. In case you have further queries, please quote the above reference number.

Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

cc Supervisor: Ms N Khan and Mrs S Govender
cc Academic Leader Research: Professor HJ van Heerden
cc School Administrator: Ms Phindile Nene

Humanities & Social Sciences Research Ethics Committee

Dr Shenuka Singh (Chair)

Westville campus, Govan Mbeki Building

Post Address: Private Bag X54001, Durban 4000

Telephone: +27 (0)31 260 3587/8350/4557 Facsimile: +27 (0)31 260 4809 Email: ximban@ukzn.ac.za 1snvmanm@yjszn.ac.za mohynp@ukzn.ac.za

Website: www.ukzn.ac.za

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100 YEARS OF ACADEMIC UCAJ.EMCE

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Edgewood

Howard College

Medical School

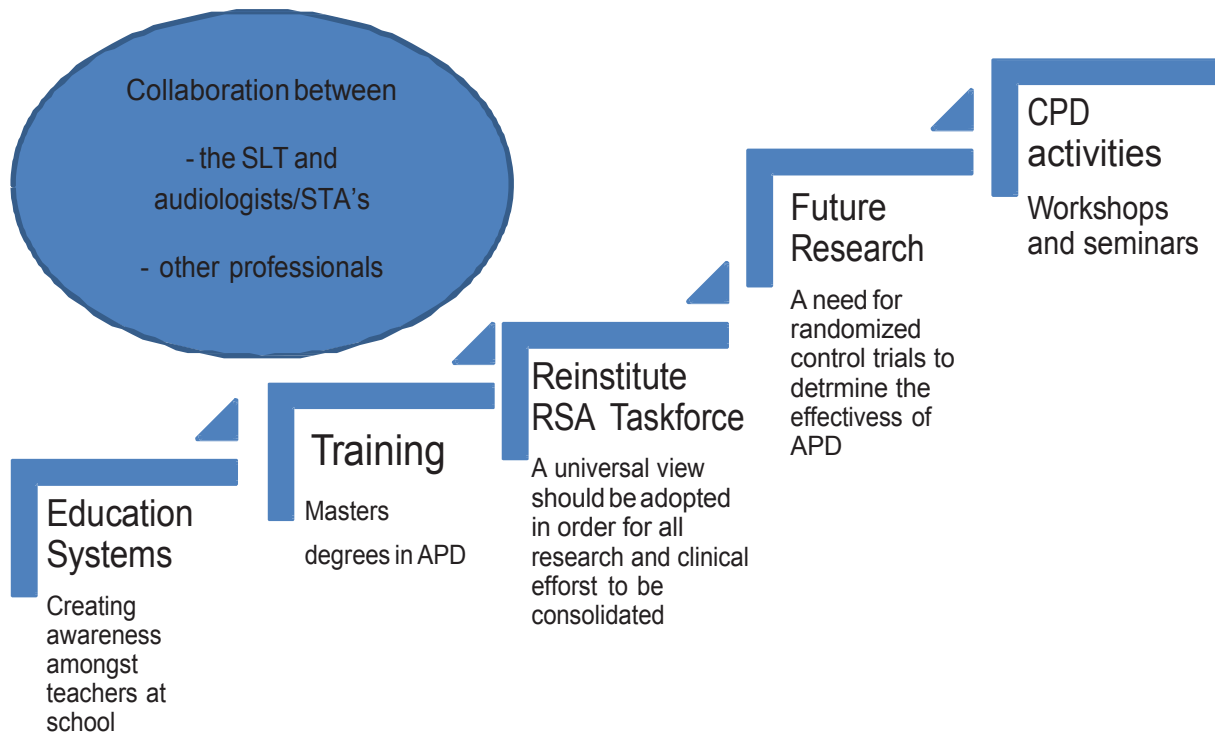
Pietermaritzburg Westville

Appendix H

Challenges faced by South African audiologists/STA's with regards to APD Practice

Assessment and Intervention	Assessment Tools	Lack of Consensus	Clinical Setting and Referral networks	Scope of Practice and Training
<p>Poor adherence to home programmes as parents are unfamiliar with APD</p> <p>Lack of treatment programmes</p> <p>No communication between therapy, family members and other practitioners on the team with regards to assessment and treatment</p> <p>Poor awareness and adherence from teachers therefore often resulting in late intervention</p> <p>Medical aids do not always compensate for APD testing and/or intervention</p> <p>Limited resources for effective intervention programs</p>	<p>Concerns with regards to the Pass/Fail criterion of screeners and sensitivity of APD tests</p> <p>Limited assessment tools for non-English proficient students</p> <p>Diagnosis is often provided before correct developmental age</p> <p>Cost of assessment tools often purchased through companies abroad</p> <p>Lack of reliable assessment materials in SA</p> <p>Difficult to identify and manage preschool children</p> <p>No screening materials available to categorize and/or profile the type of APD present.</p> <p>Time taken to complete the APD battery versus the amount charged for the interpretation and write-up of a professional report is imbalanced</p> <p>Assessment tools lack supporting documentation and often are perceived to be too complicated and too long to conduct.</p> <p>Assessment tools are considered to be 'boring' for children presenting with APD and may not be a true reflection of the child's processing abilities</p>	<p>Little consensus on the assessment and treatment of APD</p> <p>The approach between SLT and audiologists /STA's differ</p> <p>Lack of consensus with regards to APD protocols</p> <p>No universal standard regarding definition or location</p> <p>Guidelines are poorly defined</p>	<p>Little follow up between the audiologist/STA and teacher</p> <p>Audiologists /STA's are unfamiliar with the APD referral network</p> <p>Lack of available medical services and facilities in SA</p> <p>Many facilities do not see these clients e.g. specialized settings</p> <p>APD is not seen as a priority when compared to other disorders</p> <p>Lack of support from the education system.</p> <p>Strict Policies with regards to the pass and failure systems</p> <p>Poor teacher to child ratios</p> <p>Parents' expectations are greater now than before,</p> <p>Little literature on how to support hearing impaired children with an APD</p>	<p>Practitioners diagnosing out of their scope of practice</p> <p>Audiologists /STA's often screen and assess APD whereas Speech Therapists tend to provide the intervention. There is a lack of collaboration between the two professions</p> <p>APD often avoided due to lack of information and training</p> <p>Very few intervention programs administered from the view of the audiologist /STA</p> <p>Inadequate training at undergraduate level hence limited services available in SA</p> <p>Training on treatment is limited</p> <p>Literature does not support assessing those with hearing impairment and APD</p> <p>Lack of CPD accredited workshops in the area</p>

Appendix I



Recommendations pertaining to effective APD Service Delivery in South Africa