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Effectiveness of a clinic-based newborn hearing screening programme in rural South Africa: Parental perspectives

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Declaration

I, Khomotjo Kgare, declare that this dissertation, entitled 'Effectiveness of a clinic-based newborn hearing screening programme in rural South Africa: Parental perspectives' is my own work and that any assistance obtained has been only in the form of professional guidance and supervision. No part of this research has been submitted previously to any other research institution of higher learning or university. The theoretical components of this report have been referenced accordingly. I claim complete responsibility for the conclusions drawn in this research study.

_____ _____

Khomotjo Kgare Date

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Abstract

Newborn hearing screening (NHS) has been successfully implemented in developed countries such as the United States of America and the United Kingdom. This is however not the case in developing countries such as South Africa. The challenges impact on the implementation of such programmes include lack of suitably trained personnel, financial resources for staff and equipment, institutional support and political will. The lack of NHS programmes in South Africa has resulted in the late detection of hearing loss in infants and children and subsequently delayed intervention. In order to address the lack of NHS, a rural clinic-based NHS programme was implemented in July 2014 at three primary health care (PHC) clinics in the Limpopo Province. The main aim of the study was to describe the parental/caregiver perspectives regarding the effectiveness of this rural clinic-based NHS programme. The effectiveness of the programme was also evaluated in terms of meeting national (HPCSA, 2007) and international (JCIH, 2007) benchmarks.

A retrospective review of 2 302 audiological records of babies who underwent NHS between July 2014 to June 2015 was conducted. Concurrently, 18 parents of infants who underwent hearing screening as part of the programme were purposefully selected and semi-structured interviews were conducted to explore the parental perspectives regarding the programme.

The results of the retrospective record review revealed that the mean age of the infants screened during the review period was 112 days (2 – 341; ± 40.26). The overall coverage rate was 87% and the referral rate, 7%. The overall follow-up return rate was 32% and only 15% the infants who failed both the initial and rescreening underwent comprehensive diagnostic assessment to confirm their hearing status. The overall prevalence rate for significant sensori-neural hearing loss was 0.4/1000 and 7.8/1000 for middle ear effusion. The parents/caregivers confirmed the perceived effectiveness of the NHS programme. All the participants were satisfied with the programme and confirmed the credibility of the screening programme and screeners. Parents indicated that they were empowered with knowledge regarding the importance of early detection of hearing loss in infants and young children. Accessibility was both a facilitator and a barrier with travel distance and cost the most often cited obstacles to attending follow-up appointments.

The findings indicate it is feasible to implement clinic-based NHS programmes that effectively meet the needs of parents/caregivers of infants residing in rural areas of South Africa. Although not all the benchmarks were met within the first year of implementation, the high coverage- and low referral rates are the first steps in improving the outcomes of the screening programme. The study highlight the importance of regular monitoring and evaluation of the NHS programmes to keep track of key outcomes and impacts related to the different components of the programme.

Key words: Parental perspectives, satisfaction, newborn hearing screening, rural, South Africa

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List of Abbreviations

AABR	Automated Auditory Brainstem Response
ABR	Auditory Brainstem Response
DoH	Department of Health
EHDI	Early Hearing Detection and Intervention
EMLM	Elias Motsoaledi Local Municipality
HPCSA	Health Professions Council of South Africa
JCIH	Joint Committee on Infant Hearing
NCG	Ndlovu Care Group
NHS	Newborn Hearing Screening
NICU	Neonatal Intensive Care Units
NMC	Ndlovu Medical Centre
NWA	Ndlovu Wits Audiology
OAE	Otoacoustic Emissions
PHC	Primary Health Care
UNHS	Universal Newborn Hearing Screening
WHO	World Health Organization

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Chapter 1: Introduction

In this chapter the background to and rationale for the study is presented. The chapter concludes with an outline of the chapters in the dissertation.

Background and rationale

Hearing loss is referred to as a silent epidemic as it often remains undetected (Meyer & Swanepoel, 2011). Hearing plays an important role in childhood development. Undetected hearing loss that manifest early in life can affect the development of language, oral communication and cognition and hamper educational progress (Sininger, Grimes & Christensen, 2010).

The prevalence of hearing loss in children is high, especially in developing countries such as South Africa. The importance of the early detection and intervention of hearing loss in mitigating the consequences thereof cannot be underestimated. In 1994, the Joint Commission of Infant Hearing (JCIH) proposed universal newborn hearing screening (UNHS) as fundamental to the early detection of hearing loss in infants and young children (JCIH, 2000). The recommendation was the implementation of UNHS, as part of the secondary prevention of hearing loss in children, in all countries with available rehabilitation services (Olusanya, Neumann, & Saunders, 2014; World Health Organisation [WHO], 2010). The Health Professions Council of South Africa (HPCSA) supports this initiative (2007). The well-documented benefits of early intervention include the positive outcome on speech- and language development of children with hearing loss (Vohr, Jodoin-Krauzyk, Tucker et al., 2008).

UNHS have been successfully implemented in developed countries such as the United States of America, the United Kingdom and Australia.. Despite its proven benefits, UNHS programmes are yet to be implemented in developing countries such as South Africa (Kanji & Opperman, 2015) In South Africa, three early identification platforms have been proposed namely well-baby nurseries and neonatal intensive care units (NICUs) in hospitals as well as the 6-week immunisation visits at primary health care (PHC) clinics (HPCSA, 2007).

Despite the introduction of the guidelines by the HPCSA, congenital hearing loss for the majority of children in South Africa is only detected by the age of 3 years (Kanji & Opperman, 2015; van der Spuy & Pottas, 2008). This late detection of hearing loss can be, amongst other factors, attributed to the limited number of NHS programmes in South Africa. Research has found that only 5% of private hospitals (Meyer & Swanepoel, 2011) and less than 1% of public hospitals (Theunissen & Swanepoel, 2008) offer UNHS. These services are mostly available in the urban areas of two of the most resourced and populated provinces in South Africa, Gauteng and the Western Cape.

There are only a limited number of clinic-based UNHS programmes in South Africa. In order to address this inequality, a rural clinic-based UNHS was implemented in July 2014 at three PHC clinics in the Limpopo Province, one of the poorest and most under resourced provinces in the country. This public-private initiative, collaboration between a non-governmental organisation and Department of Health, is the first of its kind in a rural context. The vision of the programme is to improve the quality of life of individuals in the rural community by providing comprehensive, family-centered and quality ear and hearing health services to all individuals.

The evaluation of UNHS services should routinely be performed to determine the effectiveness thereof in meeting the benchmarks set (Januário, Lemos, de Lima Friche et al, 2015). One of the most important aspects is to obtain parents' perspectives of the services offered. Parents, as the primary caregivers of infants, play an active role in the identification on hearing loss. Parental satisfaction should thus be one of the key elements measured when evaluating the effectiveness of NHS programmes (JCIH, 2000). Their perspectives can assist in identifying the factors that contribute to or hamper the effectiveness of the UNHS programme. The identified challenges will guide the improvement of NHS services offered. This study thus aimed to address the following research questions:

i) How effective is the rural clinic-based NHS programme when measured against national and international benchmarks?
ii) What are the factors that, according to parents, contribute to the effectiveness on hearing screening programme?
iii) What are the factors that influence the effectiveness of the hearing screening programme?

iv) How can the hearing screening programme be improved?

Chapter outlines

This dissertation is presented in six chapters. The first chapter provides a background to and rationale for conducting the study. The chapter concludes with an outline of the chapters in the dissertation.

In chapter 2, the literature related to the study is presented. The chapter begins with a brief overview of hearing loss in infants with specific reference to prevalence and causes. This is followed by a description of detection of hearing loss with the focus on the South African context. Thereafter the principles of UNHS and the two platforms for hearing screening are outlined and described. The chapter concludes with the factors that contribute to the effectiveness of NHS programme. .

Chapter 3 provides a detailed description of the methodology and in Chapter 4; the results are presented in accordance with the aims of the study. In Chapter 5, the findings are discussed in relation to current literature.

The final chapter, Chapter 6, is synopsis of the study. A critical evaluation of the study in terms of the identified strengths and limitations is provided. The chapter concludes with recommendations for clinical practice and future research.

The appendices provide important information for the understanding of the data collection and analysis procedures, and thus the replication of the study.

Chapter 2: Literature review

In this chapter, the reader is guided through international and local literature relevant to this study. The chapter begins with a brief overview of hearing loss in infants with specific reference to prevalence and causes. This is followed by a description of detection of hearing loss with the focus on the South African context. Thereafter the principles of UNHS and the two platforms for hearing screening are outlined and described. The factors that contribute to the effectiveness of NHS programme are then discussed and the chapter concludes with the importance of programme evaluation.

Hearing loss in children

Disabling hearing loss in children (0 - 14 years) is defined as hearing loss greater than 30dB in the better hearing ear (WHO, 2012). The global prevalence of hearing impairment is high (Argrawal, Plats & Niparko, 2008; WHO, 2012). Worldwide, 466 million people live with hearing loss, of which 9% are children (WHO, 2018).

The highest prevalence of children with hearing loss is reported for South Asia and Sub-Saharan Africa (WHO, 2018). It has been reported that 6/1000 live-born infants are born with permanent hearing loss, with 90% of these infants living in developing countries (Olusanya & Newton, 2007). Across sub-Saharan Africa approximately 180 000 babies are either born with or acquire permanent bilateral hearing loss within the first few weeks of life every year (Meyer & Swanepoel, 2011). In South Africa, 17 babies are born with a significant permanent bilateral hearing loss every day (Swanepoel, Storbeck & Friedland, 2009). It is thus evident that hearing impairment is one of the biggest contributors to the burden of disabilities in the world. The years lived with disability (YLD) for disabling hearing impairment was 4.49% of the total YLDs due to all causes in 2015. Hearing impairment is now ranked as the fourth leading contributor to YLD (Wilson, Tucci, Merson, & O'Donoghue, 2017).

Causes of hearing loss

There are various etiologies linked to hearing loss across the lifespan. Hearing loss may be hereditary (e.g. genetic disorders) or acquired (e.g. due to prenatal, perinatal of postnatal conditions (WHO, 2010a).

Prenatal causes are varied and include maternal infections (e.g. rubella, syphilis, toxoplasmosis, congenital HIV), maternal diseases (hypertension), congenital anomalies and genetic causes (Olusanya et al., 2014). Genetic factors contribute 30-50% of the causes of hearing loss in Sub-Saharan Africa (Lebeko, Bosch, Noubiap et al., 2014). Viral infections cause up to 40% of all congenitally acquired hearing loss (Cohen, Durstenfeld, & Roehm, 2014).

Perinatal or neonatal causes of hearing loss can be attributed to preterm birth, low birth weight, birth trauma, hypoxia and hyperbilirubinemia (Olusanya et al., 2014). The incidence of sensorineural hearing loss in high-risk infants is significantly higher (2-4/100) than healthy infants (3/1000) (Wroblewsa-Seniuk et al., 2018). Viral infections such as the herpes simplex and the cytomegalovirus (CMV) in addition to prolonged and excessive exposure to incubator noise are further described by Olusanya et al. (2014) as potential causes of hearing loss in infants.

Viral infections (such as CMV, rubella, measles, acquired HIV) are the major postnatal causes of hearing loss (Olusanya et al., 2014). It is reported that of all the children born with symptomatic CMV, 14% will develop hearing loss and 5% will develop a severe, bilateral sensorineural hearing loss (SNHL) (Grosse, Ross & Dollard, 2008). In some cases hearing loss following viral infection may be mixed (CMV, measles) or conductive (measles) in nature (Cohen et al., 2014). The damage to the peripheral auditory system can include direct viral intracochlear damage (organ of Corti, stria vascularis, spiral ganglion) and secondary bacterial infection of the ear (HIV, measles, otitis media) as a result of being immunocompromised (Butler, 2012; Cohen et al., 2014).

Knowledge of the possible causes and risk factors for hearing loss is important for early detection and intervention of hearing loss in children. It is also vital that all health care workers (doctors and nurses), parents, and caregivers are educated so that they can identify if their children are at risk for hearing loss.

Detection of hearing loss in infants

Hearing loss at any stage of life can compromise communication and influence quality of life (Gondim, Balen, Zimmermann et al., 2012). The objective of early hearing detection and intervention (EHDI) programmes is to detect, diagnose and treat newborns and infants with hearing loss at an early age (Kanji & Opperman, 2015). Research has confirmed that untreated SNHL in the first year of life has adverse consequences across all developmental domains that result in a lifetime of speech and language difficulties that may severely limit educational- and vocational achievement and psychosocial development (Moeller, 2000; Olusanya, 2015). Identification and intervention later than 6 months of age result in persistent language delay of 2-4 years (Yoshinaga-Itano, Sedey, Coulter et al., 1998).

Early detection and intervention are the critical first steps toward proactive management of infants and children with hearing loss (Gondim et al., 2012). Enrolling babies into early intervention has beneficial effects on speech and language development. If intervention is provided before three months of age, development across all domains are directly proportional to that of normal hearing peers (Vohr et al., 2008). The added benefit is that early identification and intervention can reduce the burden of deafness by 50 % (Olusanya, 2008).

There are disparities in successes of NHS programmes implemented in developed and developing countries. Since the inception of the NHS in developed countries such as the United States of America, hearing screening has become universal and 95% of infants are offered screening for hearing loss (WHO, 2010a). Since 2004, between 90% and 94% of mothers have been offered hearing screening as part of the UNHS programme in the United Kingdom (Moodley & Storbeck, 2015). It was reported that 1.8% of these infants did not pass the screening. Loss-to-follow up in these countries remain a challenge as only 55% of those infants requiring diagnostic evaluation were documented to have received one. In addition, only 64% of those identified with hearing loss were documented as being enrolled in an early intervention programme (Moodley & Storbeck, 2015).

In developing countries like India, the NHS have been conducted since 1986 with varying rates of success (Augustine, Jana, Kuruvilla et al., 2014; Low, Pang, Ho et al., 2005). Findings of a study conducted in a tertiary hospital reported that 1.7% of infants presented

with suspected hearing loss and only 0.3% were confirmed to have a hearing loss and received appropriate intervention (Augustine et al., 2014).

Early detection of hearing loss in South Africa

The importance of early identification and intervention for paediatric hearing loss was recognised in 2004 but it is only in 2007, that the HPCSA proposed the implementation of UNHS as part of EHDI (Moodley & Storbeck, 2015). These guidelines support the notion that intermediary steps toward universal screening, as suggested by the JCIH (2000), should be implemented in South Africa (Olusanya, Luxon, & Wirz, 2004). Research suggested that nationally only 7.5% of public sector hospitals offer newborn hearing screening (NHS) and less that 1% offer UNHS nationally (Theunissen & Swanepoel, 2008). The lack of formalised NHS programmes in the Gauteng and the North West Provinces of South Africa was confirmed in a recent study (Khoza-Shangase, Kanji, Petrocchi-Bartal et al., 2017). Private hospitals in South Africa perform slightly better. Meyer and Swanepoel (2011) have reported that 53% of private hospitals offer some form of NHS and 5% offer UNHS. These findings are alarming as the majority of South Africans (86%) only have access to public health care facilities (Blecher & Harrison, 2006).

The average age of diagnosis in South Africa is 31 months, the age of hearing aid fitting 39 months, and age of enrolment in early intervention programmes 43 months (Venter & Viljoen, 2008). Similar findings were reported in a study conducted in Western Cape. This implies that the majority of South African children with hearing loss go undetected until 2-3 years of age (Van der Spuy & Pottas, 2008). Even though NHS screening is conducted in some provinces and health care contexts, it still does not meet national benchmarks.

Some progress has been made with the implementation of NHS in South Africa, as is evident in the growing knowledge base of the field of EHDI. Moodley and Storbeck (2015) confirm that an area of strength is the information on implementation of hearing screening in both the private and public healthcare sectors, across the three screening platforms. Another area of strength is the information on context-specific risk factors for hearing loss.

Principles of UNHS

The JCIH (2000) and HPCSA (2007) have set out eight principles to guide the implementation, monitoring and evaluation of UNHS programmes.

The first three principles outlined in the JCIH (2000) guidelines state that the hearing all infants should be screened by one month, hearing loss should be confirmed before three months of age in infants who did not the pass screening and intervention should be provided by six months of age. The HPCSA amended the guidelines to address contextual challenges specific to South Africa. The national guidelines recommend that screening be conducted as soon as possible after birth but before three months of age, hearing loss confirmed by four months of age and intervention started before eight months of age (HPCSA, 2007).

The fourth principle highlights the importance of family centered services where the rights and privacy of the infant and family are guaranteed through informed choice, shared decision-making, and parental consent (HPCSA, 2007; JCIH, 2007). The fifth principle is that the child should have immediate access to the relevant technology (including hearing aids and other assistive devices when appropriate). The importance of monitoring for hearing loss and the continued assessment of communication development of all children with or without risk is highlighted as the sixth principle. The implementation of appropriate interdisciplinary intervention programmes for infants with hearing loss and their families that should be provided by professionals who are knowledgeable about childhood hearing loss is the seventh principle. The final principle is that health information systems should be available, be used to measure outcomes, and report the effectiveness of EHDI services at all levels (HPCSA, 2007; JCIH, 2000).

Screening measures

Two physiological measures are recommended to detect hearing loss in infants; otoacoustic emissions (OAE) and automated auditory brainstem response (AABR) (JCIH, 2000; HPCSA, 2007; WHO, 2010a). OAE measures low intensity sounds generated from the outer hair cells of the cochlea in response to audible sounds (Olusanya, 2015). Screening AABR measurements evaluate the status of the peripheral auditory system, the eighth nerve, and the brainstem auditory pathway (WHO, 2010a). These automated-response detection technologies eliminate the need for individual test interpretation; the effect of screener bias

and operator error on test outcomes is thus reduced. It further ensures consistency across infants and test conditions (JCIH, 2007).

Low false-positive rates of 3-5% are reported for OAE and AABR (Mencher & de Voe, 2001). AABR has a higher pass rate compared to distortion-product OAEs (Wahid, Daud, Sidek, Abd Rahman et al., 2012). The low rate of screening failures obtained with AABR reduces costs associated with subsequent follow-up assessments (de Kock et al., 2016; Stewart et al, 2000).

For NHS at PHC clinics, a two-stage protocol is proposed by Olusanya and colleagues (2008). The first stage of screening should include transient evoked OAEs and the second stage, AABR. This protocol typically has high sensitivity (92%) and specificity (98%). The JCIH (2000) also support the use of OAEs at clinic-level. In contrast, the feasibility of AABR at clinics were recommend by de Kock et al. (2016) due to its negligible disposable costs.

Various factors influence test time when using OAEs and AABR. These factors include the infant's state of consciousness, the EEG (AABR) and signal-to-noise ratio (OAE). A shorter test time is reported when infants are in a deep sleep with regular breathing and no movement (Almeida, Sena-Yoshinaga, Côrtes-Andrade et al., 2014). Ideally, in clinic-based programmes, screening should thus be conducted prior to vaccination (Olusanya et al, 2008). Ambient noise levels should also be carefully monitored within the screening contexts, as high noise levels will specifically impact OAEs (Kanji & Khoza-Shangase, 2016).

A comprehensive audiological evaluation should be conducted to confirm hearing loss in infants who did not pass their hearing screening. The recommended test battery, as outlined by the HPCSA (2007) and JCIH (2007), should include a comprehensive case history and parental report of the infant's responses to sound, auditory- and visual behaviours and communication development. The test battery will depend on the age of the child but should include case history, behavioural audiometry, tympanometry, OAEs, and auditory brainstem response (ABR) measures.

Benchmarks

The success of NHS programmes can be measured by a set of benchmarks and quality indicators (JCIH, 2000; HPCSA, 2007). These standards include the minimum participation

rate at screening; age at completion of the screening process; maximum referral rate; minimum participation rate and age at completion of diagnostic testing; and age at which infants receive first intervention (WHO, 2010a).

The JCIH (2007) and HPCSA (2007) presented quality indicators that should be monitored monthly to ensure that a programme is achieving the expected benchmarks for the hearing screening. The HPCSA (2007) guidelines stipulate that within 6 months of the initiation of clinic-based screening programmes 95% of infants attending their 6-week immunization visit should be screened. The ultimate goal of the EHDI in South Africa was to screen 98% of all infants by 2010 (HPCSA, 2007).

The quality indicators and benchmarks for the first three principles are included in Table 1.

Table 1 *UNHS: Benchmarks and quality indicators*

Quality indicators	Benchmark	
	JCIH (2000; 2007)	HPCSA (2007)
% of all newborn infants who complete screening by 1 month of age (JCIH, 2007) or 3 months of age (HPCSA. 2007) (Coverage rate)	95%	95%
% of infants who fail initial screening and any fail any subsequent rescreening before comprehensive audiological evaluation (Referral rate)	4%	< 5%
Of the infants who fail initial screening and any subsequent rescreening, the % who complete comprehensive audiological evaluation by 3 months of age (JCIH, 2007) or 4 months of age (HPCSA, 2007) (Follow-up return rate)	90%	70%
For families who elect amplification, the % of infants with confirmed bilateral hearing loss who receive amplification devices within 1 month of confirmation of hearing loss (JCIH, 2007) and before 8 months of age (HPCSA, 2007)	95%	90%

The following indicators assist in the calculation of the coverage-, referral- and follow-up return rates; i) percentage of infants screened attending their 6-week immunisation visit; ii) percentage of infants that were screened at 6 weeks of age; iii) percentage of infants who

do not pass the clinic-based screen; iv) percentage of infants with a unilateral refer result requiring a rescreen within 6 to 9 months; v) percentage of infants who do not pass the clinic-based screen who return for follow-up services; vi) percentage of infants who do not pass the clinic-based rescreen who are referred for audiologic and/or medical evaluation; vii) percentage of parents who refuse clinic-based hearing screening; and viii) percentage of caregivers reporting a positive attitude toward the screening programme after the first screen.

Platforms for hearing screening

Three screening platforms have been identified for NHS in South Africa namely hospital-based screening on discharge from well-baby nurseries and neonatal intensive care units (NICUs), and 6-week immunization visits at PHC clinics (HPCSA, 2007). The screening programme can be either targeted/risk-based or universal. A targeted or risk-based hearing screening is one where the target babies are those exhibiting recognized hearing loss risk factors (WHO, 2010a). However when screening is directed at the whole population, it is universal (Olusanya, 2015).

Hospital-based screening

The feasibility of hospital-based hearing screening programmes has been recognised in many developed countries (Khoza-Shangase & Joubert, 2011; Olusanya, 2015). Recently, more research has been conducted specifically in the South African context (Kanji & Khoza-Shangase, 2016; Khoza-Shangase & Harbinson, 2015; Khoza-Shangase & Joubert, 2011; Meyer & Swanepoel, 2011). The impact of the technology used (AABR vs OAE), noise levels (Kanji & Khoza-Shangase, 2016), and early postnatal discharge (Khoza-Shangase & Harbinson, 2015) in South African hospitals was explored.

In a recent study by Kanji and Khoza-Shangase (2016), the feasibility of hospital-based screening in South African public sector hospitals was confirmed. The recommendations were that test time (regardless of the test battery used), sensitivity, and specificity of the screening protocol be considered before implementation. Ambient noise levels were found to be close to the maximum limits within the screening contexts, highlighting the importance of careful monitoring of noise levels. In this study, high referral rates were noted at the initial screening that decreased with the repeat hearing screening. These findings are similar to those reported by other studies (Chen, Chen, Dong et al, 2012). In another South African study, it

was found that the referral rate decreased with an increase in the age of infants (Khoza-Shangase & Harbinson, 2015).

The guidelines for hospital-based screening proposed by the Tennessee Department of Health (2009) recommend that initial screening be completed as close to discharge as possible, but not before 12 hours of age. It is preferable for screening to take place between 24 and 72 hours of life. For infants born by caesarean section, screening should preferably only be conducted after 24 hours to allow vernix to clear (Khoza-Shangase & Joubert, 2011).

Hospitals seem to be the most convenient platform for conducting NHS as the majority of infants are born in hospitals. This notion that conducting NHS soon after birth will increase the coverage rate guides the choice of hospitals as platform (Olusanya, 2015). In developed countries such as the USA, postpartum hospitalisation of a minimum of 48 hours after vaginal delivery and 96 hours after caesarean section is mandated (Fink, 2011). However, in South Africa, the postpartum length of stay after vaginal delivery is significantly shorter. If both the mother and her newborn are in good health, discharge from hospital is 6 hours after birth (Western Cape Government, 2014). Cost containment and hospital bed availability drives early discharge in public sector hospitals in South Africa (Evans, Garthwaite, & Wei, 2008).

In addition to the hospital discharge policy, the hospital platform does not allow for the hearing screening of babies not born in hospitals (Olusanya, 2015). As a result, community-based screening (e.g. at 6 week immunisation visits) is proposed as another effective platform for conducting infant hearing screening in developing countries (Olusanya, 2008).

Community-based screening: PHC clinics as a platform for NHS

Primary care is the first point of entry to the health system and is oriented toward the disease prevention. It allows for early diagnosis and treatment, management and referral to secondary and tertiary care (Keleher, 2001). In South Africa, primary healthcare as a public health strategy has been implemented to provide health services and is based on the philosophy that health gains are better when people's basic needs are met first (Keleher, 2001). The principles of the PHC approach include equity in health service delivery, access to affordable and appropriate serves, empowerment of people and sustainability of service provision (Van Weel & Maeseneer, (2010). Comprehensive care using strategies of the PHC

approach should focus on integrated health care delivery, where individuals and communities are managed holistically (Dookie & Singh, 2012).

In South Africa, 46% of the population lives in rural areas (WHO, 2010b) and PHC clinics are often the only health care service available to residents. Watermeyer and Barratt (2013) define rural areas as remote areas with poor infrastructure, poor basic utility service provision, low levels of literacy, and high levels of unemployment, limited access to health and education services and a high incidence of communicable diseases. The advantage of choosing PHC clinics as a platform for NHS is that, they are the first point of entry to the health system which provides access to affordable and appropriate serves (Keleher, 2001: Van Weel & Maeseneer, 2010).

The convenience of using PHC clinics as platforms for NHS is also the high probability that mothers routinely take their babies to immunization clinics. This provides the opportunity for effective infant hearing screening with wide population coverage (Olusanya & Okolo, 2006; Swanepoel, Hugo & Louw, 2006; WHO, 2010a). The immunisation coverage rate in South Africa is not optimal and has decreased from 63% in 1998 to 61% in 2016. In the Limpopo Province where the current study was conducted, the immunization coverage rate is slightly higher at 67% (Statistics SA, 2017).

In a recent study the lack of formalised NHS programmes at PHC clinics in Gauteng and the North West Provinces of South Africa was confirmed (Khoza-Shangase, Kanji, Petrocchi-Bartal et al., 2017). The major reasons cited for the lack of NHS programmes in both the provinces were resources constraints such as adequate financial support for equipment and human resources, and adequate space. South African research have highlighted the need to ensure that context-specific studies in EHDI are conducted to contribute to the identification of contextual challenges (e.g. resource constraints; lack of political will) that impact on the implementation of NHS across all three levels of health care (Khoza-Shangase et al., 2017, p. 159).

Effectiveness and quality of UNHS programme: Contributing factors

Various factors contribute to the success and effectiveness of UNHS programmes, regardless of platform (hospital or clinic-based) and screening technology used.

Service accessibility

Access to health services is influenced by physical and economic aspects. Inadequacy of health facilities and services, measured in terms of numbers, types and sizes of available health facilities, and accessibility is a common problem in developing countries (Mwasi, 2010). The presence of facilities may not necessary imply adequate access. Practical accessibility is a function of space (how far and what kind of terrain), availability of transportation network and economic means of utilising available transportation infrastructure and health services (Guargliardo, 2004; Mwasi, 2010).

In the rural areas of South Africa, access to health services is a challenge due to distance and affordability of accessing services (WHO, 2010a). There is a strong relationship between distance to health facilities and health seeking behavior, this relationship is referred to as distance-decay phenomena (Mwasi, 2010). This states that the further away an individual is from a resource, the less the likelihood that the resource will be used (Mwasi, 2010). Policy guidelines state that residents should be within a 5 km radius from a health facility and this was based on the distance decay concept. Recent research has found that 90% of South Africans live within 7 km of their nearest clinic and two-thirds less than 2 km away (McLaren, Ardington & Leibbrandt, 2014). A strong negative association has been reported for individuals who collect antiretroviral treatment. Individuals who live 5 kms from the nearest clinic are only half as likely to access treatment when compared to those living next to the facility (McLaren, et al., 2014).

Availability of and access to comprehensive diagnostic audiology services further impact on the success of NHS programmes. One of the principles of EHDI is that infants who fail initial screening and any subsequent rescreening should have a comprehensive audiological evaluation by 4 months of age (HPCSA, 2007). However, in South Africa, there is a limited number of audiological services and resources (Joubert, Sebothoma & Kgare, 2017) with services mostly available in cities and major towns.

Regardless of free access to PHC services, financial aspects impact on access to health care. In South Africa, access to transport and high travel costs means that small differences in distance can translate into large differences in access. This is especially true in rural areas where the majority of residents are poor and dependent on public transport. Minibus taxis are the most available and affordable mode of transport to the public (Arrive Alive, 2018). With

the high unemployment rate in rural areas, such as the Limpopo Province (42.9%), many residents may not afford to make use of public transport to access services.

Visibility of NHS screening department

Visibility of allocated space in the health facility also plays an important part in accessibility. The ability to successfully navigate a health care facility is an important goal for patients, visitors and staff (Devlin, 2014). Appropriate wayfinding systems, or signage, reduce costs as people who are unsure of how to reach their destination will interrupt staff engaged in other activities (Gehshan, 2011). Previous research found patients exposed to posted signs in the reception area made fewer demands on staff (Nelson-Shulman, 1984). Signage that use the human body or body parts performing a specific action was found to be effective in healthcare signage (Hashim, lkaabi, & Bharwani, 2014; Rouse & Hallbeck, 2011). The KwaZulu-Natal Department of Health (2013) developed guidelines for signage in health facilities and recommend that it must comply with the Occupational Health and Safety Act 85 of 1993.

Screening personnel

The hearing screening personnel involved in EHDI programmes can include audiologists, registered nurses or other trained technical staff such as community health workers (CHWs). Research indicated that with focused training CHWs can successfully screen the hearing of infants (Olusanya, Wirz & Luxon, 2008). Research conducted in Malawi confirmed that CHWs are able to identify people with ear and hearing disorders both within the community and in the clinics (Mulwafu, Kuper, Viste et al., 2017). These findings support the notion that non-specialists can play a vital role in the provision of basic community-orientated hearing health-care services (Mulwafu et al., 2017). This is relevant for the South Africa context, as CHWs will help reduce the shortage of hearing health workers in underserved and resource-constrained settings especially with the limited number of audiologists working in public healthcare.

In addition to credibility, screeners should be professional, have good communication skills and able to discuss screening procedures and results with parents and caregivers (HPCSA, 2007; JCIH, 2007; Tennessee Department of Health, 2009) and display a positive attitude toward patients.

Edgar (2015) defines professionalism in the workplace as a set of competencies or virtues that an individual is expected to manifest. Professionalism is defined as adherence to ethical principles, effective interaction with patients and their family/caregivers, effective interaction with other health care professionals, reliability and commitment to independent maintenance and improvement of competence (Wilkinson, Wade & Knock, 2009).

The attitude of health workers, such as screeners, toward their work and patients are important as it affects service delivery (Ogunforwa & Daniel, 2006). An unwelcoming and negative attitude have a direct impact on the patients' well-being, level of satisfaction and care seeking behaviour (Kiguli, Eirapa-Kiracho, Okui, et al., 2009; Mannava, Durrant, Fisher, et al., 2015).

Provider-patient communication is a key element of patient education and used in conjunction with other teaching practices (Marcus, 2014). Verbal and written health information communicated through accurate, timely, complete and clear messages enable patients to participate responsibly in their own care. Well-educated patients and parents are better able to understand and manage their own health and medical care and those of their families' throughout their lives.

Health information

Parents of infants who are screened have the right to receive information in a manner they can understand (JCIH, 2007). Education of mothers/caregivers regarding the risk factors for hearing loss, importance of returning for follow-up appointments, the effect of late-identified hearing loss, and the benefits of early identification and intervention are essential aspects to be communicated to parents. Appropriate educational approaches should take cultural, cognitive and physical differences of patients/caregivers into consideration (Goody & Drago, 2009). Written educational materials disseminated to families should contain accurate information at an appropriate reading level and in the parents' preferred language (JCIH, 2007). The use of alternative instructional aids and methods of delivery that utilize auditory, visual and kinesthetic modalities can be used to supplement verbal education (Behar-Horenstein et al., 2005).

Recordkeeping

Accurate recordkeeping will enhance the ability to evaluate and monitor programmes. Well-coordinated activities such as tracking, reporting and follow-up of children identified with hearing loss will facilitate early identification and intervention (NCHAM, 2012). In South Africa, an integrated health information system to manage data as proposed by the HPCSA (2007) is yet to be developed, thus making the effective and timeous follow-up and referral of infants at risk of a hearing loss nearly impossible. In lieu of an integrated health information system, the recommendation is that the details of a child's progress must be recorded in the Road-to-Health Care booklet to allow for continuity of care as well as to promote effective decision (Joubert & Casoojee, 2013). This patient-retained booklet should be presented to the PHC nurse or health worker at any visit to a health care facility. Recent studies however found that hearing screening results were more often recorded on the clinic-retained records than the patient-retained Road-to-Health Care booklet (Joubert & Casoojee, 2013; Petrocchi-Bartal, 2011). Poor record-keeping practices often hinder effective service delivery (Kanji, 2010) and prevent early diagnosis and intervention for hearing impairment (Olusanya, 2007).

Parents' role and satisfaction

Parents, as primary caregivers, spend most of their time with their children and are therefore integral to the success of EHDI, especially in resource-constrained settings. Knowledge of the signs and symptoms of possible hearing difficulties and other childhood illnesses is important as it equips parents with the ability to identify potential hearing problems early. The British Medical Association (BMA, 2008) defines parental responsibility as the rights, duties, powers, responsibility and authority that most parents have in respect of their children. The right of parents to consent to for example hearing screening on behalf of their children is included.

Health care literature suggests that patient satisfaction is interwoven with the strategic decisions in the health services and should thus be an integral part of the evaluation of assessments of quality of health care services (Alrubaiee & Alkaa'ida, 2011). In their study, patient satisfaction emerged as the dominant and significant determinant of trust confirming the strong evidence for the significant association between healthcare quality, patient

satisfaction and patient trust. Measuring the degree of patient satisfaction can help facilitate service provision and management, as well as increase and maintain the quality of the service provision (Alrubaiee & Alkaa'ida, 2011, p. 104).

Parental satisfaction is one of the key elements to be measured when determining the success of EHDI programmes (JCIH, 2000). Satisfaction is defined as the meeting of expectations and experiencing the clinical procedures that is not far from the expectations (Kravitz, 1996). Measuring and assuring parent satisfaction is important for several reasons. Firstly, patient expectations and satisfaction are true determinations for the care provided (Fidanci, Arslan, & Fidanci, 2014) and mirrors the quality of services offered (Alrubaiee & Alkaa'ida, 2011). Satisfaction is further related to other family outcomes including stress, depression, increased empowerment, and enhanced parent self-efficacy (Summers, Marquis, Turnbull et al., 2005). Parental satisfaction may in addition also have the unanticipated value of identifying children who are less likely to receive age-appropriate preventive care (Schempf, Minkovitz, Strobino et al., 2007).

Different questionnaires have been developed to assess parental satisfaction and views on the NHS programme (Fox & Minchom, 2008; Mazlan, Ting, Mukari & Abdulla, 2014; Swanepoel & Almec, 2008). In a recent study, Mazlan and colleagues (2014) reported that 80% of the parents whose infants' hearing was screened were satisfied with the services offered. Parents were most satisfied with the contents of the information leaflet. Aspects that parents were not satisfied with were the explanations and information provided by the screeners on test procedures (38%) and test results (26%). Similar findings were reported by Fox and Minchom (2008) regarding NHS services in Wales. Parents were satisfied with screening staff but less so with the information provided. Clear differences between women whose babies had a clear response on the initial screening and those who did not, were reported. Women whose babies had 'refer' result after initial screening were less satisfied with the screening programme. They also reported more anxiety after screening than women whose babies passed the screening.

Local research explored maternal views on and knowledge of infant hearing loss, cultural beliefs and attitude towards early intervention in a South African community (Swanepoel & Almec, 2008). The majority of the parents (99%) indicated the desire to have their baby's hearing screened after birth (Swanepoel & Almec, 2008).

Reasons why parents refuse NHS and default on follow-up rescreening was explored (Scheepers, Swanepoel & le Roux, 2014). The most frequent reasons for refusal were related to costs, lack of caregiver knowledge of NHS, health care professionals' knowledge and team collaboration. One in four caregivers defaulted on follow-up because they forgot to bring their infant for a rescreen. Only 48% of the parents who defaulted reported being aware of initial screening.

Research have documented that families vary widely in their adjustment to the child's hearing loss, motivation, affective state, responsiveness to the child and social support (Moeller, 2000). Parents who are involved in early intervention interact better with their children and contribute more to their child's progress. Calderon (2000) found that parents of later-identified children demonstrated lower levels of confidence when compared to children identified earlier. Families' involvement in intervention services buffers the effects of late enrolment as being part of early intervention services provide families with the necessary skills to become actively involved in promoting the linguistic development of the child (Moeller, 2000)

In conclusion, parental satisfaction and parental knowledge of the signs and symptoms of hearing loss as well as EHDI plays a significant role in them agreeing to hearing screening as well as attending follow-up appointments (Schempf et al., 2007). A good relationship between the screeners and parents is imperative for effective EHDI services. Evaluation of EHDI programmes as part of routine healthcare is important to identify loopholes and document progress in hearing improvement opportunities within the programme (Januário, et al., 2015; NCHAM, 2012). Quality assurance is vital for successful newborn and infant hearing screening as well as subsequent intervention (JCIH, 2007).

The study therefore addressed the expressed need for the implementation for NHS programmes in rural, resource-constrained areas of South Africa that provide information on the effectiveness of such a programme in relation to the benchmarks and quality indicators stipulated in the HPCSA (2007).

Chapter 3: Methodology

This chapter commences with an overview of the research aims, design, and various phases of the study followed by an overview of the data collection procedures used to achieve the aims, as well as the ethical considerations. Aspects related to reliability, validity and trustworthiness relevant to this study follows. The chapter concludes with the description of measures used for the analysis of data.

Research Aims

The main aim of this study was to describe the parental/caregiver perspectives regarding the effectiveness of a rural clinic-based NHS programme.

The main aim of the study was realised with the following sub aims:

- To determine the effectiveness of the rural clinic-based NHS programme in terms of meeting national and international benchmarks with regard to specific indicators (including coverage-, referral- and follow-up return rate and parental satisfaction).
- To explore the factors that influence the effectiveness of a rural clinic-based NHS programme as reported by parents/caregivers of infants who underwent hearing screening.

Research design

The research design is fundamental to research and refers to the methods the researcher utilize for collecting evidence that explores the research question (Vogt, Gardner & Haefelle, 2012).

This study employed a parallel convergent mixed method design. In this design, strategies of inquiry are used that involves collecting data either simultaneously or sequentially to best understand the research problem (Creswell, 2014). In a mixed method design quantitative methods are intended to achieve the breadth of understanding while qualitative methods are intended to achieve the depth of understanding (Creswell, 2014). The quantitative component of this study was a descriptive, retrospective record review whilst the

qualitative component comprised semi-structured interviews with the parents/caregivers of infants screened.

Descriptive research involves the description of variables as they occur naturally with no manipulation of variables (Gravetter & Foranzo, 2012). In this study, a retrospective record review of the clinical audiology records of babies who underwent NHS at three PHC clinics in the Elias Motsoaledi Local Municipality (EMLM) district between July 2014 and June 2015 was conducted. This assisted in describing the effectiveness of the rural clinic-based NHS programme in terms of meeting national and international benchmarks. The advantage of conducting a retrospective record review was that it provided a macro view of the problem under study (Bryman, 2012). The disadvantage of quantitative research is that it does not explore the complexity of human experience or perceptions (Rahman, 2017).To this end, a qualitative component was incorporated into the study design.

Qualitative research allows the researcher to access the thoughts and feelings of individuals, which in turn assists the researcher to understand the meaning they assign to their experiences (Sutton & Austin, 2015). Semi-structured interviews were conducted with parents/caregivers of children who underwent hearing screening at any of the three PHC clinics included in the retrospective record review. The interviews, conducted by the researcher, aimed to explore the perspectives of parents/caregivers of babies screened on the effectiveness of a clinic-based NHS programme. Face-to-face interviews take advantage of social cues (such as facial expressions and body language) that provide additional information not available when for example telephonic interviews are conducted or written questionnaires completed (Opdenakker, 2006).

Context

The three PHC clinics included in the study are located in the Moutse area of the EMLM area of the Greater Sekhukhune District, Limpopo Province. Limpopo Province is one of the most rural and poorest provinces in South Africa as the majority of its residents depend on social grants as a means of income (National Developmental Agency [NDA], 2014). Moutse is approximately 180 kilometres (km) from Polokwane and 135 km from Pretoria, the two closest major cities.

The estimated population size is 249 363 and made up of 97.9% African and 2.1% other population groups (Integrated Development Plan [IDP], 2017). The most predominant language spoken is Sepedi (58.6%), followed by isiNdebele (14.9%) and isiZulu (8.8%) (Statistics South Africa, 2014). Fifty-four percent of the residents are female. Individuals between 15-65 years make up the largest proportion of the population (57%), whilst 36% of the population is between 0-14 years and 7% is above 65 years (IDP, 2017; Statistics South Africa, 2014). The majority of the residents have some primary education (45.8%), whereas 35.5% have completed some secondary education and only 0.7% have attended and completed higher education activities (Statistics South Africa, 2014). Residents in the Moutse area has access to health care through mainly public health care services in the form of one district level hospital, three PHC clinics and one private PHC clinic operated by a non-governmental organisation (NGO).

Hearing health services are available at the district hospital (Philadelphia Hospital) where basic hospital-based diagnostic assessments and management (e.g. hearing aid fittings) has been provided since 2005. In January 2014, the University of the Witwatersrand in collaboration with the Ndlovu Care Group (NCG) established free comprehensive community-based audiology services in the village of Elandsdoorn. The objective of this programme is to make hearing health more services accessible to the residents of Moutse. One of the components of the programme is the NHS services offered at the three government-run PHC clinics in Moutse. Three appropriately trained screeners, under the supervision of two audiologists registered with the HPCSA, conduct the hearing screening.

Protocol

The two-stage Ndlovu Wits Audiology (NWA) NHS protocol is outlined in Figure 1. A bilateral pass criteria was adopted. The screening is considered complete if the infant passes the screening or the rescreening and has no risk factors for late onset or progressive hearing loss.

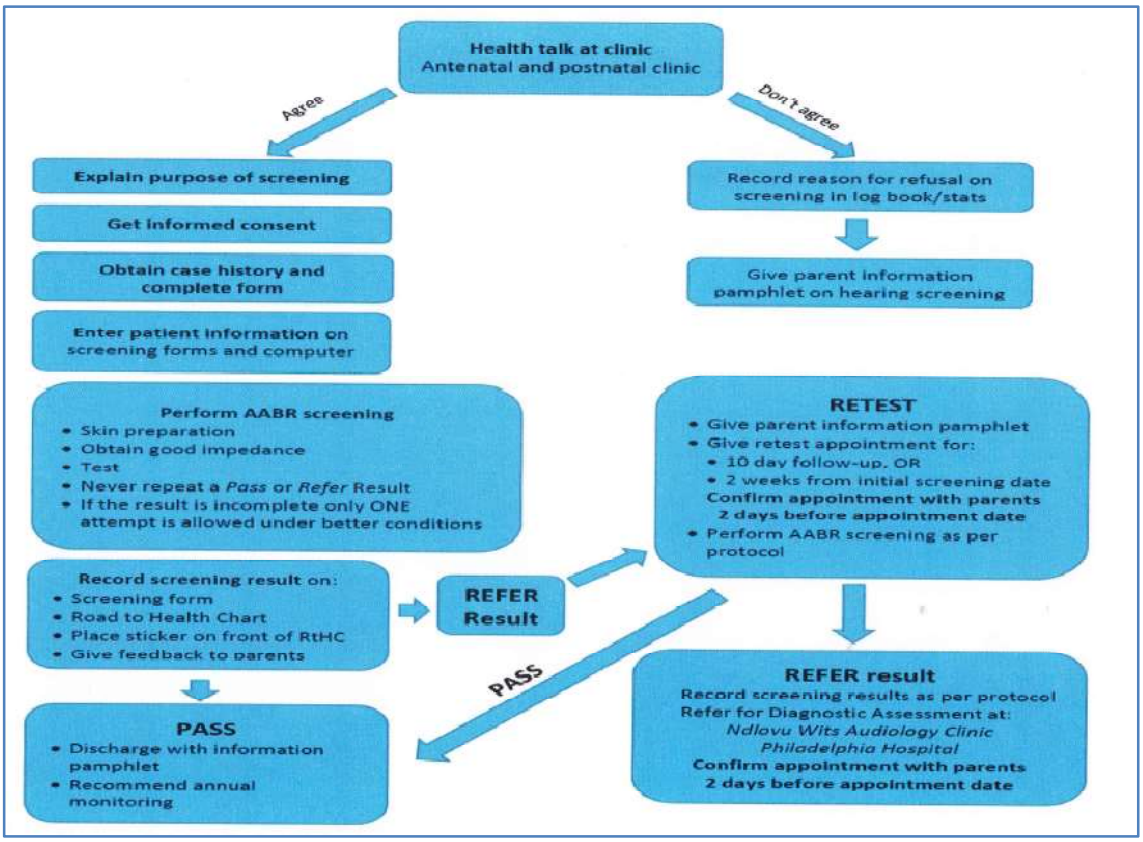

Figure 1 *NWA NHS protocol*

If an infant fails the rescreen (as outlined I Figure 1), a referral for a diagnostic assessment is made. The audiologist would perform OAE testing at the clinic where the initial screening was performed. If the infant pass the OAE test, s/he is discharged and annual monitoring encouraged. If not, s/he is referred for a comprehensive diagnostic assessment at the Ndlovu Medical Centre (NMC). This assessment will include a comprehensive case history, otoscopy, tympanometry (1000Hz probe tone), OAE, behavioural pure tone testing and if indicated frequency specific ABR (JCIH, 2007).

The hearing screening is offered from Monday to Friday from 7h00 to 13h00 at the three clinics. The three PHC clinics are described in terms of population served, number of infants immunized annually, distance to audiology services and cost to access audiology services (Table 2).

Table 2 *Description of PHC clinics*

	Clinic A	Clinic B	Clinic C
Population served (number)	170 778	13 326	31 612
Number of infants immunized between July 2014 to June 2015 (6 weeks)	783	149	515
Distance (in km) from district hospital	0 km	11.2 km	17.8 km
Distance (in km) from community-based audiology services	5 km	5 km	17 km
Average taxi fare (in Rand) one way to district hospital	None	R 20 (2 taxis)	R 20 (2 taxis)
Average taxi fare (in Rand) one way to community-based audiology services	R 10	R 10	R 10

Pilot study

A pilot study was conducted at one PHC clinic (Clinic C) in the Moutse area to evaluate the clarity, comprehensibility and difficulty of the semi-structured interview questions. The pilot study participants met the same criteria as for the main study (Table 5).

Participants

Two parents of infants who were screened at Clinic C were invited to participate in the study and after written informed consent was obtained included in the pilot study. Prior to data collection, the aim of the pilot study as well as their rights was explained. The participants were mothers (aged 25 and 31 year respectively) of infants screened at their 3-day clinic visit.

Procedures

The pilot study commenced after ethical clearance was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand. The same procedures as outlined in the main study were followed.

Recommendations

The participants indicated that the questions were clear and well understood. The interview took between 10 – 15 minutes per participant. No changes were required after the pilot study and these participants were therefore included in the main study.

Participant Selection and Description

Purposive sampling, a non-probability sampling method, was employed for the purpose of the study. Purposive sampling involves the considered choice of participants based on the qualities they have (Etikan, Musa & Alkassim, 2016). For the current study, the participants were parents or caregivers of infants screened at one of the three PHC clinics included in the retrospective record review and thus had experience in the subject matter. The disadvantage of purposive sampling is that it may hamper the researchers' ability to draw inferences about a population (Etikan et al., 2016).

Two participant groups were included in the study. Participant group 1 (n_1) included 2 302 audiological records of all the babies who underwent NHS between July 2014 and June 2015 at the three PHC clinics in the Moutse area. Participant group 2 (n_2) included 18 parents/caregivers of infants who underwent NHS at any one of the three PHC clinics.

Participant group 1: Audiological records

The audiological records included in the study had to meet the criteria outlined in Table 3 to be included in the study.

Table 3 *Selection criteria: Participant group 1*

Inclusion criteria		
Criteria	**Rationale**	**Method**
Complete audiological records	To determine the effectiveness of the programme into NHS benchmarks	Review of hearing screening forms
Signed informed consent form for use of records for research purposes	To ensure that participants are informed about the research study and are participating voluntarily	Consent forms attached to the results form
Underwent NHS between July 2014 and June 2015	Period of record review	Ndlovu Wits Audiology (NWA) logbooks from July 2014-June 2015
Screened by staff employed by the NWA programme	The staff have been trained by NWA audiologists to conduct screening	Signatures on the results form
Exclusion criteria		
Criteria	**Rationale**	**Method**
Incomplete hearing screening records	Incomplete data will skew data analysis	Review the audiological results forms
No signed informed consent form	Unethical to include information if no consent has been provided	Review of hearing screening records

A total of 2 682 records were reviewed. Of these records, 380 records were excluded due to missing information or unsigned informed consent forms. As a result, the final sample included 2 302 records. The majority of infants (93%; *n* = 2 141) across all three clinics were born at hospital (Table 4).

Table 4 *Participant description: Audiological records (n = 2 302)*

		Clinic A ***n = 910***	**Clinic B** ***n = 596***	**Clinic C** ***n = 796***	**Total** ***n = 2 302***
Gender	Male	461	278	397	1 136 (49%)
	Female	445	317	404	1 166 (51%)
Place of birth	Hospital	858	574	709	2 141(93%)
	Clinic	22	16	60	98 (4%)
	Home	30	6	27	63 (3%)

Participant group 2: Parent/caregivers of infants

This participant group included the parents/caregivers of babies who underwent clinic-based NHS at the three PHC clinics. Participants had to meet the selection criteria outlined in Table 5 to be included in the study.

Table 5 *Selection criteria: Participant group 2 (n = 18)*

Inclusion criteria		
Criteria	**Rationale**	**Method**
Parents of infants who underwent hearing screening at the three rural PHC clinics between July 2014 and June 2015	Input of NHS programme aided with the evaluation of NWA program	Hearing screening records were reviewed and parents/caregivers were contacted based on relevancy
Older than 18 years of age	Considered to be competent to independently make decisions	Parents/caregivers' date of birth obtained from the hearing screening records
Gave informed consent to participate in the research	To ensure that the participant knows about the research study and participates voluntarily	Informed consent was obtained prior to data collection
Exclusion criteria		
Criteria	**Rationale**	**Method**
Younger than 18 years of age	Not considered as an adult who can make independent decisions	Parents' date of birth obtained from the hearing screening records

Participant group 2 included 18 mothers/caregivers of babies who underwent screening. This group comprised parents/caregivers of infants who: i) passed the initial screening (n = 5); ii) had 'refer' result after the initial screening (n = 7); and iii) were referred for diagnostic assessment after a rescreen (n = 6). All the participants interviewed were female. The mean age of this participant group was 30 years (21 – 46; ± 7.90). The educational level of the majority of the participants included in this group was low as only 22% (n = 4) had a matric certificate and one parent a post matric qualification.

Measures and equipment

Two data collection forms, a retrospective data compilation form and semi-structured interview questionnaire, were used in the study.

Retrospective data compilation form

The self-developed data compilation form used to capture data from the record reviews (Appendix A) included the following information that was utilised to calculate the coverage rate and referral rates.

- Demographic information (Age, gender and place of birth)
- Clinic statistics (number of postnatal visits at 3 days, 10 days, 6 weeks and >6 weeks at the clinic)
- Hearing screening statistics (number of babies screened at 3 days, 10 days, 6 weeks and >6 weeks at the clinic)
- Hearing screening outcomes (pass, refer, rescreen and refer for diagnostic assessment)

Semi-structured interview schedule

A semi-structured interview schedule with both closed and open-ended questions was employed to achieve the aims of the study (Appendix B). The interview schedule, developed based on previous research (NCHAM, 2015) and the geographic context in which the research was conducted allowed for uniformity in the way questions were posed and thus reducing bias (Clark-Carter, 2010). The low education levels of residents in the Moutse area further necessitated the use of interviews rather than written questionnaires.

The semi-structured interview schedule comprised 28 questions (Table 6).Two audiologists, both with more than 20 years' experience in the field of clinical and community-based audiology, reviewed the items to determine the face- and content validity of the questions. Face validity was also established by conducting a pilot study.

All interviews were audio recorded (digital audio recorder) in order to confirm the accuracy of written notes. It further allowed the researcher to focus on the interview content and the verbal prompts rather than note taking (Jamshed, 2014).

Table 6 *Description of semi-structured interview schedule*

Section	No and type of questions	Description	Rationale
Demographic information	4 Closed-ended	Date of birth (mother and baby) Date and site of screening	To provide information on the participants for inclusion criteria
Oral presentation	4 Closed- & open ended	Questions related to the oral presentation of information on hearing screening (e.g. language used, complexity of the message and participants' understanding of the information)	To determine the parents' perception of the comprehensibility and content of heath talk before screening, as it would help in determining the efficacy of the health education presented orally (Marcus, 2014).
Results	9 Closed- & open ended	Questions related to the manner in which results were shared with the parent or caregiver (e.g. feelings after being told the results; understanding of results and suggested management)	To determine the parents' perception about the way in which results of NHS are shared with them
Written information	5 Closed- & open ended	Questions related to the written information handed to parents following screening (e.g. language of the pamphlet, complexity and understanding and information)	To determine the parents' perception of the pamphlets given after screening To determine the parents' perception of the comprehensibility and content of the pamphlets given after screening. This helps in determining the efficacy of the health education in written format (Marcus, 2014).
Screening personnel	3 Closed- & open ended	Questions related to participants' satisfaction with screening personnel and trustworthiness of the screening results and personnel	To determine the screener-parent rapport as well as parents' perception of the screener's trustworthiness and competency (Edgar, 2015)

Section	No and type of questions	Description	Rationale
Accessibility of hearing screening	3 Closed- & open ended	Questions related to accessing the clinic as well as the allocated space for hearing screening	To assess the parents 'perception on the accessibility of the screening facility in terms of the travelled distance and visibility of the screening room (McLaren et al., 2014).
Comments	2 Closed- & open ended	Positive and negative feedback on the programme and provide suggestions regarding the improvement of the NHS programme	To get parents' overall impression and perception of the programme to determine if there are any loopholes and to document improvement opportunities (Januário et al., 2015).

Data collection Procedures

The Chief Executive Officer of the Ndlovu Care Group (NCG) gave permission for the use of the clinical audiological records of the infants who underwent NHS at NWA clinic (Appendix C).

Ethical clearance was then obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (Appendix D).

The clinical audiological records of the infants who underwent hearing screening at the three clinics were reviewed. Only the records of the infants whose parents/caregivers gave permission for the information to be used for research purposes were included in the study (Appendix E). The relevant information was captured on an Excel spreadsheet and verified for accuracy.

Potential participants for the qualitative component of the study were selected based on their infants' hearing screening results (e.g. pass, 'refer' result on initial screen, and referred for diagnostic assessment). The selected parents were contacted telephonically (Appendix F) and informed of the purpose of the study and invited to participate in the research. If they agreed, an appointment was made for a day, place and time that were most convenient for the participants.

On the day of the interview, participants received a written participant information sheet outlining the purpose of the study and their rights as participants (Appendix G). This information was in additionally also explained verbally in the participants' home language. Only participants that gave written informed consent (Appendix H) and have the interview audio recorded were included in the study (Appendix I).

Upon completion of the interviews, the interviews were transcribed for the purpose of thematic analysis.

Ethical considerations

Research ethics is defined as a method, procedure or perspective for deciding how to act and analyse complex problems and issues (Resnik, 2015). This study adhered to the World Medical Association's Declaration of Helsinki's Principles for Medical Research

Involving Human Participants (World Medical Association [WMA], 2013). The following pertain to the current study:

Ethical clearance

Ethical clearance was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (Appendix D) after permission to conduct the study was granted by the CEO of the Ndlovu Care Group (Appendix C).

Privacy and Confidentiality

Confidentiality is defined as the nondisclosure of certain information except to another authorized person (Guraya, London & Guraya, 2014). Whereas privacy is defined as the right of an individual to make decisions regarding what information is to be shared with and by researcher (Guraya et al., 2014). The relevant personal information was captured on an Excel spreadsheet. Participant numbers were allocated to all the participants in the study and links to the information kept in a separate password-protected document. Identifying information was not recorded on the data collection forms used in the study or included in the reporting of findings.

Informed consent and autonomy

Informed consent involves documentation of the nature of the study and provides participants a choice of voluntary participation especially in studies where people are intentionally recruited (Leedy & Ormrod, 2010).

The parents/caregivers of all infants whose hearing has been screened through the NWA NHS programme are required to give written consent prior to screening which include permission to use the hearing screening results for research purposes should they wish (Appendix E). Only participants who gave written informed consent to be interviewed were included in the study. They were informed of their right to withdraw from the study at any time without any negative consequences.

Bias

Bias is defined as any trend or deviation from the truth in data collection, data analysis, interpretation and publication which can cause false conclusion (Šimundic, 2013, p. 12).

Understanding research bias is important in that it may impact on the validity and reliability of study findings (Smith & Noble, 2014). Bias was minimized by employing a purposive sampling strategy to select participants, conducting an independent review of the audiological records of infants who met the inclusion criteria, and lastly by the researcher (not the screeners) conducting the interviews with the parents/caregivers.

Beneficence and Non-maleficence

Beneficence is the principle of acting with the best interest of the participants in mind, whereas non-maleficence highlights the ethical and legal duty that no harm should be done to others (Beauchamp & Childress, 2008). In this study, participants were not exposed to any harm as the information was collected from the audiological records and through interviews that participants consented to participate in.

Reliability, validity and trustworthiness

Reliability

Reliability is defined as the consistency with which a measuring instrument produces a certain result when the variable being measured has not been changed and whether data collection was conducted under the same circumstances (Leedy & Ormrod, 2010). It is important to confirm reliability as it allows the researcher to summarise and interpret data meaningfully (Creswell, 2003). In this study intra-rater reliability and the Hawthorne effect were applied to minimise reliability threats.

Intra-rater reliability was ensured by rechecking at least 15% of the raw data entered in the excel spreadsheet for accuracy. The researcher further attempted to minimise the Hawthorne effect, or the awareness of being studied and possible impact on behaviour (McCambridge, Witton & Diana, 2014) by reminding participants who were interviewed that there were no correct or incorrect answers to the interview questions.

Validity

Validity is defined as the extent to which the research instruments measure what it sets out to measure (Leedy & Ormrod, 2010). For the purpose of this study, the face-and content validity of the semi-structured interview questions was determined.

Face validity is established when an individual who is an expert on the research subject reviews the instrument and concludes that it measures the characteristic or trait of interest (Patel & Joseph, 2016). Face validity was achieved by having two audiologists, both with more than 20 years' experience in the field of clinical and community-based audiology, reviewed and suggest modifications to the interview questions prior to the pilot study. Content validity or the degree to which the instrument fully assesses or measures the construct of interest was confirmed by conducting a pilot study (Patel & Joseph, 2016).

Trustworthiness

The trustworthiness relates to the degree to which the findings of the study are an accurate reflection of the personal or lived experiences of the participants (Curtin & Fossey, 2007). One of the most important factors in establishing trustworthiness is credibility. Credibility assists to promote confidence in the accuracy and interpretation of data (Shenton, 2004). For the current study, three elements namely triangulation, transferability and dependability was selected to enhance trustworthiness.

Analytical triangulation, in the form of thematic analysis, served to strengthen the confidence in the interpretation of results thus increasing the validity of findings (Shenton, 2004). Transferability and dependability, aimed at the replicability of the study, was achieved with the full disclosure of the research design, research context, participant description and the data collection procedures. Internal validity was achieved through peer examination in which coding of qualitative data was reviewed by an independent rater.

Data analysis

Data were documented on the two data collection tools, encoded according to the data definitions and captured on an Excel spreadsheet. Descriptive statistics, including measures of central tendency (mean) and variability (range and standard deviation) were used to analyse the data (Leedy & Ormrod, 2010). The mean values described the values most typical or representative of the collected data, whilst the measures of variability provided information regarding the extent to which data are clustered together or scattered from the point of central tendency. The mean was used to calculate the average age of infants at screening, as well as coverage-, referral- and follow up return rate in order to achieve objective 1.

Thematic analysis was used for the qualitative component of the research. The main objective of thematic analysis is to extract meaning and includes identifying, examining and recording patterns or themes (Braun & Clarke, 2006; Javadi & Zarea, 2016). This was appropriate for the current study as it assisted in reflecting and clarifying reality. Thematic analysis of the audio recorded structured interviews with the parents comprised six phases (Braun & Clark, 2006). First, the researcher transcribed the participant responses and translated it from the participants' home language into English. A list of codes representing themes was subsequently identified, compiled and coded in hierarchical order that facilitated the data analysis at different levels of specificity. Broad themes were identified from these codes followed by a more detailed analysis that resulted in more defined categories within each theme. Finally, an independent rater confirmed the identified themes.

Chapter 4: Results

The results of the study are presented in this chapter in accordance with the aims of the study. First, the effectiveness of the rural clinic-based NHS programme is described in relation to national and international benchmarks. Second, the factors that influence the effectiveness of the NHS programme as reported by parents whose infants underwent hearing screening are presented.

Effectiveness of rural clinic-based NHS programme in terms of national and international benchmarks

The first sub aim was to determine the effectiveness of the rural clinic-based NHS programme in terms of meeting national and international benchmarks with regard to specific indicators. Benchmarks included in this study were coverage rate, referral rate, and follow-up return rate. Information regarding these benchmarks was obtained from the retrospective record review of screening records.

The average age of infants screened between July 2014 and June 2015 was 112 days (range: 2 – 341; ± 40.26) or 16 weeks (Table 7). The average age of screening during the first six months was 168 days (24 weeks). After a review of the protocol, only infants younger than 6 weeks of age were targeted for screening during the last six months of the review period. The average age at initial screening decreased significantly to 56.88 days (8 weeks).

It is encouraging to note that none of the parents/caregivers refused hearing screening.

Table 7 *Average age (per clinic and for NHS programme)*

		Clinic A ***n***	**Clinic B** ***n***	**Clinic C** ***n***	**Total** ***n* (%)**
N		910	596	796	2 302
Age (in days)	Mean	74.28	178.58	84.93	112
	Range	2 - 179	2 - 301	2 - 341	2 - 341
	±	61.57	80.92	50.29	40.26

The results (coverage rate, referral rate, follow-up return rate) presented in Table 8 are compared to international (JCIH, 2000, 2007) and national (HPCSA, 2007) guidelines.

Table 8 *Achievement of benchmarks*

Benchmarks	Guidelines		NWA NHS Programme			
	JCIH (2000, 2007)	HPCSA (2007)	Clinic A	Clinic B	Clinic C	Overall
Coverage rate	95%	95%	90%	87%	83%	87%
Referral rate	4%	< 5%	8%	5%	6%	7%
Follow-up return rate	> 70%	> 70%	39%	29%	29%	32%
Percentage of infants who fail initial screening and any subsequent rescreening who complete a comprehensive audiological evaluation by 3 months of age	95%	90%	3%	25%	18%	15%

Coverage rate

Coverage rate is the percentage of all infants who complete screening by 1 month of age (coverage rate) (JCIH, 2000) and was calculated using the formula below:

$$\frac{\text{No of infants hearing screened at 3 and 10 days}}{\text{Total no of infants attending 3- and 10-day postnatal clinic}} \times 100$$

The overall coverage rate of the rural clinic-based NHS programme is 87% (Table 8) with clinic A obtaining the highest coverage rate.

Referral rate

The referral rate is the percentage of infants who fail initial and subsequent screening (JCIH, 2000). The referral rate was calculated using the following formula:

$$\frac{\text{No of infants with 'refer' result after rescreen}}{\text{Total no infants screened}} \times 100$$

The overall referral rate for the rural clinic-based NHS programme is 7% with clinic A obtaining the highest referral rate and clinic B the lowest referral rate (Table 8). It is only slightly higher than the national and international benchmarks.

Follow-up return rate

The follow-up return rate is the percentage of infants who failed initial and subsequent rescreening and complete a comprehensive audiological diagnostic evaluation by 3 months of age (JCIH, 2000).

The *follow-up return rate* for this programme was low (32%) with clinic A reporting the highest rate at 39%. The follow-up return rate is significantly lower than the benchmark of >70% (Table 8). The most alarming finding was that only 15% of infants who failed initial and any subsequent rescreening completed a comprehensive audiological assessment by 3 months of age.

The parents had a choice of two referral centres, the NWA clinic at the NMC or Philadelphia Hospital. Of the 53 infants who were referred for diagnostic assessment, 47% (*n* = 25) were assessed at the NMC (Figure 2). Of these infants, 20% (*n* = 5) passed OAE testing and were thus discharged. Only one infant was diagnosed with a bilateral sensori-neural hearing loss during the review period. As the family relocated, no amplification devices were provided by NWA. The child was referred to an academic hospital and was enrolled in an intervention programme. The rest of the infants (*n* = 17) did not return for further testing.

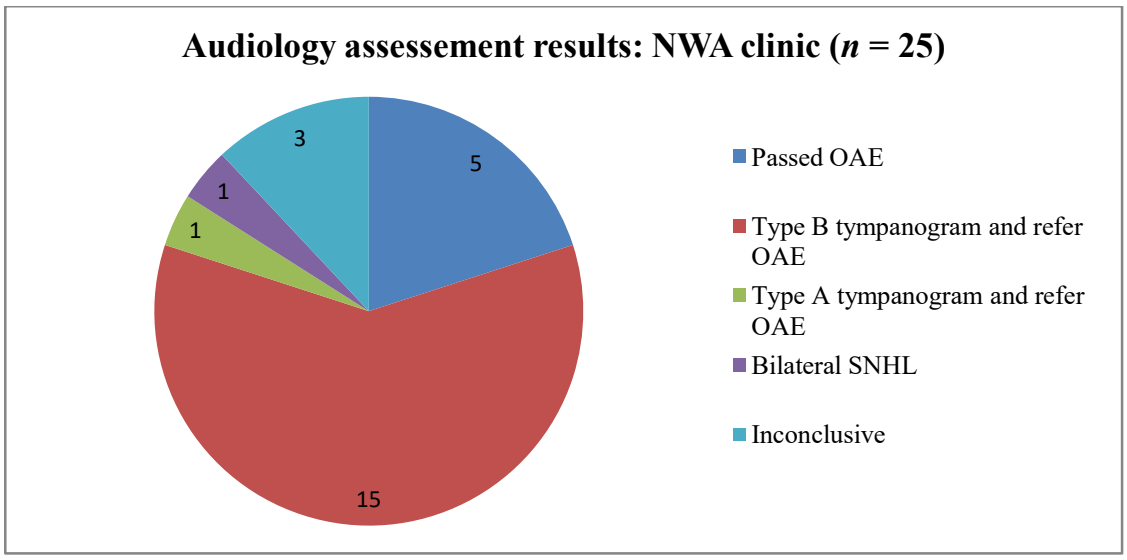

Figure 2 *Audiology assessment results: NWA clinic*

Fifty-three percent (*n* = 28) of the infants attended diagnostic audiology services at Philadelphia Hospital where only otoscopy and tympanometry was performed. Normal

otoscopy and Type A tympanograms was reported in 89% (n = 28) of the cases and Type B tympanograms in the remainder of the cases.

The overall prevalence rate for significant sensori-neural hearing loss was 0.4/1000 and 7.8/1000 for middle ear effusion.

Factors that influence the effectiveness of the rural clinic-based NHS programme

The second sub-aim was to explore the factors that influence the effectiveness of the rural clinic-based NHS programme. Information regarding the factors that influence the effectiveness of a rural clinic-based NHS programme was obtained from the face-to-face interviews conducted with 18 parents/caregivers of infants who underwent hearing screening.

Four primary themes emerged following the coding of responses namely satisfaction with the services, parental empowerment, accessibility and defaulter reasons.

Satisfaction with the NHS services

Parental satisfaction is one of the indicators of the success of a NHS programme (JCIH, 2000). The first theme was the satisfaction participants expressed with the screening programme in terms of the credibility of the screening programme, credibility of screener, communication of information and logistics (Table 9).

Table 9 *Theme 1: Satisfaction with services*

Sub category 1: Credibility of the screening programme	
Code	**Participant responses**
Reputable employer	P17: "…because she gave me the confidence that she was sent by Ndlovu"
Location of the NHS programme within the PHC clinic	P7: "…I trust her because she was at the clinic"

Sub category 2: Credibility of the screener	
Code	**Participant responses**
Positive community feedback	P10: "I have never heard anyone complaining about her"
Assurance of screener's perceived skills, experience and knowledge	P 9: "I trust her because she was able to see that the baby's ear had a problem. Even when I went to the doctor, the doctor said the same thing as what the screener said' P 6: "She handled the baby's head well, she didn't move her (baby) head in a hostile manner" P10: "…the thing is, she gives us enough time, she is patient." P8: "Yes, I trust them (results) because she is a professional and knows about checking ears"
Sub category 3: Communication of information	
Code	**Participant responses**
Clear communication of hearing screening results	P18: "She didn't tell me a lot of things, she just explained and told me about ears" P11: "She is patient that sister, she explains until you understand…"
Communication in parents' home language	P11: "Have you ever been in a situation where someone is explaining something and you just understand them?"
Sub category 4: Logistics	
Code	**Participant responses**
Queue management	P16: "…others will go there where they check ears, others stay at the waiting area and then when they come back, others can go there."

All the parents indicated that they were satisfied with the screening programme. They highlighted that the availability of screening services at the local PHC clinic contributed to the credibility of the screening programme. The fact that the screener is employed by a reputable and established NGO further strengthened the credibility of the programme and the screener. All the participants indicated that they trusted the screeners' skills and commented on their professional attitude.

Hearing screeners are required to communicate effectively with parents/caregivers. Good communication is pivotal as clear and accurate messages allow parents/caregivers to

understand and manage the health of their children (Marcus, 2014). The protocol of NWA clinic-based NHS programme is that patient education should be provided prior to, during and after screening. A health talk on the risk factors for hearing loss and importance of hearing screening is given to all mothers in the clinic waiting area prior to screening. The majority of participants (94%) indicated that they received a health talk before their babies were screened and they were satisfied with the manner in which it was done. They expressed appreciation that the health talk was in their native language and thus easily understood. Only one participant (participant 7) indicated that the oral presentation was done in English with someone translating to Sepedi. This participant perceived the health talk to be too long and with a lot of information.

The communication of hearing screening results is the most important aspect of hearing screening. Most participants (n =16) were satisfied with the way in which the results were conveyed. Participant 11 stated, "She is patient that sister, she explains until you understand". This was confirmed by participant 14, who indicated "…she explained well that the child had no problem. She said if there was a problem, she was going to tell me immediately that I should go for further testing". Two participants indicated that they were not satisfied with the way in which the results conveyed to them. Participant 4 was uncertain of the credibility of the results as her baby "…constantly moved, it didn't come out clearly but she doesn't have a problem". Similarly participant 7 reported, "They didn't explain to me, the time I took the baby to the clinic, they didn't tell me about the results of the baby" However when probed further she said, "They said there's no problem but I must come back."

Following screening, all parents/caregivers are provided with information leaflets outlining the results and recommendations based on the outcome of the screening. When questioned, the majority of participants (n = 10) indicated that they did not remember receiving any written information, whilst six participants were not sure. Only two participants confirmed that they received information leaflets.

Parental empowerment

Is it important to educate parents on hearing screening, communication development and if hearing loss is suspected, what the different options available are for the confirmation and management. Information on the screening procedures, risk factors for hearing loss and

information regarding follow-up procedures were reported as positive aspects of the programme (Table 10).

Parents indicated that they became aware of the importance of NHS and the benefits of early identification (Participant 9) and monitoring of developmental milestones (Participant 3). Twelve participants indicated that they received verbal information, support and guidance on how to access the diagnostic audiology services (at the nearby NGO or hospital) to confirm the hearing status of their babies (Participants 9, 15 and 17).

Table 10 *Theme 2: Parental empowerment*

Code	Participant responses
Screening procedures	P18: "I saw the way that thing (machine) was checking, I was looking at the machine" P2: "…she explained that they check the babies' ears, they check the baby's ears while still young is important and then so that if there's a problem with the ears, there's a possibility that they can help us; help the child with the ears."
Awareness of risk factors for hearing loss	P10: "They say I must observe the baby to see if s/he can hear" P7: "I didn't see the child scratching his ears or crying and scratching or holding one side to show that she's feeling pain" P3: "…I saw that it is very important to check the baby's ears. I realized that it is a good thing because you might stay with a child who has problems with her ears and not know" P9: "So for us to take our babies for ear check-up, it is to reduce that thing of finding out when your baby is old that s/he has ear problems. That's how they explained and I agreed that they must check my baby's ears"

Code	Participant responses

Awareness of follow-up procedures (referral)	P14: "That sister explained that we should no longer come to the clinic because the baby is older, we should rather go to Tempelman"
	P5: "She said that when I come again I must go straight there to Ndlovu"
	P15: "She wrote a letter stating that I must go to Tempelman, she explained where it is and anytime I can go".

Accessibility of services

The participants were questioned regarding the accessibility of the screening services. The most important aspects that affected accessibility were travel distance and cost, and lack of visible signage (Table 11). The majority (n = 12) indicated that the clinic is easily accessible as it is within walking distance. The remainder of the participants (n = 6) who indicated that they made use of a taxi to get to their preferred clinic.

The ease of finding the office within the clinic where the screening is performed was probed in the interview. Most participants (n = 12) indicated that the office was easy to find once they were given verbal directions. Participants highlighted the need for signage within the clinic in the form of posters advertising the service and directions to the office.

Table 11 *Theme 3: Accessibility to services*

Code	Participant responses
Challenges: Money and transport	P17: "…I only returned her now after I found a job."
	P6: "It is distance but we walk. With transport we must pay so we just walk for our children's health. We walk for our children because we don't have money"
Poor visibility of screening office	P6: "It's difficult... we think that the other side is for pregnant women only. You must first ask where is the place"
	P9: "It is not easy but that sister walks around and then she comes and calls us to take us with her"

Code	Participant responses

	P11: “I didn’t know until that sister came to us and asked us where in the clinic are we going, have we had our babies’ears checked?”
	P12: “There’s no direction to show you, as long as they didn’t come, you won’t know that they check babies’ ears in there.”

All the participants indicated that it would be beneficial to expand the NHS to other PHC clinics in the Province.

Reasons for defaulting

The fourth theme identified was the parents’ reasons for not returning for follow-up appointments (Table 12). A total of six participants who were advised to return for diagnostic assessment did not follow through. The most significant reason provided by parents was the presence of other medical conditions (Paticipant 13), forgetting the appointment (Participant 14), travel distance and cost. Participant 17 relocated (37 kms from the nearest referral centre) and could not afford to return for follow-up services.

Table 12 *Theme 4: Reason for defaulting*

Code	**Participant responses**
Other health priorities	P13: “I didn’t manage to go there because I was waiting for them to do a heart operation on the child, so they did it in April”
Forgetfulness	P14 : “Her mother is lazy, yesterday when I asked her she said she forgot’
Travel distance and cost	P17: “The reason why I didn’t take her is because I’m married, I was staying with my in-laws, so I left and I took her with me to my in-laws. I only returned her now after I found a job.”

The key findings of this study are that overall the parents reported that the NHS programme was effective as it achieved the aim of confirming the hearing status of infants. The credibility of the programme and the hearing screening staff was confirmed. The

importance of providing patient education and information in the home language of patients was reiterated. The most significant barriers to follow-up services as reported by participants were access, with distance to the clinic, travelling costs, and parents forgetting the appointments. During the review period and within the first 12 months of the implementation of this rural clinic-based NHS programme, the overall coverage rate was 87% and the referral rate 7%. The follow-up return rate was low at 32% and only 15% of infants who failed the initial screening and any subsequent rescreening completed a comprehensive audiological evaluation by 3 months of age.

Chapter 5: Discussion

This chapter provides a critical discussion of the results in accordance with the sub-aims of the study and relates these findings to the literature.

Effectiveness of rural clinic-based NHS programme in terms of national and international benchmarks

The record review was conducted to describe the effectiveness of the NHS programme in rural three PHC clinics in comparison to national (HPCSA, 2007) and international (JCIH, 2007) benchmarks.

Average age at screening

The average age of infants screened during the 12-month review period was 112 days (range; 2 – 341; ± 40.26) or 16 weeks. The average age of screening during the first six months was 168 days (or 24 weeks) and the last six month of the review period, 56.88 days (8 weeks). The high average age is attributed to the initial NHS protocol, which during the first six months after implementation, stipulated that babies up to 12 months could be screened. As this was a new service offered at the three clinics, parents were keen to bring their babies for screening regardless of age. The HPCSA's principle of screening as soon as possible after birth, but before 3 months of age (HPCSA, 2007) was achieved during the last six months of the review period.

Coverage rate

The HPCSA (2007) guidelines stipulate that within six months of NHS initiation, programmes should achieve a 95% coverage rate. The coverage rate of the current programme was 87%. The coverage rate for the 3- and 10-day post-natal visit was higher than for the 6 week immunisation visits at all the clinics. This could be attributed to the fact that during this period, the majority of infants were screened at the 3- or 10-day postnatal visit. Although the benchmark was not achieved, this coverage rate is still significantly higher than those reported for other South African NHS programmes. A community-based universal infant hearing screening program in the Western Cape Metropolitan area reported a 32.4% coverage rate over a 19-month research period for infants aged 0- 14 weeks (Friderichs, Swanepoel & Hall, 2012). A hospital based NHS programme within a private hospital in

Gauteng, only achieved a 75% coverage rate during initial 22 months, which decreased to 20% during the last 26 months of the review period. The higher coverage rate achieved during the initial period, was when the NHS service was part of the hospital-subsidized birthing package and parents thus did not have to pay for the service (Swanepoel, Ebrahim, Joseph et al., 2007). The free NHS services offered as part of the clinic-based programme included in the current study is postulated to contribute to the higher coverage rate achieved. This is encouraging as clinic-based NHS programmes, in this context can be successful and feasible (Olusanya & Okolo, 2006; Swanepoel et al., 2006; WHO, 2010a) especially as the immunisation coverage rate in the Limpopo Province is the fourth highest in the country (Statistics SA, 2017).

Referral rate

The overall referral rate (7%) reported for the current study, is slightly higher than the national (<5%) and international (<4%) benchmarks. The overall referral rate achieved at a South African hospital-based NHS (well-baby nursery) programme, during a four-year review period, was 11%. This rate decreased to 5% in year 4 (Swanepoel et al, 2007). The overall first screen referral rate was 9.5% in the community-based universal infant hearing screening programme in the Western Cape Metropolitan area (Friderichs et al., 2012).

Some of the factors that may have contributed to the referral rate in the current study are the state of consciousness of the baby and the presence of middle pathology. The infants' state of consciousness influences the time to complete the assessment (Almeida et al., 2014). Shorter test times are reported if infants are in stage one (e.g. deep sleep, no movement, regular breathing). The baby should thus be resting quietly in a bassinette and if needed may be held (American Speech-Language-Hearing Association [ASHA], 2013). With an average age of 112 days, it is possible that the babies included in the current study were more restless, thus affecting reliability of the results.

A significant number of infants who returned for diagnostic assessment (33%, n = 18) presented with type B tympanograms. The prevalence of otitis media in children (0-3 years) in the EMLM area is 1.06% and 2.48% in the general population of the EMLM area (Pullen, 2015). This rate is significantly lower than the rates reported in other developing countries such as Brazil (6.8%), Vietnam (5-7.8%) and India (6%) (Beria, Raymann, Gigante et al., 2007).

Follow-up return rate

It is evident that the follow-up return rate reported for the current study (32%) was significantly lower than the national benchmark of >70%. Similar rates were reported in other NHS programmes is South Africa (de Kock et al., 2016; Swanepoel et al., 2006) and whilst others reported an average follow-up rate for rescreens at clinic level of 85.1% and for initial diagnostic assessments at hospital level, 91.8% (Friderichs et al., 2012). Scheepers and colleagues (2014) reported loss to follow-up rate of 56% in another South African study.

When parents in the current study were probed on the reasons for not bringing their children for rescreening or diagnostic assessments, distance to the clinic/hospital, cost, forgetfulness and parental intuition was reported most often. Scheepers et al (2014) reported that 24% of caregivers forgot about the appointment, whilst a further 32% believed that the follow-up appointment was not necessary. Participant 10 did not attend the follow-up appointment, she stated "*It was not important for me to go there because my child can hear. Then I decided to just stay at home*". Research has shown that parental intuition or concern plays a role in early detection of hearing loss (Meyer & Swanepoel, 2011).

Parental views on factors that influence the effectiveness of the rural clinic-based NHS programme

Parental perspectives regarding the effectiveness of the NHS screening programme indicated that the credibility of the programme and the screeners, clear communication of information, parental empowerment and accessibility to services positively contributed to the effectiveness of the programme. Accessibility was however also reported to negatively affecting effectiveness of the screening services due to travel distance and visibility of signage.

Credibility of programme

The parents included in the current study confirmed the credibility of the programme and the screeners. This trust in the NHS programme stems from itslocation within the PHC clinicand employer-based trust. The NGO that employs the screeners make significant contributions to overall quality of life of individuals residing in the EMLM area, especially the lives of individuals and their families affected by the HIV pandemic. The positive reputation of the employer successfully translated into trust in the NHS services. The clinic-

based platform was facilitated by the strong partnership with the provincial health staff at the PHC clinic. This private-public partnership can serve as a successful model for the implementation of UNHS screening in resource-constrained settings. In this clinic-based programme, the equipment and staff required is funded by the NGO whilst the PHC clinic provide the facility, where the services are offered.

Credibility of the screeners

The social competence of healthcare workers are very important in a patient-provider relationship (HPCSA, 2007; JCIH, 2007; Marcus, 2014; Mroczek, Zarek, Rudnicki et al., 2016; Tennessee Department of Health, 2009). All participants in the study confirmed the credibility of the screeners. The professional manner in which the screeners interacted with parents was highlighted. Research confirms that the welcoming nature of healthcare workers and positive attitudes have a direct impact on patients' level of satisfaction (Kiguli et al., 2009; Wilkinson et al., 2009). In addition to the screeners' interaction with the parents the infant handling skills and patience with the infants who were restless was appreciated by the parents. Participants 4 and 6 both commented on the positive traits displayed by the screeners.

Trust is an indispensable feature of the patient-provide relationship (Mechanic, 1998) as patients with high trust in their healthcare providers are more likely to seek care in a timely manner as well as to adhere to treatment recommendations (Thom, Hall & Pawlson, 2004). The findings of the current study confirm that well-trained CHWs play a vital role in the provision of basic community-orientated hearing health-care services (Mulwafu et al., 2017; Olusanya et al., 2008).

Participants commented on the level of support and guidance provided by the screeners. The majority of participants (n = 12) indicated that they were given directions as to the 'next steps' after refer results was obtained. The screeners explained the procedures to be followed for diagnostic assessment. Research confirms that it is important to empower and engage parents as partners in the screening and diagnostic process as this will increase parental satisfaction (Madell, 2015).

Communication with parents

The majority of participants in the current study confirmed the ability of the screeners to provide health education and discuss the screening results and recommendations with parents in an unambiguous manner and in the participants' home language (Marcus, 2014; Mroczek, Zarek, Rudnicki et al., 2016; Tennessee Department of Health, 2009).. ASHA (2004) emphasizes that it is important to provide oral information regarding NHS before the screening commences in the parents' preferred language. The communication of the screening results by the screeners in the current study adhered to the ASHA (2004) guidelines and best practice principles (Best tests, 2014). Patients should be encouraged to ask questions as encouraging questions has the potential to enable shared decision making between patients and healthcare workers (Judson, Detsky & Press, 2013). In addition, this may improve patient satisfaction, adherence and receiving care in keeping with their values and preferences (Légaré & Witteman, 2013).

Parents' education levels should be considered when developing written health information material, especially in this rural context. All educational material disseminated to parents should provide accurate information at an appropriate reading level and in a language that parents are able to comprehend (JCIH, 2007). The overwhelming majority of participants in the current did not remember receiving written information leaflets (topics included typical listening behaviours, why their baby had refer results and the importance of hearing screening). These information leaflets should be reviewed to ensure that it is at an appropriate readability level with more pictures (Behar-Horenstein et al., 2005; Rouse & Hallback; 2011). Interestingly, adult patients listed speaking with an expert as their preferred educational method as verbal communication reduce the anxiety encountered by the parents' inability to read and understand written health information leaflets (Marcus, 2014).

Accessibility

Accessibility was reported as both positive and negative factors in the effectiveness of the NHS services. Although the majority of participants lived within walking distance of the clinic, a strong relationship between distance to health facilities and the follow-up return rates were found in the current study. Participants, who lived far from the available diagnostic audiology services, were unable to access the resources due to travel distance and cost (Mwasi, 2010). McLaren et al (2014) reported that individuals who live 5 kms from the

nearest clinic are only half as likely to access treatment when compared to those living next to the facility. Transport cost can be decreased by scheduling follow-up appointments to coincide with the subsequent clinic visits to increase the follow-up return rates.

The visibility of the NHS office within the PHC clinic was indicated as a barrier to access as the signage (directions to the office) was not clearly visible. It was reported that the screeners at the clinics directed them verbally to where the screening is being conducted. Secondly, one other parent mentioned that the nurse at the clinic directed her. This lack of wayfinding systems may interrupt staff engged in other activities (Gehshan, 2011). The development of relevant high contrast signage (e.g. human body or body parts performing a specific actions) as proposed by Hashim et al. (2014) would possibly be more appropriate. The signage must however be presented to individuals from the community with a range of ages and literacy levels to confirm the appropriateness thereof. The signage system must comply with the primary function of directing the patient to the relevant areas and it is suggested to be in English and Sepedi as the African language most often spoken in this community (Statistics South Africa, 2014).

The implementation of NHS in rural PHC clinics has its challenges and the context-specific issues identified by the participants can serve as a guide to programme managers for successful NHS services.

Proposed programme evaluation framework

Monitoring and evaluation provide information regarding the services provided, how it is performing and whether it is achieving its aims and objectives as well as guidance on future activities (WHO, 2018b). The WHO (2018b) define monitoring as:

> the regular collection of information about all project activities. It shows whether things are going to plan and helps project managers to identify and solve problems quickly. It keeps track of project inputs and outputs such as activities, reporting and documentation, finances and budgets, and supplies and equipment. (p. 1).

Evaluation is the periodic, retrospective assessment of a programme. Evaluations keep track of key outcomes and impacts related to the different programme components, assessing whether the objectives, aims and goals are being achieved (WHO, 2008b). The evaluation

might be conducted internally (project staff, peer workers and stakeholders) or by external independent evaluators at specific times during the programme, with a baseline evaluation near to the beginning of the programme (e.g. six months post implementation). The intervals between further evaluations are usually between two and three years (WHO, 2018b). The benefit of internal personnel conducting the evaluation is that it provides a sense of ownership.

No guidelines are currently available for the monitoring and evaluation of EHDI programmes in South Africa. As an outcome of the current study, an overarching framework for programme evaluation was developed. The framework is guided by the JCIH (2007) guidelines and a model proposed by Alrubaiee and Alkaa'ida (2011). Quality healthcare is a multi-dimensional construct consisting of five components including tangibles, reliability, responsiveness, empathy and assurance.

The three main dimensions are the structure of the programme, the processes and the outcomes of the programme (Figure 3). The structure of the programme comprise; i) service accessibility (screening platform, location of the service); and ii) tangibles (appearance of physical facilities, equipment, personnel, and health information materials) (Alrubaiee & Alkaa'ida, 2011). It is recommended that appropriate governance structures, referral pathways and strategic partnerships be in place before the programme commence (Public Health England, 2018).

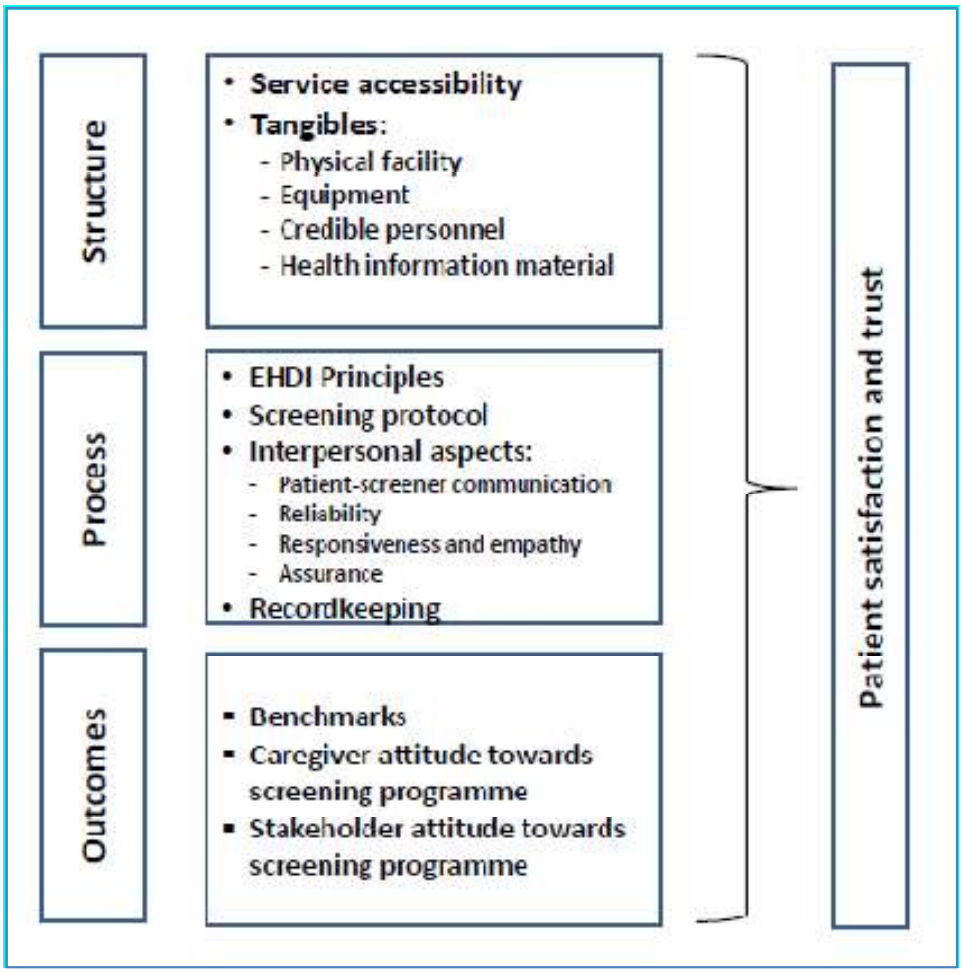

Figure 3 *Programme evaluation framework*

The second dimension, process, include a contextually relevant screening protocol that is aligned to the EHDI principles (JCIH, 2000; HPCSA, 2007). Programmes should however not only be evaluated on the technical aspects of the care but also the competence of providers and the interpersonal aspects of care (Lim, Tang & Jackson, 1999) as satisfaction with care received has been found to affect the health outcomes (Crow, Gage, Hampson et al., 2002).

Interpersonal care involves the humane aspect of care and the socio-psychological relationships between the patient and the healthcare providers. Patient-screener communication involves the explanations of results and treatment, and the availability of information (Lim et al., 1999). Alrubaiee and Alkaa'ida (2011) describes reliability as the ability to perform the promised service dependably and accurately whilst responsiveness is the willingness of staff to help patients, and provide prompt service. Empathy, is described as

providing caring, individualised attention provided to patients (Alrubaiee & Alkaa'ida, 2011). The last aspect in the process dimension is assurance, is the knowledge and courtesy of employees and their ability to convey trust and confidence.

The last dimension, outcomes, include achievement of benchmarks as well as the caregiver/parental and stakeholder attitude toward the screening programme. The evaluation of the achievements of benchmarks as outlined by the HPCSA (2007) is essential. Another key element in determining the success of EHDI programmes is attitude of parents toward the programme. Different tools are available to assess parental satisfaction and views on the NHS programme (Fox & Minchom, 2008; Mazlan, Ting, Mukari & Abdulla, 2014). Stakeholder attitudes should also be explored. The attitude of stakeholders, including screening personnel and healthcare workers at the facility (nursing staff, facility manager, etc) is also required to obtain a comprehensive view of the programme. Contextually relevant tools (e.g. questionnaires) should be developed to accurately determine the attitudes of stakeholders toward the screening programme.

It is postulated that with all three dimensions in place, patient- and stakeholder satisfaction with services will be enhanced.

Chapter 6: Conclusion

In this chapter, a holistic overview of the study is provided by highlighting the main findings of the study and its implications for the implementation of clinic-based NHS in rural areas of South Africa. A critical reflection of the study is included and the chapter concludes with the clinical implications, and recommendations for future research.

Summary of main findings

The main aim of the study was to describe the parental perspectives regarding the effectiveness of a rural clinic-based NHS programme. Overall, the parents reported that the NHS programme was effective as it achieved the aim of confirming the hearing status of infants. The credibility of the programme and the hearing screening staff was confirmed. The importance of providing patient education and information (verbal an written format) in the home language of patients was reiterated. The most important barriers to follow-up services were access, with distance to the clinic and travelling costs, as well as parents forgetting the appointments, reported.

The retrospective record review supported the view of parents regarding the effectiveness of NHS programme, despite the programme not meeting the national benchmarks as outlined by the HPCSA (2007). The results of the retrospective record review revealed that the mean age of the infants screened during the review period was 112 days. The overall coverage rate was 87% and the referral rate, 7%. These achievements are very close the national benchmarks of 95% and <5% respectively indicating that clinic-based NHS can be successfully and sustainably implemented. The overall follow-up return rate of 32% was however significantly lower than the 70% benchmark. Of most concern is that only 15% the infants who failed both the initial and rescreening underwent comprehensive diagnostic assessment to confirm their hearing status.

Critical evaluation of the study

Strengths of the study

This was the first study exploring the effectiveness of a NHS screening programme implemented in a rural community in South Africa. An attempt was made to evaluate the

programme holistically by including the perspectives of parents/caregivers of infants who underwent screening at clinics.

The credibility and validity of the results obtained during the current study had been increased by data triangulation within the research design and included both record reviews and face-to-face interviews with parents/caregivers.

The large sample size included in the retrospective record review allowed for accurate evaluation of this rural clinic-based NHS screening against national and international benchmarks.

Limitations of the study

The review period was restricted to 12 months after implementation, before the amended guidelines for the specific programme were implemented. Extending the review period to at least 24 months post implementation would have led to vastly different findings and provided information on the growth of the programme.

The findings of the study, specifically the retrospective record review, cannot be generalised to other rural contexts and NHS programmes. The parental perceptions of the programme however provide valuable information on how accessibility to the services can be improved.

Although all efforts were made to minimise the Hawthorne effect, the fact that the researcher, who is known in the community, conducted the interviews might have affected parents' responsiveness to questions.

The fact that a standardised questionnaire was not used in the study, may have limited the information obtained in relation to service quality and thus the generalisability of findings to other contexts.

The evaluation of the programme did not obtain the views of the screening personnel or the other health care workers employed in the PHC clinics where the NHS services are based.

Implications

The results have yielded important implications for the implementation of effective clinic-based NHS programme in South Africa.

Programme implications

It is evident that the current NHS programme can be improved in terms of the national benchmarks as outlined by the HPCSA (2007). Suggestions for the improvement of the specifically the follow-up return rate, include the utilising message systems (e.g. SMS, telephone calls) reminding parents of follow-up appointments; and the availability of mobile diagnostic audiology services at clinics to decrease transport costs.

To facilitate patient understanding of information shared with parents, the written information provided to parents should be evaluated in terms of quality and readability, especially with the high literacy rate reported in the Limpopo Province. Parents should further be encouraged by the screeners to ask clarity-seeking questions before, during and after the screening session.

Visibility of the programme in the clinic should be increased by adding more signage, and information on the programme in the waiting area of the clinics.

Routine evaluation of the programme is essential to ensure that systems are put in place and benchmarks are met.

Policy implications

As this study proved, clinic-based NHS is feasible in South Africa. This successful, contextually relevant programme is guided by clear protocols developed based on the HPCSA (2007) and JCIH (2007) EHDI guidelines. This programme serves as a good example of the success of public-private partnerships in NHS in South Africa.

Recommendations for future research

The results revealed a number of interesting trends. The following suggestions for future research would contribute to research in the field of EHDI and improvement of NHS in South Africa.

The study can be replicated and expanded by evaluating the effectiveness of this rural clinic-based NHS programme over a four-year period (2014 – 2018) to determine whether there was an improvement in the effectiveness with regards to meeting national and international benchmarks, specifically in reference to the follow-up return rate.

Further studies could evaluate NHS programmes more holistically by also exploring the perspectives of health care workers and screening personnel on the effectiveness of the NHS programmes.

Studies indicated that there is a difference in service quality perceptions between individuals, so measures developed in one culture or for one context may not always work in other cultures or contexts. Due to differences in response styles and interpretation of items or questions, not all measures of service quality and satisfaction are thus equivalent across cultures and contexts. The development of comprehensive, context-specific evaluation tools for South African NHS programmes (across the three different platforms) is recommended.

Studies to develop and evaluate signage as well as written health information material for NHS screening that are appropriate for a range of ages, languages and literacy levels is recommened.

Conclusion

This study has provided evidence of the feasibility of clinic-based NHS at PHC clinics in underserved and -resourced rural areas of South Africa. The facilitators and barriers identified by parents/caregivers provide signposts for improvement of access to services. Most significant though is the value of public-private partnerships in making NHS available to all residents of South Africa, especially in the current resource constraint public health environment. The need to establish EHDI as a national priority cannot be over emphasized.

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Appendices

Appendix A: Data compilation form

Name of clinic: _____

	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Total
No of babies screened													
No of first screens - 3 days													
No of first screens - 10 days													
No of first screens - 6 weeks immunisation													
No of first screens - older (> 6 weeks)													
No of babies with refer result after first screen (in %)													
No of rescreens													
No of babies with refer result after rescreen (in %)													
No of mothers who refused screening (in %)													
No of babies attending (3 day and 10 day) post-natal services at the CLINIC													
No of babies attending the 6-week immunisation services at the CLINIC													
No of children 0 - 1 year attending services at the CLINIC													
Coverage rate - 3 and 10 days													
Coverage rate: 6 weeks immunization													
Coverage rate - > 6 weeks													

Appendix B: Semi-structured interview schedule

Participant no: _____

Recently your baby was screened for hearing at the clinic. We would like to know what you think about the newborn hearing screening program. Please answer the questions that apply to you. There is no wrong or right answer because the best answer is the one that tells us how you feel. Your answers will be kept confidential. Thank you for your help.

BIOGRAPHIC INFORMATION

Baby's date of birth: _____

Baby's date of screening: _____

Clinics were baby was screened: _____

Mother's date of birth: _____

ORAL PRESENTATION

1. Before your baby was screened, was there a health talk given which explained newborn hearing screening?
    a) Yes
    b) No
2. Was it in your native language?
    a) Yes
    b) No
3. In what language was the health talk presented? _____

4. Were you able to understand the health talk?
    a) Yes
        i. Was the information presented too simple?
        ii. Was the presented information enough?
    b) No
        i. Was the information presented too complex?

Please elaborate _____

5. In your opinion, was the information presented :
    a) Too much?
    b) Enough
    c) Too little?

Please elaborate on your answer:

_____

_____

RESULTS

1. Who first told you about the hearing screening results of your baby?

    _____

2. What were the results of your baby's hearing screening?

    _____

3. Do you trust the results?
    a) Yes
    b) No

    Please elaborate on your answer:

    _____

    _____

4. Did you have any questions after your baby's hearing was screened, did you have any questions?
    a) Yes.
        If yes, how well did the screener answer your question?

        _____

        _____

    b) No

5. When you learned that you baby needed further hearing testing, did you know what you were supposed to do next?
    a) Yes
    b) No

    Please elaborate more on your answer (a or b):

    _____

    _____

6. How did you feel when you were told your baby needed more hearing tests?

   _____

   _____

7. Were you able to go for those hearing tests?
   a) Yes
   b) No (skip to question 8)

8. Tell us about your experience in getting these tests

   _____

   _____

   _____

9. Please tell us why you didn't go for the recommended hearing tests

   _____

   _____

   _____

WRITTEN INFORMATION

1. After your baby was screened, were you given any written information related to newborn hearing screening after the test?
   a) Yes
   b) No (skip to the screening personnel section)
2. Was it in your native language?
   a) Yes
   b) No
3. In what language was the written material? _____
4. Were you able to understand the information on the pamphlet/leaflet?
   a) Yes
      i. Was the information presented too simple?
      ii. Was the presented information enough?
   b) No
      i. Was the information presented too complex?

Please elaborate _____

5. In your opinion, was the information on the pamphlet/leaflet :
   d) Too much?
   e) Enough
   f) Too little?

Please elaborate on your answer:

_____

_____

SCREENING PERSONNEL

1. Were you satisfied with the way in which the screening was done?
   a) Yes
   b) No
   Please elaborate on your answers (a or b)

   _____

   _____
2. Were you satisfied with the way in which the results were given to you?
   a) Yes
   b) No
   Please elaborate on your answers (a or b)

   _____

   _____
3. Do you trust the person who gave you the results of the hearing screening?
   a) Yes
   b) No
   Please elaborate on your answers (a or b)

   _____

   _____

ACCESSIBILITY OF HEARING SCREEENING

1. Do you find it easy to go the clinic were the newborn hearing screening is offered?
   a) Yes
   b) No

   Please explain more:

   _____

   _____
2. When you are at the clinic, is it easy to find the room where newborn hearing screening is offered?
   a) Yes

b) No

Please explain more:

_____

_____

3. In your opinion, what else can be done to improve your access to the newborn hearing screening?

_____

_____

_____

COMMENTS

1. Do you think it is a good idea to have newborn hearing screening at the clinics?
   a) Yes
   b) No

   Please explain more:

   _____

   _____

   _____

   _____

2. Please list any suggestions you have for improving the newborn hearing screening program at your clinic:

_____

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION

Appendix C: Permission letter NCG

HEAD OFFICE
P.O. Box 1508, Groblersdal, 0470
Republic of South Africa

NDLOVU CARE GROUP
Community Program with a Difference

29/07/2015

To Whom It May Concern,

Permission to Conduct Research - Ndlovu Audiology Department

This serves to grant permission to **Ms. Khomotjo Kgare**, a Masters student at the University of Witwatersrand to conduct her research using data from the Audiology department. Ms Kgare will be allowed access to the audiological records of babies screened by the program to determine the effectiveness of the clinic based new-born hearing screening programme in rural South Africa.

Please do not hesitate to contact me should you need any further information.

Yours Sincerely,

Dr Hugo Tempelman

CEO - Ndlovu Care Group

Tel: +27 (0) 13 262 9000 • Fax: +27 (0) 13 262 3498 • info@ndlovu.com • www.ndlovucaregroup.com
NPO: 019-524-NPO • PBO: 930002417 • Reg no: IT 10961/99 • Vat Reg No 4300226059
Ndlovu Care Group: CEO Hugo Tempelman • FM Lourens Duvenhage
Board of Trustees:
Chairperson: Prof Geert H Blijham **Non Executive Members:** Ronald Vles, Lynn van der Elst, Sagie Pillay **Executive Member:** Hugo Tempelman

Appendix D: Ethics certificate

R14/49 Ms Khomotjo Kgare

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M150958

NAME: (Principal Investigator)	Ms Khomotjo Kgare
DEPARTMENT:	Speech Pathology and Audiology Ndlovu Wits Audiology Clinic, Dennilton, Limpopo
PROJECT TITLE:	Effectiveness of the Clinic Based Newborn Hearing Screening Programme in Rural South Africa: Parental Perspectives
DATE CONSIDERED:	02/10/2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Karin Joubert
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	18/11/2015

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

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.
I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix E: Hearing screening informed consent form

NDLOVU WITS AUDIOLOGY CLINIC
P.O. Box 14, Groblersdal, 0470
Republic of South Africa

NDLOVU CARE GROUP
Community Program with a Difference

Consent Form: New-born Hearing Screening

I hereby consent to having my child's hearing screened through the Wits Audiology Clinic and Outreach Programme.

- I understand that my child's hearing screening results will be kept confidential and that he/she will remain anonymous. ☐
- I give the Ndlovu Wits Audiology department permission to use my child's screening results for future research. ☐
- I also understand that participation is voluntary and that I may choose to withdraw from the research at any point without negative consequences ☐

Name of child: _____

Parent name and surname: _____

Signature: _____

Date: _____

Appendix F: Telephone script for inviting parents

SPEECH PATHOLOGY & AUDIOLOGY
THE SCHOOL OF HUMAN AND COMMUNITY DEVELOPMENT (SHCD)

Private Bag 3, Wits, 2050 • Tel: 011 717 4577 • Fax: 011 717 4572 • E-mail: sspa.SHCD@wits.ac.za

TELEPHONE SCRIPT FOR INVITING PARENTS/CAREGIVERS TO PARTICIPATE IN THE STUDY

Participant number _____

Age of child: _____

Date of screening: _____

Clinic No: _____

Greetings to you
My name is Khumotjo Kgare. I am a registered MA (Audiology) student in the Department of Speech-Language Pathology and Audiology at the University of Witwatersrand.

I am calling to invite you to participate in my research study titled: The effectiveness of a clinic-based newborn hearing screening programme in rural South Africa: parents' perspective.

The purpose of this research is to determine the effectiveness of the clinic-based newborn hearing programme so that we can help other rural communities to develop similar programmes and to improve the service delivery at the primary health care clinics in the Elia Motsoaledi Municipality.

If you agree to take part in the study, you will be interviewed regarding your experience of the newborn hearing screening services offered at the primary health care clinics. The interview will take approximately 30 minutes and will be audio recorded. It will be done at your home or where you feel most comfortable to avoid transport costs

Your participation in this study is entirely voluntary and you can decline to participate, or stop at any time, without stating any reason. There are no known risks associated with participating in this research study. All information will be kept strictly confidential with only the researcher, research assistant, and supervisor having access to the raw data. The reported data will not include any information that identifies you as a participant in this study as you will be allocated a participant number. The data will be kept in a in a password-protected computer file and only the researchers will have access to it

If you decide to take part in this study, you will be asked to sign an informed consent form to confirm that you understand and are willing to participate in the study before the interview.

Do you agree to take part in this study? Yes ☐ No ☐

Interview appointment date: _____

Interview time: _____

Questions/ concerns from parent/caregiver:

_____
_____
_____
_____
_____
_____

If you have any questions, please do not hesitate to contact me (Khomotjo Kgare) at Tel: 083 739 1314 or e-mail: sharky.kgare@gmail.com . Alternatively you can contact my research supervisor, Dr. Karin Joubert on Tel: 072 177 9655 or e-mail: Karin.joubert@wits.ac.za

Thank you for your time. Looking forward to seeing you.

Kind regards
Khomotjo kgare

Appendix G: Participant information sheet

Greetings to you

My name is Khomotjo Kgare and I am conducting research at the University of the Witwatersrand in partial fulfilment of the requirements for the Master's in Audiology in Speech-Language Pathology and Audiology. My research is aimed at determining the effectiveness of a clinic-based newborn hearing screening programme in rural South Africa. The purpose of this research is to determine the efficacy of the clinic-based newborn hearing programme so that we can help other rural communities to develop similar programmes.

I would like to invite you to participate in the research study. Before agreeing to participate, it is important that you read and understand the following explanation of the purpose of the study, the study procedures, benefits, risks, discomfort and precautions as well as your right to withdraw from the study at any time. If you have any questions, do not hesitate to ask. You should not agree to take part unless you are satisfied about all the procedures involved.

Part of the participation involves being interviewed to get your input of the implementation of the clinic-based newborn hearing screening programme. There are no risks when participating in the study. All information will be kept strictly confidential between the research assistants, my supervisor and me. The data will be kept in a locked cupboard or in a password-protected computer file and only the researchers will have access to it and it will be destroyed after 5 years.

Participation in the study is voluntary and you have the right to refuse being part of the study without getting any penalties.

If you decide to take part in this study, you will be asked to sign this document to confirm that you understand the study. By signing this document, you are giving me permission to use the interview content for analysis, reporting and possible publication or conference presentation.

Full report on the study will be provided to Ndlovu Care Group and the Department of Health and Social Development at the end of the study. If you have any questions, please do not hesitate to contact my supervisor, or me the details are as follows:

Researcher: Khomotjo Kgare 0837391314 email: sharky.kgare@gmail.com

Supervisor: Dr Karin Joubert 0721779655 email: Karin.joubert@wits.ac.za

Thank you for taking the time to consider my invitation. Your participation will be greatly appreciated.

Khomotjo Kgare Dr Karin Joubert (Supervisor)

Appendix H: Participant informed consent (Participant group 2)

The effectiveness of clinic based newborn hearing screening programme in rural South Africa

I hereby confirm that

- I have been informed about the nature ,conduct ,benefits and risks of the study
- I have also received and read the participation information leaflet regarding the study
- I understand that i may at any stage without prejudice withdraw my consent and participation in the study
- I have been given the opportunity to questions
- I declare myself prepared to participate in the study

PARTICIPANT:

Printed Name	Signature / Mark or Thumbprint	Date

RESEARCHER:

Printed Name	Signature	Date

Appendix I: Consent to audio record the interviews

CONSENT TO AUDIO RECORDING OF THE INTERVIEWS FOR THE STUDY:

The effectiveness of clinic based newborn hearing screening programme in rural South Africa

I hereby confirm that:

- I understand that the interview will be recorded using audio recording to assist with accuracy of transcribing responses
- I have the right to refuse audio recording
- I consent to audio recording
- I understand that the audio recording may be used during the study
- I consent to the use of my audio recording in presentation related to this study
- I understand that if the audio recordings are used for presentations, no identifying information will be associated with them
- I understand that the audio recordings will be destroyed following transcription and I understand that no identifying information will be included in the transcription.

PARTICIPANT:

Printed Name Signature / Mark or Thumbprint Date

RESEARCHER:

Printed Name Signature Date

Appendix J: Examples of participant transcriptions

Participant number 1

Question	Transcription
1	**R: Before your baby was screened, was there a health talk given which explained newborn hearing screening?** P1: Yes
2	**R: Was it in your native language?** P1: Yes
3	**R: Were you able to understand the health talk? Was the information too simple, enough or too complex?** P1: *hmm, aah, ne e le simple.* Hmm**,** it was too simple. **R: *And then wa e kgotsofalla gore ne e le enough or e a shorta?*** ***R:* And then where you satisfied that it was enough or was it insufficient?** P1:*Aaah, e a shorta* Aaah, it was insufficient **R: *If nkare o nhlalosetse gore why o re e a shorta, o feela okare ne o shorta go kwa eng le eng?*** ***R:* If I may ask why do you feel like it was insufficient, what would you have loved to hear?** P1:*Di nthwela ,ne ke nyaka a mpotse gore ditsebe tsa ngwana wo di na le bothata go ba jwang, mara ga a bolela, yena o no ngwadile mola* That thing, I wanted her to tell me if my child's ears have a problem or not, because she didn't say, she just wrote there
4	**R: In your opinion, was the information presented too much, enough or too little?** P1: *Eish nna nako yela ba bahlalosetja, ne ke se go, ne e se ke fihle mo ne ba bahlalosetja, nna geke fihla o ntseere a ya lenna ka kwa a yo checka ngwana. Yena mara o hlalositse ga nnyane*. Eish by the time she was explaining to others, I had not arrived, when I got there, she took me to where she checks babies and screened the baby, she explained a bit. I am satisfied with it.
5	**R: Who first told you about the results?** P1: *Mme wola ne a checka, nna ke mo lebetse gore ke mang,mme wo ne a mochecka.nna dilo tse dinchi ke di lebetse akere ke kgale.* That woman who checked, I forgot who she is, the woman who checked. Eish, I forgot most things, it has been a while.
6	**R: What were the results of your baby's hearing screening?** P1: *Aowa di ile tsa re o sharp.* No, they said she is fine.
7	**R: Do you trust the results?** P1: Yes

	R: Why do you trust the results? P1: *Aowa akere ba mo checkile ka bona gore ba a mo checka.* They checked her and I saw that they are checking her
8	**R: Did you have questions after you baby's hearing was screened?** P1: No
9	**R: After your baby was screened, were you given any written information related to newborn hearing screening after the test?** P1: No
10	**R: Were you satisfied with the way in which the screening was done?** P1: Yes. **R: Tell me why you were satisfied?** P1: *Ne ke kgotsofala ka gore ne a boledishana le nna gabotse.* I was satisfied because she talked with me very well.
11	**R: Were you satisfied with the way in which the results were given to you?** P1: Yes **R: Tell me why you were satisfied?** P1: *Aowa, ke no kgotsofetse akere ke no bone a mo checkile, ga a mpotsa, nna ka no kgotsofala ka mokgwa wo a mpotsang.* No, I was satisfied because they checked her, they didn't tell me, I was satisfied with she told me.
12	**R: Do you trust the person who gave you the results of the hearing screening?** P1: *Yah ka mo tshepha* Yes, I trust her
13	**R: Do you find it easy to go to the clinic were the newborn hearing screening is offered?** P1: Yes, *re tsamaya ka di taxi, re di swara gona mo skontiring mo.* Yes, we use taxis; we catch them at the tar-road.
14	**R: When you are at the clinic, is it easy to find the room where newborn hearing screening is offered?** P1: Yes, *o re latile ka mola ka mo cliniking.* She fetched us from there in the clinic.
15	**R: In your opinion, what else can be done to improve your access to the newborn hearing screening?** P1: Hmmm, satisfactory
16	**R: Do you think it is a good idea to have a newborn hearing screening at the clinics?** P1: Yes, *gore le bona ko ba e ba humane thusho ye le rena re e kereyang.* Yes, so that wherever they are, they can get help that we are also getting.
17	**R: Please give me any suggestions you have for improving the newborn hearing screening program at your clinic.** P1: *Lena ge le ka re, le ka la emela batho ge ba tlile, le ba beyele di date tja ba tja gore ba le ba checke bana ditsebe, le ske la re mola nna ke eme laena ya go ya ka kua ba ntseya ba nkisha ka kua, batho ba mphohla ba kena ka mola nna ke sa ile ka kwa.*

	If you… do not wait for people to come, set a date to check ears of children, so that they do not take me from the queue to there, because people take my space while I'm there

Participant 2

Question	Transcription
1	**R: Before your baby was screened, was there a health talk given which explained newborn hearing screening?** P2: Yes
2	**R: Was it in your native language?** P2: Yes
3	**R: Were you able to understand the health talk? Was the information too simple, enough or too complex?** P2: *Ke kgotsofaditswe ke gore o tloga a hlalositse gore ba checka bana akere ditsebe, ene go checka ngwana ditsebe e sale wo mo nnyane go bohlokwa and then gore ge e le gore o na le problem ya ditsebe go na le kgonagalo ya gore bona ba kgona go re thusha go thusha le ngwana wo ka ditsebe tse.* I was satisfied because she explained that they check the baby's ears, they check the baby's ear while still young is important and then so that if there is a problem with the ears, there is a possibility that they can help us; help the child with the ears.
4	**R: In your opinion, was the information presented too much, enough or too little?** P2: Enough
5	**R: Who first told you about the results?** P2: *Ke hlaloseditse ke wena.* They were explained by you (referring to researcher)
6	**R: What were the results of your baby's hearing screening?** P2: *O mpoditse gore ditsebe tsa ngwana ga di na problem.* You told me that the child's ears have no problem.
7	**R: Do you trust the results?** P2: Yes **R: Why do you trust the results?** P2: *Eng ke ya ditshepa ka gobane ke kgotsofetje ka mokgwa wo ne a mo dira ka teng.* Yes, I trust them because I was satisfied with the way she was doing it (conducting the screening).
8	**R: Did you have questions after you baby's hearing was screened?** P2: No
9	**R: After your baby was screened, were you given any written information related to newborn hearing screening after the test?** P2*: Eh ga ke sa gopola*. Eh, I don't remember
10	**R: Were you satisfied with the way in which the screening was done?** P2: Yes. **R: Tell me why you were satisfied?** P2: *Aowa g eke kena ne e le motho wo mo right, a se na bothata. A bolela le nna ga pila.* When I entered, I found her to be a good person, she had no problem and

	spoke very well to me.
11	**R: Were you satisfied with the way in which the results were given to you?** P2: Yes **R: Tell me why you were satisfied?** P2: *Yah ke ile ka kgotsofala ka gobane le ka mokgwa wo a mo checkileng ne ntse ke kgotsofala* Yes, I was satisfied because even the way they checked her I was satisfied.
12	**R: Do you trust the person who gave you the results of the hearing screening?** P2: *Aah, Motho waitsi sometimes ge o fihla ko go yena, o bolela le yena ka se o tlileng ka sona, a kgona go bolela le wena ga pila, ene o kgona o mmona le wena gore a tshoge gore a ka mmotsisha dilo tje mmalwa, ga se ga nchi o ka mmona okare ke motho o mo bad 'cause always ge o bolela le yena, o no dula a le right.* Sometimes when you go to a person, you explain to them about why you came to them, if she speaks/responds to you well, and you can see also that you are not scared to ask a few things, it's not often that you can say that s/he a bad person because whenever you speak to her, she is always alright.
13	**R: Do you find it easy to go to the clinic were the newborn hearing screening is offered?** P2: *Go tloga mo go fihla ko kliniking. Aowa ga ka bona mothata, ke namela taxi mo square, then ke fologa ko maswikaneng ka kena ko kliniking ga se distance.* From here to the clinic, no, I didn't see any problem, I catch a taxi at the square, then I get off at the stones and enter into the clinic, it's not a distance.
14	**R: When you are at the clinic, is it easy to find the room where newborn hearing screening is offered?** P2: *Aaah, nna ka mokgwa e leng ka teng ya nkgotsofatsa, ga ke bone e na me problem.* Aaah, the way I see it I am satisfied, I don't see any problem.
15	**R: In your opinion, what else can be done to improve your access to the newborn hearing screening?** P2: *Go tshwana le gore ankere ge re fihla kliniking, ra nna n then maybe go thoma bo sister, re ka opela ra fetsa n then after that yena o a tla, di sister di a tsamaya di tlo re botsa gore o tlo thoma akere. Then then yena o a tla wa bolela le rena wa re hlalosetja gore yena o tester bana ditsebe and bohlokwa ba gore a teste bana ditsebe ke eng, go bohlokwa bo kgole bo bo kang kang. A re reela gore ne a kgopela gore before re kena ka kwa o kgopela gore re tle re teste bana ditsebe. Mara ganchi ge o le mo pele o thoma ka ba ba leng ko morago. A tseya ba bal eng ko morago and then a re lena le leng ko pele le tla tla ka morago. Aah nna ga e bad so for nna, ke bona e le,ke bona e le sharp entlek, ga gona ka mokgwa wo ke bonang bothata mo go yona. Ga a thoma go tseya ko morago ga e na bothata, coz ankere rena ge re etswa ka mola, ra itsi gore o itse a re re jike ko yena.* It is like, when we get to the clinic, we sit and then maybe the sisters start,

	we sing and finish and then after she [screener] comes and the sisters tell us that she [screener] will start and they leave. And then she [screener] comes and talks to us explaining that she tests ears and the importance of testing children's ears. She tells us that she asks that before we go there [immunization], we must bring our children to test their ears. But most of the time when you are in front, she starts with those at the back. Aah for me it is not bad, I see it as being ok, there is no way I see a problem with it [the process]. When she starts at the back, there's no problem because when we get out of there [immunization], we know we should make a turn to her
16	**R: Do you think it is a good idea to have a newborn hearing screening at the clinics?** P2: *E tlo thusha bana ba bangwe, like ge e kgonne go thushitje ba rena, ka gobane ba kgona go kereya gore ngwana wa lwala and then ba mo thushe.* It is going to help other kids like it has helped ours, because they can find out if a child is sick and then help her/him.
17	**R: Please give me any suggestions you have for improving the newborn hearing screening program at your clinic.** P2: *Aah nna, ga ke bone e na le mo enyakang go improver, ke bona e le sharp.* Aah, I don't see the need to improve it, I see it as being sharp.

Participant 5

Question	Transcriptions
1	**R: Before your baby was screened, was there a health talk given which explained newborn hearing screening?** P5: Yes
2	**R: Was it in your native language?** P4: Yes
3	**R: Were you able to understand the health talk? Was the information too simple, enough or too complex?** P5: Yes,enough **R: Please tell me why you say it was enough?** No elaboration given
4	**R: In your opinion, was the information presented too much, enough or too little?** P5: Enough **R: Please tell me why you say it was enough?** P5: *ka gore ke kgone go itsi gore ngwanake o eme mo kae ka go utlwa* So that I know where my child stands with hearing
5	**R: Who first told you about the results?** P5: *Ke yena wola ne a mochecka* The one who was checking here
6	**R: What were the results of your baby's hearing screening?** P5: *Aowa, ne di le right* They were fine
7	**R: Do you trust the results?** P5: Yes **R: Why do you trust the results?** P5: *Eng, ka gore o mmiditse la bobedi a mo gadimo. O kgonne go mmitsa a mo gadima* Yes, because she (screener) called her and she startled. She was able to call her(child) an she startled
8	**R: Did you have questions after you baby's hearing was screened?** P5: No
9	**R: When you learned that your baby needed further hearing testing, did you know what you were supposed to do next?** P5: Yes **R: Please explain more** P5: *Eng, o ile a re ge a tlo mo checka gape,ke ye straight ko* Yes, she (screener) said I must go straight there
10	**R: How did you feel when you were told your baby needed more hearing**

	tests? P5: *aowa ga ka ba le bothata,ke mo isitse la bo s'two* No,i didnt have a problem took her the second time **R: *so wena ne o le right ge ba go boitsa gore o swanetse a boye gape*** **So were you alright when they told you to bring back your baby?** P5: *Eng* Yes
11	**R: Were you able to go for those hearing tests?** P5: Yes
12	**R: Tell us about your experience** P5: *Aowa go no tshwana le mathomo,ne go sena bothata* No it was like the first time, there was no problem
13	**R: After your baby was screened, were you given any written information related to newborn hearing screening after the test?** P5: *Ba e pastille mo karateng,* They pasted it in the card (clinic booklet) **R: *ka ntle le ya go pastiwa go na le ye ba go fileng yona*** **Besides the one pasted, was there anything else that they gave you?** P5: *ooh ya mfile ye kaa-nyana,mmm* Ooh ya, they gave me a small one, mmm
14	**R: Was it written in your native language?** P5: *hmmm ga ke sa gopola, ebile ga ke tsebe e gore e kae* Hmm I don't remember, I don't even know where it is. **R: Don't you remember the information on the pamphlet was enough ,too muich or simple for you** P5: *Ile ka e bala mara yona ga ke sa e gopola. Ooh wa itsi ne e ngwadile eng..? Gore leina la ngwana le sefapane, ba ngwadile gore right ear le left ear and then gomme ba re tick. tse dingwe tsela ga ke sa di gopola* I once read it but i don't remember. Ooh do you know what they had written on it? The name of the child, the surname, they wrote "left ear" and "right ear" and then they ticked. The other things i don't remember **R: Please tell me more** P5: *Eeh akere ke kgonne go dib ala ka di kweshisha* Eeh, I was able to read it and understand it
15	**R: Were you satisfied with the way in which the screening was done?** P5: Yes **R: Tell me why you were satisfied?** P5: *Eng, ne a se rough* Yes , she was not rough
16	**R: Were you satisfied with the way in which the results were given to you?** P5: Yes

	R: Tell me why you were satisfied? P5: *Eng ,ke kgotsofetse* Yes , I am satisfied **R: *Ke eng se se go kgotsofaditseng?*** **What made you to be satisfied?** P5: *Aowa ke kgonne go bona ka mokgwa wo ne a iketlile ka teng ge a bereka mmereko wa gage* I was able to see the way she was calm/patient when she did her work
17	**R: Do you trust the person who gave you the results of the hearing screening?** P5: Yes **R : Please tell me what makes you to trust the person?** P5: *Aowa wa boncha gore o patient* She (screener) shows that she is patient
18	**R: Do you find it easy to go to the clinic were the newborn hearing screening is offered?** P5: Yes **R: Please explain more** P5: *Aowa go easy, ke tsamaya ka maoto* It is easy,I walk **R: *ga se Kgole?*** **Isn't it far?** P5: *Aowa ga se kgole* No, it is not far
19	**R: When you are at the clinic, is it easy to find the room where newborn hearing screening is offered?** P5: Yes **R: Please tell me more** P5: *Ke re ke eng mara? Ke bontshitse ke yena (screener), ga i-one fela* What I can Ii say? I was shown by her (screener), only once
20	**R: In your opinion, what else can be done to improve your access to the newborn hearing screening?** P5: *Ba bone? Ba iponele ntle le go botsiwa? Direction ya pamphlet mo monyako* To see, to see by themselves without being told? Direction on a pamphlet on the door **R: *mo monyakong o mo fe?*** **on which door?**

	P5: *Wa ma thomo wola ka gore ke wola o leng mo kgauswi* The one at the beginning because it is the closest one
21	**R: Do you think it is a good idea to have a newborn hearing screening at the clinics?** P5: Yes **R:Please explain more** P5: *Eng, gore e tlo thusha batho* Yes, so that it can help people
22	**R: Please list any suggestions you have for improving the newborn hearing screening program at your clinic.** P5: *Hmm nna ena ke bona e le enough, e le sharp* Hmmm I see it as being enough (satisfactory), it is sharp (alright)

Participant 13

Question	Transcription
1	**R: Before your baby was screened, was there a health talk given which explained newborn hearing screening?** P13 : yes
2	**R: Was it in your native language?** P13: yes
3	**R: Were you able to understand the health talk? Was the information too simple, enough or too complex?** P13: Yes, enough **R: please tell me why you say the information was enough** P13: *ga ke sa gopola gabotse ka gore ke kgajana.* i don't remember because it was a while ago
4	**R: In your opinion, was the information presented too much, enough or too little?** P13: Enough **R: please tell me why you say the information was enough** P13: *tsona ne di lekanetse mara ga ke sa gopola* It was enough but I do not remember
5	**R: Who first told you about the results?** P13: *ke yena wo ne a re checka sister wola.* It is that sister who checked us
6	**R: What were the results of your baby's hearing screening?** P13*:A re tsebe, o itse ditsebe tsa ngwana ga a kgone go bona gore….o re ga a kgone go bona gore o right goba ga di right.ka gobane , That is why,ke nthwe ne a e chikinya* She said the ear,cant see what the baby's ears…. she said she cant see whether the baby's ears are right or not right because, that is why, the thing is she(baby) was restless
7	**R: Do you trust the results?** P13: No **R: Why do you trust the results?** *A ka tshepha ka gobane, o nneile lengwalo la gore re ye kua akere. So ga ka kgona go itse gore ngwana o right mo ditsebeng goba ga a right na. Thats why are re mo ishe kua pele* I didn't trust because, she gave me a letter that states that we must go there (Ndlovu). So I didn't know whether the baby was right on the

	ears or not. That is why she said we must take the baby further
8	**R: Did you have questions after you baby's hearing was screened?** P13: *Eng, yena aowa ne a se na bothata ne.* Yes, she didn't have a problem
9	**R: After your baby was screened, were you given any written information related to newborn hearing screening after the test?** P13: No(only remembers the referral letter and the sticker in the clinic booklet)
10	**R: When you learned that your baby needed further hearing testing, did you know what you were supposed to do next?** P13: Yes **R: Please tell me more** P13*: Ausi wola ga a bolela selo, o no ba a re file lengwalo. Phoso ke ya rena e se reye kua.* That sister didn't say much, she just gave us the letter. Our fault is that we didn't go there
11	**R: How did you feel when you were told that your baby needed more hearing tests?** P13*: E re tshwere ga pila ka gore re nyaka go tseba gore ngwana o na le bothat ba ditsebe goba ga a na bothat ba ditsebe na. E re tshwere ga botse.* We felt good because we want to know if the baby has a problem with the ears or not. We felt good
12	**R: Were you able to go for those hearing tests?** P13: No
13	**R:please tell us why you didn't go for the recommended hearing tests** P13: *Ka gore ne e le problem ya go sepela so, kgwedi ka kgwedi ke sepela bjana, ke ya Phokwane then ke ya steve biko before ba mo dira operation.* *A se ke kgone go ya kua ka gore ne ke letetse gore ba mo dire operaton pele, bjanong ba mo dirile ka april.* It was a problem of travelling a lot, month by month a travelled. I would go to Phokwane then to Steve Biko before they did an operation on her. I didn't manage to go there because I was waiting for them to do an operation, so they did it in April.
14	**R: Were you satisfied with the way in which the screening was done?** P13: yes **R: Tell me why you were satisfied?** P13: *Ke kgotsofaditse ke ge a mo dira ka mochini ka mo, ba mo checka ka mo chini,mara empa yena ne a ichikinya.*

	I was satisfied when she(screener) used the machine, they checked her with a machine,but she(baby) was restless
15	**R: Were you satisfied with the way in which the results were given to you?** P13: Yes **R: Tell me why you were satisfied?** P13: *eng di nkgotsofaditse ka gobane nna ke nyaka go itsi bothata bja ngwana akere, ke nyaka go itsi gore bothata bja ngwana ke eng.* Yes I was satisfied because I wanted to know the baby's problem,I want to know what the baby's problem is
16	**R: Do you trust the person who gave you the results of the hearing screening?** P13: yes **R: why do you trust the person who gave you results?** P13:*Akere like di sign tse ne a di boletse already nna ne setse ke di experiencitse mo ngwaneng before yena a tlo mpotsa di results* You know like the signs that she spoke about,I had already started to experience some of them on the baby before she (screener) told me about the results
17	**R: Do you find it easy to go to the clinic were the newborn hearing screening is offered?** P13: Yes **R: Please tell me more** *Re sepela ka maoto, ge o rata go namela o ka namela. Ga se kgole gona ne.unless ge e le late o bona gore ke late,o namela taxi and then o yo fihla* We walk on foot; if you like you can get a taxi. It is not that far. Unless if it is late and you see that it is late,you can use a taxi and get there
18	**R: When you are at the clinic, is it easy to find the room where newborn hearing screening is offered?** P13: No **R: Please explain more** P13*: Ge o sa tsebe, watla ausi wola, ge ntsere dutse mo dipankeng, wa tla wa botsisha gore ngwana wa gago o ile wa checka ditsebe. O a bolela gore ngwana wa gago o ile a checka ditsebe, o bona ka karata le gona, o e beile stempe. O re tla ke bone karata ya gago, o a e bula a e bula, ge setje e na le stempe o re wena ile ka go checka , ge o sna le yona o re wena ga se nke ka go checka ne. A re e tla ka kua, wa go shupetja gore e tlaka kua roomung yela* If you don't know, that sister comes while we are seated at the benches. She comes and asks if your baby's ears have been checked. She checks the card to see if it has a stamp. She asks to see the card,checks it, if it has a stamp she tells you that she had already seen your baby. If it

	doesnt have a stamp then she explains that it means she hadn't checked your baby. She asks you to go there and directs you to that room
19	**R: In your opinion, what else can be done to improve your access to the newborn hearing screening?** CG: *oooh ba plakile di pampiri, tsa ko ga tempelman, ga ndlovu mo monyakong wo le kenang ka mo teng ba plakile mola.ga o tsena ka mo klikining ka mo di skaleng mola, o re "e ya ko room mang mang,le wena o tla bona ba plakile di pampiri tsa ko ga tempelman,o ya go kena ka mouwe* Ooh they put up papers, Tempelman's or Ndlovu on the door to the screening room. When you enter into the clinic where they weigh babies, she (screener) says go to that room and you will see they have put up Tempelman's papers, that's where you are going. **R: *ge le le kamo waiting area ka kua le kgona go kweshisha gore ba checka ditsebe mola, and ba di checka ko kae?*** **When you are at the waiting area, are you able to understand where they check babies' ears?** **R: *aowa, ga ba tsebe ne*** **No I don't know ne** ***R: so ke eng se re ka se dirang gore go be easy for batho ba bangwe?*** **So what can we do so that it is easy for other people?** P13: *aowa gotseba gore le swanetse go, ka maphephe le diboard tse ba di plakile mola gore ka mo ke mo ba checkang ditsebe.* To know that you must, with papers and boards that have been put up there to show that this is where they check ears
20	**R: Do you think it is a good idea to have a newborn hearing screening at the clinics?** P13: yes **R: Please explain more** P13: *Eng, go right ga botse .ka gore bana bonchi bana ge ntse ba gola ba tlo thibana ditsebe, akere ga re itsi gore o thibana ditsebe .o humana ngwana e le lesufi…hmmm ba thusha.* Yes, it is right. Because most babies as they grow, their ears get blocked. If we know that the ears are blocked , you may find that the child has no light, yes they help **R: *bohlokwa bja gore re ishe ko di kliniking tse di se nang le yona*** **The importance of taking it to other clinics which don't have it?** P13: *le bathushe* To help them

21	**R: Please list any suggestions you have for improving the newborn hearing screening program at your clinic.** P13: *aowa nna ke bona ke kgotsofala ka gona mokgwa wo, go a kgotsofatsa, ba ga tempelman ba tlile, baithaopile.* I am satisfied with the way it is, it is satisfactory, the Tempelman people came, voluntarily