

The feasibility of a newborn hearing screening program in Malawi: A case study of Likuni Mission Hospital and Area 25 health center.

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ABSTRACT

This thesis investigates whether a newborn hearing screening program may be implemented in Malawi to allow for the early identification and treatment of hearing loss. The objectives include determining the efficacy and acceptability of the program as well as its cost-effectiveness and finding the best screening techniques, analyzing the program's results, and making implementation suggestions. The study's descriptive research methodology includes interviews, questionnaires, and a literature review. Findings point to issues with infrastructure, testing equipment, and the need for health education and awareness, as well as a paucity of qualified workers. The study emphasizes the value of educating parents and carers, enhancing screening service accessibility, and training medical staff. The outcomes offer suggestions for establishing and maintaining a newborn hearing screening program in Malawi.

Keywords: *Audiology, newborn, Malawi, early identification, hearing loss, hearing screening program*

INTRODUCTION

Malawi is a landlocked country located in the southeastern part of Africa according to (Migrants & Refugees, 2021). Its population is estimated to be 20,500,000 (Worldometer,2023). It has been ranked in the top ten as one of the poorest countries in Africa and this fact has taken a toll on the development of the health facilities. One of the affected areas is the hearing screening for newborn babies. According to the CDC, all babies are supposed to have a hearing screening before they are one month old (Centers for Disease Control and Prevention, 2022). Every child's hearing is to be assessed to identify those that may have hearing deficits or any abnormalities at an early age. This is one of many areas missing in Malawi's public hospitals, as the facilities are in a deficit of both equipment and workforce. For a country that is often faced with conflicting priorities, hearing screening for all age groups, especially children is overlooked.

According to the [World Health Organization](#) (WHO), hearing loss is the most common sensory deficit in humans, and it has affected more than 350 million people worldwide constituting 5% of the world's population who are said to be living with a disabling hearing loss (World Health Organization, 2017). Most of the individuals who have hearing loss go unnoticed because of poor facilities, and trained personnel to assess the hearing loss. This is also the case with neonatal hearing screening, since there are no Audiologists and trained personnel in government institutions and the services are not being offered, newborn babies who have disabling hearing loss go unnoticed until

they reach a certain age or parents notice that the child cannot speak.

The need for neonatal hearing screening is seen across the country or Malawi as children who have hearing loss are at substantial risk of failing to develop speech and language which impact their education as they grow older. There is a need to address this deficit by creating standards to be followed in public hospitals to at least close the gap that is there.

The [World Health Assembly](#) has approved a resolution on the prevention of hearing loss and deafness. The resolution emphasizes the need for early screening measures to identify high-risk groups, particularly infants. It is accepted that children with hearing impairments require early identification and support. Additionally, it stresses how crucial it is to establish long-term screening strategies in low-income countries like Malawi.

To find whether the government or other stakeholders should accept the responsibility of ensuring the success of neonatal hearing screening programs in public hospitals and improving early identification to foster early intervention, a study on the feasibility of a newborn hearing screening program was prompted. This thesis will attempt to find out the likelihood of the newborn hearing screening program in Malawi particularly in [Likuni Mission Hospital](#) and Area 25 Health Center.

Purpose statement

The purpose of this study was to find out if it is possible to establish hearing screening programs in Likuni Mission Hospital and Area 25 Health Centre and by doing so if it would foster the identification of newborns

with hearing loss and early intervention. Two Health surveillance assistants, two audiologists, and ten parents played a crucial role in a trial run of the neonatal hearing testing at the health center and were the focal point of the study as they provided the necessary data.

Research Problem

There is a lack of neonatal hearing screening programs in public hospitals of Malawi, but this descriptive study only focused on Likuni Mission Hospital and Area 25 Health Centre. The lack of such an important program has led to poor management of cases of hearing loss which could have been easily addressed if the condition were detected earlier. The lack of neonatal screening programs has contributed to speech, language, and hearing disorders in many children in Malawi.

Significance of the study

Newborn hearing screening is crucial because it aids in identifying infants who are likely to have hearing loss and require further testing. Early identification of hearing loss and the beginning of therapy helps these newborns maintain their developmental milestones and improve their language as they develop and support in their social life. As soon as they are born, babies begin to absorb the language by hearing it spoken around them. Important linguistic and social milestones could not be met by a newborn who is deaf or hard of hearing. “Early diagnosis is essential to help babies who are deaf or hard of hearing reach their full potential” (CDC, 2023). Additionally, it gives families the option to select the intervention courses that best suit the needs of their infant.

This descriptive study explores the possibilities of establishing a neonatal

hearing screening program and how it would encourage early intervention. As Engelman (2014) states, many reviews are suggesting a need for more pilot hearing screening studies to be conducted to establish the feasibility and efficacy of neonatal hearing screening programs in specific countries and pave the way for programs targeting children at risk for hearing loss. Once these programs are adopted in hospitals and health centers around Malawi, early identification will be possible, which will impact the child’s development of speech and language.

OBJECTIVES

1. To examine the present condition of newborn hearing screening in Malawi and identify any impediments or problems that need to be addressed.
2. To assess the feasibility and cost-effectiveness of developing a newborn hearing screening program in Malawi.
3. To assess parents’ and healthcare professionals’ level of acceptability and engagement in Malawi’s newborn hearing screening program.
4. Evaluate the program’s impact on baby hearing loss detection and intervention.
5. To provide recommendations for implementing and sustaining a newborn hearing screening program in Malawi with the help of health care providers.

LITERATURE REVIEW

Hearing loss (HL) is the fourth highest-ranked cause of disability globally and the World Health Organisation (WHO) estimates that up to 2.5 billion people globally will have some degree of hearing loss by the year 2050 (Seguya et al., 2021). A statistic that seems underrated and yet in the current climate of the health sector, is not far-fetched. The WHO has also published further alarming reports suggesting that hearing impairment is the most common sensory deficit in humans, affecting more than 360 million people worldwide. Additionally, in low- and middle-income countries, hearing disability ranks third on the list of non-fatal disabling conditions (Engelman, 2014). Further studies show that the unique geography, climate, and substandard healthcare of the Sub-Saharan African countries predispose the population to a heavy and wide-ranging burden of disease. Most of the fatal diseases and chronic conditions which are associated with substantial morbidity and disability are either preventable or treatable (Engelman, 2014). In addition, there is research that attributes congenital and early-onset hearing loss as an etiologically heterogeneous chronic condition attributable to genetic and environmental causes (Engelman, 2014).

According to (Kanji & Khoza-Shangase, 2021) early detection of hearing loss is the initial stage of any early hearing detection and intervention (EHDI) program and is conducted using newborn hearing screenings (NHS). Kamal (2013) writes that although the need for successful universal newborn hearing screening programs cannot be denied, the legislative support, technology, and expertise needed to implement such

programs on a national level has only recently been realized. She further states that screening programs need to be part of the government health service provision in the country concerned to ensure their contribution. When an NHS program is implemented in the country, healthcare policymakers must make a few essential decisions. They must decide the location where the screening will take place, ideally closely related to the age of the infant when screened. Screening is typically performed before discharge from the maternity hospital in countries with a high percentage of hospital births (Mackey et al., 2021).

Engelman (2014) cites Barbara Weinstein, Ph.D., who reports that late identification of hearing loss can lead to speech and language delays, as well as social and academic difficulties. Furthermore, neonatal hearing screening has reduced the age of identification of hearing loss in many developed countries, however, the practice is non-existent, or limited in most developing countries. He further writes to say that in sub-Saharan Africa, an estimated 180,000 infants are born annually with acquired hearing loss in the first few weeks of life as compared to 22,000 – 44,000 babies in all the industrialized countries combined, exacerbating the need for NHS programs.

Even considering these statistics and findings, the hearing impairment prevalence rate in newborns is estimated to be higher in developing countries considering the relatively higher rate of exposure to risk factors (Kamal, 2013). Unfortunately, the burden of hearing impairment falls disproportionately on the poor because they are unable to afford the preventive and routine care necessary to avoid hearing loss or to afford hearing aids to make the

condition manageable, highlighting the importance of establishing national newborn hearing screening programs in developing countries.

Early interventions for HL enable proper cognitive, psychological, speech, and language development among affected infants, and it is performed using either Transient Evoked Oto-acoustic Emissions (OAEs) or Automated Auditory Brainstem responses (ABR) to record physiologic response from the ear. The advantage of these tests is that they are quick, objective, and easy to administer yet effective in identifying infants with HL (Seguya et al., 2021). According to Engelman (2014), the most used protocol in hospital-based screenings is OAE testing followed by ABR testing for children referred from the first-stage screen, and in countries where hospital-based neonatal hearing screening pilot projects have been implemented, some reports confirm that hospital-based neonatal hearing screening is feasible. However, Engelman further discusses the inevitability of challenges that remain unresolved, as high default rates for follow-up services are common and require effective data management and tracking systems. Nevertheless, most of the programs that are initiated, are entirely managed by health professionals in hospitals with little or no government funding.

In a study presented by Mackey et al. (2021), to assess the performance of newborn hearing screening programs, through selected quality measures and their relationship to protocol design in 47 countries, including Malawi, 26 countries reported NHS access, referral rates from 23 countries, follow-up from 12 countries, and detection rates from 13 countries. Through

the study, they also realized a significant diversity in protocol design across the countries and felt it was necessary to have a systematic evaluation of the effectiveness of NHS to better understand the consequences of protocol choice and the current barriers to effective NHS. Further findings from the WHO were linked to the study suggesting that implementing a procedure for monitoring and evaluation is a key step in the development of a national strategy for ear and hearing care (including early detection). Additionally stating that without it, success cannot be distinguished from failure. For programs that use ABR, the referral rate from screening to diagnostic assessment was lower compared to those that use only OAE. Programs also had lower referral rates to diagnostic assessment if they have more screening steps. Across the few countries where follow-up rates were reported, 81% of infants referred from step 1 followed up to step 2, and 72% of infants referred from all screening steps followed up to the diagnostic assessment (Mackey et al., 2021).

Engelman (2014) observed that hearing impairment in infancy is not readily detectable by behavioral observations, although as the infant matures it can be suspected by parents through a baby's inattention or erratic response to sound. Depending on the severity, hearing impairment in an infant may not be detected until the infant is well over 18 months of age by a parental suspension, making standardized newborn hearing screening programs vital. The consequences of delays in identification are dramatic in that undetected hearing loss can result in delayed speech and language acquisition, social-emotional or behavioral problems, and lags in academic achievement (Engelman, 2014). Furthermore, he realized that the early-

identified children significantly outperformed the late-identified at all ages and for all severities of hearing loss. By 3 years of age, 93% of all early identified participants scored within normal limits for speech; 90% were within normal limits for understanding vocabulary; and 95% were within normal limits for receptive and expressive language. Progress was maintained and improved so that by 5 years of age, 96% were within normal limits for speech, with 100% within normal limits for language.

According to Kamal (2013), there is great emphasis placed on the importance of early detection, reliable diagnosis, and timely intervention with better chances of hearing-impaired infants developing skills equivalent to their peers. Kamal also emphasizes promoting newborn hearing screening as a national program with government involvement and elaborates on the challenges facing newborn screening in developing countries such as finding the resources to implement solutions for the detection and treatment of newborns, especially where most developing countries have a high birth rate with heavily dense populations.

In contrast, in places like the United States, in cities where neonatal hearing screening was mandated, there have been successful age reduction of identification of hearing loss which in turn has had implications for early intervention and successes achieved through cochlear implantation and hearing aids. According to the most recently available research, since the initiation of newborn hearing screening in the United States, the average identification of hearing loss decreased from 2.5 – 3 years of age in

the early 1990s to 2-3 months of age (Engelman, 2014).

In research conducted in Colorado, children whose hearing losses were identified by 6 months of age demonstrated significantly better receptive and expressive language skills than children whose hearing losses were identified after the age of 6 months. In addition, they found that children identified with hearing loss after 18 months of age were almost twice as delayed in their expressing language and language understanding abilities when compared with children identified before 6 months of age. Furthermore, children receiving cochlear implants between 12 and 24 months of age showed similar language skills as typical peers (Engelman, 2014).

In another similar comparative study of a cohort of 45 early-identified and 49 late-identified children with hearing loss, with all severities of hearing loss and no other concomitant diagnoses, those who were diagnosed early had received amplification by 3 months, enrolled into auditory-verbal intervention by 6 months, and received a cochlear implant by 18 months if required. These children were able to “keep up with” rather than “catch up to” their typically hearing peers by 3 years of age on measures of speech and language, including children with profound hearing loss (Engelman, 2014). In the same light, a review by the US Preventative Services Task Force (USPSTF) revealed good quality evidence of benefit in language development for children who had been detected through newborn hearing screening programs and recommended screening for hearing loss in all newborn infants (Kamal, 2013).

In South Africa, a study on the feasibility findings suggested that NHS can be

conducted in public sector hospitals if test time was considered in addition to sensitivity and specificity when deciding on the screening protocol to be adopted. These factors proved to be of relevance in the South African context, where limited resources are a significant consideration (Kanji & Khoza-Shangase, 2021). Similarly, Engelman notes that current pilot infant hearing screening programs in developing countries are either hospital-or community-based. He writes that screening babies in hospitals before discharge is desirable for at least two primary reasons. First, screening eliminates the need to ask mothers to return specifically to have their babies tested. Parents are likely to be less enthusiastic to seek the detection of an invisible and non-life-threatening handicap in their normal babies. Second, screening helps healthcare professionals satisfy an important ethical obligation of ensuring that babies have been examined and tested for hidden, detectable abnormalities before discharge (Engelman, 2014).

Seguya et al. (2021) write that most countries that lack IHS programs are in resource-limited settings and need the motivation to establish the programs and initiate services for screening. Furthermore, there is a need for data and shared experiences on the feasibility of establishing infant hearing screening programs from resource-limited settings. According to Seguya et al. (2021), the data would provide lessons for health workers and policymakers to replicate. Additionally, the programs would also provide data on the prevalence of infant hearing loss and inform on strategies for scaling the screening programs to where they are needed the most.

A study in the resource-constrained setting on the feasibility of NHS programs identified

that the economic viability of NHS is an important factor to be considered for the success of the program. Moreover, a study conducted in India found that universal NHS was not a cost-effective strategy though it was beneficial, however, a study conducted in China found that universal hearing screening could be cost-effective in the long run in developed areas with a higher program coverage, diagnosis, and intervention rates (Das et al., 2020).

Similarly, Seguya et al. (2021) reported results that showed establishing infant hearing screening programs in resource-limited settings such as tertiary hospitals in Uganda are feasible. Stakeholders were reportedly very receptive, especially mothers who were very keen to have their babies tested and even after recruitment, several others continued to request for the service. Even though they encountered human resource limitations for individuals trained in IHS, as well as a lack of equipment, they created an IHS team and provided essential IHS training to the selected team members, and through donations, they were able to acquire equipment to conduct the tests.

Lastly, studies in India realized that the feasibility of hearing screenings in developing nations needed to be assessed in a resource-constrained setting. Ideally, if the program can be deemed successful in a resource-constrained setting, it can be replicated in a much better setting with adequate resources. But they concluded that universal hearing screening is an ideal scenario for any country, and it is possible (Das et al., 2020).

METHODOLOGY

Significance of the study

This study used a descriptive research approach to determine if it is feasible to implement a newborn hearing screening program at Malawi's Likuni Mission Hospital and Area 25 Health Centre. Descriptive studies are intended to offer a quick overview or in-depth description of a certain phenomenon or population. They are also appropriate for examining and outlining the present circumstances and features of a phenomenon. A descriptive study's major goal is to present or summarize data in a relevant way without changing or modifying any factors that were involved. Most of the time, descriptive investigations are conducted through observational techniques, questionnaires, or data analysis. They seek to respond to inquiries like "What is happening?" and "What is the situation now?" The purpose of data collection is to shed light on current situations or problems. Compared to what would have been possible without it, this approach enables a more thorough description of the issue.

Participant Selection

Due to the limited time and resources this study involved two health surveillance assistants, ten parents, and two audiologists. The health surveillance assistants were selected among twelve health surveillance assistants who attended ear care courses at ABC Hearing Clinic and Training Centre. The selection was based on their availability to participate in this study. The parents were randomly selected to get the perspective of parents on how they view the program in mention. The audiologists were picked according to their expertise in the field, those responsible to train and conduct newborn

hearing screening in the selected areas. The sample size was determined based on the availability and willingness of participants to participate in the study.

Data Collection

The researcher used three methods to collect data for this study. The data collection methods include semi-structured interviews and questionnaires. This was done to provide a comprehensive understanding of the current condition of newborn hearing screening programs in Malawi.

Semi-structured interviews were conducted to gain a thorough picture of the current state of the newborn hearing screening program, its challenges, and the level of acceptance and involvement of the assistant health surveillance officers in this program. These interviews also involved Audiologists who are experienced and have expertise in this field. To maintain flexibility and consistency in data collection, the interviews used a semi-structured style that allowed for a combination of open-ended questions and prepared questions. These sessions were recorded with permission from the participants.

The researcher visited the individuals at their workplaces to observe and hold the interviews. This included their assessments on the efficacy of the preexisting screening techniques if they had any, any obstacles or difficulties they faced or face when implementing the program, as well as their suggestions for enhancing and maintaining a successful screening program.

Questionnaires were given out to parents or other carers of babies who have undertaken the hearing screening to collect information directly from them. These questions were intended to determine the parent's or

caregivers' knowledge of the program and their understanding of the value of early hearing detection in general.

Existing literature relating to neonatal hearing screening was examined in addition to data collection through interviews and questionnaires. The existing literature was sourced from the Internet and hospital records to give insight into the current state of newborn hearing screening in the respective areas. The researcher acquired a lot of information about the current protocols and procedures, the resources needed to be allocated in the newborn hearing screening program, and any reported challenges and successes from this existing literature.

Data Analysis

This case study took a qualitative approach when collecting and analysing data. The data obtained from questionnaires and the semi-structured interviews were transcribed and analyzed using thematic analysis. The researcher closely examined the data to identify common themes – topics, ideas, and patterns of meaning that came up repeatedly. The themes and patterns were identified by the researcher from the interviews to gain insights into the feasibility and challenges of implementing a newborn hearing screening program.

Ethical Issues

Permission from the institutions in which the data was collected was obtained from the right officials, to conduct the study at their respective facilities. Everyone who participated in the study was required to give their informed consent. A clear explanation and information were given to the participants by the researcher to allow them to make an informed decision. The researcher emphasized that participation was

voluntary, and individuals had the right to withdraw from the study at any time without facing negative consequences.

Respecting participants' privacy was the other important aspect followed in this research. The researcher took measures to protect participants' personal information, both during and after the study. This included using unique techniques like changing their names, instead of using their real names when publishing or sharing data publicly. By doing so, the participants' identities were protected.

Limitations and potential biases

a. Sample size

A small sample size of two helpers for health surveillance, ten parents, and two audiologists is mentioned in the study. Due to the limited sample size, it may not be possible to generalize the results or to capture the variety of viewpoints and experiences required. Additionally, the research is limited in that it only examines Likuni Mission Hospital and Area 25 Health Centre, which might restrict the practical relevance of the findings to other hospitals or areas of the nation.

b. Selection bias

The selection of participants was based on their availability and willingness to participate, which resulted in a lack of accurate representation of the target population. In addition, only parents who were available at the clinics were included in the study.

c. Self-reporting bias

To a certain extent, this study demonstrates self-reporting bias, as participants were requested to reflect on questions that relied on their subjective feelings and personal experiences.

d. Researcher's bias

The researcher's bias during the study was undermining the participant's understanding of audiology services.

e. Limited resources and time

Because of fuel shortages in the country, the researcher could not make multiple trips to the clinics. Consequently, a few days were dedicated to conducting interviews, which led the researcher to meet a few available individuals. In addition, the time the researcher could dedicate to each clinic during the study was also limited.

RESULTS

The primary objective of this study was to find out if it is possible to establish hearing screening programs in Likuni Mission Hospital and Area 25 Health Centre and by doing so, it would foster the identification of newborns with hearing loss and early intervention. This section will show and analyse the results obtained from the participants through interviews.

Trained personnel

According to feedback from participants, one notable difficulty that could be faced in the successful implementation of newborn hearing screening programs in Malawi is the shortage of qualified audiologists. The participants emphasized that this scarcity poses a significant challenge. However, an

alternative perspective was also voiced by other participants, who suggested that “by adequately training nurses and assistant health surveillance personnel, an essential role could be played in carrying out newborn hearing screening in health centres throughout the country”. These participants believe that providing existing healthcare workers with the required training will help relieve the lack of trained employees conducting neonatal hearing screening throughout Malawi.

Infrastructure and testing equipment

Participants pointed out that one of the challenges faced could be the lack of accessibility to screening services due to the long distances people must travel. The participants suggested the importance of establishing screening facilities in various locations, especially in rural areas, to make the services more accessible to everyone. This may involve setting up mobile screening units that may include audiologists, nurses, or assistant health surveillance officers to reach these remote areas. Additionally, ensuring the availability of adequate testing equipment that can also suit mobile setups, such as OAE machines is essential. Another participant pointed out that “procurement and distribution of equipment should be prioritized, with a focus on areas with high population density and limited healthcare resources.”

Health education and awareness

Educating parents and caregivers about the importance of early identification of hearing impairments is crucial. Out of ten parents who participated in the study, only two of them were familiar with the test and its importance but seven did not know that the test existed and only one did not attempt to

answer the question. And none of the parents had received any health education on the importance of early identification. Concerning awareness, one participant stressed the targeted health education campaigns to utilize various channels such as community gatherings, radio broadcasts, posters, and informational brochures. Collaborating with local community leaders, schools, and childcare centers could help disseminate information and create awareness about the benefits of newborn hearing screening programs on a larger scale. Some participants stated that “emphasizing the potential impact on language development, education, and overall quality of life can also help to change attitudes of parents and increase participation in such programs”.

Community involvement and outreach

The participants advised employing tactics like community outreach programs and seminars to meet the demand for community engagement. With these measures, the community would be made aware of the need for neonatal hearing screening. The program could potentially educate parents, carers, and community members about the advantages of early diagnosis of hearing impairments by holding educational workshops and dispersing instructional materials.

The participants also emphasized the value of collaboration with regional community leaders. Stressing that community leaders frequently have a lot of followers and may be quite helpful in promoting programs in their communities. Henceforth, the program would increase its credibility and support by collaborating with chiefs, religious leaders, and other powerful individuals. This would expand its reach and influence.

The participants emphasized the importance of community engagement and outreach initiatives in overcoming obstacles and assuring the newborn hearing screening program’s success. The program would build trust, promote engagement, and foster a feeling of ownership within the target population by actively interacting with community members. This cooperative approach would enhance the program’s ability to detect and treat neonatal hearing issues.

Cost

The participants recognized that it would be costly to start a newborn hearing screening program in Malawi. To manage the rising number of infants born every day, there is a need to have proper infrastructure and it also highlights the necessity to buy a sizable number of screening equipment like Transient Evoked Otoacoustic Emissions (TEOAE) and Auditory Brainstem Response machines for diagnosing if needed. Additionally, the costs would increase because of staff training. The participants stressed that such a program would have significant long-term economic benefits.

Likuni Mission Hospital and Area 25 Health Centre an example

Some participants expressed that for other healthcare organizations interested in introducing newborn hearing screening programs, Likuni Mission Hospital and Area 25 Health Centre could offer as models from the participant’s point of view. By setting up informational meetings, interacting with local authorities, and sharing success stories, these hospitals would aim to increase awareness within their communities. By working with other healthcare organizations, they would promote the inclusion of neonatal

hearing screening in standard healthcare services. By making these efforts, Likuni Mission Hospital and Area 25 Health Centre would serve as examples and a resource for other organizations as they set up their screening programs, improving the hearing health of infants in Malawi.

DISCUSSION

The case study investigated the feasibility of newborn hearing screening programs in Malawi, focusing on Likuni Mission Hospital and Area 25 Health Centre. This discussion section will analyze and interpret the study's findings, considering factors such as the shortage of qualified audiologists, accessibility challenges, awareness and education, community involvement, financial considerations, and the experiences of exemplary healthcare institutions. By addressing these aspects, the discussion aims to provide a comprehensive analysis and valuable insights for the establishment of effective newborn hearing screening programs in Malawi.

To ensure that newborns with hearing impairments receive proper care, audiologists are essential in conducting accurate tests and interpreting the findings. However, the lack of audiologists restricts the scope and effectiveness of such programs, particularly in environments with few resources. The participants suggest training nurses and assistant health surveillance professionals as an alternate workforce to do neonatal hearing screening to overcome this difficulty. This recommendation was made because these healthcare workers are already employed by the healthcare system and may be called upon to do these tasks. These professionals

can acquire the skills and information essential to conduct hearing screening efficiently by giving them relevant training.

Additionally, educating nurses and assistant health surveillance staff might improve screening programs' accessibility in impoverished communities. In contrast to specialized audiology clinics, these healthcare practitioners are frequently assigned to neighborhood health centers and community clinics, which are more spread geographically. Newborn hearing screening services may be made available to isolated and rural areas that are served by these two health centers and have limited access to specialized healthcare by utilizing the existing healthcare infrastructure. This strategy, which guarantees that all newborns, regardless of their geographic location, have access to early hearing screening, is consistent with the objective of fair healthcare service.

Although the lack of audiologists may be addressed and accessibility increased by educating nurses and assistant health surveillance professionals, it is vital to be aware of the possible drawbacks of this strategy. Audiologists have specialized skills and knowledge that go beyond standard screening methods. Collaboration between audiologists and qualified healthcare professionals is essential when newborns need additional diagnostic testing or intervention. A good newborn hearing screening program must thus develop efficient referral routes and ensure continual communication and coordination amongst these providers.

It is important to take accessibility into account while developing newborn hearing screening programs, especially for those living in distant places. The study's

participants stressed the need of having screening facilities accessible in a variety of locales, particularly rural ones. This acknowledgment demonstrates a comprehension that, especially in marginalized groups, distance from healthcare providers can be a substantial obstacle for people seeking care. The idea of using mobile screening machines has a lot of potential for resolving this accessibility issue. The program can successfully reach a larger population by delivering screening services directly to communities, especially those in distant or difficult-to-reach places. On-site screening, diagnostic, and intervention services can be offered by mobile screening units outfitted with the proper testing tools, such as Otoacoustic Emissions (OAE) devices. OAE equipment is renowned for being practical and simple to operate, which makes it ideal for transportable screening units. By ensuring the availability of such tools, healthcare providers would be able to conduct screenings in a range of venues, improving the efficiency and efficacy of the screening program.

The results of this research highlight the significance of focused health education and awareness initiatives to combat parents' and carers' understanding of the importance of early detection of hearing problems. To ensure that parents are aware of the possible effects of hearing loss on their child's development and overall quality of life. To reach and engage the target demographic, many communication channels may be used to satisfy this demand. Community events offer chances to speak with parents and other carers face-to-face, enabling in-person instruction and resource distribution. These events can be planned in cooperation with local community leaders, who frequently

wield considerable power and can aid in highlighting the significance of neonatal hearing screening.

Radio programs may be an effective way to reach a larger audience. The program can run educational portions or interviews with healthcare specialists by collaborating with local radio stations, addressing common misunderstandings, and highlighting the advantages of early detection and treatments for hearing impairments. To ensure maximum reach and effect, these radio broadcasts can be timed during times when the target demographic is most likely to tune in. The use of visual aids, such as posters and informational pamphlets, can support the instructional messages in addition to face-to-face and radio-based techniques. These resources can be thoughtfully positioned in places where parents and carers are likely to visit, including healthcare institutions, community centers, schools, and nursery facilities. The posters can explain the significance of newborn hearing screening and offer instructions on how to use the services. Booklets can include comprehensive explanations and responses to frequently asked questions, giving parents the information, they need to make knowledgeable decisions about their child's hearing health.

Another effective method for expanding the reach and effectiveness of health education programs is to collaborate with local community leaders, schools, and childcare facilities. Community leaders can use their influence to encourage participation in the program and advocate for the value of neonatal hearing screening in their areas. Schools and day-care facilities function as crucial touch points because they have easy access to the parents and other adults who

look after young children. By collaborating with these organizations, the program can incorporate instructional sessions or disseminate educational materials via recognized channels, furthering awareness, and comprehension.

When it comes to the execution of newborn hearing screening programs, Likuni Mission Hospital and Area 25 Health Centre have stood out among leading healthcare institutions. For other healthcare facilities interested in setting up programs comparable to theirs, their successful experiences might be a useful source of inspiration. The promotion of newborn hearing screening as a normal healthcare service and advocacy for its inclusion might be aided by these facilities. Likuni Mission Hospital and Area 25 Health Centre can actively share success stories associated with their newborn hearing screening programs to raise awareness in their communities. They may show the usefulness of such programs to healthcare professionals as well as the public by emphasizing the favorable results and advantages attained via early detection and action. Sharing these success stories might encourage other healthcare organizations to adopt similar strategies and give neonatal hearing screening a high priority.

Holding informational meetings might be a useful tool for Likuni Mission Hospital and Area 25 Health Centre to impart knowledge and best practices to other healthcare institutions in addition to sharing success stories. These gatherings can provide healthcare professionals a chance to share ideas, talk about problems and solutions, and gain knowledge from one another's experiences. These hospitals may enhance knowledge transfer and support the adoption of efficient methods for putting newborn

hearing screening programs into action by encouraging a collaborative atmosphere.

CONCLUSION

The goal of this case study was to assess the feasibility of establishing a newborn hearing screening program at Malawi's Likuni Mission Hospital and Area 25 Health Centre. The study had several goals, including evaluating the current state of newborn hearing screening, figuring out the program's viability and cost-effectiveness, assessing the level of parental and medical professional involvement, identifying the best screening techniques, and gauging the program's effectiveness in identifying and treating hearing loss. The study's goal was to offer suggestions for the sustainable implementation of a newborn hearing screening program in Malawi. Children in Malawi suffer from speech, language, and hearing problems because of the lack of newborn hearing screening programs in public hospitals. Early intervention, which has a substantial impact on a child's developmental milestones, language development, and social interactions, depends on the prompt detection of hearing loss. Likuni Mission Hospital and Area 25 Health Centre can play a crucial role in detecting newborns with hearing loss and facilitating quick care by creating a newborn hearing screening program.

Individuals, stakeholders, and the government must cooperate and be willing to work together to accomplish these goals. To establish a comprehensive and long-lasting newborn hearing screening program, it is crucial to encourage a multidisciplinary approach involving healthcare experts, decision-makers in public policy, educators,

and community leaders. This teamwork will help to promote the program's long-term viability and effect in addition to ensuring the program's successful implementation.

Additionally, to develop neonatal hearing screening programs, ongoing research, and assessment are crucial. It will be helpful to do more research on the incidence of hearing loss in various parts of Malawi, analyze the efficacy of various screening techniques, and gauge the long-term effects of early treatments to gain important insights and direct evidence-based decision-making. Program managers and policymakers may enhance and optimize the screening processes and interventions with the aid of this research by identifying possible issues and areas for improvement.

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APPENDIX

Appendix A

THE FEASIBILITY OF A NEWBORN HEARING SCREENING PROGRAM IN MALAWI: A CASE STUDY OF LIKUNI MISSION HOSPITAL AND AREA 25 HEALTH CENTER

RESEARCH QUESTIONNAIRE

1. How common is hearing loss in newborns in Malawi, and how does it compare to other nations with established screening programs?
2. What are the challenges to successfully adopting a neonatal hearing screening program in Malawi, and how can these challenges be overcome?
3. What are the most successful screening techniques and technologies in Malawi for identifying newborn hearing impairment?
4. How can healthcare workers in Malawi be taught and educated to initiate and sustain a newborn hearing screening program?
5. Cost-effective is it to establish a neonatal hearing screening program in Malawi, and what are the long-term economic advantages of such a program?
6. What are parents' and caretakers' attitudes and views about newborn hearing screening in Malawi, and how can these attitudes be changed to promote program adoption?
7. How can community involvement and outreach be used to boost newborn hearing screening knowledge and participation in Malawi?
8. What are the possible ethical concerns and consequences of adopting a newborn hearing screening program in Malawi, and how can these issues be addressed?
9. What are the long-term health benefits and advantages for infants with hearing disabilities found through a screening program in Malawi?
10. How can the Likuni Mission Hospital and Area 25 Health Centre serve as examples for other Malawian healthcare institutions interested in implementing a newborn hearing screening program?

Appendix B

A questionnaire to assess the satisfaction and level of understanding of parents or caregivers regarding the importance of early hearing detection.

1. (optional): Demographic Information:
 - a. Name:
 - b. Age:
 - c. Gender:
 - d. Relationship to the child:
 - e. Contact Information:
2. How familiar are you with the concept of early hearing detection in newborns?

3. Have you ever heard about the importance of early hearing detection in infants before this questionnaire?
4. How important do you think early hearing detection is for a child's overall development? Please rate on a scale of 1 to 5 (1 being not important and 5 being extremely important)
5. Have you received information or education about early hearing detection from healthcare professionals, educational institutions, or other sources?
6. How confident do you feel in your ability to recognize the signs of potential hearing problems in infants? Please rate on a scale of 1 to 5 (1 being not confident at all and 5 being very confident)
7. Have you ever had your child's hearing tested? If yes, please specify when and where.
8. If you have not had your child's hearing tested, what are the reasons for not doing so? Please select all that apply:
 - a. Lack of awareness about the importance of early hearing detection.
 - b. Concerns about the accuracy of the tests.
 - c. Lack of access to healthcare facilities or professionals.
 - d. Other (please specify):
9. How satisfied are you with the information and support provided by healthcare professionals regarding early hearing detection? Please rate on a scale of 1 to 5 (1 being very dissatisfied and 5 being very satisfied)
10. What challenges, if any, have you faced in seeking early hearing detection for your child? Please describe briefly.
11. Would you be interested in attending educational workshops or seminars on early hearing detection? Why or why not?
12. Do you have any other comments or suggestions related to early hearing detection?

Thank you for taking the time to complete this questionnaire! Your feedback is valuable in understanding the satisfaction and level of understanding among parents or caregivers regarding the importance of early hearing detection.