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Audiologists' perspective on newborn hearing screening in a developing nation: a questionnaire-based survey

C. S. Vanaja¹ and Kristi Kaveri Dutta^{1*}

Abstract

Introduction Hearing is crucial for a child's development, influencing speech, cognition, and emotional well-being. Early detection of hearing disorders is vital, yet India faces challenges in implementing effective newborn hearing screening (NBHS) programs. This research explores the perspectives of audiologists, focusing on the major and minor challenges faced and current protocols followed across diverse setups in India.

Method A two-phase study involved questionnaire development and data collection from 116 audiologists nationwide. The survey addressed demographics, current practices, challenges faced, and opinions on NBHS improvements.

Results Findings revealed disparities in screening protocols, with 42 variations reported. Challenges included ambient noise control, communication gaps, and lack of interdisciplinary support. Audiologists emphasized the need for sensitizing healthcare professionals, free screening, and increased manpower to enhance NBHS efficacy.

Conclusion The study aligns with global challenges in NBHS program implementation. Rural areas face a shortage of audiologists, emphasizing the necessity to train community health workers. The varied screening protocols and delays in screening timeframe underscore the need for standardized guidelines and increased funding.

Audiologists play a pivotal role in NBHS success. To overcome challenges, standardizing protocols, sensitizing healthcare professionals, and promoting community-based screening are crucial. The study emphasizes proactive measures among audiologists, continual research, and collaboration to enhance evidence-based practices and policy improvements in newborn hearing screening.

Keywords Hearing loss, Newborn hearing screening, Audiologists, Challenges, Perspectives, Varied set-ups, India, Experience, Uniform protocols

Background

Hearing is a fundamental sense that is essential for the development of a child. It plays a pivotal role in development of speech and language, communication, cognitive abilities as well as emotional and social development. This underscores the critical importance of early detection

and intervention of any hearing-related disorders in infants and young children. A survey for congenital hearing loss in India by Verma et al. 2021 [1] revealed that the prevalence of congenital hearing loss ranges between 1.59 and 8.8 per 1000 births, with a high prevalence of 7 to 49.18 per 1000 births among 'at risk' babies.

Delay in the diagnosis of hearing loss can lead to hindrance in speech and language development, poor academic performance, personal-social maladjustments, and emotional difficulties [2]. Hence, a Universal Newborn Hearing Screening program has been mandated and implemented in most of the developed countries [3].

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Newborn hearing screening (NBHS) ensures early identification of babies/ infants at risk for hearing loss, which in turn enables early intervention.

NBHS programs are carried out at various setups in India, but there is a need to increase the number of centers and have uniformity in the protocol used for NBHS. Kumar and Mohapatra (2011) [4] reported that only 38.09% of the medical colleges in India have a NBHS program. They stressed the need for an urgent implementation of universal neonatal hearing screening in all the healthcare facilities in the country at large. A review of early detection and intervention programs in low- and middle-income countries of Asia by Joshi et al. (2022) [5] showed that a majority of the NBHS programs in India, primarily employed a two-step approach. Initially, either otoacoustic emission screening (utilizing Distortion Product or Transient Evoked emissions) or automated auditory brainstem response screening was conducted. Subsequently, a thorough auditory brainstem response test was administered to confirm hearing loss. Audiologists were the professionals most commonly involved in conducting these screenings. Joshi et al. (2022) [5] further reported that the screening tools and procedures employed in low- and middle-income countries were comparable to those in high-income countries but, there was a lack of standardized protocols within individual countries.

It is still a struggle for developing countries such as India to make NBHS a reality because of the many challenges faced at the grassroots level [2]. Out of the multiple challenges faced, the ones that are marked as major red flags in the poor implementation rates of the program are failure to follow a uniform protocol across hospitals, lack of cost-effectiveness, lack of follow-ups, lack of skilled manpower, increased load on audiologists, audiological services, absence of collaboration from/gap in communication between audiologists and other professionals [5]. In fact, a few programs in India opt for screening only a targeted population, high-risk infants in order to reduce the load on audiological services [6].

Standardized international NBHS guidelines are given by bodies such as the Joint Committee of Infant Hearing (JCIH). In 2019 the JCIH body stated that the countries that meet the 1–3–6 benchmark (screening completed by 1 month, audiological diagnosis by 3 months, enrolment in early intervention by 6 months) should strive to meet a 1–2–3-month timeline [7]. In 2017, the Indian Academy of Pediatrics [8] released a consensus statement outlining the procedure for newborn hearing screening and identifying risk factors for infants prone to hearing loss. According to the statement, the initial screening must occur before the newborn is discharged from the hospital. If the test yields

a positive result, a retest should be conducted after four weeks or during the first immunization visit. If the outcome remains unfavorable, auditory brainstem response (ABR) audiometry is recommended. The statement also stressed the importance of ABR screening for all infants admitted to intensive care units (ICUs). There are several protocol disparities regarding the NBHS protocols followed all around India as there is a lack of uniformity in the protocols being followed. The failure of uniformity in India might be because audiologists work in diverse setups, ranging from government hospitals and private clinics to academic institutions and research organizations. The nature of their work varies significantly based on these setups.

Several inherent variables come into play when implementing Newborn Hearing Screening (NBHS) programs in India. The composition and expertise of the NBHS team, adherence to standardized protocols, efficient utilization of time and resources, and the effectiveness of follow-up procedures are crucial factors determining the success of such programs [9, 10]. These variables require careful consideration and coordination to ensure the timely and accurate screening of newborns for hearing impairments. Since an audiologist plays a significant role in early identification and intervention of hearing loss and proper implementation of the NBHS program, we need to understand their outlook and standpoint on the current scenario in order to overcome the challenges. A noticeable dearth of evidence in literature is seen which talks about the challenges and shortcomings from the point of view of an Audiologist.

The current study aimed to understand the protocol followed by audiologists working at different setups and their perspective on NBHS. The opinion of audiologists towards the barriers, facilitators, pass or refer criteria, and steps towards improving the efficacy of an NBHS program will be useful to bring out the necessary change needed in the current scenario. The specific objective of the studies is to understand the current scenario and status of the NBHS program across different setups in India and to explore current practices and challenges encountered by an audiologist.

Methods

The study was conducted in two phases. A questionnaire was developed in Phase I and data were collected from audiologists working in different setups across India in Phase II. The study was approved by the Institutional Ethics Committee of Bharati Vidyapeeth (Deemed to be University) Medical College (Code: BVDUMC/IEC/45) and the rules of the Institutional Ethics Committee were followed.

Phase 1

This phase involved developing and validating the questionnaire. In order to do so, a pool of questions was prepared based on an extensive review of the literature to gain a comprehensive understanding of the research question of 'What are the challenges, barriers, and facilitators for building a structured newborn hearing screening protocol from the bird's eye view of an audiologist'. After a thorough review, a multiple-choice-based questionnaire was developed by including all the crucial variables for the NBHS program. This questionnaire was examined by a group of experts who evaluated each item of the questionnaire for relevance, clarity, and comprehensibility. It was ensured that the questionnaire items were easily understood and aligned with the intended theoretical framework prioritizing readability by avoiding complex language, lengthy sentences, and leading questions. The questionnaire incorporated content about current practices and perspective challenges and solutions to those challenges, and work set-up environment.

The developed questionnaire was circulated to five subject experts for pilot testing and validation. The suggestions of having a consensus among the audiologists were incorporated. The final questionnaire had 2 sections. Section 1 included demographic details of the audiologist such as highest qualification, experience years, and specific region of practice: urban or rural/village/ town city. Section 2 included questions related to current clinical practices and opinions of the audiologist. All the questions in every section included an option as 'Other' to share additional views from the audiologists. Additionally, the participants of the study were also allowed to select as many options for a single question if they thought more than one option was correct and applicable. A copy of the questionnaire is attached as Appendix 1.

Phase 2

A survey design was used to collect data for the study. Professionals working as audiologists at different setups across India participated in this study. The questionnaire was circulated amongst the audiologists working in various regions across India. Informed consent to participate in the study was taken from all the participants. The questionnaire was circulated through electronic media. Audiologists who had a minimum qualification of Bachelor of Audiology and Speech Language Pathology (B.ASLP) and experience working in NBHS setup for a minimum period of 6 months were included in the study. A total of 116 participants who are practicing newborn hearing screening audiologists across India participated in the study.

Results

The current study aimed at investigating and understanding the perspective of an audiologist towards the barriers, facilitators, pass or refer criteria, and steps towards improving the efficacy of a NBHS program. The specific objective was to understand the current scenario and status of the NBHS program across different areas in India and to explore the current practices and challenges of audiologists.

The data obtained from the questionnaire was tabulated for analysis. Descriptive analyses were carried out in order to determine the frequency of responses across all the questions in the questionnaire. Amongst the 116 audiologists who participated in the study, 36 had experience of less than 2 years, 35 participants were working for 2 to 5 years, 13 participants with 5 to 10 years of experience, and 32 participants with greater than 10 years of experience. Only 9 participants were working in rural locations, 103 participants were working in urban locations with 4 participants working in both rural and urban locations.

Figure 1 represents the distribution of different setups where newborn hearing screening is carried out in India. From the results, it could be deciphered that 55 audiologists carried out the NBHS program in a government setup while 61 carried out the program in a private setup. Among the audiologists working in a government setup, 13 worked in a government institutional setup while 42 worked in a government hospital setup. Under private setup, 39 worked in a private hospital setup and 22 worked in a private institution setup. It is important to note that some of these participants ($n=49$) reported that they were working under a mixed setup, which included them working in both government (institutes/hospitals) along with private clinical practice or private hospitals.

Our study also revealed that in 100 NBHS programs, both well-baby and babies with high-risk factors were screened while in 16 NBHS programs, only babies with high-risk factors and NICU babies were screened. A probe into the screening protocol used revealed that 98 programs used Distortion Product Otoacoustic Emissions (DPOAE), 62 programs used Transient emission otoacoustic emission (TEOAE), 47 programs used AABR, 64 programs used high-risk register (HRR) and 19 audiologists used a hand-held pediatric audiometer for behavioral screening while 45 audiologists check for behavioral observation. Only 9 audiologists included testing using a portable immittance meter in the screening protocol. A majority of the audiologists included more than one test in the test for screening. Table 1 shows the various screening protocols used by the participants for the NBHS program. The variability in the screening

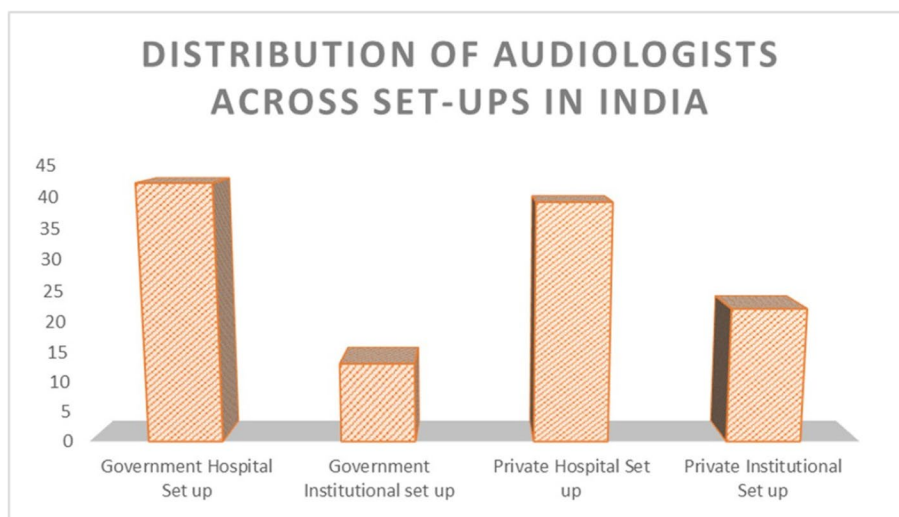


Fig. 1 The distribution of different setups where newborn hearing screening is carried out in India

protocol used by different audiologists is evident in the table which depicts 42 different screening protocols.

The current study also analyzed the time frame under which the babies undergo screening in the current Indian scenario. Table 2 shows the responses given for the time frame within which the babies were screened in the NBHS program. It can be observed from the table that a majority of the audiologists ($n=73$) reported that babies undergo screening within 48–72 h of birth but only 31 audiologists followed it strictly. Very few audiologists carried out screening after one month or only on referral by the pediatrician.

Further, the various team members who are a part of the NBHS program were also analyzed. It can be observed from Table 3 that a majority of the programs ($n=104$) included pediatrician/neonatologists as a part of the team followed by ENT doctors ($n=69$). Nurses were included in $n=53$ programs. Very few programs ($n=35$) included gynecologists. Only 9 programs included Anganwadi workers.

Challenges faced by audiologists

The survey collected information on the challenges/hurdles affecting the success of the NBHS programs and the steps to overcome the challenges. Regarding challenges, 74 audiologists reported that controlling ambient noise to carry out the screening test was a challenge for the smooth functioning of the NBHS program. A gap in communication absence of proper collaborations Lack of support from other inter-disciplinary professionals and lack of referrals from other professionals as major challenges faced on routine levels were reported by 63 and 62 audiologists respectively. Another challenge that was

divulged by audiologists ($n=33$) working in different setups was the lack of manpower and funding. Twenty-one audiologists reported over-referral, referring infants to undergo further assessment when they do not actually need an extensive diagnostic evaluation, as one of the major hurdles. This was attributed to the lack of technologically advanced instrumentation used for screening. The inability to screen babies before discharge was also reported by 44 participants as a potential challenge. Other challenges such as equipment maintenance costs, high traveling charges, conveyance troubles, lack of parent cooperation, instrumentation out-of-order, and lack of follow-up of refer babies are a few of the other challenges that they face on a day-to-day basis reported by 11 audiologists. The results revealed that 99 audiologists reported that the biggest challenge in the present Indian scenario is the follow-up of cases for detailed diagnostic evaluation. Many participants ($n=72$) opined that the challenge is to carry out the screening at a routine level while 57 Audiologists felt that setting up an NBHS program in a centre is itself the challenge. Other challenges like lack of awareness among parents, poor support from other professionals, poor socio-economic status, no educational background, and lack of proper instrumentation are also reported by eight participants.

Audiologists opinions on ways to overcome the various challenges faced in an NBHS program

The current study also did a survey on audiologists' opinions on ways to overcome the various challenges faced in an NBHS program. Results highlighted 96 audiologists opined that one way to overcome the challenge is by sensitizing doctors and nurses about the importance of

Table 1 Screening protocols used in various NBHS programs

Protocol	No. of programs
DPOAE	14
TEOAE	10
DPOAE, AABR	9
DPOAE, TEOAE	8
Behavioral responses, DPOAE	6
HRR, TEOAE	6
HRR, DPOAE	5
DPOAE, AABR, immittance	4
DPOAE, TEOAE, immittance	4
DPOAE, TEOAE, AABR	4
Behavioral observation, TEOAE, AABR	3
Behavioral observation, DPOAE, AABR	3
Behavioral observation, DPOAE, immittance	3
HRR, TEOAE, diagnostic ABR	3
HRR, TEOAE, AABR	2
HRR, DPOAE, behavioral responses	2
HRR, DPOAE, AABR	2
HRR, DPOAE, TEOAE	2
HRR, behavioral observation, DPOAE	2
HRR, behavioral observation, handheld audiometer	2
Behavioral observation, DPOAE, TEOAE, immittance	1
Behavioral observation, DPOAE, TEOAE, AABR	1
HRR, DPOAE, AABR, behavioral responses	1
HRR, DPOAE, TEOAE, AABR	1
HRR, immittance, DPOAE, AABR	1
HRR, behavioral responses, DPOAE, AABR	1
HRR, behavioral responses, DPOAE, TEOAE	1
HRR, behavioral responses, immittance, AABR	1
HRR, behavioral responses, immittance, DPOAE,	1
HRR, DPOAE, TEOAE, AABR, immittance	1
HRR, behavioral observation, TEOAE, AABR, immittance	1
HRR, behavioral observation, DPOAE, TEOAE, behavioral response audiometry	1
HRR, behavioral responses, DPOAE, TEOAE	1
HRR, behavioral responses, DPOAE, TEOAE, AABR	1
HRR, behavioral responses, immittance, TEOAE, AABR	1
HRR, behavioral responses, immittance, DPOAE, AABR	1
HRR, behavioral responses, immittance, DPOAE, TEOAE	1
HRR, behavioral responses, immittance, DPOAE, TEOAE, AABR, immittance	1
HRR, behavioral responses, handheld audiometer, TEOAE, AABR, immittance	1
HRR, behavioral responses, handheld audiometer, immittance, DPOAE	1
HRR, behavioral responses, handheld audiometer, DPOAE, TEOAE, AABR	1
HRR, behavioral responses, handheld audiometer, DPOAE, TEOAE, AABR, immittance	1

screening, knowledge about risk factors of hearing loss, early identification, and intervention. Many participants ($n=81$) suggested that hearing screening should be made free of cost and compulsory for all. Ideas such as discussions, meetings with high government officials, and

altering government policies were put forth by 70 participants as potential ways in which the challenges can be overcome. Options such as training the primary health-care level workers (Anganwadi workers, midwives) to screen in order to increase referrals and increase parental

Table 2 Time frame within which the babies were screened in various NBHS programs

Time frame	No. of programs
Within 48–72 h of birth	31
Any time before discharge	20
Within 48–72 h of birth, any time before	9
On referral to a pediatrician	7
Within 48–72 h of birth, on referral by the pediatrician	7
Within 48–72 h of birth, during vaccine follow-up	2
Within 48–72 h of birth, within 1 month of birth	3
Within 48–72 h of birth, any time before discharge, on referral by the pediatrician, during vaccine follow-up, within 1 month of birth, from 1 month to 1 year of birth	3
Within 48–72 h of birth, any time before discharge, on referral by the pediatrician, during vaccine follow-up, within 1 month of birth	2
Within 48–72 h of birth, any time before discharge, on referral by the pediatrician, within 1 month of birth	3
Within 48–72 h of birth, any time before discharge, during vaccine follow-up, within 1 month of birth	3
Within 48–72 h of birth, any time before discharge, on referral by the pediatrician	5
Within 48–72 h of birth, any time before discharge, within 1 month of birth	1
Any time before discharge, on referral by the pediatrician, during vaccine follow-up	2
Any time before discharge, on referral by the pediatrician, from 1 month to 1 year of birth	1
Any time before discharge, during vaccine follow-up, within 1 month of birth	1
Within 48–72 h of birth, within 1 month of birth	2
Anytime before discharge, on referral by the pediatrician	4
On referral by the pediatrician, within 1 month of birth	2
On referral by the pediatrician, from 1 month to 1 year of birth	2
Within 1 month of birth, from 1 month to 1 year of birth	1
On vaccine follow-up	1
Within 1 month of birth	1
From 1 month to 1 year of birth	1

awareness regarding the need and importance of newborn hearing screening were suggested by 64 and 66 audiologists respectively. Many audiologists ($n=65$) also proposed to increase manpower to screen at grassroots levels such as primary healthcare, pink rooms, mohalla clinics, etc. Other suggestions such as making a unique ID card linked to the results of hearing screening results and asking the parents to carry that card till 1 year of follow-up at the hospitals, desensitizing the government, and creating revolutionary campaigns such as the Polio vaccine campaign to create awareness and reach the mass, not screening any babies less than 48 h to reduce referral rates, were given by 8 participants.

Discussion

From the results of the present study, it can be well understood that in a developing country like India, the challenges that are faced by audiologists at grassroots levels obstruct the implication of an impeccable newborn hearing screening program with a uniform protocol. Our findings in the study stated by the audiologists match with similar challenges reported by several researchers in

literature which addresses the problems that a developing country faces while trying to implement and regulate a screening program such as lack of funding, lack of awareness, lack of manpower, low support of inter-disciplinary teams, poor data management systems resulting in loss of follow-up data which are in accordance to the major challenges that an audiologist face [11–13].

Results of the present study show that there is a shortage of audiologists practicing in the rural parts of India. It can be inferred from these results that a very large population of newborns is being missed to screen for hearing loss. An earlier survey has also indicated that only 38.09% of medical hospitals with an annual birthing census of over 2000 babies have implemented a universal NBHS which supports the fact that not all babies are screened immediately after birth [4]. Barriers to early hearing loss detection in a rural community were attributed to lack of parental awareness, language barriers, financial concerns, distance to appointments, weather, and transportation in a study done in Idaho, USA [14]. This issue can be solved by training the Anganwadi workers or midwives to carry out newborn screening. Investigations by Ramkumar

Table 3 Team members of the NBHS program

Team members	Number of NBHS programs
Audiologists, Pediatrics Neonatologist Doctors, Audiologists	14
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors,	13
Audiologists, Pediatrics Neonatologist Doctors, Nurses,	11
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Speech Language Pathologists,	10
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Nurses	9
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Nurses, Speech Language Pathologists, Obstetrician and Gynecologists,	6
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Nurses, Speech Language Pathologists, Audiologists	6
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Obstetrician, Gynecologists	5
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Obstetrician, Gynecologists, Speech Language Pathologist	4
Audiologists, Pediatrics Neonatologist Doctors, Nurses, Obstetrician and Gynecologists,	4
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Nurses, Anganwadi Workers	3
Speech Language Pathologists, Obstetrician, Gynecologists	
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Nurses, Anganwadi Workers, Speech Language Pathologists	3
Audiologists, ENT Doctors, Speech Language Pathologists	3
Audiologists, Pediatrics Neonatologist Doctors, Speech Language Pathologists	2
Audiologists, Pediatrics Neonatologist Doctors, Obstetrician and Gynecologists	2
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Nurses, Obstetrician, Gynecologists	2
Audiologists, Pediatrics Neonatologist Doctors, Speech Language Pathologists	2
Obstetrician, Gynecologists	
Audiologists, ENT Doctors, Nurses, Anganwadi Workers	1
Speech Language Pathologists, Obstetrician and Gynecologists	
Audiologists, ENT Doctors, Pediatrics Neonatologist Doctors, Audiologist, Speech Language Pathologists	1
Audiologists, Pediatrics Neonatologist Doctors, Nurses, Obstetrician and Gynecologists, Speech Language Pathologist	2
Audiologists, Pediatrics Neonatologist Doctors, Nurses, Anganwadi Workers, Speech Language Pathologists	1
Audiologists, ENT, Nurse, Anganwadi Workers	1
Audiologists, Pediatrics Neonatologist Doctors, Nurses	1
Speech Language Pathologists	
Audiologists, Pediatrics Neonatologist Doctors, Nurses	1
Audiologists, Pediatrics Neonatologist Doctors, Speech and Hearing Technician (Diploma Holder in HI), Speech Language Pathologists	1
Audiologists, Pediatrics Neonatologist Doctors, Obstetrician and Gynecologists, OAE Technician	1
Audiologists, ENT Doctors and Nurses	1
Audiologists, Nurses, Obstetrician and Gynecologists	1
Audiologists and ENT Doctors	1
Audiologists and Obstetrician, Gynecologists	1
Audiologists and Nurses	1
Audiologists and Speech Language Pathology	1

and colleagues (2018, 2019) [15, 16] support the engagement of grassroots workers in community-based hearing healthcare provision in India. Training the grassroots level workers and providing them with the necessary equipment for the newborn hearing screening programs was easier in these projects as the projects were funded by government/non-government bodies. Among the participants of the study, only 9 audiologists reported that they involve Anganwadi workers in their NBHS programs. There is a need to promote the inclusion of

grassroots-level workers in NBHS programs to reach out to a larger population. The shortage of audiologists in rural regions observed in the present study emphasizes this need.

The results regarding current practices of the audiologists carrying out the NBHS program also gave the findings about the target population being screened in India. As per our findings, 6 out of 116 setups only screen the NICU babies which shows that targeted population screening has been initiated in a few set-ups across India.

A study carried out by Vishwakarma and colleagues (2015) [6] in India also suggested that carrying out UNHS was challenging as a result of system malfunctions and an excessive amount of time spent on various procedures. Conversely, the targeted hearing screening proved to be significantly easier, with fewer occurrences of false-positive and false-negative results. The study discussed that in a densely populated country with insufficient personnel for the field, it becomes crucial to adopt an alternative approach to the system in order to optimize the program's outcomes.

The study also reviewed the current protocol used by audiologists across various set-ups in India in order to do a critical appraisal of the protocols. The findings revealed 42 different screening protocols being used at present across various set-ups and the differences seen were majorly due to lower-resource settings and time constraints. Our results are in consonance with the investigation done by Joshi and colleagues (2023) [5] who reported that screening protocol predominantly includes one objective test, OAE, especially DPOAE. The same study also found that in spite of similar screening tools and protocols used by high-income countries, there is still high variability and no uniform screening protocol within each country. Another important finding from our study was that not all set-ups that screen infants in NICU have AABR as screening equipment in their protocol. This indicates that in many of the current ongoing programs identification of babies with Auditory Spectrum Disorders (ANSD) is being missed. It is well established that the inclusion of AABR in the screening protocol increases the sensitivity of the protocol in detecting ANSD [17, 18]. The choice of DPOAEs or TEOAEs also seems random across the studies. Thus, there is a need to increase funding for NBHS centers to include ABR in hearing screening of at least high-risk babies and bring uniformity in the protocols used. The present study however did not probe into the details of the type, intensity, and frequency of the stimuli used for recording OAEs. The variability across centers will probably increase if we delve deeper.

Our result on the time frame under which the babies are screened showed variations. It is clear that ongoing program set-ups are unable to follow the time frame under recommended guidelines by the Indian Academy of Paediatrics (2017) [8] which recommends screening of every infant before discharge. This limits the current programs to identify high-risk babies or babies at risk of developing late-onset hearing loss for follow-up, therefore increasing the intervention time [17, 19].

The current study also tried to look at suggestions and opinions that an audiologist holds as they are the primary torchbearers of a successful NBHS program. After

analyzing the opinions given by the audiologists to overcome the various challenges reported by them in the survey, it can be concluded that the biggest challenge in the Indian scenario is the follow-up of cases for detailed diagnostic evaluation and carrying out the screening at a routine level. All the participants of the study opine that to make the NBHS program a successful outcome, the professionals must ensure the desensitization of every medical worker. The support from doctors, nurses, and hospital administration can help create awareness towards early detection and intervention of hearing loss. Poor follow-up is a challenge reported in many of the Western studies also [20–23]. A systematic review literature also states that the most commonly used or suggested measures leading to increased follow-up across the studies included the need for a multidisciplinary dedicated team, a focus on public awareness, and the need for better facilities in terms of technology and infrastructure [24].

As an audiologist is an integral part of we play a vital role in ensuring and regulating newborn hearing screening based on analyzing the suggestions it can be clear that the only way we can achieve the goal faster is by taking keen and prompt actions. Primarily as a professional, it is our utmost duty to stay informed and keep track of the latest research, guidelines, and best practices related to newborn hearing screening. A well-knit connection with hospitals, and inter-disciplinary professional organizations can make the task of coordination and cooperation easier. A similar study in literature in support of this discusses that developing countries must promote community-based screening programs, recognize the importance of trained nonprofessional screeners, and have an efficient database as the number of newborns screened for hearing loss increases [25].

Conclusions

In summary, this study sheds light on the challenges faced by audiologists in implementing effective newborn hearing screening programs in a developing country like India. The findings highlight the lack of uniform protocols, insufficient funding, limited awareness, and manpower issues hindering the process. Notably, the shortage of audiologists in rural areas results in a significant portion of newborns missing screenings, emphasizing the need for training community health workers to bridge this gap. The current study also highlights that the identification of disorders such as ANSD is being missed in India as AABR is not used in many programs. Additionally, it is of utmost importance to establish a nationwide program for universal neonatal hearing screening, employing a standardized protocol, offering regular training, involving a multidisciplinary team,

and ensuring follow-up procedures for cases identified as “refer.” Furthermore, the study emphasizes the necessity for proactive measures among audiologists, including staying updated on research, collaborating with health-care institutions, and actively engaging in community-based screening initiatives. Continuous monitoring, data analysis, and research are vital to enhancing the newborn hearing screening landscape, ultimately contributing to evidence-based practices and policy improvements.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s43163-024-00617-1>.

Supplementary Material 1.

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Authors' contributions

CSV, KD: study design, concept; CSV: preparation of questionnaire, acquisition of data; KD, CSV KD: drafting the manuscript; KD interpretation of the results; CSV: supervision, critical revision of the manuscript. Both authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Institutional Ethics Committee of Bharati Vidyapeeth (Deemed to be University) Medical College (Code: BVDUMC/IEC/45) and the rules of the Institutional Ethics Committee were followed.

Consent for publication

Written consent for publication was taken from the participants for their willingness to participate in the study.

Competing interests

The authors declare that they have no competing interests.

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