Qualitative Analysis of Newborn Hearing Screening Program in Iran

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Abstract
 Background: Early diagnosis of hearing loss and timely interventions are important to minimize the consequences of this condition, especially for children. This research was conducted to analyze the newborn hearing loss screening program in Iran.

Methods: This qualitative study was conducted using the content analysis method and based on the CIPP model in 2023. The snowball method was used to recruit a sample with maximum diversity. The criteria for selecting people for interviews included having at least three years of experience in the newborn hearing loss screening program and sufficient knowledge in the field. To ensure the reliability of the results, four criteria proposed by Lincoln and Guba were used. Data analysis was conducted by MAXQDA2022 software.

Results: In the current research, using content analysis in the form of the CIPP model, based on the viewpoints of the interviewees (40 people), the management requirements of the newborn hearing loss screening program were categorized into the four main categories of context (texture), input, process, and output. Eight subcategories were identified in the context dimension, four subcategories in the input dimension, seven subcategories in the process dimension, and four subcategories in the output dimension.

Conclusion: According to the findings of this research, in order to properly implement the newborn hearing loss screening program, there is a need to conduct pilot studies, need assessments, evidence-based programs, and epidemiological studies and to prioritize services and resources. Also, communication between service delivery levels needs to be improved, and attention should be paid to personnel motivation and screening programs.

Keywords: Program analysis, Hearing loss screening program, infants, Iran, CIPP model, Directed qualitative

Introduction

In 2017, the World Health Organization (WHO) asked different countries to provide strategic plans and necessary measures to prevent and control hearing loss and decrease the burden of disease. According to the statistics of the WHO, currently 466 million people around the world suffer from hearing loss, of whom 34 million are children (1, 2).

Newborn hearing screening refers to the tests that are performed in the first few days of the newborn's life and separate the newborns who may be sick (suspicious cases) from those who are probably not sick. After screening and determining suspicious cases, confirmatory tests are performed. The list of diseases that are screened varies from 1 to 50. Screening newborns not only has undeniable advantages for patients and their families, but it also prevents the wastage of huge human and financial resources and

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↑What is "already known" in this topic:
Hearing loss in a child creates many challenges for the family and affects the quality and quantity of parent-parent relationships. Newborn hearing screening is performed early in life to identify neonates with possible auditory problems.

→What this article adds:
Using the CIPP (context, input, process, product) evaluation model, we showed that the effective implementation of the newborn hearing loss screening program in Iran required appropriate needs assessment, promoting organizational culture, developing policies and laws, compiling protocols and guidelines, allocating sufficient resources, and designing appropriate decision-making systems.

helps the development of countries by maintaining the IQ of patients (3).

In developing countries, there are few programs aiming to prevent and treat ear diseases and identify those with impaired hearing. However, in many of these countries, healthcare workers receive little training to implement these programs. Effective and cost-effective interventions for ear and hearing disorders can be implemented by trained healthcare providers at primary levels. If these interventions are used on a national scale, they can substantially reduce the burden of ear diseases and deafness (4).

Deaf children and those with partial hearing loss need special needs (5). Hearing loss is one of the sensory injuries with a low prevalence and also the most common sensory-nerve injury (6). In deaf people, the possibility of developing psychological disorders and behavioral problems increases due to inability to communicate properly and the feeling of inadequacy. Despite recent advances in medical treatments, hearing loss still remains a challenge. Two to three out of every thousand children are born with profound hearing loss (7). Also, hearing loss in a child creates many problems and challenges for the family as it affects the quality and quantity of parent-parent relationships and interactions, compromising the functioning of the family (8). On the other hand, deaf children develop major problems in their social and language communication skills (9).

Evaluating and measuring performance make the system smarter and motivate people towards desirable behaviors (10). The existence of a performance evaluation system at different levels is necessary to ensure compliance with programs, policies, laws, directives, and standards, so that it is possible to compare the performance of systems in consecutive periods in order to identify and improve their capacities and abilities and to encourage them to use successful models as much as possible (11). The CIPP (context, input, process, product) evaluation model, by emphasizing on constructive evaluation during the developmental stages of a program from the time when an idea starts until the time of its planning, designing, implementation, and completion, helps policymakers make appropriate decisions. The four components of this model include context, input, process, and output. The CIPP model helps program evaluators collect information regularly during the development and implementation of a program (12).

The correct implementation of newborn hearing screening programs is very important for the early diagnosis of deafness and timely interventions for minimizing the consequences of hearing loss, especially in children. This qualitative research was conducted to analyze the various aspects, including context, input, process, output, and challenges, and corrective solutions, of the newborn hearing loss screening program in Iran. The results of this research can provide evidence helping improve hearing screening programs and implement preventive interventions to minimize the consequences of deafness in children and reduce health costs.

Methods
Study Design
This was a qualitative study with a comparative directed content analysis approach, the detail of which have been provided below in the data analysis section.

Inclusion Criteria
The criteria for selecting people included having at least three years of experience in the newborn hearing loss screening program and sufficient knowledge in the field. The interviewees included the managers and experts implementing the program in the Deputy Health Ministry of the Ministry of Health, Treatment and Medical Education and the National Welfare Organization, audiologists, otolaryngologists, pediatricians, department heads and matrons, and experts in related fields working at medical centers and rehabilitation clinics.

Conducting the Interviews
The interviewees included the managers, experts in the ministry of health and the well-fare & rehabilitation organization, audiologists, ENT specialists, pediatricians, supervisors, matrons, and all the experts involved with the screening program in audiology and rehabilitation clinics. In the current research, semi-structured interviews were performed using an interview guide to finalize the questions. The interview guide was designed based on in-depth interviews, the CIPP framework, and a comprehensive literature review. Before starting the main interviews, two to three in-depth interviews were conducted with people who had the most work experience related to the newborn hearing loss screening program in Iran. In order to deepen the interview, probing questions such as "Would you give me an example, why, how, and how, does this program is used?" were asked. The interview was conducted in a face-to-face manner. In this type of interview, the interviewee is given enough time and freedom of action to present his opinions, and any comments about the correctness or incorrectness of the answers are avoided during the interview. With the consent of the participants, audio-recording and note taking were used during the interviews. Then the texts of the interviews were implemented in Word format. A total of 40 interviews were conducted.

The place and time of the interview were arranged with the interviewee. After the initial arrangements, a notification form was provided to the participants by visiting them in person or via sending it through the portal or e-mail. Before conducting the interview, the objectives of the study were explained to the subjects, and informed consent was obtained from them. The duration of the interview was 50 minutes on average; the minimum interview time was 20 minutes, and the maximum time was 75 minutes.

To conduct the interviews, the snowball method was used to a sample with maximum diversity. In this type of sampling, the samples that have the most enriched information on the subject under study are selected. For this purpose, the interviews were started with one of the experts, and the next interview is conducted with a person introduced by the first interviewee.

Data Analysis
In this study, we used the comparative directed content analysis approach, introduced by Hsieh and Shannon in

2005 (13), for data analysis. In this approach, subcategories are merged together to help identify the main categories using the content analysis method. Since directed content analysis needs a predefined framework, we here employed the CIPP. The main feature of directed content analysis is that primary coding is conducted based on prior findings or hypotheses. The main objective of this approach is to validate and extend the conceptual framework of a hypothesis or the hypothesis itself (13, 14). This approach is used for studies whose purpose is to give credit or implicitly develop a previous conceptual framework or theory. On the other hand, the theory can help predict thought-provoking variables or the relationships between variables. In the beginning, it is prepared based on the pattern of strata and sub-strata. Next, the interviews are listened to several times by the researcher and then are converted into text. After reading the text several times and being immersed into the data; the data were analyzed to find the content corresponding to previously defined categories (15). For data analysis purpose, MAXQDA software version 2022 was used.

Rigor

To ensure the reliability and quality of the results, the four criteria of Lincoln and Guba were used (16).

Credibility: Credibility, which refers to a conscious effort to ensure the interpretability and meaning of the data, as well as its accuracy and correctness, we spent enough time to gather and interpret the data (i.e., prolonged engagement). Also, the research process was informed to all members of the research team to receive their comments and consultation (i.e., peer debriefing). Regarding one of the interviews, in order to resolve some ambiguities and ensure complete and correct understanding of its content, the interview text was sent to the interviewee to verify the accuracy of the coding process (i.e., member-checking). Also, a combination of various resources was utilized when needed to ensure the reliability of the results (i.e., triangulation). The texts of all the interviews along with primary codes and categories were reviewed by director professors and advisors, and the codes emerging during the interviews were regularly assessed by holding meetings to resolve discrepancies and conflicts.

Transferability: This item refers to the generalizability of the data obtained to other places. Here, we tried to include participants with diversified views and experiences with the phenomenon under the study to increases the transferability of the findings. We also tried to provide a comprehensive and clear description of the details of the research, including the selection of interviewees, the coding process, the preparation of the interview guide, the data analysis process. These efforts have increased the generalizability of our findings to other situations.

Dependability: This parameter refers to the stability of data over time and under different conditions. In other words, reliability denotes the ability to reproduce the data in similar times and conditions. In the current research, the study process was described in details, and in-depth and semi-structured interviews were clearly explained according to audit trail and external audit to increase the reliability of the data.

Confirmability: This item, also known as objectivity, ensures the acquisition of quality data. In this research, we employed inquiry audit, in which a researcher who was not involved in the study along with two members of the research team reassessed the research process and the data in terms of trustworthiness and accuracy of interpretations.

Results

The demographic information of 40 interviewees, including gender, educational status, age, and work experience, has been given in Table 1.

Table 2 shows the codes identified based on the CIPP model. In this research, using content analysis in the form of the CIPP model, the management requirements of the newborn hearing loss screening program were placed in four main categories: context (texture), input (input), process, and output (output). Eight subcategories were identified in the context dimension, four subcategories in the input dimension, seven subcategories in the process dimension, and four subcategories in the output dimension (Table 2).

In the first dimension (i.e., context), there were components such as conducting pilot studies, performing needs assessment, evidence-based programs, promotion of organizational culture, consideration of ethics and confidentiality, implementing policies and laws, developing protocols, guidelines, and programs, setting appropriate goals and indicators, prioritization of services, and epidemiological investigations.

In the second dimension (i.e., input), the requirements needed for developing a screening program according to the opinions of the interviewees were identified as balancing the ratio of personnel to the volume of services provided, suitability of instrumental structure and equipment, appropriate budget allocation, and proportionate payments.

In the third dimension (i.e., process), the requirements

Table 1. Frequency distribution of demographic characteristics of interviewees

Demographic characteristics		Frequency (percentage)	Demographic characteristics		Frequency (percentage)
Gender	Female	12 (30)	Education	Bachelor's degree	3 (7.5)
	Man	28 (70)		Masters' degree	6 (15)
Educational group/faculty	Member of science Committee	19 (47.5)		Ph.D.	16 (40)
	Non-academic	21 (52.5)		General practitioner	4 (10)
Age		38.5 average		Specialist	9 (22.5)
Work experience		14.5 average year		Subspecialist	2 (5)

Table 2. Dimensions of the CIPP model regarding the management requirements of the newborn deafness screening program

Floor	Under the floor	Selected quotes
Background (texture)	Conducting pilot studies	"... for the better implementation of the programs, if the programs are implemented as a pilot, we will see fewer problems in the programs and the problems will be seen in the pilot stage..." (M. 20)
	Needs assessment	"... the problem that can be seen in the current programs of deafness in newborns is that real needs assessment has not been done and some programs are based on people's interest..." (M. 28)
	Evidence-based programs	"...Evidence-based programs are a wonderful and creative and managerial method that, in addition to increasing knowledge, leads to better understanding of the environment and better prioritization. In this situation, the programs will reach the defined goals more appropriately. ..." (M. 14).
	Promotion of organizational culture	"...in deafness diseases of babies, the important issue is culture building, and culture building happens when a group of service providers take action in this field and move forward towards changing beliefs and attitudes that improve health. go...".) M. 10)
	Consideration of ethics and confidentiality	"...all over the world, health system employees are constantly exposed to complex ethical issues, that's why in developing programs for the management of deafness in newborns, ethical issues such as having communication skills, the existence of an ethics committee, reviewing and presenting reports of abuse should be considered. Behavior, negligence, negligence, error, mistake and violation of rights should be seen..." (M. 7)
	Implementing appropriate policies and laws, protocols, guidelines, programs, goals, and indicators	"Programs will be successful if the policies are formulated in a suitable way that is good for achieving the goals, and for the implementation and practical aspect, there must be appropriate guidelines and protocols..." (M. 7)
	Service prioritization	"... in order to achieve the goals of the neonatal deafness care system, prioritization through needs assessment means directing and allocating resources to the most important needs should be done. It is better to determine the needs according to the specific conditions of the environment..." (M. 1)
	Epidemiological studies	"...in order to control the disease of deafness in newborns, the epidemiological conditions must be investigated. A series of indicators must be properly considered, such as prevalence, lethality, and mortality..." (M. 7)
Input	Balancing the ratio of personnel to the number and volume of services provided	"...a number of programs increase the workload of the personnel and harm the main work they used to do. Due to the increase in the number of visits, the time spent on face-to-face contact has become less, and only forms are filled. It will be completed..."(M.2)
	Suitability of physical structure and equipment	"... in formulating programs for deafness of newborns in order to provide effective services, special attention should be paid to manpower, physical space, facilities, equipment and activities, and existing regulations and instructions so that proper performance occurs in order to provide the desired services. .."(M.5)
	Appropriate budget allocation	"...one of the required resources that should be paid more attention to in the programs is the appropriate budget allocation. If there is no budget, the motivation and potential of the organization will be wasted..." (M.22)
	Appropriate payments	"...the reduction of payments leads to the weakening of job security and the reduction of motivation..."(M.2)
Process	Identification of stakeholders and comprehensive cooperation	"...inter-departmental and intra-departmental coordination should be taken into consideration to solve problems related to the prevention and treatment of diseases. Through external and intra-departmental cooperation, occupational anxieties should be reduced and the effects reduced..." (M. 7).
	Comprehensive training in the field of screening, diagnosis, timely therapeutic interventions, and follow-up	"...one of the problems is insufficient and ineffective training in the field of prevention, treatment and rehabilitation. From a medical point of view, the training should move towards radical prevention training..." (M.24))
	Appropriate decision-making systems	"...in the development of programs for deafness of newborns, considering that decision-making has become the most important and complex knowledge of management, it is an important issue that should be seen in the management programs of deafness in newborns..." (M. 39)
	Providing services on a permanent and active basis	"... the effectiveness of health services depends on what services are provided and how these services are organized. In developing programs related to deafness in infants, services should be provided continuously and actively in the society..." (m.2)
	Communication between service delivery levels	"... the referral path should be seen in the development of programs for deafness of babies, because the referral system makes the patients receive the services they need with better quality at the relevant level (level one, two or three). Thus, with Establishing a family doctor and referral system, every patient gets the service he really needs..."(M.8)
	Documentation in service delivery levels	"... the process of documenting the activities of planning and implementing the program is not done well. Documentation should be done at all levels of service delivery..."(M.1)
	Attention to personnel motivation	"...that the managers and policy makers should take advantage of human relations skills and use knowledge and other organizational resources to motivate employees in order to achieve organizational goals..." (M. 2)
Output	Having appropriate evaluation systems	"... in developing the plan, there should be attention to proper evaluation. Through evaluation, the performances are measured and when it is done correctly, the employees, supervisors and managers will benefit from it..." (M. 14)
	Continuous assessment	"... evaluation should happen periodically and continuously and by improving the evaluation method..." (M. 15)
	Update the assessment process	"... in developing the program, the existence of technical and specialized committees is mandatory and standardization should be done and through the committees and standardization, the evaluation process should be updated..." (M.16)
	Appropriate evaluation indicators	"... in order to improve the health status, one of the points that should be considered is the discussion of appropriate indicators of the evaluation system, which should be monitorable, measurable, objective, compatible with the existing environment, etc...." (M. 19)

needed for developing the program according to the opinions of the interviewees included the identification of stakeholders, all-round cooperation, comprehensive education in the field of screening, diagnosis, timely therapeutic

Table 3. Challenges for managing the newborn deafness screening program and their solutions

Dimensions of the CIPP model	The proposed framework main topic (within topic)	Challenges Inside sub-topics	Suggested solutions Inside sub-topics
Background (texture)	Prioritization and needs assessment	Failure to pay attention to the issue of prioritization	1. Paying attention to upstream documents in formulating the vision, mission and values of neonatal deafness disease programs 2. Proper prioritization and needs assessment according to the opinions of staff experts
		Neglecting sustainable development	The necessity of adopting an active and proactive approach in policymaking in the field of infant deafness
		Improper needs assessment	Involving environmental forces in planning
		Failure to pay attention to the indicators related to the disease	Forming committees in the field of infant deafness to investigate and determine indicators and ways to reach the desired goals. Paying attention to the reports and documents regarding the existing indicators in the field of deafness in newborns
		Failure to conduct the program as a pilot	The programs should be implemented in a phased and pilot manner.
		Lack of evidence-based programs	Programs should be developed in such a way that they are based on evidence.
		Lack of attention to group development	Actions should be taken in the field of control and prevention of deafness in infants collectively and collective control policies of the target population.
Input	Financial problems	Failure to allocate funds through stable and independent sources	Allocation of appropriate budget to reach the appropriate situation in the field of deafness in newborns
		Inappropriate payment system	There should be a suitable payment system for health system personnel to improve motivation.
		Inadequate health per capita	The policies should be in such a way that the per capita health is appropriate.
		The cost of ineffectiveness of some programs	Plans should be realistic, practical and logical.
	Shortages in human resources	Unstable managers	The health system should justify the policy makers that the managers have appropriate stability that the organization does not face short-term goals.
		Improper distribution of manpower	human resources should be distributed exactly according to needs and according to the efficiency of human resources, and financial and non-financial incentives to attract human resources in places where there is a lack of human resources; Be considered.
	Process and physical structure problems	Inadequate infrastructure due to program expansion	Appropriate infrastructure should be considered and existing spaces should be used appropriately.
		Absence of appropriate organizational chart and structure	A suitable organizational chart should be considered to provide services in the field of deafness in newborns.
		Lack of proper documentation in the preparation and implementation stages of the program	Paying attention to the documents that are applicable and appropriate.

interventions and long follow-ups, appropriate decision-making systems, updating educational curricula in the field of neonatal deafness, providing services permanently and actively, promoting the levels of service provision, documentation of the services provided, attention to personnel's motivation,.

The fourth dimension (i.e., output) included the following elements: presence of a suitable evaluation system, continuous assessment, updating the evaluation process, and use of appropriate evaluation indicators.

The challenges and corrective solutions of the newborn hearing loss screening program based on the CIPP model have been shown Table 3.

Discussion

The main goal of the current research was to identify experts' point of views and explain the challenges of and solutions to improve the newborn hearing loss screening program in Iran based on the CIPP model.

Based on the results obtained in this study, one of the prerequisites for developing a program, in the context dimension, was environmental analysis and appropriate needs assessment in the field of infant hearing loss programs. The importance and sensitivity of the needs assessment process increases when we consider the limited budget allocated to the medical and health education processes in most countries. In such a situation, the question of priorities and necessities is raised, and policymakers and educational planners have to choose among various and unlimited demands that cannot be responded by the existing facilities. In these conditions, specialists and educational experts must reach standards according to which they can identify the necessary issues and take action to solve them (17). As it can be seen, the first and most basic step in the planning of any system is the needs assessment process, based on which the program is designed and then implemented. In fact, the evaluation process is based on the fact that it should meet predetermined goals (18).

Another requirement in the field dimension (i.e., texture)

Table 3. Continued

Dimensions of the CIPP model	The proposed framework main topic (within topic)	Challenges Inside sub-topics	Suggested solutions Inside sub-topics
Process	Service provision	Failure to pay attention to providing active services in some areas	Provide services as actively as possible to increase access and service coverage.
		Failure to fully implement the referral system	Redefining the system in such a way that the referral system is respected and based on the hierarchy of the referral system, the referrals and services are provided.
		Improper performance of decision-making units	There should be evaluation and monitoring committees of activities and goals to correct the inappropriate performance of the system.
	Communicational and motivational problems	Lack of comprehensive participation of stakeholders	All-round participation of the health system should be done through the participation of all service providers.
			Through the development of motivational programs, the participation of the service receiving community should be provided.
		Limited access	Inform the community about the available services.
			Services should be provided actively.
			Fair distribution of human resources
	Educational problems	Lack of necessary and effective training in the service delivery system	Manpower training should be done with targeted in-service courses.
			Community education through participation
Output	Assessment problems	Lack of a comprehensive evaluation system	The evaluation system should be such that all dimensions of the health system can be seen in the field of prevention and control of deafness in newborns.
			The evaluation system should be targeted and conducted in such a way that it leads to the improvement of service delivery and solving the existing problems.
		Lack of comprehensive participation in the evaluation process	Attracting comprehensive support should be considered as one of the key approaches or strategies in the programs in the field of deafness in newborns.
		Failure to perform evaluation by the expert team	The evaluation is done by experts in the field of prevention and control of deafness in newborns.
		Improper development of evaluation indicators	Evaluation indicators should be developed in a logical and realistic manner.
		Inappropriate feedback in assessments	The evaluation should have proper feedback and take place in real form in the system, and the system should encourage proper feedback to the evaluation system.
		Being the trustee of the Ministry of Health in providing and evaluating services	In the evaluation system, it is better that the Ministry of Health is not in charge and an independent organization should perform the evaluation of the provider organizations and programs in the field of neonatal deafness.

included the need for conducting epidemiological investigations to determine mortality rate, prevalence, incidence, lethality, etc. Norouzinezhad (19) stated that without recognizing and determining national and regional problems and priorities based on the identification of demographic and epidemiological characteristics, it is not amenable to find the most appropriate solutions or cost-effective methods based on local and regional characteristics or design and implement scientific programs at different levels of the service delivery system. Also, it is impossible to enact necessary legislations to control risk factors and the process of dealing with current health priorities at the national and regional levels (19).

One of the requirements of developing the program, based on available evidence, is to have transparent and systematic access, where scientific evidence is used as the main inputs in policymaking and decision making. In the study of Brownson et al. (20), it was mentioned that the health system should move towards evidence-based platforms due to the lack of resources, inefficient structures, and limited social access to service delivery. Evidence-based health principles and services reduce the gap between planning and implementation. Therefore, organizational communication and motivation can be promoted by increasing the capacity of the health system, technical assistance, evaluation, and feedback (20).

Prioritizing of services was one of the important discussions when developing programs. Through the prioritization of services, the focus on the right goals will be increased, and less resources will be wasted, so fair access to services will be met. In the study of Joy et al., it was found that prioritization should be included in the development of programs based on several criteria, including population, the area covered, the rate of morbidity, the type and prevalence of the disease, and available equipment and beds.

Also, factors such as local customs and culture are also influential in this matter (21).

The formulation of appropriate policies, regulations, and protocols is one of the prerequisites in the management of hearing loss screening programs in newborns. Considering that the drafting of laws and regulations aims to improve people's health and the performance of the health system (access, quality, justice, accountability, and cost reduction) (22). Ichiho et al. stated that disease management and control are a priority in the US Pacific Islands. Formulation of appropriate policies and guidelines allows for the evaluation of inputs, processes, and outputs in programs to obtain more appropriate results (23).

Accessibility is one of the prerequisites of developing a health plan, including physical and financial accessibilities. Physical accessibility means the appropriate distribution of system inputs (beds, doctors, nurses, etc.) among populations, and financial accessibility means effective access to health care services in terms of financial payment, in other words, the degree of public participation and purchasing power (24, 25).

In the input dimension, the proportionality of the number of personnel with workload and volume of services was one of the requirements of program formulation, which was also indicated in a study by Dieleman et al., who stated that the poor performance of the health system could result in the shortage of service provision and insufficient development of human resources for the health system. A shortage in qualified personnel leads to failure to respond to the needs of society, and factors such as personal issues, factors related to the work environment, lack of in-service training, problems in policymaking and planning, inefficient human resources management, lack of motivation in employees, and lack of appropriateness in expected services are among the factors contributing to a shortage of human resources (26).

Physical structure and equipment are preconditions for developing a program. In this context, Akkazieva et al. noted that for the prevention and control of non-communicable diseases, it was better to design appropriate interventions, increase political commitment, clear prioritization approaches, inter-sectoral, and external cooperation, empower the public through education, and develop an effective model for providing evidence-based services. Other factors that need to be considered are the provision of localized services, appropriate distribution and combination of resources, easy access to facilities, effective management, appropriate information and decision-making systems, and financial protection (27).

In the input dimension, appropriate budget allocation was identified as another requirement for program formulation. In Demari's study, budget allocation was designated as a process with different stages that must be paid attention to. Inappropriate budget allocation in Iran mainly roots in financial instability due to limited resources and sanctions. Also, the allocation of credits in the national headquarters is not systematic, fair, and timely, leading to inadequate credits for some programs, which is not proportional to the burden of diseases, their prevalence, incidence, and risk factors. Besides, the centralized ranks of the health sector are not notified on time (28).

Next, the process of identifying stakeholders and comprehensive cooperation with them is one of the requirements of developing a plan, which must be accomplished with the participation of internal and external stakeholders of the organization in order to improve services. In the study of Auvinen, it was noted that effective health care in the workplace requires collaboration, partnership, and alliance with internal, interface, and external stakeholders. The basic measures to fully cooperate with various stakeholders are to identify the main stakeholders, regularly analyze their opinions and positions, and develop stakeholder participation. Stakeholder analysis aims to assess and understand them from an organization's perspective, starting with identifying and classifying key stakeholders. The issue of beneficiaries in the context of national health care systems and health care organizations is one of the principles of the health system because the health system alone cannot respond to all the needs of society (29).

One of the requirements of developing a program, identified in the dimension of process, was documentation at the level of service delivery. In the study of Geisel et al., it was also stated that governments cold try solve the problems of health information systems through national management. National health information systems often include several sub-systems maintained by different systems, which must be performed with utmost care. For example, the challenges of the information system and documentation of the health system can lead to gaps or overlaps, making it difficult to share information, perplexing coordination and control. Another information challenge is the lack of effective documentation, rendering it impossible to determine the status quo. Also, reporting and collecting a large amount of relevant and irrelevant information in the health system is a common phenomenon (30).

Organizational motivation and encouragement are prerequisites for developing a hearing loss screening program for infants. Unwin et al. stated, in a study entitled "Non-Communicable Diseases in South Africa", that in order to improve the condition of diseases, there was a need for developing motivational programs, strengthening people's positive beliefs, increasing public awareness, increasing risk factor adjustment policies and inter-sectoral and external cooperation, and incorporating disease management programs (31).

Advanced technologies and organizational innovation are also required for developing programs for the management of neonatal deafness. Today's technologies have a great impact on the health of people in society. Through the use of appropriate technological entities (e.g., telemedicine), it is possible to timely diagnose and treat diseases, reduce their transmission rate, and cut medical costs. The introduction of information and communication technology can help obviate common problems in the health field (32).

Regarding the output dimension, a suitable evaluation system was recognized to be one of the requirements of developing the hearing loss screening program, which was also verified in the study of Babakhani (2009), noting that the evaluation of care and health services could improve

decision-making in the field of resource allocation in the health system sector (33). Also, in Maynard's study (2003), it was suggested that carrying out a proper and comprehensive evaluation process directed health care systems towards the cost-effective and fair allocation of resources based on predetermined goals (34).

Examining the final indicators and feedback at all levels are also indispensable for developing a program for screening hearing loss in newborns. In the study of Jahanmehr et al., it was stated that performance evaluation should be a dynamic, developmental, and two-way process. Health system performance evaluation depends on the commitment, enthusiasm, and seriousness of individuals and governments and requires feedback on the results (35).

Improving the reporting, supervision, monitoring, and evaluation systems is mandatory when developing hearing loss programs for babies. Hamalaw et al., who scrutinized infectious disease surveillance systems in Mosul, Iraq, stated that the timeliness of services in the health system was important, and one of the requirements for timeliness is the availability of quality data and transparent reports (36).

Limitations and Implications

One of the limitations we faced in this study was the busy schedule of the managers and experts, causing them to have a narrow and limited time for participating in interviews. So, we tried to arrange the time and place of the interviews based on the participants' preferences. An inherent limitation of qualitative studies is the fact that interviews can be time-consuming and exhausting. Another limitation was that a few studies had been conducted on newborn hearing screening programs based on the CIPP comprehensive model. For future studies, we recommend investigating the factors affecting the development and implementation of newborn hearing screening programs, including managerial approaches towards the establishment of these programs and resource allocation priorities in the field of newborn hearing screening. It is also suggested to use new technologies such as those based on artificial intelligence in the implementation of these programs.

Conclusion

According to the findings of this research, the requirements for properly implementing a newborn hearing loss screening program include conducting pilot studies, conducting needs assessment, evidence-based programs, promoting organizational culture, developing policies and laws, compiling protocols and guidelines, setting goals and appropriate indicators, prioritizing services, conducting epidemiological investigations, allocating sufficient resources, identifying beneficiaries, ensuring all-round cooperation, providing comprehensive training, designing appropriate decision-making systems, establishing effective communicational routes between service delivery levels, documenting all service delivery levels, and paying attention to personnel motivation. Moreover, the existence of a suitable evaluation system, continuity of evaluation, updating the evaluation process, and appropriate evaluation in-

dicators seem necessary for developing the screening program.

Authors' contributions

EM: Study design, data collection, writing the proposal, LV: Assistance in the preparation of the manuscript, SM: Data collection, MB: Data analysis, manuscript preparation, supervision. All authors have read and approved the final draft of the manuscript.

Ethics approval and consent to participate

This research, extracted from a Ph.D. thesis in the field of health services management by Ehsan Moradi-Joo, was approved by the Ethics Committee of the Ministry of Health of Iran with number "IR.KMU.REC.1401.415. This study is part of the doctoral thesis. All protocols in this study were conducted in accordance with the ethical guidelines of Declaration.

Conflict of Interests

The authors declare that they have no competing interests.

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