Exploring Training Needs in Educational Audiology of Teachers in Support Services for Children with Disabilities

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ABSTRACT:

This study aims to identify the knowledge and informational needs in audiology among teachers working in Educational Support Services for Children with Disabilities or Developmental Risk in Costa Rica, from birth to six years old. Using a qualitative, descriptive, and phenomenological approach, data were analyzed from semi-structured interviews and autobiographical narratives of 17 participants, including teachers and regional or national advisors.

The findings highlight significant gaps in the theoretical and practical training provided to teachers, particularly in audiological topics. Participants emphasized the lack of specialized education in areas such as auditory evaluations, the use of assistive hearing devices, and inclusive communication strategies. Additionally, the study reveals a disconnect between medical and educational models, underscoring the need for interdisciplinary collaboration among audiologists, educators, and families to enhance support for children with hearing disabilities.

The results call for the development of targeted training programs, informational guides, and collaborative practices to bridge existing gaps. Furthermore, the importance of implementing educational audiology programs in Costa Rica is emphasized, as these programs would strengthen teachers' competencies and promote sustainable inclusive practices. This integrated approach aims to improve educational outcomes and the overall quality of life for children with hearing disabilities in Costa Rica.

Keywords: Educational audiology, inclusive education, hearing impairment, deaf people, early education.

INTRODUCTION

Hearing impairment is one of the most common chronic conditions worldwide. According to the World Health Organization (WHO), of the 466 million people with hearing loss globally, 34 million are school-aged children (WHO, 2021). Hearing loss, also known as hypoacusis or auditory deficiency, is defined as an alteration in the normal hearing range and can have multiple causes, as well as various classifications based on the affected area, the onset timing, or the degree of intensity. Hearing impairment, on the other hand, refers to the limitations imposed by hearing loss on performing daily tasks within a specific environment (Santos et al., 2006; WHO, 2021).

The early years of life represent critical periods for linguistic, cognitive, social, and emotional development. During this stage, adequate access to auditory stimuli is essential for language acquisition and the establishment of fundamental communication skills. Undiagnosed or untreated hearing conditions can significantly hinder language development, directly affecting academic performance and limiting access to information. Furthermore, these barriers may restrict opportunities for participation in social, educational, and familial contexts, impacting the child's emotional well-being and social integration. Therefore, identifying and addressing hearing needs early is crucial to ensuring equitable and comprehensive development. This scenario highlights the importance of implementing interdisciplinary strategies and specific educational programs to minimize the impact of hearing conditions during the early years of life (Santi-León, 2019).

Early and timely intervention for children with hearing loss is essential. However, over the years, the approach to hearing impairment has been a subject of contention, primarily between the educational and medical sectors, due to differing perspectives on disability. The debate between oralist and bilingual models is less a scientific issue and more a political and ideological one (Peluso, 2019).

Currently, there is a push to understand deafness from a social perspective, advocating for the use of sign language and recognition of deaf culture, while also providing necessary auditory support from the medical field. This approach avoids framing deafness solely as a problem to be cured, instead supporting the learning of oral and written language while respecting diverse communication methods (United Nations, 2006).

Joint efforts are needed to comprehensively address the needs of deaf children, incorporating social, family, and personal aspects. This could be effectively achieved through an interdisciplinary approach and coordinated work in the field of educational audiology.

Educational audiology, as defined by the Educational Audiology Association, is a branch of audiology focused on assessing acoustic environments, addressing children's auditory needs within educational settings, selecting, adjusting, verifying, and validating assistive devices, and educating the staff involved in the child's care, as well as their peers and family (2020).

Countries like the United States have implemented educational audiology programs since the 1960s, achieving significant progress through the involvement of audiology professionals in school environments. However, educational audiology remains one of the greatest challenges in professional practice, while also presenting an opportunity to make a meaningful difference in the lives of deaf children (Johnson & Seaton, 2021). Despite the recognized importance of interdisciplinary work, there is limited systematic data on collaborative experiences between audiology professionals and educational staff.

In the United Kingdom, educational audiology emphasizes training professionals to evaluate, diagnose, and treat auditory disorders, focusing particularly on integrating students with hearing loss into educational environments. These programs prepare audiologists to collaborate with educators, families, and other health professionals, ensuring that students with hearing difficulties receive the necessary support for their academic and social

development. Furthermore, the training includes the use of advanced auditory technologies and adapted communication strategies, promoting inclusive and high-quality education for all students (British Association of Educational Audiologists, n.d.).

In Costa Rica, the Ministry of Public Education (MEP) is responsible for early intervention services for deaf children from birth to six years of age. These services employ specialized educators in special education, aiming to provide all school-aged children with quality education tailored to their individual or group support needs, fostering holistic development with equal opportunities and rights.

Despite these efforts, teachers face significant challenges in addressing the needs of children with hearing loss. In Costa Rica, training options in the education of deaf individuals are limited, and there is no specialized training in educational audiology for teachers. Additionally, there are no consistent collaborations between audiology professionals and teachers to promote collaborative work, often resulting in conflicting approaches between the two groups (Cortez, 2017).

Educational support services play a fundamental role by providing early interventions for children with disabilities. However, the effectiveness of these interventions largely depends on the knowledge and skills of the teachers implementing them. In the audiological field, despite its importance, there is a lack of studies addressing the specific competencies and training needs of special education teachers in Costa Rica.

In this context, the present study aims to identify the knowledge and informational needs in audiological topics among teachers working in the Educational Support Service for Children with Disabilities or Developmental Risk from Birth to Six Years of the Ministry of Public Education. This research seeks to foster collaborative work between teachers and audiology professionals, facilitate the creation of informational guides and teacher training programs, and enhance the comprehensive care of deaf children during their early years, ultimately ensuring a better quality of life and academic future.

METHODOLOGY

2.1. Design

This study was conducted using a qualitative approach under a descriptive and phenomenological design.

Initially, the aim was to describe the specific characteristics of audiological approaches in the education of deaf individuals and process the information from an analytical and deductive perspective. Simultaneously, the study sought to achieve a comprehensive understanding of the lived experiences of teaching staff and the impact of these experiences on their professional development.

2.2. Participants

A non-probabilistic convenience sampling method was employed due to the recent establishment of the service, resulting in a limited number of appointed teachers distributed across various regions of the country. The sample was divided into two groups: teachers and regional or national special education advisors from the Ministry of Public Education (MEP). The following inclusion criteria were applied:

A. Teachers: 1)Actively appointed in the Educational Support Service for Children with Disabilities or Developmental Risk from birth to six years. 2)A minimum of two years of experience in the service. 3)Professional training in the field of special education.

B. Advisors: 1) Regional or national special education advisors from the MEP with knowledge of the operations of the Educational Support Service for Children with Disabilities or Developmental Risk from birth to six years. 2) A minimum of two years of experience in an advisory role involving work with deaf individuals or participation in the planning processes of the service.

Exclusion criteria included teachers from other educational levels without special education training and those not working with children with hearing

disabilities. Advisors who were not responsible for teachers in the Educational Support Service for Children with Disabilities or Developmental Risk from birth to six years were also excluded.

The study sample consisted of 17 participants, including 12 teachers (11 women and 1 man) with an average of 13 years of professional experience, and 5 special education advisors (4 women and 1 man) with an average of 14 years of professional experience.

2.3. Data collection instrument

Two data collection techniques were employed: semi-structured interviews and autobiographical narratives. Semi-structured interviews were conducted with the advisors, while autobiographical narratives were used with the teachers.

The semi-structured interview guide consisted of nine open-ended questions focusing on:

- Experience in supporting teachers working with deaf students.
- Training received for addressing the needs of deaf students.
- Description of the ideal profile for a teacher working with this population.
- Key challenges faced.
- Knowledge of educational audiology.
- Main informational and training needs in audiological topics.

The autobiographical narrative guide for teachers included five open-ended questions related to:

- Experiences and training in audiological topics.
- Primary strategies and resources used to work with deaf students.
- Main training and informational needs in audiological topics.
- A personal account of their professional experience with children with hearing disabilities.

Both guides were reviewed and validated by professionals in research, audiology, and special education to ensure the relevance of the questions. All suggested modifications were incorporated into the final version of each guide.

2.4. Fieldwork

The fieldwork was conducted in the following stages:

1. Contact with the Department of Educational Support for Students with Disabilities at the Ministry of Public Education: Initial contact was made with a national advisor, who provided a list of institutions offering educational services for children with disabilities or developmental risks from birth to age 6, along with the contact information of relevant teaching staff.
2. Email contact with each institution: Direct contact was made with the teaching staff and advisors, confirming that they met the inclusion criteria and were willing and available to participate in the study.
3. Database structuring and contact: Direct communication was established with the teachers and advisors to arrange meeting dates, confirm participation, explain the methodology to be followed, and clarify any questions regarding the research process.
4. Application of data collection instruments: Due to geographical location and time availability constraints, interviews and autobiographical narratives were conducted virtually via the Zoom platform (Zoom Video Communications, California, USA). Each session was recorded with the participant's prior consent. Two researchers participated in each session: one led the interview or narrative, while the other took notes on key aspects.
5. Transcription of data: The recordings were transcribed and stored in Google Drive folders (Google LLC, California, USA), with access limited to the research team only.

It is important to note that at each stage, a brief introduction to the research and an explanation of the study's objectives were provided, outlining the nature of each participant's involvement.

2.5. Data analysis

For the analysis of the collected data, the Atlas.ti platform (ATLAS.ti, Scientific Software Development GmbH, Berlin, Germany) was used, allowing for the interpretation of the gathered information. The data was first coded and grouped into the following conceptual categories and subcategories:

- Information and training received on the comprehensive auditory approach for deaf children:
    1. Theoretical knowledge: Training and education received.
    2. Practical knowledge: Strategies for working with deaf individuals or auditory approaches.
- Teachers' needs regarding audiological information:
    1. Theoretical needs: Hearing impairment or loss, types and degrees of deafness, parts of the ear and their functions, hearing aids, and auditory technical supports.
    2. Practical needs: Audiological assessments, use of hearing aids, use of auditory technical supports, Auditory Verbal Therapy.

The analysis of the information continued until saturation was reached, meaning the diversity of ideas or new data was exhausted to ensure the reliability of the results.

A triangulation of techniques was used, where an analysis of the existing theoretical framework, the results from semi-structured interviews, and the autobiographical narratives was conducted.

2..6. Ethical considerations

This research responsibly adhered to the relevant ethical considerations regarding the proper handling of information from the study population, guided by the ethical principles of research: respect for the dignity of individuals, the principle of beneficence, the principle of non-maleficence, and the principle of autonomy. All participants signed an informed consent form before the start of the study, and it was explained to them that they had the right to skip any question or withdraw from the study at any time they deemed appropriate. The study was conducted in accordance with the principles of the Declaration of Helsinki. The anonymity of all participants was guaranteed, and any information that could identify them was restricted. Only the researchers had access to the recordings for the purpose of transcribing them. These videos were encrypted.

FINDINGS AND DISCUSSION

The information obtained during the fieldwork, through the techniques of semi-structured interviews and autobiographical narratives, was coded and analyzed, allowing for the classification of the data into three dimensions that align with the research objectives. Each of these dimensions was assigned at least one category (Figure 1).

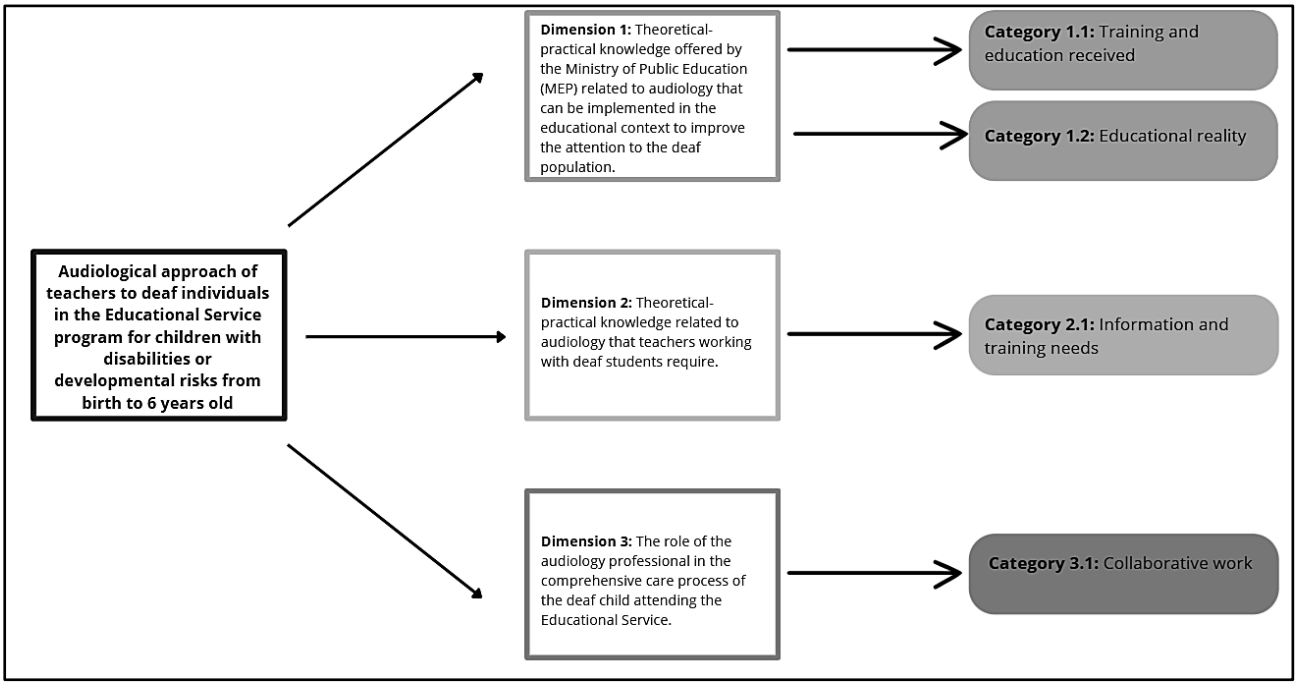

Figure 1. Diagram with dimensions and conceptual categories. Own elaboration

3.1. Dimension 1: Theoretical and practical knowledge in audiology, provided by the Ministry of Public Education (MEP) in the educational context

This dimension refers to both theoretical and practical knowledge provided by the Ministry of Public Education (MEP) to teachers and advisors to adequately support students with hearing disabilities. It encompasses the training and education received, and highlights an emerging category related to the daily experiences of the teaching staff (Figure 2).

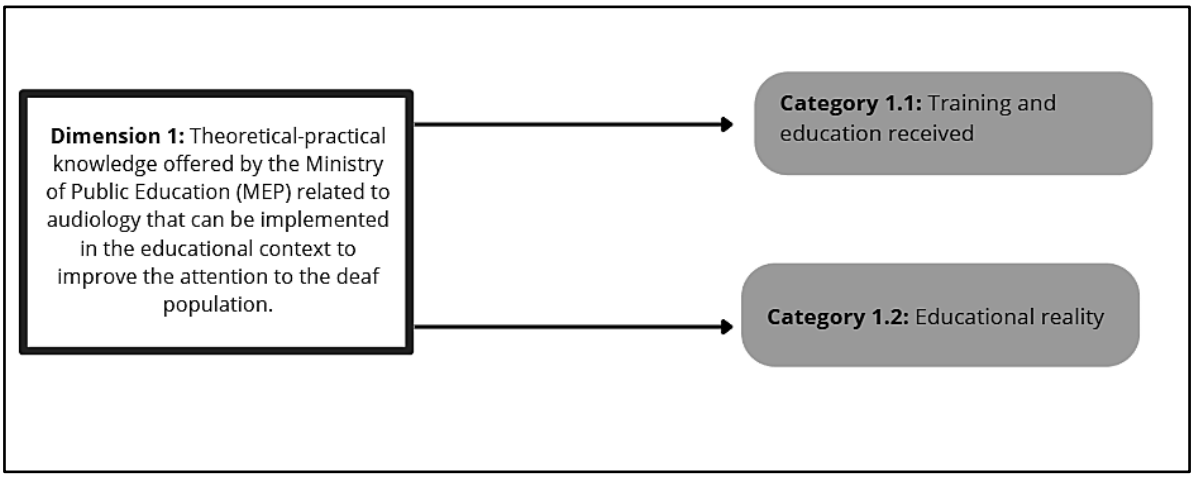

Figure 2. Diagram of dimension 1 and its categories. Own elaboration

3.1.1. Category: Training and education received

Teacher training in special education is crucial to ensuring quality education tailored to the needs of this population. Teachers face significant challenges due to an initial generalist preparation that does not specifically address the needs of individuals with hearing disabilities. One teacher expressed: *"In university, we only received general overviews, but never anything specific for hearing disabilities"*. Furthermore, the training provided by the Ministry of Public Education (MEP) is considered insufficient, leaving

teachers with limited technical and practical knowledge to meet the particular needs of students with hearing loss. One participant mentioned that after 26 years working with the MEP, they had never received any training related to hearing loss; another participant commented:*"The MEP rarely trains teachers to work with any type of population, and in the case of deaf individuals, I have never received any training from the MEP for this"*.

The research reveals contradictions within the Costa Rican educational system. On one hand, organizations and programs are developed to train teaching staff, but in practice, many individuals are assigned to positions supporting students with hearing disabilities without adequate preparation. One participant described this challenge as "an achievement," highlighting the shortcomings in the educational system regarding audiological support and inclusive teaching. According to Concepción et al. (2019), the implementation of specific programs and the proper use of teaching materials are key to the formation and development of deaf students.

UNESCO (2013) emphasizes the need to provide professional learning opportunities for educators so they can face current challenges and provide inclusive teaching that meets the needs of all students. Santi-León (2019) also underscores that early intervention significantly influences the development of skills and learning throughout life. Therefore, it is crucial that teachers receive the necessary support and tools to assist students with hearing disabilities, ensuring their progress within the educational system. Although the MEP is responsible for providing training and supervision to teachers, limitations in resources and the lack of specific knowledge among advisors hinder the fulfillment of this task. This creates inequalities in the quality of education received by students with hearing loss.

However, some teachers highlight the importance of personal and professional commitment, adopting measures such as self-training to improve their skills and provide quality support. According to Valles-Ornelas et al. (2015), the intellectual task of the teacher includes understanding the needs of their students, adapting to current changes and challenges.

3.1.2. Category: Educational reality

The education of students with hearing loss or deafness in Costa Rica faces an environment full of challenges where social, pedagogical, educational, and health-related aspects converge. To ensure equitable education, it is essential that these components work in synergy. However, the experiences shared by teaching staff and advisors reflect various difficulties that hinder the achievement of this goal. One of the main challenges lies in the relationship between regular teachers and itinerant specialists in hearing and language. One participant noted: *"When the itinerant teacher arrives, we don't know what they did or what strategies they implemented. There's no communication, and this makes it difficult to follow up"*.

Although the Ministry of Public Education (MEP) establishes in its regulations the importance of teamwork and effective communication between teachers (MEP, 2005b), this practice has not materialized in many schools. This disconnection directly affects the quality of educational support and limits the implementation of resources and strategies adapted to the needs of students, such as hearing aids, cochlear implants, and the use of sign language.

Another recurring concern is the lack of specialized teaching staff. According to Desueza (2021), it is common for schools not to have a special education teacher with a focus on hearing and language; usually, they only have an itinerant teacher who comes a few hours a week.

This reality creates additional challenges for teachers. One participant described their experience in the service classroom: *"Here, we attend to the entire population: autism, cerebral palsy, Down syndrome, blindness. Everything is attended to in one classroom with 20 children. It's overwhelming, and education for the deaf child is neither adequate nor equal to that of their peers"*.

This overload makes it difficult for staff to provide individualized, quality attention, limiting the academic progress of students with hearing loss or deafness.

Franco (2011) emphasizes the importance of an individualized approach, as *"so many variables influence the impact of hearing loss on development and education… Each child requires and deserves individualized consideration"* (p. 304). This underscores the need for teaching staff to receive continuous training in audiological topics and specific strategies to support this population.

It is crucial to promote ongoing training for teaching staff, encourage interdisciplinary collaboration, and ensure sufficient resources are allocated to meet the needs of this population. As one participant expressed: *"We want to give them the best, but we need support, training, and tools. This is not just a personal struggle; it's a commitment from the entire educational system"*

By addressing these deficiencies, progress can be made towards an inclusive and quality education that allows individuals with hearing loss or deafness to reach their full potential.

3.2. Dimension 2: Theoretical and practical knowledge in audiology for teachers

This second dimension focuses on the theoretical and practical knowledge related to audiology required by teachers of students with hearing disabilities, in line with the services established by the MEP. The goal is to ensure that all students benefit in terms of their holistic development and access to quality education. This dimension includes the theoretical and practical needs highlighted by teachers and advisors related to audiology and hearing disabilities to conduct a comprehensive approach to the child (Figure 3).

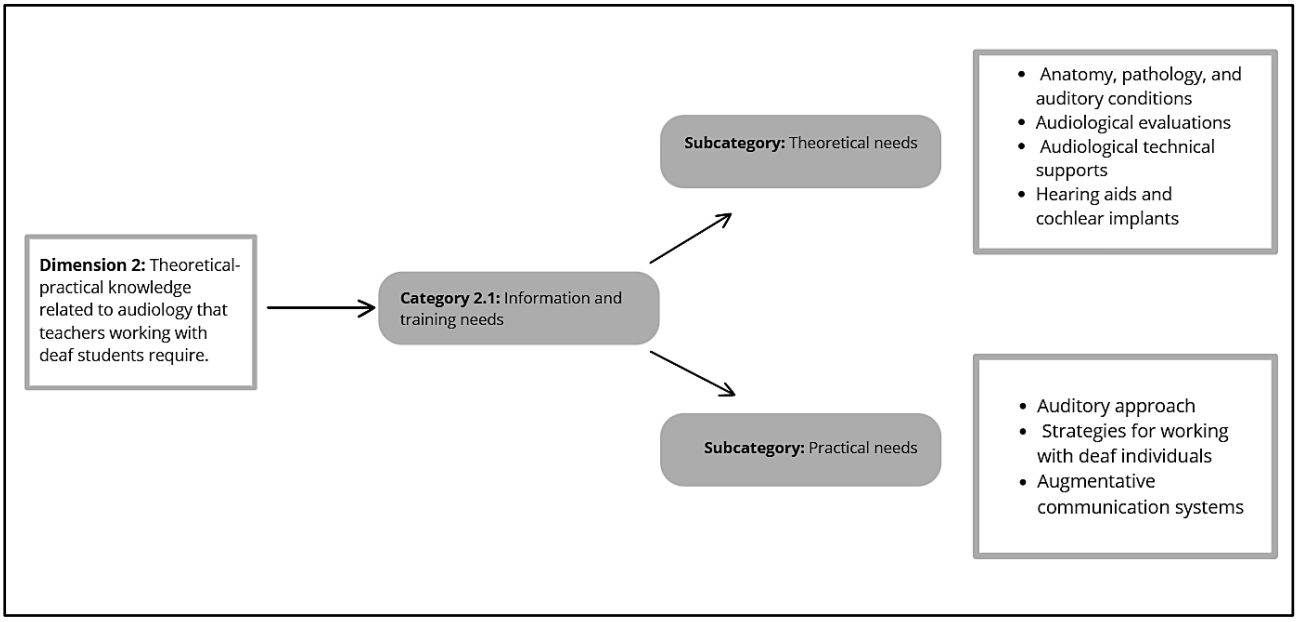

Figure 3. Diagram of dimension 2 with its categories and subcategories. Own elaboration

3.2.1. Category: Information and training need

Both the participants, advisors, and teachers indicated that in order to carry out effective work, actions need to be taken to increase knowledge and establish realistic and achievable goals in favor of access to quality education. In this regard, receiving timely information and training enables teachers to access new ways of professional development, while also adjusting to classroom conditions and the needs of students.

3.2.1.1. Subcategory- Theoretical needs: Anatomy, pathology, and auditory conditions

Understanding the anatomy of the ear and auditory pathologies in the child population (0 to 6 years old) is a crucial aspect for the development of inclusive educational strategies that allow overcoming

barriers in the learning of students with hearing disabilities. Limitations in teachers' knowledge about these topics directly affect their ability to implement pedagogical adjustments that facilitate access to quality education and respect the rights and culture of this population. The Ministry of Education of the Government of Chile (2007) emphasizes that hearing difficulties are not related to cognitive or intellectual processing but to damage in the peripheral nervous system that hinders the reception of sound stimuli. This highlights the need to train teachers in basic audiology so they can understand how these limitations impact learning processes. Additionally, it is noted that students with hearing disabilities tend to rely more on their vision to monitor their surroundings, which is often mistaken for attention problems.

In the Costa Rican context, the participants showed significant gaps in teachers' knowledge. One participant expressed: *"...what is the difference between conductive hearing loss and sensorineural hearing loss, for example, why is it so important to address it, because they have falls in high frequencies, and what should I then focus on"*. Another participant highlighted that teachers: *"...should have knowledge about everything related to audiology for decision-making and support management."*

This knowledge would not only allow teachers to improve the educational services offered but would also contribute to their professional development, training them to act as mediators between educational agents and ensuring comprehensive care for students. In this regard, Sánchez (2018) states: "The study of the anatomical structures involved in hearing and language processes increases knowledge about the difficulties in the education of people with hearing disabilities, thus improving the training of teachers related to this issue" (p.51).

Therefore, teacher training should be considered a priority to reduce educational barriers, fostering the integration of clinical and educational knowledge that enables informed decision-making and proper support management. In this way, teachers will not only understand the social and educational aspects of hearing disabilities but also the clinical mechanisms mediating them, thus promoting a more inclusive and effective education.

3.2.1.2. Subcategory-needs: Theoretical Audiological assessments

Understanding the main audiological tests is essential for teachers to interpret diagnoses related to hearing disabilities and design educational strategies that respond to the specific needs of each student. Key assessments include audiometry, logo audiometry and acoustic immittance tests. The Spanish Association of Audiology (AEDA, 2002) highlights that these tests allow identifying issues from infections to structural problems that can cause various types of hearing loss, which directly impacts the perception of the sound environment and language learning.

The Ministry of Education of the Republic of Peru (2013) emphasizes that "any loss of auditory function, whether total or partial, even if minimal, will influence language development, learning, and interaction with the environment" (p.9). In this regard, knowing the type and level of hearing loss not only allows adapting strategies in the classroom but also promotes the social and educational development of the student. One participant explained: *"It is essential to interpret audiological diagnoses and understand how these results may affect the student's development."*

The goal of this knowledge is not for teachers to manage clinical or rehabilitation processes, but for them to adjust resources and pedagogical strategies to promote communication and learning. The Ministry of Education of the Government of Chile (2007) illustrates how hearing losses of various degrees affect sound perception and emphasizes the need for specific support even for students with mild losses.

Additionally, López and Guillén (2008) emphasize that adjustments made for students with hearing disabilities also benefit the rest of the students by fostering values such as solidarity, empathy, and teamwork, contributing to an inclusive learning environment. Despite its importance, participants noted that the lack of information about these tests

is a recurring barrier in Costa Rican education. One teacher shared: *"There are diagnoses that are brought to us, and we don't fully understand the degree or level of auditory deterioration."*

This reflects the urgent need to train teachers in audiological assessments and their implications. By providing adequate resources and training, frustrations in the classrooms could be reduced, and teaching processes improved, ensuring that each student receives educational care tailored to their needs and potential.

3.2.1.3. Subcategory -Theoretical needs: Auditory technical support

Auditory technical support includes devices, software, and computer tools that enhance the perception of auditory signals, facilitating communication and access to information for people with hearing disabilities (Hípola, 2006). These devices, such as hearing aids and cochlear implants, aim to reduce educational barriers and promote equal opportunities. In Costa Rica, the management of these supports primarily falls on teachers, who face challenges due to a lack of specialized knowledge. One participant pointed out: *"Teachers should have knowledge about everything related to audiology for decision-making and support management."*

The lack of training on hearing aids and their impact on students limits the use of available resources. According to Hípola (2006), technical support "provides enormous possibilities for application and is necessary to achieve equality of opportunities [...] in educational, social, and labor integration" (p.134). Although not all students with hearing disabilities require these devices, their proper implementation can level the access to quality education. However, myths persist, such as the belief that using hearing aids guarantees immediate auditory rehabilitation, highlighting the need to train teachers in understanding and managing these supports.

3.2.1.4. Subcategory- Theoretical needs: Hearing aids and cochlear implants

Hearing aids and cochlear implants are classified based on the amplification route: air, bone, or electrical (Ribalta and Díaz, 2016). These devices are essential for minimizing the barriers faced by people with hearing disabilities when accessing information and education. However, teachers' knowledge about their functionality and benefits is limited, which negatively affects the quality of education.

One participant emphasized the need for teachers to understand the functionality of these technologies and their impact on access to auditory information. Furthermore, false beliefs were identified, such as the idea that a cochlear implant eliminates deafness. According to Palma-García (2019), "even when implanted, these people still depend largely on sign language [...] and they are late to it due to the myth of the self-sufficiency of the implant" (p.15).

The bilingual model, which integrates sign language and spoken language from early ages, offers a more inclusive path for the linguistic and educational development of students with hearing disabilities (Morales, 2019). However, the lack of audiology services in school systems and limited teacher training hinder the effective implementation of these strategies (Deconde and Seaton, 2021). One participant emphasized the importance of identifying available technological tools and adapting educational programs to the specific needs of each student, stressing that teacher training in this area should be a priority to guarantee the right to inclusive and quality education.

3.2.1.5. Subcategory- Practical needs: Strategies for working with deaf people

Teaching work with people with hearing loss or deafness is crucial to ensuring inclusive and quality education. However, according to Marchesi (2009), integrating students with hearing loss requires teachers who are aware of communication barriers and capable of providing the necessary supports. Despite this, some teachers highlight the lack of training in skills such as using lesco (Costa Rican Sign Language), which hinders inclusion in regular classrooms. Bernal (2018) highlights that the current challenge is to transform teaching processes through student-centered strategies. However, the lack of specialized training leads teachers to use trial-and-error methods, as one participant stated:

"What has worked continues to be used, and what hasn't been discarded."

The Ministry of Public Education (MEP) has specialized personnel in hearing and language, but collaborative work with classroom teachers is not always encouraged, which limits the development of effective strategies. One participant emphasized the need for more preparation in these teams to recommend practical actions in classrooms. Although teachers make significant efforts to adapt to their teaching, these strategies must be adjusted to the auditory characteristics of each student. Early attention and synergy among professionals are key to ensuring inclusive and successful learning.

3.2.1.6. Subcategory -Practical needs: Augmentative or alternative communication systems

Augmentative communication systems offer non-verbal alternatives to oral communication, essential in teaching children with hearing disabilities. In the MEP educational service for children aged 0 to 6, these tools are crucial to overcoming initial communication and teaching barriers. These systems facilitate interaction and capture the attention of students with hearing loss, while parents choose between using lesco and verbal communication supported by hearing devices.

However, the lack of lesco training among teaching staff limits their ability to ensure effective communication and respect the right of deaf children to be educated in sign language as their primary language. According to the participants, it is urgent to integrate lesco into education and teacher training, as Lissi et al. (2012) point out, "greater emphasis is needed on developing sign language skills in the initial training of teachers for the deaf" (p.316). In the face of this gap, teaching staff have self-trained using tools such as pictograms, songs, and basic signs, which, according to Velasco and Pérez (2012), are manual and graphic aids to facilitate communication. To guarantee equitable access to learning, it is essential that children have communication systems from the start that meet their needs, whether through sign language or spoken Spanish with technical support. These measures ensure that students with hearing disabilities participate on equal terms with their hearing peers.

3.3. Dimension 3: The Role of Audiology Professionals in the Comprehensive Care Process of Deaf Children Attending the Educational Service for Children with Disabilities or Developmental Risk from Birth to 6 Years

This dimension establishes the need to foster and strengthen collaborative work between audiology professionals and teachers, as well as an integrated approach with the families of people with hearing disabilities. This refers to an area of audiology still underdeveloped in Costa Rica called educational audiology, which responds to and supports everyone involved in the education sector working directly or indirectly with the hearing-impaired population and their families (Figure 4).

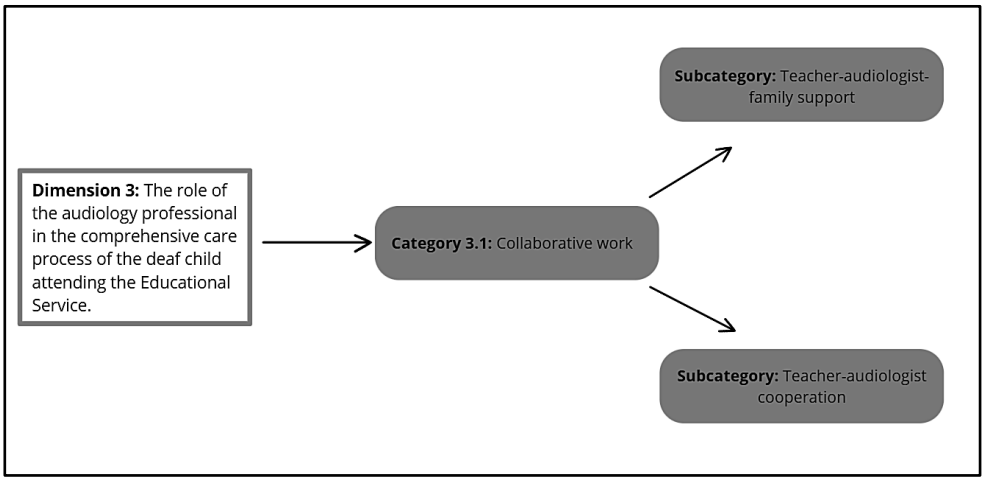

Figure 4. Diagram of dimension 3 with its categories and subcategories. Own elaboration

3.3.1. Category: Collaborative work

Education professionals face multiple challenges when addressing the teaching of children with hearing disabilities in the MEP program for children aged 0 to 6 years. These difficulties arise due to the lack of collaborative work between the educational and health sectors, which negatively impacts access to inclusive and quality education.

Educational audiology is identified as a key need to ensure proper auditory services in educational settings. According to the Educational Audiology Association (2020), these professionals evaluate, diagnose, and manage technical supports, facilitating listening and communication in the classroom. However, in the country, this specialty requires development to alleviate the workload of teachers and advisors, who face multiple demands, including administrative tasks and attending to students with various disabilities. Furthermore, participants highlight the gap between the medical (rehabilitative) and educational (inclusive) models. This mismatch creates barriers and confusion for students, who face incompatible expectations and objectives between both sectors.

The role of teachers is crucial to ensure access to education, but it requires constant support from audiologists and continuous training. One of the most important recommendations is to promote collaborative work, allowing the integration of areas and innovative strategies that benefit the students. One participant suggested making the educational model more flexible to incorporate rehabilitative information, preventing its absence from becoming an additional barrier. This approach promotes comprehensive care based on participation and inclusion.

Finally, two central subcategories are highlighted:

1. Teacher-audiologist support: To coordinate strategies and ensure access to necessary tools.
2. Teacher-audiologist-family support: To work together on personalized solutions that address each student's specific needs. These joint efforts are essential to overcome current challenges and ensure that children with hearing disabilities have an inclusive and equitable educational experience.

3.3.2. Subcategory: Teacher-audiologist support

Collaborative work is a fundamental tool to ensure a comprehensive approach adapted to the educational needs of students with hearing disabilities. According to Lledó (2008), in the field of education for people with hearing disabilities, it is crucial to design new strategies that respond to diversity and the different learning styles of students. This approach emphasizes the importance of integrating medical and technical criteria provided by audiologists with the pedagogical strategies used in the classroom. Participants have identified several challenges in this process, including: a) the lack of effective communication because there is little interaction between the different parties involved, making it difficult to integrate interdisciplinary perspectives, 2) the teacher workload, where the high number of students, combined with administrative tasks, limits educators' ability to implement specialized strategies and, 3) the need for training: Training in basic topics related to hearing and inclusion is essential to strengthen educational skills and overcome barriers in the classroom.

Collaborative work is seen as an essential complement to address the educational needs of students with hearing disabilities. This approach allows:

- Involving audiologists in the educational process to provide technical solutions and specific strategies.
- Coordinating with families to ensure effective intervention aligned with the child's needs.
- Training teaching and administrative staff in inclusive tools and strategies, contributing to the development of quality educational skills.

Pedrosa and Cobo (2017) highlight that these methodological approaches foster an inclusive environment where children with hearing disabilities can fully participate in the educational system and society. Interdisciplinary collaboration not only enriches the educational experience but

also breaks down barriers, ensuring equal opportunities for academic and professional development.

3.3.3. Subcategory: Teacher-audiologist-family support

Support for the families of students with hearing disabilities is a crucial element in promoting inclusion and ensuring the full development of children within the educational system. However, there is no formal space in the Costa Rican educational system dedicated to this purpose.

Active family participation in the educational process is essential, as mentioned by the participants. Specific guidance is needed to help families understand the characteristics and needs of their children, as well as the required support. This support can lead to significant changes at home and create appropriate development environments. Inclusion not only benefits people with disabilities but also enriches communities and improves the educational system (Coppola, 2010). To achieve this, it is essential to work together with teachers, audiologists, and families, promoting comprehensive care that transcends the initial school integration stage and fosters equal opportunities.

3.4. Limitations and future research

The main limitations of this study were the small sample size, which limits the generalization of the results to the entire population. However, it is important to clarify that educational services for children with disabilities or developmental risks from birth to 6 years old are newly implemented in the country, so there are a limited number of teachers assigned to these services. Another limitation was the access to participants due to geographic location, which required conducting interviews and autobiographical accounts online, potentially leading to the loss of important data for qualitative analysis. This was attempted to be mitigated by having at least two researchers present during each session to avoid data loss or bias from a single researcher's subjectivity.

Future research should involve a larger sample and diversify educational contexts and levels. It could also explore the perspectives of families of deaf students and investigate new collaborative work strategies. Additionally, based on the information obtained in this study, guides could be developed to address the main training needs of teachers.

CONCLUSION

The teaching staff and participating advisors exhibit a lack of specific training in audiology, which can create barriers in the learning process of students with hearing disabilities. It is crucial that teachers understand the implications of hearing loss on language development, communication, and learning, and that they are familiar with strategies to create an accessible educational environment. The importance of collaborative work between audiology and education professionals is emphasized to achieve a comprehensive approach for students with hearing disabilities. Interaction between both professionals would allow for a better understanding of the student's needs, as well as the implementation of more effective pedagogical and support strategies.

The participation of audiology professionals in the Ministry of Education's educational programs is crucial, as it will directly address the auditory needs of children with hearing loss. These professionals can contribute to academic development by identifying characteristics, needs, and necessary accommodations, with clear objectives established.

Educational audiology should be implemented as part of educational services to provide theoretical and practical information on hearing disabilities, hearing devices, communication strategies, and collaborative work among professionals, thereby promoting educational inclusion.

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