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HEARING LOSS IN CHILDHOOD: WHAT DO NURSING STUDENTS AND PROFESSIONALS KNOW?

PERDA AUDITIVA NA INFÂNCIA: O QUE SABEM ESTUDANTES E PROFISSIONAIS DE ENFERMAGEM?

Marly Saragossa[1], Vanessa Luisa Destro Fidêncio[2*]

ABSTRACT: **Aim:** To assess the knowledge of nurses and nursing students about hearing loss in childhood. **Methodology:** A total of 52 individuals (20 nursing students and 32 nurses) participated in the study and answered an online questionnaire consisting of 20 questions divided into four domains about hearing loss in childhood. Descriptive statistical analysis of the data and the Mann-Whitney test were performed, with a significance level of $p<0.05$. **Results:** The average score on the questionnaire was 12.9 among students and 13.13 among professionals. There was no significant difference between the groups regarding the total score on the questionnaire or between the results of the different domains ($p>0.05$). In the isolated analysis of the questions, a significant difference was observed in question 11 ($p=0.019$) and in question 15 ($p=0.049$). **Conclusions:** Nursing students and professionals have limited knowledge about general issues of prevention and care in childhood hearing health, with no significant difference between the groups.

KEYWORDS: Hearing loss. Knowledge. Nurses.

RESUMO: **Objetivo:** Foi avaliar o conhecimento de enfermeiros e estudantes de enfermagem sobre a perda auditiva na infância. **Metodologia:** Participaram 52 indivíduos (20 estudantes de enfermagem e 32 enfermeiros) que responderam, via formulário on-line, a um questionário composto por 20 questões, dividido em quatro domínios sobre perda auditiva na infância. Realizou-se análise estatística descritiva dos dados e o Teste Mann-Whitney, com nível de significância de $p<0,05$. **Resultados:** A pontuação média no questionário foi de 12,9 entre os estudantes e 13,13 entre os profissionais. Não houve diferença significativa entre os grupos com relação a pontuação total do questionário ou entre os resultados dos diferentes domínios ($p>0,05$). Na análise isolada das questões, observou-se diferença significativa na questão 11 ($p=0,019$) e na questão 15 ($p=0,049$). **Conclusões:** Estudantes e profissionais de enfermagem apresentam conhecimento limitado sobre questões gerais de prevenção e cuidados em saúde auditiva infantil, não havendo diferença significativa entre os grupos.

PALAVRAS-CHAVE: Conhecimento. Enfermeiros. Perda auditiva.

[1]Nurse. Master's student in the Postgraduate Program in Human Communication Health, Tuiuti University of Paraná. Curitiba (PR), Brazil.; [2]Speech Therapist. PhD in Sciences. Professor in the Postgraduate Program in Human Communication Health, Tuiuti University of Paraná, Curitiba (PR), Brazil.

***Corresponding author**: Vanessa Luisa Destro Fidêncio – *Email*: vanessa.destrof@gmail.com.

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INTRODUCTION

Worldwide, over 1.5 billion people present some degree of hearing loss. Among them, 430 million are estimated to have moderate or severe hearing loss in the ear with better hearing[1].

The development of oral language is closely correlated to the development of hearing skills. Thus, hearing loss in the child population damages the development of oral language, consequently, the higher the degree of hearing loss, the higher the hearing difficulty in perceiving and discriminating speech[2]. Even when hearing loss affects a single ear, that is, it is a unilateral hearing loss, the child is at risk of delayed oral language development, and may present vocabulary, hearing and speech disorders[3].

The speech therapist is the professional responsible for assessing, monitoring and refining hearing, speech aspects involved in the peripheral, central auditory function, including the universal neonatal hearing screening (UNHS)[4]. However, the role of the other involved professionals from the Health Area is promising regarding hearing health. Among them, the nursing professional, who can be a great supporter. Nurses work closely with families, and they may contribute to reduce the evasion rate of UNHS programs, and support the surveillance of babies and children at risk of or with confirmed diagnosis of hearing loss[5].

The National Policy for Integral Child Healthcare is structured to orient and qualify child healthcare actions and services within the Brazilian territory[6]. Nursing passes through different knowledge fields and social realities, and in the Brazilian Unified Health System (Sistema Único de Saúde - SUS), it stands out in the health promotion and disease prevention, resonating in the public policies on social well-being[7]. Nurses' performance in the Primary Healthcare entails, among others, the pregnant healthcare and nursing appointments on child healthcare to infants (0 to 24 months)[8]. In this sense, it is necessary to qualify those professionals in order to upskill their nursing healthcare actions.

Although they are hardly highlighted by the professionals[9], educational nursing actions on hearing health favor early hearing health diagnosis and intervention, reducing its consequences and, consequently, promoting better health conditions[9-11]. However, evidence points to existing weaknesses in multiprofessional teams of family healthcare regarding hearing health[12].

A study[13] carried out with nurses in Northern India showed that the assessed professionals had scarce knowledge and attitudes toward hearing loss in the child population. In another study[14] conducted in South Africa, the authors reported deficit in the assessed nurses' knowledge regarding the risk indicators for hearing impairment, which prevented children from being referred to assessment at a specialized service. In a study[15] conducted in Samoa, results showed low levels of awareness among this population on early identification and intervention of hearing loss in childhood. In Brazil, studies addressed the knowledge of nursing undergraduates on breastfeeding[16], on the newborn screening test[17], but not on hearing loss in children. Meanwhile, it is also important for those students to understand general questions on the theme, as these concepts may provide them with solid foundation for them to get started in the professional practice in the area[18].

Importantly, speech therapists must have a basic notion on the knowledge status of the target public on this theme so that they can provide proper information on hearing loss in children, in order to establish a starting point[13]. In this sense, it is indispensable to assess nurses and nursing students' knowledge for proper strategies to be built in order to guide that population regarding this theme, and favor healthcare. Thus, the current study aimed to assess nurses and nursing undergraduates' knowledge on hearing loss in children.

METHODOLOGY

ETHICAL ASPECTS AND TYPE OF STUDY

The current study is an observational, prospective, analytical, cross-sectional study, approved by the Ethical Committee on Research of the Tuiuti University of Paraná, opinion number 6.771.257, and Certificate of Presentation for Ethical Consideration (Certificado de Apresentação para Apreciação Ética – CAAE in Portuguese) register number 78518224.3.0000.8040. The participants confirmed their participation in the study by means of the Free Informed Consent Form, electronic format.

SELECTION CRITERIA

The following criteria were adopted for the inclusion in the study: to be a nursing undergraduate from any term and Higher Education Institution (HEI) or graduated from a nursing course, to be 18 years old and over. As the exclusion criterion, incomplete response to the proposed questionnaire.

The sample selection was held by the "Snowball" sampling method. In this kind of probabilistic sampling, the early participants in the study indicate new participants who, in turn, indicate new participants successively until the objective of the study is achieved, and saturation point is reached.

The invitation for participating in the study was held by releasing the research information and link to access the questionnaire on social media, on whatsapp groups, and researchers' profile on the Instagram. Data collection was conducted online through a formulary elaborated in Google Forms.

COLLECTION INSTRUMENT

On the first page, the Free Informed Consent Form was presented. Individuals could only read and fill out the questionnaires after accepting the Free Informed Consent Form. On the second page of the formulary, questions regarding general data were presented. On the third page, the instrument[5] on hearing loss in children displayed.

The participants answered questions on gender, age, length of work in the area and work place (if already a professional), if they have already cared for patients (as an intern), if they have already been oriented on hearing health, and if they have already attended a postgraduation course (if already a professional).

In order to assess their general knowledge on childhood hearing loss, the participants answered a questionnaire[5] comprising 20 items, divided in 4 domains, as follows: (1) Basic concepts (items 1 to 6); (2) Prevention (items 7 to 10); (3) Techniques of identification and diagnosis of hearing impairment (items 11 to 16), and (4) General aspects of hearing impairment involved in the intervention (items 17 to 20). Each item had a statement, and the participant should classify it as "true" or "false". Each correct answer scored 1 point, and incorrect responses scored 0 points. Therefore, the total score of the instrument varies between 0 and 20 points. Thus, the higher the score, the higher the amount of correct responses.

DATA ANALYSIS

The participants were divided in two groups, as follows:les: SG (comprising nursing students) and PG (comprising nursing professionals). The PG was divided in two subgroups, PG1 (professionals graduated for as long as ten years), and PG2 (professionals graduated for over ten years).

Descriptive statistical analysis of the data was carried out, Shapiro-Wilk Test to verify data distribution, and Mann-Whitney Test in order to compare results between the different groups. The level of significance adopted was $p<0.05$. Analysis was held by means of the Jamovi 2.3.28 software.

RESULTS

Fifty-six (56) individuals answered the formulary. However, four were excluded from the sample for not fully completing it. Therefore, the final sample comprised 52 participants, among them, 20 nursing undergraduates (SG), from those, 70% were females, and 32 nursing professionals (PG), from those, 71.88% were females. All participants lived in Paraná State, Brazil. Participants' age from the SG group ranged from 19 to 55 years, while in the PG group, age ranged from 27 to 67.

From 20 participants in the SG, 10% attended the first semester of the graduation course, 20% from the 5th semester, 20% from the 6th semester, 20% from the 7th semester, and 30% from the 9th semester. Among the undergraduates, 75% reported caring for patients during practical internship. Among the PG participants, length of time from graduation ranged between 2 and 26 years.

From 32 participants in the PG, 37.5% (n=12) stated that they worked at Primary Healthcare Units, 34.38% (n=11) at Urgency and Emergency Units, 15.63% (n=5) at Hospitals, 6.25% (n=2) at the Mobile Emergency Care Service, 3.12% (n=1), at the faculty of a Higher Education Institution, and 3.12% (n=1) at a petrochemical plant. In addition to this group, 75% reported attending a Specialization Course, 6.25%, a Postgraduation Course, and 3.7% , a Doctoral course, while 15.05%) did not report attending any postgraduation courses.

Only three participants (15%) from the SG, and six (18.75%) from the PG reported having some guidance on hearing health. In both groups, most participants answered 11 to 15 items correctly out of 20 (Table 1).

Table 1 – Range of total score by each assessed group. Curitiba, Paraná State, Brazil, 2024.

Total score Total	SG (n=20)	PG (n=32)
0-5	0% (n=0)	3.12% (n=1)
6-10	20% (n=4)	15.63% (n=5)
11-15	65% (n=13)	53.13% (n=17)
16-20	15% (n=3)	28.12% (n=9)

Source: the authors of the study. 2024.
Capttion: SG=nursing students; PG=nursing professionals.

There was no significant difference between the groups of undergraduates and professionals regarding the total score in the instrument on hearing loss in children, as well as in the total score of each domain assessed by the instrument. However, there was significant difference in the total score of domain 2 ("Prevention"), with the best scores (3.00±1.11) in the group of professionals graduated for over 10 years (Table 2).

Table 2 – Descriptive analysis of the variables age, length of time from graduation in years, and total score for each domain of the instrument on hearing loss in children. Curitiba, Paraná State, Brazil, 2024.

Variables	SG (n=20)	PG (n=32)	SG x PG (p* value)	PG1 x PG2 (p* value)
Age (years)	33.45±10.05	41.78±10.67	-	-
Length of time from graduation (years)	-	11.2±5.97	-	-
Domain 1	3.20±1.39	3.21±1.38	0.773	0.279
Domain 2	2.40±1.27	2.62±1.21	0.512	0.044*
Domain 3	4.15±1.13	4.09±1.08	0.992	0.314
Domain 4	3.15±0.48	3.18±0.69	0.730	0.431
Total	12.90±2.88	13.12±3.21	0.416	0.065

Source: The authors of the study, 2024.
Caption: SG=nursing students; PG=nursing professionals; PG1=nursing professionals graduated for up to 10 years; PG2=nursing professionals graduated for over 10 years; n=number of participants.
*Inferential analysis by means of the Mann-Whitney test, statistical difference for p<0.05(*).

The items with the least amount of correct responses were item 4 (“Sensorineural hearing impairment occurs when damage is verified in the cochlea, in the auditory nerve or in both altogether”), and item 14 (“Children younger than one year old, in general, repeat words when asked”), 15 hits each, considering the total sample of the study, which corresponds to 28.85% of the participants; and item 16 (“Human ear is able to hear low-pitched, mid-range and high-pitched sounds”). with 16 hits, corresponding to 30.77% of the participants (Table 3).

Table 3 – Comparison between groups regarding the score for each domain of the questionnaire, total score. Curitiba, Paraná State, Brazil, 2024.

Domain	Items	SG x PG (p* value)	PG1 x PG2 (p* value)
1: Basic concepts	**1**	0.317	0.316
	2	0.939	0.775
	3	0.671	0.775
	4	0.450	0.166
	5	0.905	1.000
	6	0.973	0.409
2: Prevention	**7**	0.552	0.062
	8	0.225	0.016*
	9	0.736	0.306
	10	0.696	0.965
3: Techniques of identification and diagnosis of the hearing impairment	**11**	0.019*	0.054
	12	0.552	0.062
	13	0.871	0.964
	14	0.895	0.561
	15	0.049*	0.485
	16	0.385	0.622
	17	0.192	0.804
4: General aspects of the hearing impairment involved in the intervention	**18**	0.756	0.316
	19	0.108	0.027*
	20	0.453	0.381

Source: The authors, 2024.
Caption: SG=nursing students; PG=nursing professionals; PG1=nursing professionals graduated for up to ten years (n=16); PG2=nursing professionals graduated for over 10 years (n=16); n=number of participants.

*Inferential analysis by means of the Mann-Whitney test, statistical difference for p<0.05(*)

The item with the lowest amount of correct responses in the SG was item 17 ("The cochlear implant is a surgical treatment, but it does not cure deafness"). As for the PG, it was item 4 ("Sensorineural hearing impairment occurs when the cochlea or the auditory nerve, or both are damaged altogether").

In the isolated analysis of the items, significant difference between SG and PG was observed in item 11 (p=0.019) ("*Hearing assessment and auditory screening mean the same thing"*), with the highest mean in the PG; and in item 15 (p=0.049) ("*Cochlea is the main sensory organ in hearing*"), with the highest mean in the SG. Comparing the length of time from graduation among the professional groups (PG1 x PG2), significant difference was observed between the groups in items 8 (p=0.016) (*"Damage in the cochlear cells due to high noise exposure is always reversible"*), and item 19 (p=0.027) (*"Hearing aids amplify the sound for a child to be able to hear"*), with the highest mean of hits in the group of professionals graduated for over 10 years.

DISCUSSION

The current study aimed to investigate nursing undergraduates and nursing professionals' knowledge on childhood hearing loss. As other studies, which compare the same population, have been scarce, considerations about the undergraduates and professionals will be presented separately.

In Brazilian literature, evidence on the knowledge of nursing undergraduates about hearing loss in children has been scarce. When addressing the theme of hearing loss, it is common among nursing undergraduates, as well as among the greatest part of the population to think about the use of the Brazilian Sign Language (LIBRAS)[19]. This exclusive relation is misleading as there is *"diversity within diversity"*, and not every hearing-impaired, even in a profound degree, communicates by means of the Sign Language, such as the oral deaf[20].

In the current study, only three out of 20 assessed nursing undergraduates reported having some kind of guidance on hearing health, and it was provided by a doctor or speech therapist, that is, there was no guidance on the theme along the nursing graduation course. In a study[19] conducted with nursing undergraduates from the 1st and 4th semesters, the authors observed that most participants reported not being able to care for hearing-impaired patients in both groups, showing that minimum knowledge on that population was obtained through external sources, disregarding the course. According to data from the National Health Research (Pesquisa Nacional de Saúde - PNS)[21], in 2019, 2.2 million people in Brazil suffered from hearing loss. Worldwide, the number of people with hearing loss may reach 322 million until 2050. Additionally, lack of information and qualification of health professionals on prevention and early identification of hearing loss may compromise the access of that population to proper care[1].

Researchers[22] claimed that the deficit in nursing education brings consequences to the daily future of nursing professionals concerning care for hearing-impaired people. Considering the increase in the number of people with hearing loss, and considering that nursing education must provide undergraduates with knowledge to work, among other areas, in the disease prevention and health promotion[23], it is claimed that the theme should be addressed, even briefly, in the graduation course. Nursing undergraduates' insecurity to care for hearing-impaired people must be perceived by HEIs in order to be established strategies which favor their healthcare[19].

Among the challenges found in the implementation of the National Curricular Nursing Guidelines (Diretrizes Curriculares Nacionais da Enfermagem - DCN/ENF)[23] is the construction of a creative, innovative pedagogical model that seeks for an educational process which expresses the commitment to the population's quality of life[24]. It is also important that faculty think over their practice in nursing graduation courses, as the gap from healthcare services and the resistance to changes encompass some of the contradictions that should be confronted[25]. DCN/ENF as well as nursing undergraduates wish the educational process were incremented with competences and skills that educate a better-prepared professional, with a broader view to perform in practice[26]. Therefore, further research is fundamental to discuss issues that lead to the construction of a pedagogical project for the nursing course, which contemplates the Unified Health System (Sistema Unificado de Saúde – SUS) and the health/disease/care process[24].

HEIs in Colombia have worked in the education of nursing undergraduates, focusing on the strengthening of job profiles and in the acquisition of competences that generate significant contributions to care, aiming at the application of an integral primary healthcare model[27]. Specifically in relation to the theme of the current study, researchers report that the awareness on the early diagnosis and intervention of the hearing loss can be enhanced with its inclusion in the university curriculum. Additionally, opportunities of continuing education with lectures on child hearing health in workshops and/or scientific nursing events[15].

Concerning the domains of the questionnaire applied in the current study, no significant difference was verified between the group of the undergraduates and the group of nurses, showing that, in general, in the assessed sample, the professionals did not present more knowledge than the undergraduates on hearing loss in children. However, significant difference was observed in the analysis of the isolated items, with the group of nurses presenting higher rate of correct responses in item 11 (*"Hearing assessment and auditory screening are the same thing"*), and the group of undergraduates in item 15 (*"Cochlea is the main sensory organ in hearing"*). Probably, the students had hadmrecent contact with disciplines associated with anatomy and physiology of the human body, thus, justifying that difference in item 15. Similarly, the fact that nurses are already in the job market, and with greater assumed contact with users from healthcare services, may justify the higher performance of that group in item 11.

In the comparison between the groups of nurses graduated for up to 10 years, and the nurses graduated for over ten years, better performance was observed in the domain "prevention" among those graduated longer. This difference can be related to the participants' workplace and the activities performed in their professional scope. Among 16 professionals that worked in the area for as long as 10 years, 26% reported working at Primary Care Units, while among the professionals who worked for over ten years, 43.75% reported working at Primary Care Units. The Primary Care Unit, through the Family Health Strategy (Estratégia Saúde da Família -ESF) is the gateway to the Unified Health System (Sistema Unificado de Saúde – SUS), encompassing actions that cover, among other aspects, the health promotion and disease prevention[28]. However, it is important to point out that nurses' work at a Primary Care Unit can be diverse[29]. Therefore, in order to confirm that assumption, studies would be necessary to correlate those professionals' knowledge on hearing loss in children with the specific activities that they performed at their workplace.

The knowledge deficit of nurses on aspects related to hearing loss in children may affect directly the prognosis in face of a disorder that may be disregarded. In the current study, one of the questions with the highest amount of incorrect responses was related to one of the milestone in the oral language

development, closely correlated to hearing. The lack of nurses' knowledge on the milestones of the oral language development was also pointed by other authors[30].

In face of the knowledge deficit observed in the current study, the need of qualification on the theme is stressed. Educational processes must constitute the job process, and nurses acknowledge the Higher Education role in integrating education and service, showing interest in qualifying their education[31]. In that sense, a study[5], published in 2020, proposed qualification in childhood hearing health to 41 nurses by means of a Cybertutor. The authors reported that the interactive tele-education tool showed efficiency for its objective, as they observed significant difference in the professionals' knowledge on the theme by comparing pre and post-training. However, they also pointed that a single qualification course may not be enough. Continuing education is required.

The use of information technology and communication tools can be positive for the qualification of nurses and nursing undergraduates, fundamentally if we consider the country distances[5,32]. However, it is important to consider some setbacks in this teaching methodology. A study[33] conducted with 517 nursing undergraduates compared a module of a course of "Psychology for Nurses" in online and in-classroom formats. The results of the individual interviews unveiled that the experiences with online tutorials were influenced by self-motivation, opportunities of interaction between tutors and students, the given feedback, quality of teamwork and class design. The participants pointed that the class design for online tutorials should not follow the same format as in- classroom courses. They also claimed that tutors should establish some basic rules, such as the obligation to turn on the camera in order to improve the interaction during online tutorials. They also pointed out that a long online tutorial may hinder learning quality, thus, reporting difficulty, tiredness, and lack of focusing after the first hour of a class.

Apart from the analysis on the best learning strategy for the target public, it is also important for managers and professionals to be always aware of the transformative potential of the educational practice and in what ways it may contribute to their professional practice[34]. Professionals must update themselves based on the available evidence that enables to enhance care. In that sense, he importance of strengthening relationship and interaction between clinical professionals and undergraduates must be recognized as a way to establish a bond which promotes, above all, collaborative research and continuing education[35].

STUDY LIMITATIONS

The current study presents a series of limitations, such as the sample size, the lack of representativeness from different regions in the country, nurses' diverse workplaces, and nursing undergraduates from different semesters. In spite of that, results unveil the reality of lack of knowledge on hearing loss in children on the part of nursing undergraduates and professionals.

PRACTICAL IMPLICATIONS OF THE STUDY

The results from the current study point to the need of thinking over proposals for nurses' continuing education regarding hearing loss in children. In addition, concerning nursing undergraduates, a reflection on the curricular structure of graduation courses is deemed necessary, with implemented changes to include aspects related to the theme, aiming at education advocated by the Guidelines, that is, a professional able to work for the health promotion and disease prevention. In that sense, speech therapists, while hearing health professionals may contribute to the elaboration and implementation of

strategies for nursing undergraduates and professionals' awareness on the early identification and intervention of the childhood hearing loss. Therefore, the importance of the multiprofessional work stands out, and additionally, the partnership between the areas, the work of researchers and faculty from HEIs in order to contribute to the teaching-service relationship, aiming at the quality of life of users from healthcare services.

The current study does not aim to exhaust the theme. On the contrary, the reflections on it are expected to prompt further scientific research with greater and more diversified samples so that other analyses can be conducted.

CONCLUSION

Nursing undergraduates and professionals assessed in the current study showed limited knowledge on general questions about hearing loss in children, which may have negative impact on healthcare.

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