CARACTERÍSTICAS AUDIOLÓGICAS DE CRIANÇAS E ADOLESCENTES ATENDIDAS EM UM SERVIÇO AMBULATORIAL DE SAÚDE AUDITIVA EM SANTA CATARINA

HEARING CHARACTERISTICS OF CHILDREN AND ADOLESCENTS TREATED IN AN OUTPATIENT HEARING HEALTH SERVICE IN SANTA CATARINA

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Resumo

Introdução: A capacidade auditiva desempenha um papel crucial no desenvolvimento infantil, influenciando a aquisição da linguagem, interação social e compreensão do ambiente. A deficiência auditiva destaca-se como um distúrbio significativo, afetando mais de 34 milhões de crianças e adolescentes globalmente. **Objetivo:** Analisar longitudinalmente dados audiológicos de crianças e adolescentes avaliadas em um Serviço Ambulatorial de Saúde Auditiva em 2018 e acompanhadas por quatro anos em consultas anuais do ambulatório. **Método:** Estudo retrospectivo com crianças e adolescentes de 0 a 12 anos submetidas à avaliação inicial para perda auditiva e acompanhamento no SUS de janeiro de 2018 a dezembro de 2022. **Resultados:** Foram analisados dados de 127 sujeitos (51,20% do sexo feminino e 48,80% do sexo masculino), com idade média de 20 meses. 60,62% foram diagnosticados com deficiência auditiva, predominantemente, do tipo neurossensorial (59,1%). 43,40% desenvolveram deficiência auditiva pré-lingual, e 26,80% permaneceram na unidade de tratamento intensivo ao nascer. 37,00% eram candidatos à adaptação bilateral do Aparelho de Amplificação Sonora Individual, com a classe A mais prevalente (15,70%). **Conclusão:** Houve prevalência significativa de deficiência auditiva no presente estudo, demonstrando o impacto no desenvolvimento, observa-se necessidade urgente de desenvolvimento de políticas públicas para a população estudada.

Palavras-chave: Atenção Primária à Saúde; Saúde da Criança; Audição; Perda Auditiva.

Abstract

Introduction: Hearing ability plays a crucial role in child development, influencing language acquisition, social interaction, and understanding of the environment. Hearing impairment stands out as a significant disorder, affecting more than 34 million children and adolescents globally. **Objective:** To longitudinally analyze audiological data of children and adolescents evaluated at an Outpatient Hearing Health Service in 2018 and followed for four years in annual outpatient consultations. **Method:** Retrospective study with children and adolescents aged 0 to 12 years who underwent initial evaluation for hearing loss and follow-up at the SUS from January 2018 to December 2022. **Results:** Data from 127 subjects (51.20% female and 48.80% male) with a mean age of 20 months were analyzed. 60.62% were diagnosed with hearing impairment, predominantly of the sensorineural type (59.1%). 43.40% developed prelingual hearing loss, and 26.80% remained in the intensive care unit at birth. 37.00% were candidates for bilateral adaptation of the Individual Sound Amplification Device, with class A being the most prevalent (15.70%). **Conclusion:** There was a significant prevalence of hearing loss in the present study, demonstrating the impact on development, and there is an urgent need to develop public policies for the population studied.

Keywords: Primary Health Care; Child Health; Hearing; Hearing Loss.

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1. Introduction

Childhood and adolescent emerges as a period of exploration, growth, and learning in human development. In this context, the ability to hear plays a leading role, laying the foundations for language acquisition, social interaction, and understanding the world around them.[1] Hearing is the foundation for communication, a vehicle for sharing ideas, feelings, and knowledge. Therefore, adequate hearing health is indispensable for children's linguistic and cognitive development, shaping their educational trajectories and social

interactions.[2,3]

Hearing impairment (HI) stands out as one of the most prominent developmental disorders, with a global projection of approximately 34 million children and adolescent with disabling HI.[4] It is also estimated that 60% of hearing losses in children can be prevented by adopting public health interventions. These approaches encompass vaccination, appropriate maternal and child care practices, early detection, and management of common ear diseases.[5] However, according to the World Health Organization (2021),[3] most individuals with hearing impairment live in socioeconomic disadvantage, where resources and services for hearing care are often not readily available. At the national level, according to the National Health Survey conducted by the Brazilian Institute of Geography and Statistics in 2019, 1.1% (or 2.3 million) of the population aged two years and older presented hearing impairment, of which 2.8% were below the extreme poverty line, and 11.6% were below the poverty line.[6]

The rapid identification of auditory changes in children and adolescent and their immediate intervention positively impact development, encompassing academic progress, emotional health, and social interaction[7]. The Universal Neonatal Hearing Screening Program (UNHS) was established to ensure early detection and rehabilitation, aiming at the hearing well-being of newborns. This program encompasses stages of identification, verification, diagnosis, and early rehabilitation of hearing impairment[8]. The UNHS is mandatory in Brazil according to Federal Law No. 12,303.[9]

In the Unified Health System (SUS) context, the Ministry of Health established the Health Care Network for People with Disabilities (HNPD), underpinning effective care for various forms of disability. The Hearing Health Care Guidelines in the HNPD were launched in 2021 specifically for hearing health in Santa Catarina, addressing education, prevention, evaluation, treatment, and rehabilitation. These guidelines aim to establish regulatory and evaluation systems for people with hearing impairment, essential to the key principles of SUS, such as universal access, equitable treatment, comprehensive care, and active community participation.[10]

It is undeniable that people with disabilities in Brazil continue to face considerable challenges despite the constitutional guarantees of universal access to health through SUS and existing public policies. This complex reality is shaped by several factors, notably the limited availability of services and professionals and insufficient financial resources.[11-12]

Intervention with Hearing Aids (HA) in the elderly is essential to reduce the negative effects of presbycusis (age-related hearing loss), significantly improving the quality of life, communication and overall health of this population. Studies show that the use of hearing aids is associated with improved cognition and reduced risk of dementia, as adequate auditory stimulation preserves brain functions. Increased social interaction, reducing isolation and depression, common in elderly people with untreated hearing loss. Safety and autonomy, since clear hearing prevents falls and facilitates response to environmental alerts. Adolescent hearing loss has emerged as a critical public health issue, with profound consequences for educational

achievement, social integration, and psychological well-being. Globally, nearly 1.1 billion young individuals face the risk of hearing impairment, primarily due to unsafe listening habits, including prolonged exposure to high-volume audio devices such as headphones. [5]

Hearing loss in adolescents (10–19 years) is a growing public health concern, often linked to exposure to loud noises from personal audio devices, concerts, and recreational activities. Studies suggest that nearly 1 in 5 teens exhibit some degree of hearing impairment, with prolonged use of earphones at high volumes being a major risk factor (WHO, 2021). Additionally, ototoxic medications, untreated ear infections, and genetic predispositions can contribute to auditory damage. Early detection through screenings and preventive measures, such as safe listening practices and noise reduction, are crucial to mitigate long-term consequences, including academic difficulties and social isolation. Public awareness campaigns and stricter regulations on noise exposure are essential to protect adolescent hearing health.[3]

Contributing factors also include untreated middle ear infections, viral illnesses, and genetic susceptibility, which further elevate the prevalence of hearing disorders in this population. Without timely identification and intervention, adolescents may experience severe repercussions, such as impaired communication, academic underperformance, and increased social withdrawal. Addressing this challenge demands urgent preventive measures, including hearing conservation programs and routine auditory screenings tailored to adolescents.

In this context, this study aimed to perform a retrospective cross-sectional study of the audiological data of children and adolescents who underwent initial evaluation at the OHHS in 2018.

2. Methods

Type of study: Retrospective cross-sectional study in an Outpatient Hearing Health Service (OHHS), a reference in the state of Santa Catarina (SC), with users aged between 0 months and 12 years, who performed an initial evaluation in 2018 with a longitudinal analysis concerning follow-up appointments between February 2018 and December 2022. The collection period concerns the onset of the use of the electronic medical record, considering that the evaluations in 2018 became completer and more accessible. Data were collected from the evaluations of the multidisciplinary team regarding the initial evaluation, hearing diagnostics, individual Sound Amplification Device (ISAD) adaptation, and hearing monitoring.

Inclusion Criteria: Users aged between 0 months and 12 years who entered the OHHS for evaluation, diagnosis, rehabilitation with ISAD, and hearing monitoring, and those registered in the Hearing Health System (HHS) of the SUS of the state of SC, who performed initial evaluation in 2018 and follow-up consultations between February 2018 and December 2022. The sample consisted of collecting all patients treated at the service during the period studied.

Exclusion Criteria: Users who presented inconsistent responses to the Pure Tone Threshold Audiometry exam, in which the results were considered inconclusive by the evaluator, were excluded.

Research Instruments: Data were collected from the Hearing Health System (HHS) database of the SUS of the state of SC in the OHHS, which receives demands from primary care, specializing in auditory diagnosis and rehabilitation, contemplating the care of users of all life cycles.

Stage A

1. Initial assessment consultation: The users are treated by the multiprofessional team. The data were collected from each professional's registry file at the HHS. Sociodemographic data, difficulty in social interaction, previous use of ISADs, and the form of communication used by the patient were collected from the Social Service. Information on the period and time of HI and the expectations regarding the use of ISADs was collected from the psychological interview. Data were collected on the primary and secondary diagnostic hypothesis from the otorhinolaryngological evaluation and the primary associated diseases. Data were collected for each ear concerning the type and degree of hearing loss, indication of ISAD and type of ISAD selected, type of sound transmission, and the class of ISAD selected based on the audiological evaluation.
2. ISAD adaptation consultation: Information was collected regarding the waiting time between the first consultation and the ISAD adaptation.

Stage B

1. Adaptation return consultation: Data were collected on the operating status of the ISADs, the status of the mold/tube or capsule, the need to adjust the acoustic parameters, the user's complaint concerning the ISADs, and information on the time between the adaptation of the ISAD and the return for consultation by the user or the absence of attendance at the adaptation return.

Stage C

1. Follow-up stage: Data were collected on the annual return consultations until December 2022. The data collected verified the status of the ISADs and molds, the need for adjustments, the primary complaints regarding use, time of daily use, self-assessment of the benefit of using the ISADs, consideration of the examiner regarding the performance of the user, and the need for replacement of molds and ISADs requested and authorized.

Data Analysis: The data were organized in Microsoft Excel® spreadsheets and subsequently exported and analyzed in the *MedCalc ® Statistical Software* version 22.006. For the analysis of quantitative (numerical) data, the data description was used through descriptive statistics with descriptive measures summary (position and variability), such as mean, median, minimum, maximum, and standard deviation, and relevant statistical graphs to provide adequate visualization of the results obtained. For the description of the variables (categorical), descriptive statistics were used with single and double-entry tabulations concerning the absolute and relative frequencies of the object of study.

Figure 1. Flowchart of the research collection stages.

Ethical Aspects: This research was approved by the Research Ethics Committee of Universidade Federal de Santa Catarina under CAAE Opinion no. 39562720.8.0000.0121. The Free and Informed Consent Form (FICF) was applied to the participants

3. Results

In 2018, 127 children and adolescents and participated in the initial evaluation to detect hearing impairment, of which 65 (51.20%) were identified as female and 62 (48.80%) were identified as male. The age ranged from 0 to 12 years, with a mean age of 20 months.

Concerning the period of onset of HI, 34.60% (n=44) of the subjects presented oral communication; 37.80% (n=48) of the subjects presented the "not applicable" form of communication since they were not, in fact, in the language development phase. The periods of the highest prevalence of HI onset were prelingual and perilingual, with 43.40% (n=55) and 7.90% (n=10), respectively (Table 1).

Table 1. Form of communication, HI onset, and prior ISAD experience of those treated at OHHS in 2018.

Variable (n=127)	n	Frequency (%)
Form of communication		

Oral	44	34.60%
Brazilian Sign Language	1	0.80%
Homemade gestures	13	10.20%
Oral and Brazilian Sign Language	3	2.40%
Oral language and homemade gestures	2	1.60%
Homemade gestures and Brazilian Sign Language	1	0.80%
Others	15	11.80%
Does not apply	48	37.80%
Period of onset of hearing impairment		
Normal hearing	50	39.40%
Pre-lingual	55	43.40%
Perilingual	10	7.90%
Post-lingual	3	2.36%
No diagnosis	7	5.50%
No information	2	1.57%
Previous use of ISAD		
No	124	97.60%
Yes	3	2.40%
Total	127	100.0%

Caption = ISAD: Individual Sound Amplification Device.

Table 2 shows the primary diseases associated with 127 subjects who underwent the initial evaluation for hearing impairment. We found that 26.80% (n=21) of the subjects remained in the Intensive Care Unit (ICU) at birth, 25.20% (n=32) were born premature, and 18.10% (n=23) had malformations, such as microcephaly and cleft palateIt was also observed that 7.90% (n=10) of the subjects used ototoxic medications, 5.50% (n=7) had heart disease, 2.40% (n=3) epilepsy, 1.60% (n=2) hypothyroidism and 1.60% (n=2) hyperbilirubinemia.

Table 2. Primary diseases associated with subjects treated in the OHHS for an initial valuation in 2018.

Variable (n=127)	n	Frequency (%)	P*
Prematurity			P < 0.0001*
No	95	74.80%	
Yes	32	25.20%	
Intensive Care Unit			P < 0.0001*
No	93	73.20%	
Yes	34	26.80%	
Congenital infections			P < 0.0001*
No	119	93.70%	
Syphilis	3	3.10%	
Toxoplasmosis	3	2.40%	
HIV	1	0.80%	
Anoxia			< 0.0001*
No	125	98.40%	
Yes	2	1.60%	
Low birth weight			< 0.0001*
No	115	90.60%	
Yes	12	9.40%	
Malformations			< 0.0001*
No	104	81.90%	
Microcephaly	8	6.30%	
Cleft palate lip	5	3.90%	
Microtia of the right ear	4	3.10%	
Stenosis of the external auditory canal	3	2.40%	
Malformation of the right cerebellum	1	0.80%	
Microtia of the left ear	1	0.80%	
Microcephaly + cleft palate lip	1	0.80%	

P* value by the Chi-Square test. The p-value is a statistical measure that quantifies the evidence against a null hypothesis (H_0) in a hypothesis test.

The mild degree (26-40dB NA) was the most prevalent, with incidences of 17.30% (n=22) for the RE and 15.00% (n=19) for the LE. The most prevalent type of HI was sensorineural, with 31.50% (n=40) for the RE and 27.60% (n=35) for the LE.

Table 3. Audiological characteristics of the subjects treated at the OHHS in the year 2018.

Variable (n=127)	n	Frequency (%)	P*
Degree of hearing impairment RE			P < 0.001*
Normal (<25 dB NA)	51	40.20%	
Slight (26-40 dB NA)	22	17.30%	
Moderate (41-55 dB NA)	14	11.00%	
Moderately severe (56-70 dB NA)	6	4.70%	
Severe (71-90 dB NA)	9	7.10%	
Deep (>91 dBNA)	18	14.20%	
Did not complete the diagnosis	7	5.50%	
Degree of hearing impairment LE			P < 0.001*
Normal (<25 dB NA)	60	47.20%	
Slight (26-40 dB NA)	19	15.00%	
Moderate (41-55 dB NA)	9	7.10%	
Moderately severe (56-70 dB NA)	9	7.10%	
Severe (71-90 dB NA)	7	5.50%	
Deep (>91 dBNA)	16	12.60%	
Did not complete the diagnosis	7	5.50%	
Type of hearing impairment RE			P < 0.001*
Conductive	12	9.40%	
Sensorineural	40	31.50%	
Mixed	12	9.40%	
Normal hearing	51	40.20%	

Did not complete the diagnosis	12	9.40%	
Type of hearing impairment LE			P < 0.001*
Conductive	9	7.10%	
Sensorineural	35	27.60%	
Mixed	9	7.10%	
Normal hearing	62	48.80%	
Did not complete the diagnosis	12	9,40%	

P* - teste do qui-quadrado. The p-value is a statistical measure that quantifies the evidence against a null hypothesis (H_0) in a hypothesis test. RE:right ear . LE:left ear

Of all the evaluated subjects, 37% (n=47) were candidates for the bilateral adaptation of ISAD, 6.30% (n=8) were candidates for the RE, and 4.70% (n=6) were candidates for the LE. Regarding the ISAD class, the highest prevalence was Class A, with 15.70% (n=20) for both ears (Table 4).

Table 4. ISAD candidates and classes of the subjects treated at the OHHS for initial evaluation in 2018.

Variable (n=127)	n	Frequency (%)	P*
ISAD candidate			P < 0.001*
Bilateral	47	37.00%	
Unilateral right	8	6.30%	
Unilateral left	6	4.70%	
Outside the criteria	50	39.40%	
Follow-up	6	4.70%	
Prosthesis anchored to the bone	1	0.80%	
Follow-up in private care	1	0.80%	
No follow-up	8	6.30%	
ISAD class RE	RE		P < 0.001*
Does not apply	76	59.80%	

A	20	15.70%	
B	14	11.00%	
C	15	11.80%	
Prosthesis anchored to the bone	1	0.80%	
No follow-up	1	0.80%	
ISAD class LE			P < 0.001*
Does not apply	78	61.40%	
A	20	15.70%	
B	11	8.70%	
C	16	12.60%	
Prosthesis anchored to the bone	1	0.80%	
No follow-up	1	0.80%	

P* - Chi-square test. The p-value is a statistical measure that quantifies the evidence against a null hypothesis (H_0) in a hypothesis test. ISAD: individual Sound Amplification Device. RE:right ear LE:left ear.

4. Discussion

The identification of periods of higher prevalence of onset of hearing impairment (HI) as pre-lingual (43.40%) and perilingual (7.90%) is a relevant finding. This suggests that a significant portion of the children and adolescents evaluated developed hearing impairment before or during the early phase of language development. The absence of auditory stimulus in hearing impairment acquired before language acquisition may influence the development of auditory neural connections, given that the maturation of these pathways is conditioned to stimulation. Additionally, this deprivation may impair the development of verbal and linguistic communication skills.[13]

The identification of risk indicators for hearing impairment (IRDA), such as prematurity and stay in neonatal intensive care units (NICU), resulted in statistically significant findings. As evidenced in the research conducted by Botasso, Lima and Correa (2021), prematurity emerged as the most prevalent IRDA, with an incidence of 7.32%. Subsequently, the use of ototoxic medications and stay in the NICU were verified, with rates of 5.32% and 4.17%, respectively.[14]

Authors also highlight a higher incidence of AD in developing countries, attributed to unfavorable health and socioeconomic conditions and a high infant mortality rate, associated with the lack of adequate prenatal care. It is estimated that the incidence should be 6

cases per 1000 babies in these contexts. Scholars highlight the importance of preventing diseases such as measles, meningitis, mumps and rubella through the implementation of vaccination in care actions.[15-16]

The significant proportion of subjects diagnosed with some degree of hearing impairment (54.33%) confirms the relevance of hearing impairment in this studied population. The mild degree was the most prevalent, consistent with research indicating that this degree of hearing impairment is common in children.[17-18] However, the predominance of the sensorineural type of hearing impairment (59.1%) is inconsistent with the scientific literature. Studies suggest that the most common type of hearing impairment is the conductive type.[19,20,21]

The results of this research showed a significant proportion (48%) of participants who met the criteria outlined by the 2021 Guidelines for Hearing Health Care in Rehabilitation with Hearing Prostheses (RCPD) for the adaptation of Individual Sound Amplification Devices (AASI)[10]. It was observed that bilateral adaptation was the most prevalent, with 37% of indications, a finding in line with the literature[21], with 94% of participants benefiting from bilateral hearing aids. Furthermore, the compliance of results with established guidelines suggests that clinical practices adopted in hearing aid fitting are aligned with professional and regulatory recommendations, providing a solid basis for the effectiveness of these interventions. This alignment is essential to ensure that patients receive quality care and obtain maximum benefit from using hearing aids.10 In short, the research highlights significant adherence to the criteria established by hearing health guidelines when fitting hearing aids, with a notable preference by bilateral adaptation. These results are consistent with existing literature, reinforcing the practical and clinical importance of these findings [10,18,21].

According to the guidelines, 50% of the ISAD granted by SUS is recommended to be of Class A, which corroborates the present study, where there was a greater predominance of this type of technology. Santos (2019) also observed a higher prevalence of Class A (66%), followed by Class B (24%) and Class C (20%). Class A hearing aids are characterized by a more limited set of technological features compared to Class B devices, which stand out for offering an intermediate technology. On the other hand, devices belonging to Class C are notable for incorporating advanced technology.[22-23]

In addition to the audiological characteristics in children and adolescent, it is important to highlight the prevalence and impact of hearing loss in adolescents. Recent studies indicate that factors such as exposure to loud noise (such as inappropriate use of headphones) and poorly treated infections contribute to the increase in cases in this age group.[24] Hearing loss in adolescents can lead to academic difficulties, social isolation, and emotional harm, reinforcing the need for preventive strategies, such as awareness campaigns and regular hearing screening in schools.[25]

Hearing loss in adolescents (10–19 years) is an emerging global health issue, with significant implications for communication, academic performance, and psychosocial well-being. Worldwide, studies indicate that nearly 17% of teenagers suffer from some degree of hearing impairment, primarily due to unsafe listening practices, such as

prolonged exposure to loud music via personal audio devices [3]. In Brazil, research has shown a similar trend, with 12.5% of adolescents exhibiting noise-induced hearing loss (NIHL), often linked to recreational noise exposure and lack of preventive awareness [26].

The consequences extend beyond auditory deficits, as affected individuals frequently experience tinnitus, difficulty concentrating, and speech recognition challenges, which can lead to academic underachievement and social withdrawal.[27] Additionally, studies highlight an increased risk of depression and anxiety among adolescents with untreated hearing loss, emphasizing the need for early intervention. Given the preventable nature of NIHL, public health strategies, including education on safe listening habits and stricter noise regulations are crucial to mitigate this growing epidemic. Further research should explore the long-term cognitive and emotional impacts of hearing loss in this vulnerable population.

5. Conclusion

The analysis presented in this article has limitations and weaknesses, including possible inadequate information on subjects within the Hearing Health System (HHS), characterized by the absence of essential data and the lack of standardization in documentation. Additionally, the scarcity of current studies addressing the audiological characteristics and hearing technology selections (ISAD) in children and adolescents underscores the urgent need for further research to better understand this critical aspect of hearing rehabilitation.

The results of this study indicate that most patients evaluated in the observed HHS had mild sensorineural hearing loss, with the majority developing hearing impairment before language acquisition, significantly impacting global child development. Among those fitted with ISAD, there was a higher prevalence of bilateral adaptation and the selection of Class A technology.

These findings highlight the importance of early detection and intervention in children and adolescents, particularly given the vulnerability of adolescents to acquired hearing loss due to factors such as noise exposure, infections, or genetic predispositions. There is a critical need to expand public policies to address the specific hearing health needs of adolescents, ensuring they receive timely and appropriate care. The implementation of educational programs, hearing conservation initiatives, and improved accessibility to hearing technologies is essential to mitigate the negative impacts on both children and adolescents, promoting their comprehensive development and quality of life.

These insights can guide hearing health professionals in selecting devices and adaptation strategies that effectively meet the needs of young patients, significantly improving their communication skills and social integration. Furthermore, they reinforce the importance of raising awareness about hearing health and promoting early detection practices to adequately address the growing demands of children and adolescents with hearing impairments.

6. Conflict of interests:

The authors declare no conflicts of

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8. References

1. GUO, RUI; LI, YANG; LIU, JIAO; GONG, SHUSHENG; LIU, KE. **Complete Elimination of Peripheral Auditory Input Before Onset of Hearing Causes Long-Lasting Impaired Social Memory in Mice.** Frontiers In Neuroscience, [S.L.], v. 15, p. 1-11, 27 jul. 2021. Frontiers Media SA. http://dx.doi.org/10.3389/fnins.2021.723658 .

2. HAILE, L M; KAMENOV, K; BRIANT, P; ORJI, A; STEINMETZ, J; ABDOLI, A; ABDOLLAHI, M; ABU-GHARBIEH, E; AFSHIN, A; AHMED, H. **Hearing loss prevalence and years lived with disability, 1990–2019: findings from the global burden of disease study 2019.** The Lancet, [S.L.], v. 397, n. 10278, p. 996-1009, mar. 2021. Elsevier BV. http://dx.doi.org/10.1016/s0140-6736(21)00516-x.

3. WHO – WORLD HEALTH ORGANIZATION [homepage on the Internet]. **World Report on Hearing** [cited 2023 ago 15]. Available from https://www. who.int/publications/i/item/9789240021557

4. DUPLESSIS, D; MAHOMED-ASMAIL, F; ROUX, T; GRAHAM, M; KOCK, T; LINDE, J; SWANEPOEL, D. **MHealth-Supported Hearing Health Training for Early Childhood Development Practitioners: an intervention study.** International Journal Of Environmental Research And Public Health, [S.L.], v. 19, n. 21, p. 14228, 31 out. 2022. MDPI AG. http://dx.doi.org/10.3390/ijerph192114228.

5. WHO – WORLD HEALTH ORGANIZATION [homepage on the Internet]. **Deafness and hearing loss** [cited 2023 ago 15]. Available from: https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss

6. INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. **Pesquisa Nacional de Saúde: Pessoas com Deficiência e as Desigualdades Sociais no Brasil** [homepage on the Internet]. [cited 2023 ago 15]. Available from: <liv101964_informativo.pdf (ibge.gov.br)>

7. CABRAL, I. **A promoção da saúde auditiva no âmbito escolar: a efetivação de políticas públicas.** Rev Cient Multidisc Uniflu. Rio de Janeiro. 2022;7(2):50-53. Available from:https://www.revistas.uniflu.edu.br/seer/ojs-3.0.2/index.php/multidisciplinar/article/view/501/310

8. JCIH - JOINT COMMITTEE ON INFANT HEARING. **Position statement: principles and guidelines for early hearing detection and intervention programs.** The Joint Committee on Infant Hearing. 2019;4(2);1-44. Available from: https://www.infanthearing.org/nhstc/docs/Year%202019%20JCIH%20Position%20Statement.pdf

9. BRASIL – PRESIDÊNCIA DA REPÚBLICA. **Lei Nº 12.303, de 2 de agosto de 2010. Lei do Teste da Orelhinha.** Dispõe sobre a obrigatoriedade de realização do exame denominado Emissões Otoacústicas Evocadas. Brasília (DF): Diário Oficial da União, 2010. Available from: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12303.htm

10. SANTA CATARINA - SECRETARIA DE ESTADO DA SAÚDE. **Diretrizes de Atenção à Saúde Auditiva na Rede de Cuidados à Saúde da Pessoa com Deficiência em Santa Catarina.** Santa Catarina; 2021. Available from: https://www.saude.sc.gov.br/index.php/documentos/legislacao-principal/anexos-de-deliberacoes-cib/anexos-deliberacoes-2018/14169-anexo-01-230-2018/file

11. VIACAVA, F; OLIVEIRA, R; CARVALHO, C; LAGUARDIA, J; BELLIDO, J. **SUS: oferta, acesso e utilização de serviços de saúde nos últimos 30 anos.** Ciência & Saúde Coletiva, [S.L.], v. 23, n. 6, p. 1751-1762, jun. 2018. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/1413-81232018236.06022018.

12. SILVA, V; BUSNELLO, A; CAVASSIN, R; LOUREIRO, A; MOSER, A; CARVALHO, D. **Acesso à fisioterapia de crianças e adolescentes com deficiência física em instituições públicas.** Ciência & Saúde Coletiva, [S.L.], v. 25, n. 7, p. 2859-2870, jul. 2020. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/1413-81232020257.12682018.

13. WANG, JING; SUNG, VALERIE; CAREW, PETER; BURT, RACHEL A.; LIU, MENGJIAO; WANG, YICHAO; AFANDI, AFLAH; WAKE, MELISSA. **Prevalence of Childhood Hearing Loss and Secular Trends: a systematic review and meta-analysis.** Academic Pediatrics, [S.L.], v. 19, n. 5, p. 504-514, jul. 2019. Elsevier BV. http://dx.doi.org/10.1016/j.acap.2019.01.010.

14. BOTASSO, K; LIMA, M; CORREA, C. **Association between failure in otoacoustic emissions and risk indicator for hearing loss.** Revista Cefac, [S.L.], v. 23, n. 1, p. 1-10, 2021. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/1982-0216/202123110620.

15. OLUSANYA, B; NEWTON, V. **Global burden of childhood hearing impairment and disease control priorities for developing countries.** The Lancet, [S.L.], v. 369, n. 9569, p. 1314-1317, abr. 2007. Elsevier BV. http://dx.doi.org/10.1016/s0140-6736(07)60602-3.

16. FICHINO, S; AVELINO, V; LEWIS, D. **Características demográficas e audiológicas da população pediátrica de um centro de referência em saúde auditiva de São Paulo.** Distúrbios da Comunicação, [S.L.], v. 30, n. 3, p. 570, 24 set. 2018. Pontifical Catholic University of Sao Paulo (PUC-SP). http://dx.doi.org/10.23925/2176-2724.2018v30i3p-570-584.

17. GOUVEIA, F; JACOB-CORTELETTI, L; SILVA, B; ARAÚJO, E; AMANTINI, R; OLIVEIRA, E; ALVARENGA, K. **Perda auditiva unilateral e assimétrica na infância.** Codas, [S.L.], v. 32, n. 1, p. 1-6, 2020. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/2317-1782/20192018280.

18. EMMETT, S; PLATT, A; GALLO, J.; LABRIQUE, A.; WANG, N; INGLIS-JENSON, M; JENSON, C; HOFSTETTER, P; HICKS, K; ROSS, A. **Prevalence of Childhood Hearing Loss in Rural Alaska.** Ear & Hearing, [S.L.], v. 44, n. 5, p. 1240-1250, 8 jun. 2023. Ovid Technologies (Wolters Kluwer Health). http://dx.doi.org/10.1097/aud.0000000000001368.

19. FITZPATRICK, E; MCCURDY, L; WHITTINGHAM, J; ROURKE, R; NASSRALLAH, F; GRANDPIERRE, V; MOMOLI, F; BIJELIC, V. **Hearing loss prevalence and hearing health among school-aged children in the Canadian Arctic.** International Journal Of Audiology, [S.L.], v. 60, n. 7, p. 521-531, 17

mar. 2020. Informa UK Limited. http://dx.doi.org/10.1080/14992027.2020.1731616.

20. BRODIE, K; DAVID, A; KRISS, H; CHAN, D. **Outcomes of an Early Childhood Hearing Screening Program in a Low-Income Setting.** Jama Otolaryngology–Head & Neck Surgery, [S.L.], v. 148, n. 4, p. 326, 1 abr. 2022. American Medical Association (AMA). http://dx.doi.org/10.1001/jamaoto.2021.4430.

21. CORREIA, R; PINHEIRO, C; PAIVA, F; GOMES NETO, P; RODRIGUES, T; MENDONÇA, A; FREITAS, M. **Reabilitação auditiva por aparelhos de amplificação sonora individual (AASI): perfil epidemiológico de pacientes adaptados em um hospital terciário em 5 anos.** Revista de Medicina da Ufc, [S.L.], v. 57, n. 2, p. 26, 24 ago. 2017. Revista de Medicina da UFC. http://dx.doi.org/10.20513/2447-6595.2017v57n2p26-30.

22. VIACELLI, S; COSTA-FERREIRA, M. **Perfil dos usuários de AASI com vistas à amplificação, cognição e processamento auditivo.** Revista Cefac, [S.L.], v. 15, n. 5, p. 1125-1136, 30 out. 2012. FapUNIFESP (SciELO). http://dx.doi.org/10.1590/s1516-18462012005000098.

23. SANTOS, V. **Perfil de Pacientes Usuários de AASI Atendidos no Serviço de Saúde Auditiva no Município de Lagarto.** Trabalho de Conclusão de Curso. Fonoaudiologia. Universidade Federal de Sergipe. 2019.

24. FITZPATRICK, EM; MCCURDY, L; WHITTINGHAM, J; ROURKE, R; NASSRALLAH, F; GRANDPIERRE, V; MOMOLI, F; BIJELIC, V. **Hearing loss prevalence and hearing health among school-aged children in the Canadian Arctic.** Int J Audiol. 2021 Jul;60(7):521-531. doi: 10.1080/14992027.2020.1731616. Epub 2020 Mar 17. PMID: 32180475.

25. BRODIE, KD; DAVID, AP; KRISS, H; CHAN, DK. **Outcomes of an Early Childhood Hearing Screening Program in a Low-Income Setting.** JAMA Otolaryngol Head Neck Surg. 2022;148(4):326–332. doi:10.1001/jamaoto.2021.4430

26. LOPES, AC; OTOWIZ, VG; LOPES, PMB; LAURIS, JRP; SANTOS, CC. **Prevalence of noise-induced hearing loss in drivers.** Int. Arch. Otorhinolaryngol. 2012;16(4):509-514

27. DAVIS, H; SCHLUNDT, D; BONNET, K; CAMARATA, S; HORNSBY, B; BESS, FH. **Listening-Related Fatigue in Children With Hearing Loss: Perspectives of Children, Parents, and School Professionals.** Am J Audiol. 2021 Dec 9;30(4):929-940. doi: 10.1044/2021_AJA-20-00216.