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Access to pediatric hearing healthcare in Rio Grande do Norte, Brazil

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ABSTRACT

Introduction: Hearing impairment compromises the child's language development and learning process. Neonatal screening, diagnosis, and hearing intervention are actions that must be carried out for comprehensive hearing healthcare in childhood. **Objective:** To assess access to children's hearing healthcare services and the factors that influence access. **Methods:** Cross-sectional study with 104 children who underwent neonatal hearing screening and were referred for diagnosis. The sources were the databases, where demographic, social, and variables related to the access and use of health services were collected. Percentage distribution of categorical variables and measures of central tendency and dispersion of continuous variables were performed. To assess the association of dependent and independent variables, the Chi-square test was used with a 5% significance level. **Results:** Only 56 (53.3%) of screened children attended hearing healthcare services. Of these, 41 went to the studied service, and 24 completed the diagnosis. Three children had hearing loss and were candidates for cochlear implants. The mean age at diagnosis was 211 days and the standard deviation was 155.9 days. The duration of diagnosis was 135 days and the standard deviation was 143.2 days. There was no statistical significance between access to health services and the distance of the service, age, and education of the mother. **Conclusion:** There is a lack of access to the service and completion of the diagnosis and children are not assisted at appropriate ages. The mother's age and education and distance to the service did not influence access to and use of the service.

Keywords: health services accessibility; child; hearing loss; neonatal screening.

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INTRODUCTION

Hearing impairment is characterized by the difficulty or impediment of the individual to hear sounds, which causes losses in communication and socialization with the individual. In children, it may cause delay or alteration in the development of language and school performance and be present since birth or develop in the postpartum period or throughout life, due to some comorbidity[1,2]. According to the 2010 census data, in Brazil, approximately 9.4 million people reported some hearing complaint and in the state of Rio Grande do Norte, there are 191,862 thousand people.

Given these consequences, in Brazil and all over the world, Neonatal hearing screening (NHS) programs have been implemented in maternities and hospitals to identify and treat children with hearing loss early[4-6], since interventions to prevent, identify and treat hearing loss are cost-effective and can bring great benefits to individuals[1,7,8].

The national hearing health policy in force is the National Plan for People with Disabilities[9], which established the Network of Care for the Health of People with Disabilities, in which NHS should be performed in all live births in public institutions before the first month of life and in case of failure the neonates should be referred to the Hearing Health Services or Specialized Rehabilitation Centers to perform the diagnosis before the third month of life and the hearing intervention one month after the confirmation of the hearing impairment[5].

Factors such as access, the existence of repressed demand, difficulty in adhering to treatment, parents' socioeconomic conditions, and peculiarities of the diagnosis, may influence how to use the existing services in the network and impact children's hearing health[10-14]. Despite the laws and scientific recommendations, the ages for diagnosis and intervention are late at the national level[11,15].

The evaluation of the Hearing Health Care Network allows for the definition of areas and services that need more resources to optimize the network, and consequently improve the quality of life of the population[10].

This study aimed to evaluate access to infant hearing health services and the factors influencing access in a neonatal hearing screening program in the state of Rio Grande do Norte.

METHODS

This research is part of the study entitled "Evaluation of the infant hearing health policy in the state of Rio Grande do Norte" approved by the Research Ethics Committee of the Onofre Lopes University Hospital of the Federal University of Rio Grande does Norte under CAAE number 25214819.4.0000.5292 on April 29, 2020.

A cross-sectional study was conducted. The sample is made up of all children referred for hearing diagnosis after failing NHS. The children were screened at Hospital Universitário Ana Bezerra (HUAB), located in the municipality of Santa Cruz, in the Northeast region of Brazil.

The NHS was performed from the exam of transient-evoked otoacoustic emissions (TEOAE) and carried out by a speech therapist. Children who did not pass the first stage (test) were reassessed in the second stage (retest), after about 15 days, with the same TEOAE protocol. The children who did not pass the retest were considered to have failed the HLT and were referred to the hearing health care service for diagnosis, and this appointment was made by the municipal office of their residence. The reference service is the SUVAG Center, located in the city of Natal, the state capital, and is classified as medium complexity in the Brazilian public health system (*Sistema Único de Saúde* -SUS).

Inclusion criteria were considered for children who failed neonatal screening in the period from January 2015 to December 2019. The only exclusion criterion was death, which eliminated one child. The sample was composed of 104 children, of whom 89 were born in HUAB and 15 were born in other institutions.

Data collection was performed between June and July 2020, through the database of the HUAB hearing screening program and the diagnosis sector of the SUVAG Center, where the demographic, social, and variables related to access and use of the health service were collected. The link between the two banks was possible through the child's name. The banks are fed daily after the care is provided by the speech therapist, and the HUAB speech therapist contacts the children's mothers every year to check if the care was provided at the health service. The sample loss occurred when the child did not attend the health care service or when the hearing diagnosis process was not concluded.

Children's care at the SUVAG Center is provided by four specialties: otorhinolaryngology, psychology, social work, and speech therapy, and the auditory diagnosis is comprised of anamnesis, behavioral assessment (instrumental and audiometry with visual reinforcement), acoustic immittance measurements (tympanometry and acoustic reflex testing), and transient evoked otoacoustic emissions and brainstem and steady-state auditory evoked potentials.

The maternity bank collected data on program coverage, the child's gender, sociodemographic variables of the mother (race, age, marital status, education, and municipality of residence), the child's age at referral, and attendance to hearing health services. The diagnostic database at the SUVAG Center collected the age at first visit (first visit in the four specialties mentioned above), the interval between referral and first visit, age at diagnosis, diagnostic results, duration of diagnosis (time interval between first visit and diagnosis), age at intervention (age at which the child starts using Hearing Aid (HA), indication for cochlear implant surgery, cochlear implant users, and speech therapy follow-up. These variables were used to calculate two quality indicators: the percentage of children who were diagnosed before 3 months of age, which should be greater than 90%, and children who started using HA one month after the hearing loss diagnosis, which should be greater than 95%. The dependent variables of the study were access to the service, which corresponds to attendance or not at the hearing care service, and completion of the diagnosis, which refers to the end or not of the diagnostic process in the hearing care service.

In the data analysis, the percentage distribution of categorical variables and measures of central tendency and dispersion of continuous variables were performed. To evaluate the association of dependent variables with age and education of the mother and distance between the municipality of residence of the mother and the servic e, we used the chi-square test with a 5% significance level. IBM SPSS Statistics v.20.0 software was used for statistical analysis.

RESULTS

During the period from 2015 to 2019, the NHS program showed coverage of 67.2%, in which 8,438 children were screened, of these 104 failed screening. The sample has 56 (53.3%) male children and 48 (46.7%) female children. Regarding the sociodemographic characteristics of mothers, the age range varied from 15 to 43 years with a mean age of 27 years, predominantly mixed race (88.5%), single (56.3%), and incomplete high school education (69.1%). The distance between the municipality of residence of the mother and the service ranged from 21 to 306 km with an average of 120 km, in a total of 27 municipalities and most with a distance greater than or equal to 121 km (61.5%) (Table 1).

As for access to hearing health services, it was found that only 56 (53.8%) children attended; of these, 41 went to the SUVAG center, 14 went to another network service - Service A - and one went to a private clinic. At the SUVAG center, we found a drop-out of 17 children who did not complete the diagnostic process. Most children presented normal hearing, corresponding to 21 children, and three presented hearing impairment. Figure 1 is represented the path of the children in access to the health service through the flowchart.

Table 1: Sociodemographic characterization of mothers of children referred to the hearing health care service.

Variables	n	%
Sex of the child (n=104)		
Male	56	53..3
Female	48	46.7
Mother's skin color (n=87)		
White	10	11.5
Not white	77	88.5
Mother's age (n=89)		
≤27 years	48	53.9
≥28 years old	41	46.1
Mother's marital status (n=87)		
Married/stable union	38	43.7
Single	49	56.3
Mother's level of education (n=75)		
High school incomplete	51	68.0
High school complete	24	32.0
Distance between the municipality and the service (n=104)		
>120km	40	38.5
≤121km	64	61.5

The mean age of the children at the time of referral from the maternity hospital to the hearing health care service was 25 days, before the child's first month of life; the mean age at diagnosis was 211 days, with a large gap between the minimum and maximum ages. The duration of diagnosis was 135 days, which is approximately 4.5 months. Table 2 shows the number of children, the mean, the minimum and maximum in days, and the standard deviation of each variable related to age and time interval in the stages of access to the health service.

In most children, the diagnosis process lasted between 0-90 days and half of the children were aged between 91-180 days, as presented in Table 3. The quality indicator "age of diagnosis completion" was not achieved by the program, as only 3 children (12.6%) completed the diagnosis before 3 months of life.

The indicator "age they started using hearing aids" was not reached either; no hearing-impaired child received an HA after 1 month of diagnosis; the times were 48, 102, and 129 days. As for the classification of hearing impairment, the three had the sensorineural type of bilateral profound degree and were referred to another service in the network - Service A - to assess their candidacy for cochlear implant surgery. During data collection, one of the children was a bilateral cochlear implant user, and the other two were bilateral HA users awaiting implant surgery. All three

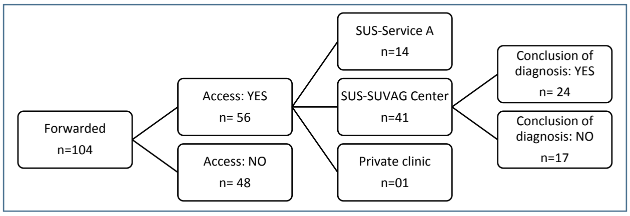

Figure 1: Flowchart of access to hearing health care for 104 children.

Table 2: Measures of central tendency and dispersion of variables related to age and time intervals of the steps in access to the health service.

Variables	n	Average (days)	Standard deviation	Minimum (days)	Maximum (days)
Age at referral	104	25	13.5	2	76
Age at first attendance	41	101	135.2	23	776
Age at diagnosis	24	211	155.9	52	593
Age at intervention	3	379	217.1	251	630
The interval between referral and first service	41	77	132.3	4	724
Duration of diagnosis	24	135	143.2	0	512
The interval between diagnosis and intervention	3	93	41.3	48	129

were being monitored for speech therapy every week, two at the SUVAG center and one at a service in their city.

In the inferential statistical analysis, access to hearing health care services, represented by the variables first visit and conclusion of the diagnosis was not significantly influenced by the distance between the municipality of residence of the mother and the service and the age and education of the mother (Table 4).

DISCUSSION

We observed a high dropout rate in the access to child hearing health services after neonatal screening both for the first visit and for the completion of the diagnosis, according to the indicator age of completion of diagnosis. The age and education of the mother and the distance between the municipality and the service did not influence access and use of the service. Moreover, a delay in diagnosis and auditory intervention is observed.

In the study, some children obtained access to another service, since the Network is formed by more than one hearing health service. Only one child was seen in a private service, indicating that the public network is the most used by this population. It is important to stress that the professionals responsible for the hearing diagnosis are the speech therapist and the otorhinolaryngologist, and these professionals have a greater insertion in private practices and/or those associated with health plans, while there is a lack of these professionals in the public health services[14].

Table 3: Distribution of duration of diagnosis and age at diagnosis (n=24).

Variable/time intervals	Duration of diagnosis		Age at diagnosis	
	n	%	n	%
0- 90 days	13	54.2	03	12.6
91 to 180 days	04	16.6	12	50.0
181 to 270 days	03	12.6	04	16.6
Over 271 days	04	16.6	05	20.8
Total	24	100	24	100

Table 4: Bivariate analysis of first attendance and completion of diagnosis with age and education of the mother and distance between the municipality of residence of the mother.

Independent variables	Dependent Variables			
	First service			
	Sample n	Yes n	No n	p-value
Mother’s age	89			
≤27 years	48	27	21	*0.858*
≥28 years old	41	26	15	
Distance between the municipality and the service	104			
>120km	40	22	18	*0.139*
≤121km	64	34	30	
Mother’s education	75			
High school incomplete	51	27	24	*0.537*
High school complete	24	17	07	
	Diagnostic Conclusion			
Mother’s age	37			
≤27 years	17	12	05	*0.543*
≥28 years old	20	12	08	
Distance between the municipality and the service	41			
>120km	18	11	07	*0.646*
≤121km	23	13	10	
Mother’s education	40			
High school incomplete	27	12	15	*0.681*
High school complete	13	10	03	

According to Brazilian Law No. 12,303/2010, all children must undergo screening[4], which was not found in the program studied. In the Northeast region of Brazil, the low percentage of coverage of neonatal hearing screening was associated with insufficient speech therapists inserted in the SUS and the hearing health services[16]. Considering that the organization of the Network depends on the diagnosis and analysis of the health situation[5], commonly carried out by the speech therapist, the lack of this professional in the network certainly hinders access and breaks the continuity of care.

The interval between referral at the maternity hospital and the first service at the hearing health care service shows a fragility in the access to the medium complexity service since it represents the waiting line. This finding corroborates national and international studies which have described similar situations in the services used by people with disabilities[17,18]. The justifications for such a finding may be due to the lack of communication between the services, low supply of professionals such as speech therapists and specialized care, insufficient information for families[10,19], underfunding in public health, and regional inequalities in the supply of health services[20].

The age of hearing diagnosis is above that recommended by the Brazilian literature, but below the values found in research, 9 months[15] and above 12 months of age[11]. This is different from what occurs in countries such as the United States, in which the mean age of diagnosis ranged from 2 to 3 months[7,] and in a maternity hospital in Chile, where 95% of children were diagnosed before 3 months[21]. This age is considered a quality indicator of the NHS program, which in Brazil is still not reached. The most recent American publication proposes that states that have already achieved this indicator should try to reduce the age of diagnosis to 2 months[22].

The duration of diagnosis was on average 4.5 months, with great variation; in the literature, this process lasts between 2 and 6 months[11]. This finding shows a delay in diagnosis, as identified by Neves et al.[23] when evaluating the access of children with special health needs to the health care network.

Infant hearing assessment is guided by the cross-check principle, in which the result of one test must be accepted after being confirmed by another independent test, and uses behavioral, electroacoustic, and electrophysiological methods[24]. The parents' lack of knowledge about the importance of performing the tests may have caused them to abandon or be absent during the diagnostic process[25]. The healthcare professional has the role of making the individual, in this case, the family, aware of the importance of further care, while the behavior of the individual is usually responsible for the first care in the healthcare services[26].

The advanced age after the hearing diagnosis and the delay in this process culminates in late access to intervention. Regarding the development of hearing abilities in children, the first years of life, especially the first six months, are considered a crucial period[2]. Within this context, the Care Network for People with Disabilities stresses that rehabilitation and disability prevention actions must start early[27].

As to the interval between diagnosis and intervention, the results show that at the beginning of the intervention, adaptation of HA was also slow. In the city of Maceió, the predominant waiting time for HA fitting was between three and six months[28]. Access to health services is faster and easier for children than for adults and the elderly[29]. The research identified that the waiting time is expressive for the adaptation of hearing aids and follow-up, and this influences negatively all phases of auditory rehabilitation[30].

The Auditory Health Care Network offered cochlear implant surgery as an option for hearing treatment, and the three hearing-impaired children were indicated for this surgery. Studies have shown the benefits of CI[31], and its superiority over HA[32]. The network also offered weekly speech therapy, regardless of the electronic device, Cochlear Implantation (CI), or HA, adherence to therapy is extremely important for hearing habilitation[33].

The mothers in this study are considered socially vulnerable due to their sociodemographic characteristics and mothers with lower socioeconomic status have less access to information and services[12,13,34]. A national study found that mothers with greater access to health services are those who live in the South and Southeast regions and those whose head of household has a higher level of education[35].

In this study, the distance between the municipality and the service did not influence the access to the service, but in the literature, the geographical distance is pointed out as one of the barriers the access to the health service, especially in the perception of parents[12,13,17]. This aspect is considered in the organization of the services and points of the Health Care Network for People with Disabilities, in which the user must be seen, preferably, in the service closest to his/her residence[5]. The distance may not have been high enough to negatively impact this access. In the literature, most studies are qualitative and portray the perception of parents about this aspect[12,13,17]. Another factor that interferes directly with access to the service, and can justify this finding, is care regulation; the municipalities must make flow pacts in the network; this factor may be an explanation for the non-influence of distance on access. The difficulties associated with the implementation of the regulation system for chronic children by speech therapists were waiting to schedule appointments and referral errors[19].

It is worth emphasizing the importance of monitoring the quality indicators of neonatal hearing screening programs since studies show that the programs reduce the ages of diagnosis and auditory intervention[7,11] and that children rehabilitated early have better language performance[2]. It is with this perspective that the Network of Care for the Person with Disability presents a specific objective to build indicators responsible for monitoring and evaluating the quality of services, as well as the resoluteness of health care[27].

As limitations of the study, we cite the inclusion of only one hearing health service, which generated a lack of data on the other service of the Network. Studies with larger sample sizes and analyses of other factors related to the health service, such as human and physical resources and the existence of repressed demand are suggested since they can directly impact access and use of the health service.

NHS, diagnosis, and intervention need to happen as a permanent and inseparable process, to foster the appropriate linguistic development in hearing-impaired children. Therefore, it is essential to develop strategies to ensure that children have access to these three stages promptly, as guaranteed by the laws in force.

This study found that access to hearing health care services for children has weaknesses and potential. Children who did not attend the health service and those who did not complete the hearing diagnosis process represent the majority of the study population; moreover, the children did not gain access to diagnosis and intervention at times favorable to their maximum development. However, the hearing-impaired children did have access to cochlear implant surgery and speech therapy follow-up. The factors of age and education of the mother and distance between the municipality and the service did not influence the access and use of the service.

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REFERENCES

1. World Health Organization (WHO). Deafness and hearing loss. Available from: http://www.who.int/newsroom/fact-sheets/detail/deafness-and-hearing-loss

2. Azevedo MF, Angrisani RG. Desenvolvimento das habilidades auditivas. In: Boéchat EM, Menezes PL. Tratado de Audiologia. Rio de Janeiro: Guanabara, 2015; p. 373-80.

3. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo de 2010. Available from: https://www.ibge.gov.br/estatisticas/sociais/saude/2061-np-pesquisa-nacional-de-saude/29540-2013-pesquisa-nacional-de-saude.html?edicao=9161&t=sobre.

4. Brasil. Presidência da República. Lei 12.303, de 2 de agosto de 2010. Dispõe sobre a obrigatoriedade de realização do exame denominado Emissões Otoacústicas Evocadas. Brasília: 2010.

5. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Ações Programáticas Estratégicas. Diretrizes de Atenção da Triagem Auditiva Neonatal. Brasília: Ministério da Saúde, 2012.

6. Mincarone P, Leo CG, Sabina S, Constantini D, Cozzolino F, Wong JB, et al. Evaluating reporting and process quality of publications on UNHS: a systematic review of programs. BMC Pediatr. 2015;15:86. https://doi.org/10.1186/s12887-015-0404-x

7. Stewart JE, Bentley JE. Hearing Loss in Pediatrics: What the Medical Home Needs to Know. Pediatr Clin North Am. 2019;66(2):425-36. https://doi.org/10.1016/j.pcl.2018.12.010

8. McDaid D, Park A, Chadha S. Estimating the global costs of hearing loss. Int J Audiol. 2021;60(3):162-70. https://doi.org/10.1080/14992027.2021.1883197

9. Brasil. Presidência da República. Decreto 7.612, 17 de novembro de 2011. Instituiu o Plano Viver sem Limite. Brasília: 2011.

10. Rezende CF, Carvalho SAS, Maciel FJ, Oliveira NR, Pereira DVT, Lemos SMA. Rede de saúde auditiva: uma análise espacial. Braz J Otorhinolaryngol. 2015;81(3):232-9. https://doi.org/10.1016/j.bjorl.2014.01.003

11. Fichino SN, Avelino VLF, Lewis DR. Características demográficas e audiológicas da população pediátrica de um centro de referência em saúde auditiva de São Paulo. Disturb Comun. 2018;30(3):570-84. https://doi.org/10.23925/2176-2724.2018v30i3p-570-584

12. Bush ML, Kaufman MR, McNulty BN. Disparities in access to pediatric hearing health care. Curr Opin Otolaryngol Head Neck Surg. 2017;25(5):359-64. https://doi.org/10.1097/MOO.0000000000000388

13. Barr M, Duncan J, Dally K. A Systematic Review of Services to DHH Children in Rural and Remote Regions. J Deaf Stud Deaf Educ. 2018;23(2):118-30. https://doi.org/10.1093/deafed/enx059

14. Rech RS, Bulgarelli PT, Condessa AM, Santos CM, Hilgert JB, Goulart BNG. Acesso e uso de serviços de Fonoaudiologia em Porto Alegre, Brasil: estudo populacional. Cienc Saude Coletiva. 2020;25(3):817-25. https://doi.org/10.1590/1413-81232020253.17212018

15. Rodrigues GRI, Loiola-Barreiro CM, Pereira T, Pomilio MCA. A triagem auditiva neonatal antecipa o diagnóstico e a intervenção em crianças com perda auditiva?. Audiol Commun Res. 2015;20(3):246-54. https://doi.org/10.1590/S2317-64312015000200001453

16. Dias WCFGS, Paschoal MR, Cavalcanti HG. Análise da cobertura da triagem auditiva neonatal no Nordeste brasileiro. Audiol Commun Res. 2017;22:e1858. https://doi.org/10.1590/2317-6431-2017-1858

17. Silva VA, Busnello ARR, Cavassin RC, Loureiro APC, Moser ADL, Carvalho DR. Acesso à fisioterapia de crianças e adolescentes com deficiência física em instituições públicas. Cienc Saude Coletiva. 2020;25(7):2859-70. https://doi.org/10.1590/1413-81232020257.12682018

18. Maciel FJ, Friche AAL, Januário GC, Santos MFN, Reis RA, Oliveira Neto R, Lemos SMA. Análise espacial da atenção especializada na Rede de Cuidados à Pessoa com Deficiência: o caso de Minas Gerais. CoDAS. 2020;32(3):e20180104. https://doi.org/10.1590/2317-1782/20202018104

19. Silva MF, Moreira MCN. Dilemas na regulação do acesso à atenção especializada de crianças com condições crônicas complexas de saúde. Cienc Saude Coletiva. 2021;26(6):2215-24. https://doi.org/10.1590/1413-81232021266.11992019

20. Vianca F, Oliviera RAD, Carvalho CC, Laguardia J, Bellido JD. SUS: oferta, acesso e utilização de serviços de saúde nos últimos 30 anos. Cienc Saude Coletiva. 2018;23(6):1751-62. https://doi.org/10.1590/1413-81232018236.06022018

21. Bravo AR, Krefft MM, Gómez YF, García MFT, Sandoval VP, Torrente AM. Indicadores de calidad del Programa de Detección Precoz de Hipoacusia Permanente del Hospital Padre Hurtado. Rev Otorrinolaringol Cir. 2017;77(2):117-23. http://dx.doi.org/10.4067/S0718-48162017000200001

22. Joint Committee on Infant Hearing (JCIH). Year 2019 position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs. J Early Hearing Detection Interv. 2019;4(2):1-44.

23. Neves ET, Okido ACC, Buboltz FL, Santos RP, Lima RAG. Acesso de crianças com necessidades especiais de saúde à rede de atenção. Rev Bras Enferm. 2019;72(3):65-71. https://doi.org/10.1590/0034-7167-2017-0899

24. Alvarenga K, Araújo ES. Avaliação audiológica de 0 a 1 anos de idade. In: Boéchat EM, Menezes PL. Tratado de audiologia. Rio de Janeiro: Guanabara, 2015; p. 395-406.

25. Alvarenga KF, Gradet JM, Araújo ES, Bevilacqua MC. Triagem auditiva neonatal: motivos da evasão das famílias no processo de detecção precoce. Rev Soc Bras Fonoaudiol. 2012;17(3):241-7. http://dx.doi.org/10.1590/S1516-80342012000300002

26. Travassos C, Martins M. Uma revisão sobre os conceitos de acesso e utilização de serviços de saúde. Cad Saude Publica. 2004;20(2):190-8. http://dx.doi.org/10.1590/S0102-311X2004000800014

27. Brasil. Ministério da Saúde. Portaria de Consolidação n° 3/GM/MS de 28 de setembro de 2017. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2017/prc0003_03_10_2017.html#ANEXOVI.

28. Flores NGC, Jesus RPFS, Vidal SA. Responsividade dos Centros de Saúde Auditiva de Maceió: Avaliação dos Usuários. CoDAS. 2020;32(5):e20190029. http://dx.doi.org/10.1590/2317-1782/20202019029

29. Ruivo NGV. Saúde auditiva e integralidade do cuidado: Itinerário de usuários na rede de serviços. [master´s thesis]. [São Paulo]: Universidade Estadual de Campinas; 2014.

30. Gonçalves LDC. Plano Viver sem Limite e reabilitação auditiva: um estudo na microrregião de Itajubá. [master´s thesis]. [Itajubá]: Universidade Federal de Itajubá; 2018.

31. Guo Q, Lyu J, Kong Y, Xu T, Dong R, Qi B, et al. The development of auditory performance and speech perception in CI children after long-period follow up. Am J Otolaryngol. 2020;41(4):102466. https://doi.org/10.1016/j.amjoto.2020.102466

32. Monteiro CG, Cordeiro AAA, Silva HJ, Queiroga BAM. O desenvolvimento da linguagem da criança após o implante coclear: uma revisão de literatura. CoDAS. 2016;28(3):319-25. http://dx.doi.org/10.1590/2317-1782/20162015151

33. Youssef BC, Mendes BCA, Costa EC, Ficker LB, Novaes BCAC. Efetividade na adesão a reabilitação auditiva em crianças: Grupo de Adesão Familiar e terapia inicial. Distúrbios Comun. 2017;29(4):734-48. https://doi.org/10.23925/2176-2724.2017v29i4p734-748

34. Stopa SR, Malta DC, Monteiro CN, Szwarcwald CL, Goldbaum M, Cesar CLG. Acesso e uso de serviços de saúde pela população brasileira, Pesquisa Nacional de Saúde 2013. Rev Saude Publica. 2017;51(Supl 1):3s. https://doi.org/10.1590/s1518-8787.2017051000074

35. Mallmann MB, Tomasi YT, Boing AF. Neonatal screening teste in Brazil: prevalence rates and regional and socioeconomic inequalities. J Pediatr. 2020;96 (4):487-94. https://doi.org/10.1016/j.jped.2019.02.008