

Monitoring of hearing and language in primary health care: project pilot

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Abstract *This article analyzes the feasibility of implementing a program that monitors the hearing and language development in the first year of life. It is a prospective longitudinal study, in which 41 community health workers were invited to monitor, on a monthly basis, by means of a questionnaire validated earlier, the hearing and language of children born in their micro areas of expertise. Thirty-nine community health workers agreed to participate, with only two refusals. Five gave up participating. Twenty-six (66.66%) did not perform monitoring, seven (17.94%) monitored improperly and only six (15.38%) monitored properly. Just one child failed the quiz, who was forwarded to the hospital that conducted the auditory screening for retesting. These professionals' high activity demand was considered the main reason for the difficulties encountered in this project. In addition, there is the difficulty to have contact with the Family Health Strategy teams, as well as the impossibility of permanent face-to-face discussions and the influence of the community health agents' supervisors.*

Key words *Hearing, Monitoring, Community Health Workers, Family Health Strategy*

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Introduction

Neonatal hearing screening (NHS) is the most effective way to detect child hearing impairments early¹. Due to the existence of acquired hearing losses or which manifest in a late stage^{2,3}, however, the hearing and language development of children who undergo NHS needs monitoring².

For the purpose of this control, the possibility of a questionnaire validated by Alvarenga et al.⁴ has been proven, which serves to monitor the hearing and language development in the first year of life on a monthly base. This questionnaire, which the Community Health Agents (CHAs) apply to the children's parents or responsible caregivers, was created based on the need for new strategies for the early identification of hearing impairment, especially when hearing losses cannot be detected through NHS⁴.

The CHA is considered to be the link between the community and the Family Health Strategy (FHS) team^{5,6}, being active in Primary Health Care through health promotion and disease prevention activities, in educational and monitoring actions for individuals, families and groups, encouraging practices to promote group life and the development of social interactions⁷. Thus, the CHAs can intermediate the hearing and language monitoring during the home visits. Hence, these professionals can play a fundamental role in the identification and forwarding – if necessary – of subjects with hearing losses that manifest after the NAS, permitting proper intervention in the hearing impairment within the child's critical development period³.

Thus, the children should be forwarded for diagnostic purposes through primary health care, whenever the parents suspect a hearing impairment⁸, as they are the first to raise suspicions⁹. Therefore, the monthly monitoring can identify children who develop below expectations and favor the parents' suspicions of hearing problems, mainly in cases of bilateral hearing losses.

The Brazilian Federal Health Department⁸ recommends the monthly monitoring of hearing and language in children up to one year of age and suggests using hearing and language development markers (WHO, 2006) for reference. In addition, the guidelines of the American Academy of Pediatrics¹⁰ propose using questionnaires applied to the parents during screening sessions intended to identify developmental changes, in combination with the pediatrician's clinical observation, for the sake of further forwarding for expert assessments.

Despite the recommendations mentioned, in Rio Grande do Sul, no publications have been found about primary health care actions to monitor the hearing and language of children. Therefore, the objective in this research was to analyze the feasibility of implementing a monitoring program of hearing and language development in the first year of life for children in the Norte/Eixo Baltazar Region of Porto Alegre, RS.

Methods

Approval for this study was obtained from the Research Ethics Committee at Universidade Federal de Ciências da Saúde de Porto Alegre under opinion number 924.958, with authorization by the Management of the Health District Norte/Eixo-Baltazar of Porto Alegre/RS. A prospective, longitudinal study was undertaken, in which the hearing and language were monitored for children without hearing problems on the NHS. The CHAs executed this monitoring by means of the questionnaire proposed by Alvarenga et al.⁴.

Forty-one CHAs were invited to participate in the study. The invitation was extended face to face at five Primary Health Care Services in the Norte/Eixo-Baltazar District of Porto Alegre/RS, consisting of Family Health Strategy (FHS) teams. Four services were administered by the Municipal Health Department of Porto Alegre and one by Grupo Hospitalar Conceição (GHC). At the time of the invitation, a face-to-face meeting was held at each UBS, when all CHAs who accepted to participate received proper training by means of oral instructions and print material on the normal development of hearing and language, including expected behaviors up to the age of 12 months and instructions on the application of the questionnaire.

The five participating UBS were chosen because they possessed the largest number of CHAs enrolled in the community service program "Continuing Education for Family Health Teams", offered by Universidade Federal de Ciências da Saúde de Porto Alegre. The participants in the program took part in an in-class training in maternal-infant auditory health, taught by the researchers and grantees from the community service program, which took four hours. The dynamic lecture promoted discussions on the themes addressed. These included risk factors for hearing impairment, prevention, classification and rehabilitation of hearing losses. The information obtained during the training was shared with the other CHAs from each UBS.

Each CHA was responsible for monitoring the hearing and language of the children born in his/her micro activity area on a monthly base, using the questionnaire described above, during the routine home visits.

The questionnaire is divided per age range, from zero to 12 months, and contains up to three questions for each age about hearing and language development, such as “Does your child hear well?”, with two alternative answers, “yes” and “no”. In case of “yes”, the children’s development was considered appropriate for their age and, in case of “no”, they were considered “at risk for hearing problems” and the UBS advised the families to visit the place where the NAS was carried out for retesting.

Upon the first visit to apply the questionnaire, the caregivers responsible for the children received proper information on the research and signed a free and informed consent form. On that occasion, the CHAs verified on the child’s health card whether the NAS was carried out and the result, and asked questions about the risk indicators for hearing impairment (RIHI), in accordance with the Joint Committee for Infant Hearing (JCIH) recommendation²

The criteria to include the children in the sample were: having passed the NAS in both ears, with registers of the result in the child’s health card; living in the coverage region of the CHA who participated in the research and being up to one month old. Children who did not undergo the NAS or who failed the test in one or both ears were excluded from the sample. In these cases, the CHAs were instructed to encourage the responsible caregivers about retesting at the location where the auditory screening took place.

Children identified by the CHAs between March and August/2015 were included in the research, each of whom was monitored for up to six months.

To assess the CHAs’ compliance with the program, a management worksheet on their participation in the proposed program, containing the following information: monthly participation in the project, proper registration of questionnaire results, number of infants monitored per month, number of monitoring cases closed off. In this study, the first six months of monitoring were analyzed, which continued up to the age of 12 months.

The data on the monthly births affiliated with each UBS were registered and, each month, the students affiliated with the project collected the questionnaire and RIHI results identified by the

CHAs at the Primary Health Care Services. The answers were registered in an Excel® worksheet for proper statistical analysis.

The chi-squared test was used to associate the neonatal auditory screening result with each RIHI. Then, logistic regression was used for multifactorial analysis. The qualitative data were analyzed descriptively.

Results

In Table 1, the CHAs’ acceptance of the invitation to participate in this research is displayed. The CHAs dropped out in three cases because the infants had not undergone the NHS, one of the drop-outs was due to the CHA’s increased activity demand at the UBS and another due to difficulties to locate the family.

In Table 2, the range of the project per UBS is demonstrated.

Table 3 presents the efficacy of the children’s monitoring by the CHAs. The difficulties reported by the CHAs who did not start the monitoring or did not execute the monitoring during one or more months were: absence of infants in their micro-areas; inability to include children who had not undergone the NAS, location of the families during the period of inclusion in the research (up to 31 days of the infant’s life), great activity demand at the UBS, forgetting, families who moved and left the responsibility area of the CHA and difficulty to find the families at home during the home visits.

In Figure 1, the number of children born and monitored monthly per UBS is displayed.

One of the children monitored was identified with RIHI (Figure 2) due to a hospitalization period of more than five days at the Neonatal ICU at birth. For this child, the answer to all questions was “yes” during the months of monitoring.

In another case, the family answered “no” to one of the questions. Therefore, the UBS forwarded the child, who did not possess RIHI, to the hospital where the NAS had taken place for the purpose of retesting.

Discussion

The analysis of the results revealed that the CHAs’ acceptance of the invitation to participate in the project was satisfactory, with only two refusals. Despite the lack of further information on the acceptance rate of the invitation, in the valida-

Table 1. Participation of CHA in the project.

	Invited CHA	CHA who accepted to participate n (%)	Drop-out rate of CHA n (%)
UBS 1	6	6 (100%)	1 (16.66%)
UBS 2	5	5 (100%)	0 (0%)
UBS 3	15	13 (86.66%)	0 (0%)
UBS 4	7	7 (100%)	4 (57.14%)
UBS 5	8	8 (100%)	0 (0%)
Total	41	39 (95.12%)	5 (12.82%)

UBS: Primary Health Care Service. CHA: Community Health Agent.

Table 2. Range of monitoring per UBS.

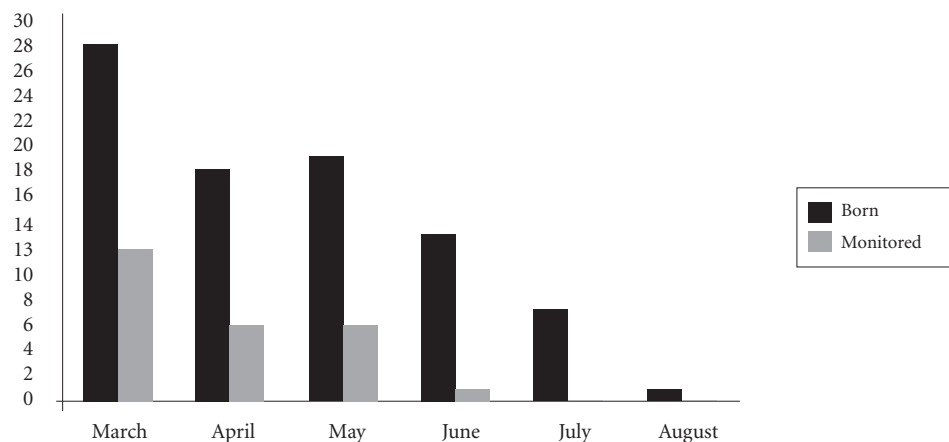
	UBS 1	UBS 2	UBS 3	UBS 4	UBS 5	Total
N° of live births in CHAs' areas	15	9	34	10	18	86
N° of children monitored	5	5	13	1	1	25
% of range per UBS	33.33%	55.55%	38.23%	10%	5.55%	29.06%

UBS: Primary Health Care Service. CHA: Community Health Agent.

Table 3. Effectiveness of monitoring by CHA.

	CHA who monitored properly n (%)	CHA who monitored improperly n (%)	CHA who did not monitor n (%)	All participating CHA
UBS 1	0 (0%)	4 (66.66%)	2 (33.33%)	6
UBS 2	0 (0%)	2 (40%)	3 (60%)	5
UBS 3	5 (38.46%)	0 (0%)	8 (61.54%)	13
UBS 4	0 (0%)	1 (14.29%)	6 (85.71%)	7
UBS 5	1 (12.5%)	0 (0%)	7 (87.5%)	8
Total	6 (15,38%)	7 (17,94%)	26 (66,66%)	39

UBS: Primary Health Care Service. CHA: Community Health Agent.

**Figure 1.** Total number of children born and monitored per month.

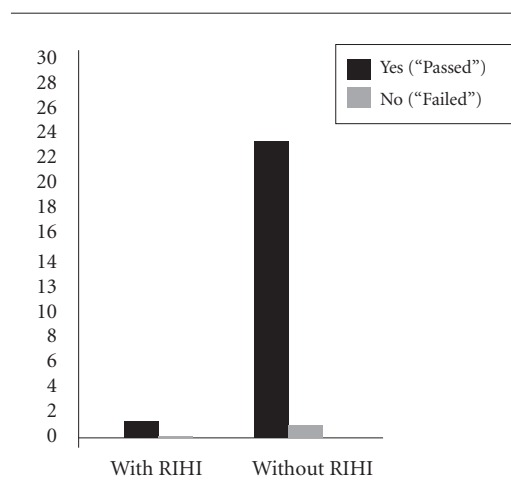


Figure 2. Relation between questionnaire results and RIHI.

tion research of the hearing and language monitoring questionnaire, 76 CHAs participated⁴. A study undertaken to get to know the CHAs' daily reality in the Family Health Program in Porto Alegre involved 114 CHAs, without any refusals to participate¹¹.

In the course of the monitoring proposed, five CHAs dropped out of the project. The main justification for dropping out, indicated by three of them, was not finding children who complied with the inclusion criteria. That was the case because, for the sake of a better organization of the study, the researchers decided to exclude children who had not undergone the NAS from the research. The lack of information and awareness-raising of the population and of health professionals about the need and importance of detecting hearing impairments early represent possible reasons for not undergoing NHS¹². Another considerable factor is that the test is not done before the discharge from the maternity hospital¹³. For the sake of future studies, the monitoring of all infants could be considered, independently of whether they underwent NAS or not, as all infants can benefit from the hearing and language monitoring⁴.

Another reason to drop out, which one CHA mentioned during the monthly collection of the results, was the increased activity demand. One study indicates that the lack of clarity on the CHA's tasks can provoke a functional burden, holding this professional accountable for too many activities¹⁴. Only one CHA mentioned this

factor, which may nevertheless have contributed to discourage other CHAs' who dropped out of the project.

Yet another reason mentioned by one of the CHAs who dropped out of the project was the difficulty to meet the family during the home visit. He reported that many families move and do not let the UBS know, and that others are not located because they work during the home visiting periods.

When comparing the number of infants born in each micro-area with the number of infants monitored by the CHA, it was verified that only 29% were included in the monitoring. Only one UBS (UBS 2) obtained a coverage percentage of more than 50%. At that UBS, the nurse coordinator was receptive and interested in the project. In addition, the team seemed to be united and motivated. It is known that good leadership is fundamental for the functioning of the UBS, as it facilitates the teamwork and promotes the organization needed for health actions¹⁵. Therefore, sensitizing the coordinators is considered fundamental in the compliance process with projects developed in primary health care.

Among the CHAs who agreed to participate in the research, 66.66% did not start the monitoring with the children born in their micro-areas and 17.94% did not perform the monitoring properly, monthly, in accordance with the proposal.

As mentioned, the great activity demand of the CHAs was also indicated as an impediment to start the monitoring and apply the questionnaire monthly. In a study that investigated the satisfaction and limitation in the CHAs' daily work, their testimonies clearly reveal their dissatisfaction with the high activity demand, negatively influencing the professionals' satisfaction and health¹⁶.

Another factor the CHAs mentioned was forgetting, which may be linked to stress and/or discouragement, possibly due to the work burden and/or lack of leadership by the team coordinator. Once again, these professionals face a high activity demand and need the coordinator's leadership and commitment to develop action strategies and encourage the team to implement and guide the actions¹⁵.

Other hypotheses are raised for these professionals' discouragement, such as low wages, devaluation, work conditions and difficult work relationships, in line with the findings in the literature^{14,17-20}.

One aspect observed at the two UBS with the lowest monitoring efficacy percentage (UBS 4 and UBS 5) was the turnover of the team coor-

dinator, which happened more than once during the six months of the project. According to one study that analyzed the causes for the turnover of physicians and nurses in FHS teams, the turnover of this professional is very harmful for the effectiveness of the expected results. The causes of the turnover vary, ranging from the precarious employment bond to relationship difficulties between professional and manager, lack of structure and bad work conditions, among others²¹.

When talking to some CHAs affiliated with the UBS with the highest rate of proper monitoring (UBS 3), feelings of pride of their function and motivation to perform an activity that can favor the community are revealed. In a study intended to describe the CHAs' perceptions and motivations concerning their work, the CHAs' reports of satisfaction with doing their work for the benefit of the community were observed. In the same study, the importance of valuing these professionals is highlighted for them to feel motivated in their job¹⁹.

With regard to the scale of the total number of children born and monitored per month, a drop in both data is observed. During the research period, no space was found to talk to the CHAs, providing clarifications, discussions and raising their awareness in the course of the monitoring. These face-to-face actions are considered fundamental to implement any primary care program. Nevertheless, these professionals' high daily activity demand and the unfeasibility of meetings to provide orientations can be one of the main factors related to the data found.

Among the 25 infants monitored, the only infant with RIHI identified in this research presented all "yes" answers to the questionnaire, which means that the infant's hearing and language development could be considered normal at that moment. That infant does need monitoring though, as children with RIHI need hearing and language monitoring during the first year of life, in accordance with recommendations by the Brazilian Ministry of Health⁸ and JCIH².

For one of the infants without RIHI, the answer to one of the questions was "no". Therefore, the infant was considered "at risk for hearing loss". Although the number is small to raise any hypothesis, the importance of monitoring all infants' hearing is known, considering that about 50% of hearing losses are idiopathic²². It is highlighted that the project will continue and will monitor all participating infants up to the age of 12 months.

In a study in which the same questionnaire was applied through telephone contact with the infants' parents/responsible caregivers, the impossibility to execute the monitoring was found, generally due to a move or unknown telephone number. The authors alerted to the need to permit and implement monitoring strategies and highlighted the CHAs' activities as a feasible option²³. This option is considered possible, as the CHAs are the main primary care link with the community and can contribute to auditory health actions for infants. Nevertheless, some results were not satisfactory and should therefore be kept in mind for the planning of other studies.

The study by Alvarenga et al.⁴ also encourages the inclusion of this questionnaire into the CHAs' routine, indicating that the monthly application enhances the possibility to identify hearing losses without increasing the cost of the procedure. It should be highlighted that monitoring by means of the questionnaire can identify more severe bilateral hearing losses, leaving mild or unilateral losses undetected⁴.

One of the challenges in the accomplishment of this project was the contact, mainly by telephone and e-mail, with the CHAs and their coordinators, to schedule the collection of the monthly results, which often failed. Besides this difficulty, results were collected and doubts were clarified individually and at each CHA's availability. If this had occurred more systematically and in group, the CHAs' engagement could have been greater.

Overall, the aspects that negatively affected a good result of the project, besides those mentioned in the previous paragraph, were: lack of training for all CHAs; low motivation of the participants; turnover/lack of leadership of the coordinators and lack of room to sensitize the CHAs and coordinators involved in the UBS.

The study was positive due to the fact that it granted knowledge about hearing to the infants' parents, increasing their alertness to their children's auditory and language behavior. Similarly, it enhanced the CHAs' knowledge on maternal-infant auditory health, which will certainly entail positive effects in the community. Other positive points that should be addressed are: simple and easy application of the questionnaire, demanding little time during the CHA's home visit and opportunity to exchange experiences with the CHAs.

Conclusion

The analysis of this study's outcomes reveals that better results demand investments in proper and continuing training of the CHAs and team managers, as only some CHAs had the opportunity to participate in the complete training offered. Thus, the professionals master their function, which can enhance their motivation to participate in auditory health actions for infants. More frequent contact with the teams is also important to clarify doubts and sensitize the CHAs and supervisors. In addition, the importance of elabo-

rating valuation and motivation strategies for the CHAs' work practice is emphasized.

The implementation of hearing and language monitoring during the six-month period in the format adopted was considered unsatisfactory. It should be emphasized that, despite the difficulties observed, the CHAs are considered the ideal professionals to implement maternal-infant auditory health monitoring programs in primary health care. Further research is suggested, with some modifications in the format of the strategies, to make the proposal feasible.

Collaborations

J Wagner worked on designing, data collection, data analysis and interpretation, and article writing. AW Bonamigo and F Oliveira participated in the idealization of the project, in the correction and in the critical revision. MS Machado participated in the idealization of the project, in the data analysis, in the correction and critical revision and approval of the version to be published.

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Article submitted 21/07/2016

Approved 16/12/2016

Final version submitted 18/12/2016