MONITORING OF CHILDREN WITH RISK INDICATORS FOR HEARING LOSS

Monitoramento de crianças com indicadores de risco para a deficiência auditiva

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ABSTRACT

Purpose: to describe the proposal of monitoring children in the first year of life, who were not identified in the newborn hearing screening program but had risk factors for hearing loss. **Method:** the study included 258 risk children who had obtained the result "pass" in the Universal Newborn Hearing Screening Program of Hospital Santa Isabel – Bauru/SP, from June to November 2008. It was applied by the telephone, a validated questionnaire in a previous study, containing questions about hearing and language. For each question there were two possible answers: "yes" or "no" and we considered "failure" to obtain at least one "no" answer. With such result, the child was scheduled to perform an immediate hearing evaluation. **Results:** the questionnaire was applied with 169 families; with the others, there was no contact. From the total, 164 (97,04%) obtained "passed" and five (2,96%) "failed". Between these five children, only three showed up for hearing evaluation and one had no disorders; two presented conductive hearing loss. It was observed distinct prevalence among the risk factors and there was no relation (p>0,05) of the risk factors with the evasion in the monitoring process. **Conclusion:** the monitoring through a questionnaire applied by telephone proved to be feasible, however, it is necessary to develop strategies to support their execution.

KEYWORDS: Monitoring; Audiology; Neonatal Screening; Questionnaires; Hearing; Language

INTRODUCTION

Newborn hearing screening (NHS) has been regarded as the most effective and recommended way to detect newborns at risk for hearing loss, enabling the identification and early intervention to maximize language development [1]. So that the purposes of the NHS are met, existing programs must be continuously reviewed. The Joint Committee on Infant Hearing [2] and the multiprofessional committee of hearing health[3] proposes several quality indicators for NHS programs, among which stands out: the achievement of the NHS for at least 95% of live births; the percentage of newborns who failed the test and retest must not exceed 4%; and of these, at least 90% must be submitted to audiological evaluation by three months of age; the rate of false-positive should not exceed 4%, and false--negative should be zero.

In regards to monitoring, the JCIH (2000)[4] recommended the monitoring of newborns with risk indicators every six months. However, experience demonstrated that this is an impractical recommendation to auditory health services. Thus, in more recent recommendation (JCIH, 2007)[2], the newborn must be monitored in accordance with the risk factor, going through at least one assessment by 24 or 30 months of age in case there is any indication of risk, or more frequently, in case of related indicators of risk to the hearing losses of delayed onset.

The audiologic monitoring promotes the identification of possible alterations and, consequently,

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makes early intervention possible, resulting in optimized development of the child[5-9]. Although the importance of the audiologic monitoring of children at risk is known and some studies have been developed[10-17], this recommendation is not a routine yet in the majority of the auditory health services, thus, the development of other studies that discuss the accomplishment of the same, in order to know the difficulties and to consider facilitating strategies for its execution.

In this context, the objective of the present study was to describe a proposal of monitoring of children in the first year of life that had not been identified in the newborn hearing screening, but presented risk indicators for hearing deficiency.

METHOD

The study is linked to the Model Program of Infant Auditory Health, that includes the universal newborn hearing screening (UNHS) carried through in the Saint Isabel Public Hospital- Bauru/SP, for the Department of Speech Pathology of the College of Dentistry of Bauru.

Casuistic

In the period of June to November of 2008, 1740 newborns were submitted to the hearing screening in the program of UNHS of the Saint Isabel Maternity Hospital, by means of transient evoked otoacoustic emissions by stimulation, being that 376 (21.61%) obtained result "pass" and presented some risk indicators for hearing deficiency. Of this total, 258 children had been selected in accordance with the age group at the moment of the study, five to 12 months of age, to compose the casuistry.

When carrying through the NHS, the professional fills a protocol proposed by the service containing identifying data, information regarding the gestation and childbirth, and family history of alterations (Figure 1). The analysis of these protocols made it possible to gather risk factors of the newborns, as well as obtaining information regarding the address and telephone number to contact the family.

Methodology

Initially we established contact via telephone with the guardians/parents of the children. After explaining the study and receiving consent from the guardians/parents in participating, we applied a follow-up questionnaire via telephone about hearing and language development, validated in previous study (CNPq, process number 403719/2004-6), with specificity of 96% and sensitivity of 67% for sensorioneural hearing losses, for not identifying unilateral[18]. The questionnaire is divided by age groups, from zero to 12 months, and for each age it contains three questions about hearing and language development , being that the question "Can your child hear well?" is in all questionnaires. There are only two possible answers, "yes" or "no", so, in cases where the answer "sometimes" was obtained, it was considered as "no". We considered "fail", if the answer "no" was obtained in at least one question, what would determine the need for an immediate audiologic evaluation (Figure 2).

In cases where telephone contact was not possible due to inexistent numbers or calls not answered after five attempts at different times, a letter was sent requesting that the family contacted the Clinic for Speech Therapy to inform a new telephone number for contact to enable the implementation of telephone screening. In cases where there was no contact from the family after 20 days a second letter was sent reinforcing the request.

Amongst those children identified at risk for hearing deficiency through the questionnaire were seen by an interdisciplinary team involving speech therapist, ENT physician, psychologist and social worker, at the Speech Therapy Clinic at the University of São Paulo, campus of Bauru. The protocol for audiological evaluation involved behavioral, electrophysiological and electroacoustic procedures as well as guidance to parents or guardians. In cases that hearing loss or other alterations were noticed, necessary intervention was performed.

The present study was approved by the Ethics Committee of the College of Dentistry of Bauru – University of São Paulo, process number 027/2009. As the study was carried through via telephone, consent was obtained by means of acceptance or not of the guardians/parents in answering the proposed questionnaire.

Data analysis

The data obtained were analyzed by descriptive and inferential statistics using the Fisher's exact test. The significance level used was 5%.

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NB mother:_____Age: _____Sex: _____
Address: _____
Record: _____RH: _____ Doctor: _____
DoB: _____/_____/_____ Time: _____Insurance: _____

UNIVERSAL NEWBORN HEARING SCREENING **Date:** ____/_____/_____

☐ Bacterial Meningitis:

☐ Jaundice
With transfusion without transfusion

☐ Low weight < 1500 grams
Weight: _____ grams

☐ Mechanical ventilation 5 days or more

☐ Congenital and perinatal infection (CMV, Rubella, Toxoplasmosis, Syphilis, Herpes)

☐ Ototoxic medications
Which ones: _____
How long: _____

☐ Craniofacial anomalies or syndromes associated with hearing loss

☐ Severe asphyxia, hypoxia (APGAR of 0-4 in the 1st min. ; 0-6 in the 5th min)
1 min: _____ 5 min: _____

☐ Inbreeding

☐ Familiy history of hearing deficiency

☐ Others: _____
_____

☐ Gestational age _____ months

Childbirth: _____

Figure 1 – Protocol used in the Newborn Hearing Screening

PROJECT SAUDI
(Infant Hearing Health Program)

Infant Hearing Health Program

Inventory of hearing and language development

NAME:	DATE OF BRITH___/___/_____
AREA:	MICRO AREA:
FAMILY:	

1st month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child get startled with loud noises?
( ) yes ( ) no

2nd month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child pay attention to sounds?
( ) yes ( ) no
3. Does your child recognize your voice?
( ) yes ( ) no

3rd month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child calm down with music?
( ) yes ( ) no
3. Does your child make cooing sounds?
( ) yes ( ) no

4th month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child turn his/her head towards sounds?
( ) yes ( ) no
3. Does your child make more sounds, i.e. fffff, oooo?
( ) yes ( ) no

5th month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child look for sounds?
( ) yes ( ) no
3. Does he/she make sounds as trying to talk?
( ) yes ( ) no

6th month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child look when you call?
( ) yes ( ) no
3. Does he/she say mamama, dadadada as trying to talk?
( ) yes ( ) no

7th month
1. Can your child hear well?
( ) yes ( ) no
2. Does your child recognize names of family members?
( ) yes ( ) no
3. Does your child say several different syllables?
( ) yes ( ) no

8th month
1. Can your child hear well?
( ) yes ( ) no
2. Does he/she turn quickly when called?
( ) yes ( ) no
3. Does he like to play with toys that make noise?
( ) yes ( ) no

9th month
1. Can your child hear well?
( ) yes ( ) no
2. Does he understand when people say no?
( ) yes ( ) no

10th month
1. Can your child hear well?
( ) yes ( ) no
2. Does he/she try imitating sounds?
( ) yes ( ) no

11th month
1. Can your child hear well?
( ) yes ( ) no
2. Does he/she wave bye when he hears bye bye?
( ) yes ( ) no
3. Does he babble as if talking?
( ) yes ( ) no

12th month
1. Can your child hear well?
( ) yes ( ) no
2. Does he say his first words?
( ) yes ( ) no
3. Does he understand commands such as “where’s it” and “give it to me”?
( ) yes ( ) no

Figure 2 – Quetionnaire of monitoring of the development of the hearing and the language

RESULTS

Figure 3 presents a general overview of the results of the study, demonstrating the contacts that were obtained or not, the evaluations carried through, and also the results verified.

We tried to contact by telephone and / or by sending a letter to the families of 258 infants who constituted the population but there was failure with 89 families (34,5%) due to the lack of updated contact information and due to the lack of contact from the parents after receipt of the letter, culminating in the possibility of carrying out the telephone screening interview with 169 families, representing 65,5% of our initial population.

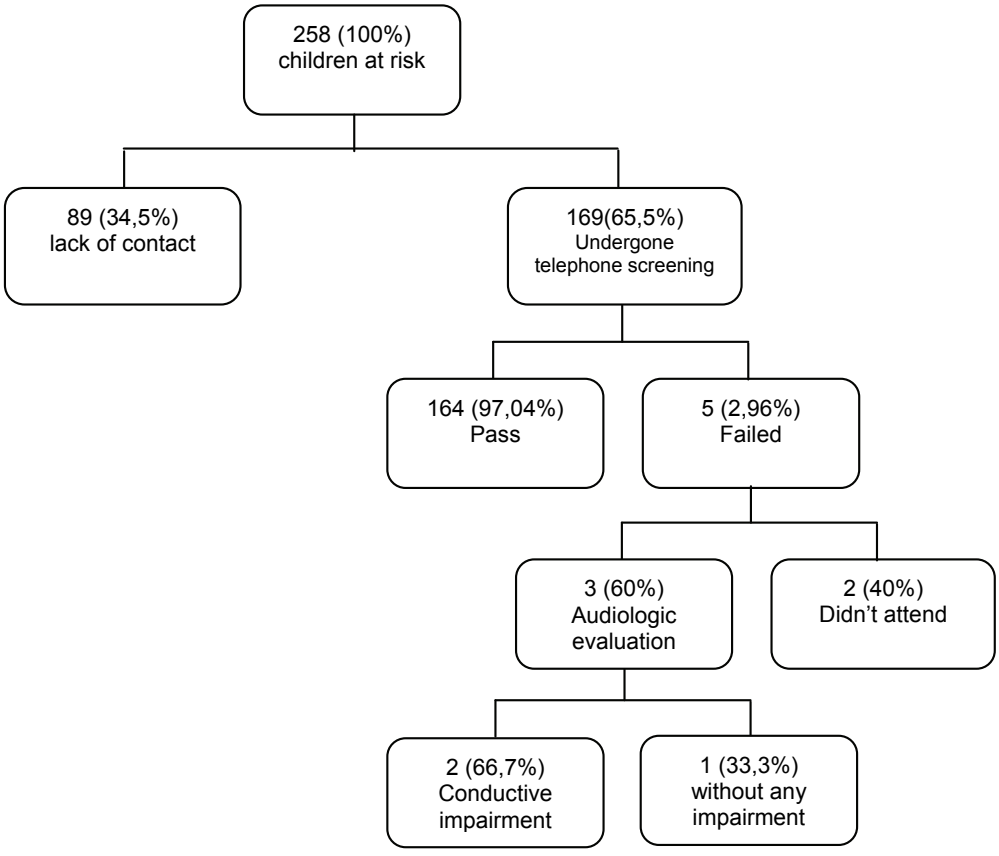
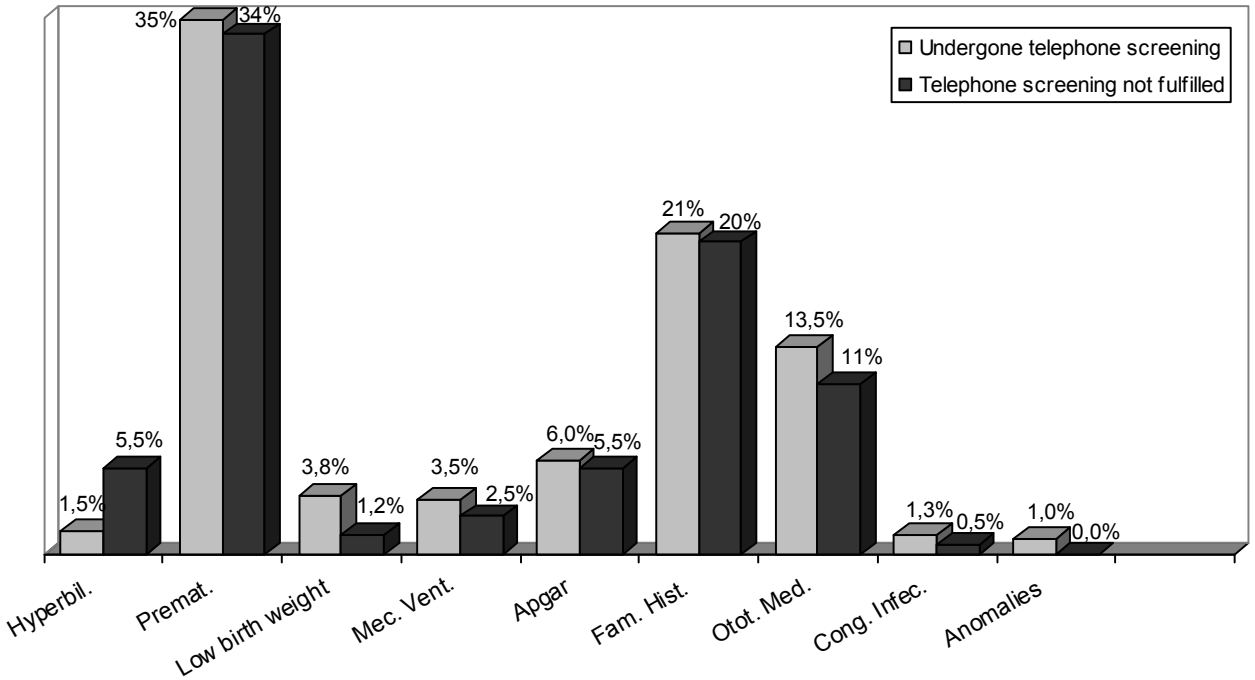


Figure 3 – Overview of the implementation of telephone screening and their results

Amongst the children identified as at risk by the questionnaire and scheduled for evaluation, there was an evasion rate of two children (40%), even after our clarifying the importance of holding the proposed assessment and having done on average five rescheduling at schedules flexible for the family dynamics.

On the other hand, out of the three children who showed up for the audiologic evaluation, one did not present hearing and language alteration and two presented conductive hearing loss, which started the necessary treatment.

Figure 4 shows the distribution, in percentage, of the risk factors found in the history of children who were part of the population, divided into two groups, those who participated in telephone screening and those who did not participate.



Legenda: Hyperbil.= Hyperbilirubinemia; Premat = prematurity; Mec. Vent.= mechanical ventilation; Fam. Hist = Family history; Otot. Med.= ototoxic drug; Cong. Infec.= congenital infection.

Figure 4 – Distribution, in percentage, of the risk factors found in the history of children who were part of the population

Through the Fisher's exact test we observed there was no statistically significant correlations between risk factors for hearing impairment and the fact that the family had participated or not in the telephone screening. Significance levels are shown in Table 1.

Table 1 – Significance levels of correlations between risk factors and attendance or not for audiological evaluation

Risk Factors	Atendance or not for audiological evaluation
Hyperbilirubinemia	p = 1.000
Prematurity	p = 1.000
Low weight	p = 0.583
Mechanical ventilation	p = 1.000
Apgar	p = 0.583
Family History	p = 0.226
Ototoxic drug	p = 0.333
Congenital infection	p = 1.000
Anomalies	p = 1.000

*Legend: $p \leq 0,05$ statistically significant.

Amongst the children identified as at risk by the questionnaire (N = 5) we did not observe "no" to the question "Does your child hear well?", thus what triggered the need for audiological evaluation was the answer "no" for some of the other questions comprised in the questionnaire, which involved the development of hearing and language.

DISCUSSION

International[19] and national studies[20-22] described the difficulties in regards to the participation of the families to the programs of newborn hearing screening. As for the monitoring of the children who show risk for hearing deficiency and difficulties for implantation, the difficulties are similar, as much in developed countries[11,16] as in developing countries[12-15,17].

Following the recommendation of the JCIH (2007)[2] about the need to monitor the hearing of the newborns at risk, we proposed to analyze the effectiveness of a questionnaire, applied by telephone, to monitor the development of these children. The application of the questionnaire occurred in 65,5% of the initial casuistry due to lack of contact with the family or unresponsiveness to the letters sent, that is, the proposal found the difficulties commonly described in previous studies, such as the incapacity

in contacting a significant amount of parents, generally due to relocation or unknown telephone number [23,24].

Longitudinal studies of newborns for long periods pointed to a high rate of abstention from mothers to scheduled appointments[5,25], and the reasons have been investigated by many authors from the geographic location of the hospital to the fact that parents believe the child is not have hearing impairment, among others[20,23,26,27]. National studies demonstrated high levels of abandonment in the monitoring process, such as the abandonment of 71.7% for the second monitoring and of 80.7% for the third monitoring[15], also confirming difficulties in concluding the test battery of audiologic tests in only one session, what contributes for the abandonment of the monitoring process[17].

Thus, to achieve the 70% minimum recommended percentage of monitoring by JCIH[2] becomes a challenge, since this result was not obtained even with a greater commitment of time from the professional to get this to work around the family schedule. Studies showed that this difficulty is not limited to developing countries, as percentage of follow-up were obtained from 40%[10] and 64.4%[11] in developed countries. This reflects the need of developing strategies to promote the implementation of monitoring programs in the NHS.

Studies have pointed to the lack of knowledge of mothers and of different professionals about the importance of the NHS and the early diagnosis and intervention of hearing impairment[6,28], thus, actions to promote education regarding health could contribute to greater adherence to programs of NHS and also the process of monitoring, which should include awareness of the importance of maintaining the address and phone number updated with the health services.

It is important to highlight that the lack of participation from the family was also observed amongst the children who had been identified as at risk through the questionnaire and had had appointments for audiologic evaluation set. In the data analysis, it was possible to verify absence of statistically significant relation between the risk factors and the fact that the families had participated or not in the monitoring process (p>0,05). This finding does not agree with the results from a study in which the fact of having attended all children to achieve at least one hearing evaluation, was attributed to the knowledge on the part of those responsible, that the child had a risk factor for hearing loss[29].

Although the identification of conductive hearing losses is not the purpose of the monitoring process, it is inevitable that it occurs during the process, once alterations of this type are common in the age group studied. Amongst the evaluated children, we observed absence of language alterations and sensorineural loss. However, the results obtained in this study do not oppose the recommendations regarding the importance of audiological monitoring[2,3], considering that it is proven that the identification and early intervention in hearing deficiency are fundamental to the child's optimal development[5-9]. Thus, any action in this direction must be valued.

In view of the importance of accomplishing the audiological monitoring of the children who obtained "pass" in the newborn hearing screening but show risk factors for hearing deficiency and the difficulties found to accomplish the same, we emphasize the need for strategies that make the monitoring possible and feasible. In places where there is coverage from the Strategy of Family Health, the performance of community health agents can represent a feasible option, once qualification of these professionals in the area of infantile hearing health has been promising[30,31] and that they can insert the application of the questionnaire of monitoring of the development of the hearing and the language in their professional routine, during the monthly home visits.

CONCLUSION

The monitoring of the children who show risk factors for hearing deficiency through the questionnaire via telephone was viable. However, it did not reach the proposed objective due to difficulties for its application, making it necessary to develop strategies that favor its implementation.

RESUMO

Objetivo: descrever uma proposta de monitoramento de crianças, no primeiro ano de vida, que não foram identificadas na triagem auditiva neonatal, mas apresentavam indicadores de risco para deficiência auditiva. **Método:** participaram do estudo 258 crianças de risco que haviam obtido o resultado "passa" no Programa de Triagem Auditiva Neonatal Universal da Maternidade Santa Isabel – Bauru/SP no período de junho a novembro de 2008. Foi aplicado, via telefone, um questionário de acompanhamento do desenvolvimento da audição e da linguagem, validado em estudo anterior, contendo questões sobre a audição e a linguagem. Para cada questão havia duas possibilidades de resposta "sim" ou "não" e considerou-se como "falha", a obtenção de pelo menos uma resposta "não". Tal resultado refletia no agendamento da criança para realização de uma avaliação audiológica imediata. **Resultados:** o questionário foi aplicado com 169 famílias, com as demais não foi obtido contato. Deste total, 164 (97,04%) apresentaram resultado "passa" e cinco (2,96%) resultado "falha". Dentre as cinco crianças, apenas três compareceram para avaliação audiológica e destas, uma não apresentava alterações e duas apresentavam perda auditiva condutiva. Observou-se prevalências distintas entre os fatores de risco e não houve relação (p>0,05) dos mesmos com a evasão no processo de monitoramento. **Conclusão:** o monitoramento por meio de aplicação de questionário via telefone mostrou-se viável, entretanto, é necessário o desenvolvimento de estratégias que favoreçam sua execução.

DESCRITORES: Monitoramento; Audiologia; Triagem Neonatal; Questionários; Audição; Linguagem

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