SOCIOECONOMIC AND DEMOGRAPHIC ASPECTS OF FAMILIES ENROLLED IN A NEWBORN SCREENING PROGRAM DURING ITS FIRST THREE YEARS

Análise dos aspectos socioeconômicos e demográficos de famílias atendidas em um programa de triagem auditiva neonatal ao longo de três anos

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ABSTRACT

Purpose: to analyze the socioeconomic and demographic aspects of the mothers attended to a newborn hearing screening program. **Methods:** the data came from a database of newborn hearing screening program. Participated in this study, 2476 mothers, whose neonates and infants were seen in this program, from an university hospital, during the years of 2007, 2008, and 2009. **Results:** among the analyzed variable, it was observed that 65,1% of the mothers aged between 20 and 34 years-old, and 67,5% were married. From de socioeconomic variables, it is observed that 36,2% mothers did not finished the medium grade, 56,4% were housekeepers and 96,7% had their babies in public maternities. **Conclusion:** from these results, it can be seen that there is some socioeconomic and demographic characteristics considered unfavorable to good health, especially if one talks about newborns and infants. Those conditions can lead to risk indicators for hearing loss, and should be taken in account when implementing a newborn hearing screening program, in developing countries.

KEYWORDS: Child Health; Hearing; Socioeconomic Factors

INTRODUCTION

Transformations that have occurred in different sectors of society influence the quality of life and health of a population [1]. An international conference held in Ottawa in 1986, under the auspices of the World Health Organization (WHO), officialized the concept of health promotion, from a social, political, technical, economic and medical perspective. From that moment, demographic, socioeconomic and cultural changes were considered factors that intertered in health [2].

In relation to hearing health, there is a wide implementation of pediatric hearing health aimed at newborns and infants, which include newborn hearing screening. However, the success of these programs is often related to the social and economic conditions of each region [3,4].

Newborn Hearing Screening (NHS) is the first step in the process of identifying hearing alterations, included in a pediatric hearing health program. During NHS hearing alterations can be identified and diagnosis and intervention initiated as soon as possible. All of these efforts are focused on developing language, irrespective of the type of intervention adopted [5].

Ideally, NHS should be applied to all newborns before hospital discharge, or by the age of one month. Once an alteration is identified, the diagnosis of hearing loss should occur by the age of three months, in order for therapeutic intervention to be initiated before the age of six months [5,6].

However, 20 years after the recommendation of universal NHS[6], that is, for all newborns, pediatric

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hearing health programs do not treat the entire population.

Independent of universal NHS, the risk indicators for hearing loss are needed to organize the flowchart of pediatric hearing loss programs, as a way to achieve universal identification of hearing loss in newborns and infants. Thus, identifying risk indicators for health in general is important, especially in developing countries where socioeconomic and demographic conditions result in unfavorable health outcomes.

Not only should the risk indicators for hearing loss commonly described in the literature be studied [3,5-7], but also socioeconomic and demographic indicators that can influence the overall health of pregnant women and, in turn, newborns and infants [8]. Analysis of these indicators reveals the variables involved with the etiology of hearing loss, helping establish more effective hearing health program protocols aimed at newborns and infants [4,8].

The following socioeconomic and demographic conditions were investigated in this study: age, marital status, mother's schooling level and occupation, personal and family income, number of children and type of housing. Even though the socioeconomic and demographic aspects of the families of newborns and infants should be analyzed considering the association with hearing loss, this information may also help determine prevention and hearing health strategies for the population in question. Thus, the aim of the present study was to analyze the socioeconomic and demographic factors between 2007 and 2009, in mothers of newborns and infants that took part in a Newborn Hearing Screening program.

METHODS

This is a retrospective, descriptive, cross-sectional study.

A total of 2476 mothers of newborns and infants treated between 2007 and 2009 took part in the Newborn Hearing Screening (NHS) program at a university hospital maternity in Northeast Brazil, affiliated with the Unified Health System (SUS). All newborns and infants that were born in this hospital or referred to it for the NHS test were included.

Data were obtained from the NHS program's database, which contains information from the chart of each newborn or infant. This chart consists of transient evoked otoacoustic emission (TEOEA) exam results (using a Madsen Capella device) and a form containing data from an interview with the mothers regarding their demographic and socioeconomic situation as well as information from medical charts describing the risk indicators present in the pre, trans and postnatal period.

This study was approved by the Health Science Research Ethics Committee of Universidade Federal de Pernambuco (UFPE), under no. 0158.0.172.000-07. After being informed of the objective of the study, participating mothers gave their informed consent and authorized the use of medical chart data.

Statistical analysis of the data involved obtaining bivariate, descriptiveabsolute distributions, and inferential statistics, using Pearson's chi-square test. The significance level was set at 0.05.

RESULTS

Of the 2522 newborns and infants that participated in the NHS stage of the pediatric hearing health program at a university hospital, 1193 (47.3%) were treated in 2007, 847 (33.6%) in 2008 and 482 (19.1%) in 2009. The results of 2476 mothers of newborns and infants born between 2007 and 2009 will be presented, 46 having been eliminated since their demographic and socioeconomic data were incomplete.

The total values of each variable have a different n from the total N (2476), since the information was not always adequately provided on the forms and, consequently, in the database. The only variable with no missing data was "mother's age".

Table 1 shows the demographic characterization of the mothers, where the most prevalent ages ranged between 20 and 34 years (65.1%, n=1611). A smaller portion were adolescents (25.1%, n=621) or subjects older than 35 years (9.9%, n=244). However, there was no significant difference over the years. With respect to marital status, most of the mothers (67.5%, n=1662) were married. There was a statistically significant increase in single mothers from 2007 and 2008 to 2009.

Table 2 shows that most socioeconomic variables changed significantly over time, except for number of children and prenatal follow-up, which remained constant.

Table 1 – Demographic factors of the mothers under study, according to the birth year of the newborns and infants

	Year of birth								
	2007		2008		2009		Group Total		P-value
	n	%	n	%	n	%	n	%	
Mother's ages									
≤ 19	293	25.3	210	24.9	118	24.8	621	25.1	
20 to 34	743	64.2	549	65.1	319	67.2	1611	65.1	$p^{(1)} = 0.606$
≥ 35	122	10.5	84	10.0	38	8.0	244	9.9	
TOTAL	**1158**	**100.0**	**843**	**100.0**	**475**	**100.0**	**2476**	**100.0**	
Mother's marital status									
Single	332	28.7	246	29.5	221	47.0	799	32.5	$p^{(1)} < 0.001$*
Married	825	71.3	588	70.5	249	53.0	1662	67.5	
TOTAL	**1157**	**100.0**	**834**	**100.0**	**470**	**100.0**	**2461**	**100.0**	

(*): Significant difference at a confidence level of 0.05.
(1): Pearson's chi-square test.

DISCUSSION

The study of socioeconomic and demographic conditions is justified by the need to assess the health status of individuals and the pediatric health programs of a region, given that their results help improve health programs such as those involving hearing health aimed at newborns and infants [3,8]. In other words, this knowledge could lead to basic health care measures aimed at minimizing the possible causes of hearing alterations, thereby encouraging better health conditions.

Given that there are associations between socioeconomic indicators and the health conditions of a population, social class, family income, mother's age, number of children that live in a same house, mother's marital status, and prenatal care received were investigated in the present study [1], as well as mother's schooling, since it is also believed to be related to the health conditions of a community [9].

Although most of the mothers were aged between 20 and 34 years, part of the population consisted of adolescents (25.1%) and older mothers (9.0%). These percentages did not significantly vary over the three–year analysis period. However, being a teenage or older mother may have implications for the pregnancy [9-12], such as higher low birth weight and prematurity indices[9], considered risk indicators for newborn and infant hearing loss [6].

Being a teenage mother interferes in a woman's life, in that she often has to interrupt her studies, given the difficulty in combining them with child rearing. These aspects delay their entry into the job market, altering their prospects of having a better financial status[12].

Other family and social problems faced by adolescent mothers have been described, such as early responsibility during a period of maturation. This results in a teenager who is unprepared to assume the psychological, social and economic responsibilities that maternity entails [12].

Older mothers also pose risks to newborn and infant health, since they may suffer from chronic diseases such as hypertension and diabetes *mellitus*, in addition to higher prevalence of miscarriage in the first trimester [13]. In a study conducted in Recife it was observed that maternal age greater than or equal to 35 years was associated with transnatal mortality [14].

With respect to marital status, although most mothers were married (67.5%; n=1662), there was a significant increase in single mothers from 2007 and 2008 to 2009 and a reduction in married mothers over the three-year study period. In other words, mothers are increasingly caring for their children alone. Furthermore, these results may indicate a lack of family planning and increased risk of children being mistreated [9].

Unstable conjugal relationships may contribute to emotional distress such as affective disorders, which can be aggravated by an unwelcoming environment caused by the social stigma of being a single mother [9,10], or even attempted abortion which increases the risk to the fetus since, if it survives, it could suffer from sequelae, including head and/or neck malformations, considered risk indicators for hearing loss [7].

These are some of the factors that can justify the mother's need for a companion, since this may have a positive influence on her conduct, resulting in less adverse outcomes during pregnancy [10].

Table 2 – Socioeconomic factors of the mothers under study, according to the birth year of the newborns and infants.

	Year of birth								
	2007		2008		2009		Group Total		p-value
	n	%	n	%	n	%	n	%	
Schooling									
Illiterate	24	2.1	22	2.7	3	0.7	49	2.0	
Elementary incomplete	431	38.3	284	34.5	156	34.2	871	36.2	
Secondary incomplete	333	29.6	210	25.5	140	30.7	683	28.4	$p^{(1)} = 0.007$*
Secondary complete	301	26.8	271	32.9	136,	29.8	708	29.5	
University	36	3.2	36	4.4	21	4.6	93	3.9	
TOTAL	**1125**	**100.0**	**823**	**100.0**	**456**	**100.0**	**2404**	**100.0**	
Mother's occupation									
Homemaker	664	59.7	367	51.0	249	57.2	1280	56.4	
Housekeeper	64	5.8	69	9.6	29	6.7	162	7.1	$p^{(1)} = 0.002$*
Student	126	11.3	78	10.8	45	10.3	249	11.0	
Other occupations	259	23.3	206	28.6	112	25.7	577	254	
TOTAL	**1113**	**100.0**	**720**	**100.0**	**435**	**100.0**	**2268**	**100.0**	
Personal income									
No income	-	-	407	59.9	223	57.5	630	39.8	
< 1 minimum monthly wage	260	50.5	107	15.7	66	17.0	433	27.4	$p^{(1)} < 0.001$*
≥1 minimum monthly wage	255	49.5	166	24.4	99	25.5	520	32.8	
TOTAL	**515**	**100.0**	**680**	**100.0**	**388**	**100.0**	**1583**	**100.0**	
Family income									
No income	-	-	7	1.0	27	7.3	34	1.6	
< 1 mminimum monthly wage	257	24.3	196	26.9	109	29.3	562	26.0	$p^{(1)} < 0.001$*
≥ 1 minimum monthly wage	801	75.7	525	72.1	236	63.4	1562	72.4	
TOTAL	**1058**	**100.0**	**728**	**100.0**	**372**	**100.0**	**2158**	**100.0**	
Number of children									
≤ 3	1032	89.7	741	89.4	384	86.9	2157	89.1	$p^{(1)} = 0.262$
≥ 4	119	10.3	88	10.6	58	13.1	265	10.9	
TOTAL	**1151**	**100.0**	**829**	**100.0**	**442**	**100.0**	**2422**	**100.0**	
Homeowner									
Yes	609	53.6	542	65.5	307	67.6	1458	60.3	$p^{(1)} < 0.001$*
No	527	46.4	285	34.5	147	32.4	958	39.7	
TOTAL	**1136**	**100.0**	**827**	**100.0**	**454**	**100.0**	**2417**	**100.0**	
Type of maternity born in									
Public	1047	97.7	788	94.0	451	99.3	2313	96.7	$p^{(1)} < 0.001$*
Private	25	2.3	50	6.0	3	0.7	78	3.3	
TOTAL	**1099**	**100,0**	**838**	**100.0**	**454**	**100.0**	**2391**	**100.0**	
Prenatal follow-up									
Yes	1106	97.4	815	97.4	456	97.9	2377	97.5	$p^{(1)} = 0.833$
No	30	2.6	22	2.6	10	2.1	62	2.5	
TOTAL	**1136**	**100.0**	**837**	**100.0**	**466**	**100.0**	**2439**	**100.0**	

(*): Significant difference at a confidence level of 0.05.
(1): Pearson's chi-square test

In regard to mother's schooling, although there is a higher percentage (36.2%; n=871) of mothers that did not complete elementary school, this variable remained stable during the study period. There was also a statistically significant increase in mothers' schooling over these years, except for a decrease in high school graduates in 2009. In other words, mothers' schooling levels have increased over time. This may be due to public policies aimed at improving parents' education, such as adult education programs [15].

Formal education is an important factor to consider in terms of health promotion, protection and recovery, including hearing health, since it leads to improved life conditions, better access to favorable health conditions and enhanced future prospects for the health of mothers' and their offspring. Moreover, mothers with low schooling had more difficulty in obtaining prenatal care[8].

In a study conducted at a public hospital, researchers observed that 36.1% of mothers (n=431) had less than eight years of schooling in 2010, while 25.3% had completed high school. [8]

An important social question is the mother's occupation. In the present study, the data show that a majority of mothers (56.4%; n=1280) were homemakers. However, there was a statistically significant increase in economically active mothers, betwee 2007 and 2009. These data are reflected in personal income, which rose between 2008 and 2009, even though most mothers remained unemployed.

Non-working mothers may lead to poor quality of life indicators,[10] given that their income could contribute to family expenses and improved nutrition, as well as more chances to take part in cultural and educational events and better leisure opportunities, considered important factors for good quality of life [16].

The Intersyndicate Department of Statistics and Socioeconomic Studies (DIEESE) [17] presented the results of women in the labor force between 1999 and 2006. This document shows that the proportion of women in the economically active population is similar in the six regions of Brazil, increasing in Recife (45.2% of women are economically active) in 2006, when compared with previous years.

Although there has been an increase in economically active mothers (between 2007 and 2009), family income has decreased over time. There has also been a rise in the number of children, which, albeit not statistically significant, can reflect in per capita income. This, in turn, influences living conditions, nutrition, leisure and most importantly, health.

The economic status of families may result in public policies, improving healthy eating patterns [18]. Given that maternal nutritional status has a direct impact on intrauterine growth, there may be a relationship with birth weight. The nutritional status of pregnant women is one of the most important requirements for good gestational evolution [19]. Thus, poor nutrition during pregnancy may contribute to low newborn and infant body weight, considered a risk fator that could result in hearing alterations.

The results show that most (89.1%; n=2157) of the mothers in the present study had three children. These findings may be associated with fertility rate, which has been declining [20], possibly due to changes in education and health systems.

There has been an important reorganization in the Brazilian health system, which has helped decrease the fertility rate since the 1970s to 2 children in 2006 [20].

With respect to housing, the data found in this study demonstrate that most (60.3%; n=1458) of the mothers own their own home, a statistically significant increase, between 2007 and 2009. Since housing is one of the main determinants of the quality of life of a population, it may be related to good life conditions [21,22], which are interrelated with health status, considered of great importance in the establishment of measures to promote the quality of life of individuals, families and communities [21].

Thus, if there are better housing conditions, these families may enjoy improved life and social conditions, reflected in rising consumption of goods and enhanced hygiene, making them less vulnerable to diseases associated with poor basic sanitation [22].

In relation to type of maternity, the vast majority of the women were treated at public maternities (99.3% in 2009). The type of hospital where the newborns were born reveals a little about the user of the service [20]. Although all individuals are constitutionally guaranteed access to the public health system, only those with low purchasing power always use this service, unlike more economically priviledged people who use it only for more sophisticated exams, procedures and costly medication [23].

With respect to prenatal follow-up most (97.5%; n=2377) mothers underwent such a follow-up. This percentage remained constant over time. These data corroborate the Ministry of Health, which recommends that mothers initiate prenatal follow-up in the first trimester of pregnancy, with at least six consultations. Prenatal care is where mothers are informed about health promotion and prevention, and well-being, in addition to undergoing diagnosis and treatment for a number of complications that could affect the health of both the woman and her child.

CONCLUSION

Marital status proved to be an aspect that may put the mother's social condition at risk and consequently her health, since there is an increase in the number of mothers with unstable conjugal relationships.

This finding may indicate the need for programs aimed at informing these mothers about newborn and infant care, despite the fact that their prospects have improved because they are economically active.

Even though the results show improvements in a number of aspects related to life conditions during the three-year study period, sociodemographic and demographic characteristics may be potentially unconducive to good health, especially for pregnant women and, in turn, newborns and infants. This means that greater investments in educational programs are needed, primarily with respect to the hearing health of these individuals.

It is concluded that particular attention must be given to the poor health conditions of mothers, newborns and infants, which must be considered when implementing pediatric health programs aimed at newborns and infants.

RESUMO

Objetivo: analisar fatores socioeconômicos e demográficos, dos anos de 2007 a 2009, de mães de neonatos e lactentes participantes de um programa de saúde auditiva infantil. **Métodos:** a coleta de dados foi realizada a partir do banco de dados do programa de Triagem auditiva neonatal, que contém informações retiradas do registro de cada neonato ou lactente. Participaram 2476 mães de neonatos e lactentes atendidos na etapa da Triagem Auditiva Neonatal, entre 2007 a 2009. **Resultados:** entre as variáveis demográficas destaca-se que 65,1% das mães possuíam idades entre 20 e 34 anos e 67,5% eram casadas. Nas variáveis socioeconômicas, destaca-se que 36,2% das mães possuíam o ensino fundamental incompleto e 56,4% eram donas de casa e 96,7% tiveram seus filhos em maternidades públicas. **Conclusão:** apesar dos resultados indicarem um crescimento de melhores condições de vida, durante os três anos de estudo, ainda observa-se, em termos percentuais, que a população estudada encontra-se em condições desfavoráveis para uma boa saúde das mães, e, consequentemente para a saúde e desenvolvimento global dos neonatos e lactentes. Esses resultados chamam a atenção para o desenvolvimento de ações de promoção da saúde na população estudada, devendo, portanto, serem incluídas quando da implementação de um programa de Saúde Auditiva Infantil de uma dada região.

DESCRITORES: Saúde da Criança; Audição; Fatores Socioeconômicos

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