

# Hearing loss-related knowledge and attitude toward neonatal hearing screening among Egyptian parents

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## Background

Hearing loss is considered one of the most prevalent global health concerns. In Egypt, the accurate estimation of hearing loss among children is difficult to be determined owing to the absence of a national hearing screening program until now. The parents play an important role in the process of hearing screening and intervention. Their knowledge and attitude certainly influence their decisions. Their decisions toward early identification and intervention of hearing loss may have lifelong effects on the infant's life.

## Aim

To assess the knowledge and attitude of Egyptian parents toward risk factors of infant hearing loss and its neonatal screening and treatment.

## Methods

A cross-sectional study was conducted among 384 Egyptian parents through convenience sampling technique using an online questionnaire over a period of 3 months (from August 2018 to November 2018).

## Results

Overall, 51.6% of the parents who participated in the study had a good knowledge about hearing loss, and 99.5% had a good attitude toward neonatal hearing screening. There was no significant association between knowledge, attitude, and sociodemographic characteristics except between the attitude toward child wearing of hearing aid and age of the parents.

## Conclusion and recommendation

In spite of good positive attitude toward neonatal hearing screening and infant wearing of hearing aids among the studied parents only half of them showed a good level of knowledge about hearing loss. Accordingly, the application of a national newborn hearing screening program is highly recommended.

## Keywords:

attitude, knowledge, neonatal, screening

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## Introduction

Hearing loss is considered one of the most prevalent global health concerns. In 2017, the WHO estimated the prevalence of worldwide hearing loss to be ~466 million people. Of these, 34 million individuals are children. By 2050, it is predictable that more than 900 million people will have disabling hearing loss [1]. According to Parving [2], an international statistic for children with hearing loss is reported to be two to six per 1000 live birth. In the United States, three per 1000 live birth are born with permanent hearing loss [3].

In Egypt, the accurate estimation of hearing loss among children is difficult to be determined because of the absence of a national hearing screening program until now, and the estimation depends only on the hospital-based academic studies [4]. The prevalence of hearing loss among children is estimated to be 20.9% according to a previous study that was established in the Shebin El-Kom District of Egypt [5].

Sixty percent of hearing loss occurring in children is owing to preventable causes. Children hearing loss may result from congenital or acquired etiology. The term congenital hearing loss indicates that the hearing loss is present at birth. It can include hereditary hearing loss or hearing loss owing to other factors present either in utero (prenatal) or at the time of birth (perinatal). Genetic factors are believed to cause more than 50% of all cases of congenital hearing loss in children. Genetic hearing loss may be autosomal dominant, autosomal recessive, or X-linked. Maternal infection such as German measles, cytomegalovirus, or herpes simplex virus; prematurity birth injuries; toxins; complications associated with the Rhesus (Rh) factor in the blood; maternal diabetes; toxemia during pregnancy; and anoxia, all are considered other causes of congenital hearing loss.

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However, acquired hearing loss that presented later in life may be owing to certain infectious diseases, chronic ear infections, the use of particular drugs, and exposure to excessive noise [6].

Hearing loss affects children in four major ways: first, it causes a delay in the development of receptive and expressive communication skills (speech and language). Second, the language deficit causes learning problems that result in reduced academic achievement. It affects the ability of children to communicate causing feelings of loneliness, isolation, frustration, and poor self-concept. Last, it may affect vocational choices [7,8].

Research demonstrates that these negative consequences can be minimized or prevented through early identification and intervention [9–12]. Because of this, the National Institutes of Health's Consensus Development Conference on Early Identification of Hearing Loss concluded that all infants should be screened for hearing impairment, preferably before hospital discharge [13].

Primary prevention can be defined as the measures that are taken to prevent the disorder before its occurrence. Secondary prevention is the early identification of the disorder to minimize the effects of it. The awareness of the causes of the disorder is crucial to prevent it. However, previous studies suggest that public awareness and attitude toward disabilities in childhood are poor and often aggravated by illusory customs and beliefs in developing countries [14–17].

The parents play an important role in the process of hearing screening and intervention. The decisions that are taken by them are certainly influenced by their knowledge and attitude. Their decisions toward early identification and intervention of hearing loss may have lifelong effects on the infant's life [14–18].

The aim of this study was to assess the knowledge and attitude of Egyptian parents toward risk factors of infant hearing loss and its neonatal screening and treatment.

## Methodology

### Study design and participants

A cross-sectional study was conducted among Egyptian parents over a period of 3 months (from August 2018 to November 2018).

### Sample size and sampling technique

Using EPI calculator, the sample size was calculated to be 384 based on a prevalence of

50% and infinite population. Participants were recruited through convenience sampling through social media.

### Data collection tools

A structured online questionnaire was designed by the researchers in Arabic language and is comprised of three sections:

- (1) The first section covered the demographics of the participants (age, sex, level of education, and number of children).
- (2) The second section consisted of eight multiple choice questions regarding knowledge about neonatal hearing screening (causes and risk factors of hearing loss; language acquisition and hearing; the parental suspicion of early manifestations of hearing loss; age of ability of the child to pronounce a clear word; treatment procedures; the specialty of concerned physician when suspecting the hearing loss and when to intervene with such case; and the correct time for hearing screening).
- (3) The third section consisted of four questions, two of them measured attitude toward neonatal hearing screening and the other two questions measured attitude toward the child's wearing of hearing aids. Answers of attitude questions were presented as three-point Likert scale.

### Pilot study

Before dissemination of the questionnaire's link, a pilot study was conducted on 20 parents to test for the clarity of the questionnaire, and modifications were done accordingly. These parents were not included in the study group.

### Data management

Data was analyzed using SPSS, version 24 (SPSS Inc., 2016, Chicago, Illinois, USA). The cutoff point for knowledge and attitude was 50%, below which is considered to be poor. Data were presented in descriptive tables, and the association between knowledge, attitude, and demographics was tested using  $\chi^2$ , which is considered to be significant at less than or equal to 0.05.

### Ethical consideration

The first section of the online questionnaire described the aim of the study to the participants, and if they approve to participate, they had to proceed toward filling the survey. The identity of

the participant was adjusted by Google docs to be kept as anonymous.

## Results

Table 1 shows that most participants were female (74.2%), 57% of the participants were in the age group 30–40 years, 57.8% of the participants had graduated from a university, and 84.4% of the participants had two or more children.

Table 2 shows that 90.1% of the parents knew that there is a relation between hearing and language acquisition. Only 25.5% answered correctly the question asking about the manifestations suspecting the presence of the child's hearing loss.

Table 3 shows that 91.2% of the participants agreed for neonatal hearing screening, 43.5% agreed on

performing the test even if it will cause pain for the baby, 49.7% agreed that wearing a hearing aid will embarrass the child, and only 11.7% agreed that it will embarrass the family.

Table 4 shows that 51.6% of the parents had a good level of knowledge about hearing loss, 99.5% had a good attitude toward neonatal hearing screening, and 88.8% had a good attitude toward having a child wearing a hearing aid.

Table 5 shows that there was no significant association between knowledge and attitude toward neonatal hearing screening and sociodemographic characteristics, and there was a significant association between attitude toward having a child wearing a hearing aid and age of the parents.

**Table 1 Sociodemographic characteristics of the studied sample**

	<i>n</i> (%)
Sex	
Male	99 (25.8)
Female	285 (74.2)
Age (years)	
Less than 20	4 (1)
20–29	64 (16.7)
30–40	219 (57)
More than 40	97 (25.3)
Education	
High school	8 (2.1)
University graduates	222 (57.8)
Postgraduate	154 (40.1)
Number of children	
<2	60 (15.6)
≥2	324 (84.4)

**Table 2 Knowledge of studied sample about hearing loss**

	<i>n</i> (%)
Causes of diminished hearing	152 (39.6)
When to suspect	98 (25.5)
Clear pronunciation of first word	287 (74.7)
Relation between hearing and language acquisition	346 (90.1)
Specialty of the concerned physician	294 (76.6)
Time for hearing screening	166 (43.2)
Treatment procedure	122 (31.8)
Time of starting treatment	294 (76.6)

**Table 3 Attitude of the studied sample toward neonatal hearing screening and wearing hearing aid**

	Agree [ <i>n</i> (%)]	Neutral [ <i>n</i> (%)]	Disagree [ <i>n</i> (%)]
Wearing hearing aid embarrass the child	191 (49.7)	91 (23.7)	102 (26.6)
Wearing hearing aid embarrass the family	45 (11.7)	54 (14.1)	285 (74.2)
Screening of newborn	350 (91.2)	30 (7.8)	4 (1)
I will perform hearing screening for my baby even if it causes pain	167 (43.5)	188 (49)	29 (7.6)

## Discussion

The parents of a newborn play an essential role in the process of hearing screening and intervention. The decisions taken by them are certainly influenced by their knowledge and attitude. The present study aimed to assess the knowledge and attitude of Egyptian parents toward risk factors of infant hearing loss and its neonatal screening and treatment.

This study was conducted on 384 Egyptian parents. Most of them were female (74.2%), and more than half of the participants were in age group 30–40 years and university graduates (57 and 57.8, respectively) (Table 1). Most of the participants had more than two children (84.4%) (Table 1).

In the current study, the knowledge of parents about the main causes of infant hearing loss was 39.6%

**Table 4 Level of knowledge and attitude among the studied participants**

	Poor [ <i>n</i> (%)]	Good [ <i>n</i> (%)]
Level of total knowledge	186 (48.4)	198 (51.6)
Attitude toward having a child wearing hearing aid	43 (11.2)	341 (88.8)
Attitude toward neonatal hearing screening	2 (0.5)	382 (99.5)

**Table 5 Association between knowledge, attitude, and sociodemographic characteristics among studied sample**

	Knowledge (good)	<i>P</i> value	Attitude toward having a child wearing hearing aid (good)	<i>P</i> value	Attitude toward neonatal hearing screening (good)	<i>P</i> value
Sex						
Male	41	0.02	89	0.7	99	0.4
Female	157		252		283	
Age (years)						
20	2	0.9	4	0.001	4	0.7
20–29	34		50		64	
30–40	110		192		217	
<40	52		95		97	
Education						
High school	4	0.2	8	0.1	8	0.2
University education	106		191		222	
Postgraduate	88		142		152	
Number of children						
<2	32	0.7	50	0.1	60	0.5
≥2	160		282		312	

(Table 2). This finding was very near to the results found by previous studies [14,19]; these results revealed that more than 50% of the parents correctly identified main etiological factors for infant hearing loss. The parental suspicion of early manifestations of hearing impairment is essential for proper management. A previous study revealed that the percentage of parents who suspected the presence of hearing loss in their infants was 44% [20]. However, the parents in this study showed lower percentages of knowledge regarding the symptoms suspecting the presence of hearing loss (25%) (Table 2). The previous two findings can be explained by the lack of hearing loss awareness programs in the developing countries, which leads to decreased awareness of people about the causes and symptoms of infant hearing loss.

There is considerable evidence that, hearing loss in infants and young children has a deleterious effect on speech and language development owing to restricted access to speech and language input [21]. This is consistent with the results of the current study which showed that 90.1% of the parents stated there is a relation between hearing and language acquisition (Table 2). Moreover, a previous study mentioned that neonatal screening for hearing loss is positively correlated with the scores of expressive and receptive language and also vocabulary production ( $P<0.001$ ) [22].

When parents suspect the presence of hearing problems in their infants, they should seek an audiologist for audiological identification, assessment, diagnosis, treatment, and prevention of further effects [23]. Overall, 76.6% of the participants in this study knew the specialty of

concerned physician and the proper time to start the treatment (Table 2).

The present study revealed that a high percentage of the parents (91.2%) showed a positive attitude toward neonatal hearing screening (Table 3). The former result was consistent with two previous studies; the first one found that 99% of mothers showed a positive desire to perform their baby's hearing screening after birth [14]. The second one showed that 84.9% of mothers presented positive attitude toward hearing screening at birth [19]. Only 43.5% of participants in this study agreed on performing the test even if it will be painful for the baby (Table 3), and this can be explained by that the fear of parents from exposing their infants to pain exceeds their fear from drawbacks of hearing loss.

In a previous study, parents reported several challenges related to hearing aid use and inverse emotional effect on their children [24]. Another study stated that, one of the most frequently reported challenges that interfered with hearing aid use was that the child does not want to wear the hearing aids [25]. In accordance with the previous findings, the current study revealed that 49.7% of parents agreed that wearing a hearing aid will embarrass their child, and only 11.7% agreed that they will embarrass the family (Table 3). This result can be explained by that even being different from others may embarrass the child, but this will not be reflected on the family as they know the great value of wearing the hearing aids. On the contrary, they will fight their child's negative feelings.

In the present study, 51.6% of the participants showed a good level of knowledge about hearing loss, whereas

99.5% had a good attitude toward neonatal hearing screening (Table 4). This finding can be explained by that even if half of the parents had poor knowledge about hearing loss, they had a great desire to avoid this problem with its grave complications.

Regarding the attitude toward wearing hearing aids, a large percentage of the parents (88.8%) exhibited a good attitude toward having a child wearing hearing aid (Table 4). This finding is in agreement with the finding shown in Table 2, where 90.1% of the participants know there is a crucial relationship between hearing and language acquisition. So, even if hearing aids have some drawbacks, their merits exceed demerits. This result is in agreement with the result of a previous study in which the mothers showed high acceptance toward child wearing hearing aids (84%) [26]. On the contrary, a previous study mentioned that only 54.3% of parents stated that they would allow their children to wear hearing aids [19].

The current results revealed no significant association between parents' knowledge and attitude toward hearing loss and their sociodemographic characteristics (Table 5). These results were consistent with a previous study which revealed that there was no association between parents' demographic data and their knowledge and attitude toward infant hearing screening except between the age and knowledge domain [26]. In the present study, there was only a significant association between the age of parents and their attitude toward the child wearing of hearing aids (Table 5). This finding can be explained by the fact that, there is better decision making with increasing age.

### Conclusion and recommendations

In spite of good positive attitude toward neonatal hearing screening and infant wearing hearing aids among the studied parents, only half of them showed a good level of knowledge about hearing loss. Accordingly, it is important to consider the implementation of public awareness programs to improve parents' knowledge and attitude toward infant hearing loss and neonatal screening and management to reduce the consequences of infant hearing loss. Moreover, more studies are necessary to measure the knowledge and attitude of parents toward infant hearing loss among diverse populations. Finally, for early detection of infant hearing loss and improvement of outcomes, the application of the national newborn hearing screening program is highly recommended. It is considered a

comprehensive and organized approach that includes screening, diagnosis, intervention, and follow-up.

### Limitations

As the participants of this study were recruited through nonprobability convenience sampling technique, data cannot be generalized to all Egyptian parents. The least level of education of the participants was high school as researchers reached them through social media, so further studies are needed to reach public of lower education.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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