



KNOWLEDGE AND ATTITUDE TOWARD EARLY DETECTION OF HEARING IMPAIRMENT IN CHILDREN UNDER FIVE YEARS IN A WELFARE TEACHING HOSPITAL/ MEDICAL CITY, BAGHDAD-2025

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ABSTRACT

Background: Hearing plays a vital role in early childhood development, especially in language, learning, and social skills. Hearing loss at a young age can delay speech and reduce quality of life. In many low- and middle-income countries, lack of universal newborn hearing screening remains a challenge. Parental awareness is key to recognizing early signs and seeking timely help. **Aim of the Study:** To assess parents' knowledge and attitude toward early detection of hearing impairment in children under five years at Pediatric Teaching Hospital/Medical City Directorate in Baghdad, 2025. **Methods:** A cross-sectional study was conducted using a pre-structured questionnaire adopted from previous literature. A total of 250 parents were selected through convenience sampling were recruited from the Pediatric Teaching Hospital /medical city. from March 1st to June 30th, 2025. The data collected using a questionnaire which consist of 3 parts, the first part about sociodemographic data, the second part measure parental knowledge (about causes, diagnosis, and early intervention), the third part about attitudes toward hearing impairment. Data were collected through direct interviews with Iraqi parents aged 18 years and above who had children under five years. SPSS version 26 was used for analysis. **Results:** Most participants were mothers 150 (60%). Knowledge levels were moderate in 153 (61.2%), good in 78 (31.2%), and poor in 19 (7.6%). Positive attitudes were reported by 228 (91.2%) of parents. Mothers had significantly higher knowledge and more positive attitudes than fathers ($P < 0.001$). However, only 6% of children had undergone hearing screening. **Conclusion:** More than half of the participants had a moderate level of knowledge about hearing impairment and screening, while the vast majority showed a positive attitude toward screening and early intervention. Only a small proportion of children had undergone screening. A significant association was found between being a mother and having a higher knowledge level as well as a positive attitude. These findings highlight the need to strengthen the health system to provide adequate facilities for screening.

INTRODUCTION

Hearing is a vital sense that plays a key role in the development of speech, language, and cognitive skills. Hearing impairment in children can lead to serious consequences if not detected and managed early.^[1] Hearing impairment refers to a partial or total inability to hear. In children, it interferes with normal language acquisition and psychosocial growth. The severity of hearing impairment is graded using thresholds measured in decibels. It is possible to perceive sounds quieter than a whisper because the normal hearing range is between 0 and 20 decibels.^[2]

Although hearing impairment can affect individuals at any age, its impact on children is particularly profound due to its interference with essential developmental milestone.^[3] Children with hearing impairments may experience emotional and social disadvantages. The more severe the hearing loss, the greater the challenges in recognizing and interpreting speech, often resulting in language delays.^{[4][5]} Deprivation of auditory perception can negatively affect quality of life and spoken communication, which can hinder language development and increase the risk of dementia and cognitive decline later in life. If left untreated, early-life deafness is linked to poor reading outcomes and less career prospects later in life.^[6]

Worldwide the prevalence of congenital hearing loss is estimated at 1 to 3 cases per 1000 newborns and are classified as deaf or hard of hearing based on newborn hearing screening.^{[7][8][9][10]} These hearing threshold changes can be caused by a variety of acquired causes, genetics, or congenital conditions that show up as delayed hearing changes.^[7] Acquired hearing loss in children can result from multiple factors including recurrent ear infections, exposure to ototoxic drugs, loud noise, and other infections such as meningitis and measles. These factors may cause irreversible damage to the auditory system, emphasizing the importance of early prevention and regular screening to mitigate long-term effects.^[10]

Researches indicate that early interventions give young children (birth to 36 months of age) the conditions they need to overcome hearing-related challenges. Early detection and management can greatly reduce or completely eliminate developmental obstacles. It also instructs families on how to support and interact with their children with hearing impairments. Children with hearing impairments can benefit from three key variables when learning spoken language: 1) Early management; 2) Early detection of hearing problems through a universal newborn screening program; and 3) Developments in auditory technology.^[11]

This study aimed to assess parents' knowledge and attitude towards early detection of hearing impairment in children under five years old at the pediatric teaching hospital/ medical city directorate in Baghdad, 2025.

METHODS

Study design

A cross-sectional survey with analytic component.

3.2 Study Setting

This cross sectional study included 250 parents of children under 5 years who attended the outpatient office in the welfare teaching hospital/ medical city in Baghdad. It was carried out during the period from 1st of March 2025 to the 30th of June 2025.

Inclusion Criteria

Iraqi parents who have children less than 5 years and are age 18 years and above who volunteered to give information about their knowledge attitude toward hearing impairment.

Exclusion Criteria

Parents with communication difficulties (such as severe speech, hearing, or language problems) that interfere with completing the questionnaire.

Data Collection Method

Data were collected by direct interviews using a written structured questionnaire by the researcher and modified by the supervisor and translated to the Arabic language by a professional translator

Questionnaire

The questionnaire sections and questions were adopted from previous studies^{[12][13]} and modified according to the research needs and the intended category of this research and reviewed by an expert committee.

The structured questionnaire consisted of three parts

Part 1: the first part contains 6 questions about Sociodemographic features:

Age

Relation

Consanguineous marriage

Level of education

Had any screen for your baby.

At what age?

Part 2: The Second part is 29 questions, (17) questions assessing parents knowledge about causes, (12) questions assessing diagnosis, intervention and early sign of early hearing impairment each question can be answered by yes, no, or I don't know. Part 3: The third part contains 5 questions about parents' attitude towards hearing impairment each question can be answered by yes or no.

Statistical Analysis

The Data was entered, coded and analyzed using Microsoft Excel and Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) International statistics version 26 .Continuous variables were expressed as means and standard deviations. Categorical variables were expressed as frequency and percentages. The difference between categorical variables was investigated using either the χ^2 test with Yates' correction or Fisher's exact test, depending on the context. A P-value less than or equal 0.05 was considered statistically significant.

Scoring System

The score for knowledge and attitude questions was calculated as follows: each item get
1 if the answer is 'True',
0 if the answer is No' or 'Don't know'.

Given the total number of 29 knowledge items (17 from Table 4.2 and 12 from Table 4.3), a knowledge score can be constructed with a maximum score of 29 points.

Score	Range	Percentage of Total	Interpretation
0–9			Poor knowledge
10–19			Moderate knowledge
20–29			Good knowledge

For a binary categorization of parental attitude toward childhood hearing impairment using the 5 items in Table (4), the following scoring and classification system was used:

Total Score Attitude Level

0–2 Negative attitude

3–5 Positive attitude

Ethical considerations

An approval from scientific council of Arabic board for health specialization to collect data was obtained from the administrative department of the hospital After selecting the patient through convenience sampling, the purpose of the study was fully explained to the

participant by the researcher that did the interviews, data privacy and anonymity were ensured also and the right to withdraw at any time during the interview was granted for the participant. Informed verbal consent was obtained from each person before starting the interview.

RESULTS

The study sample comprised 250 parents. Sociodemographic characteristics are illustrated in Table 1.

Table 1: Sociodemographic Data of the Sample.

Characteristic	N = 250, n (%)
Parent	
Mother	150 (60.0%)
Father	100 (40.0%)
Age of the parent (years)	
<20	17 (6.8%)
21-30	107 (42.8%)
31-40	97 (38.8%)
41-50	24 (9.6%)
>50	5 (2.0%)
Education	
Illiterate	58 (23.2%)
Primary school	78 (31.2%)
Secondary school	47 (18.8%)
University and above	67 (26.8%)
Presence of consanguinity	137 (54.8%)
Child underwent a hearing test	
Yes	15 (6.0%)
No	235 (94.0%)
At which age the child underwent testing (N=15) (years)	2.6 ± 1.5 ¹
¹ Mean ± SD	

Parents showed varied awareness of hearing impairment causes in children under five. High recognition was noted for family history (89.2%) and ear infections (84.0%), while awareness of maternal infections (29.6%)

and jaundice (17.2%) was low. Additionally, 44.0% identified treatment-related risks, and over half (55.6%) acknowledged loud sound exposure as a potential cause.

Table 2: The Knowledge of the Parent about the causes of Hearing Impairment in Children Under 5.

Question	Yes ¹	No ¹	Don't know ¹
Maternal infection like rubella can cause hearing loss	74 (29.6%)	72 (28.8%)	104 (41.6%)
Babies can be born with hearing loss	181 (72.4%)	31 (12.4%)	38 (15.2%)
Delayed crying at birth can cause HL	53 (21.2%)	98 (39.2%)	99 (39.6%)
Low birth weight, <1500 g and premature, can cause HL	38 (15.2%)	111 (44.4%)	101 (40.4%)
Craniofacial anomalies can cause HL	120 (48.0%)	81 (32.4%)	49 (19.6%)
Head trauma can cause HL	166 (66.4%)	48 (19.2%)	36 (14.4%)
CNS infection can cause HL	195 (78.0%)	23 (9.2%)	32 (12.8%)
Jaundice can cause HL	43 (17.2%)	91 (36.4%)	116 (46.4%)
Ear infection can cause HL	210 (84.0%)	31 (12.4%)	9 (3.6%)
Recurrent respiratory infection can cause HL	69 (27.6%)	133 (53.2%)	48 (19.2%)
Exposure to loud sounds can cause HL	139 (55.6%)	88 (35.2%)	23 (9.2%)
Family history of deafness or dumb can cause HL	223 (89.2%)	16 (6.4%)	11 (4.4%)
Consanguineous marriage can cause HL	182 (72.8%)	51 (20.4%)	17 (6.8%)
Drug/medication for pregnant and children can causes HL	108 (43.2%)	71 (28.4%)	71 (28.4%)
Radiotherapy for child can cause can cause HL	110 (44.0%)	66 (26.4%)	74 (29.6%)
Chemotherapy for child can cause HI	110 (44.0%)	67 (26.8%)	73 (29.2%)
Passive Smoking can predispose to OM	60 (24.0%)	126 (50.4%)	64 (25.6%)

Table 3 reveals that while many parents are knowledgeable about early indicators and interventions for hearing impairment in children under five, gaps remain. Most recognized key auditory responses and the

importance of early assessment, but fewer understood early detection after birth or the educational potential for children with hearing impairment. Many were aware of supportive institutions.

Table 3: The knowledge of the parent about diagnosis, intervention and early indicator about hearing impairment in children under 5.

Question	Yes1	No1	Don't know ¹
HL can be identified soon after birth	113(45.2%)	59(23.6%)	78 (31.2%)
At and below 3 months your baby can be startled when you clap your hand behind her head?	228(91.2%)	10(4.0%)	12(4.8%)
Between 4-6 months your baby can be identified and realize sound and turn toward you and reacts to your voice?	240(96.0%)	3 (1.2%)	7 (2.8%)
Between 6-10 months your baby can respond to her /his name?	241(96.4%)	2 (0.8%)	7 (2.8%)
HL Can effect-child's speech and language development?	170(68.0%)	58(23.2%)	22(8.8%)
Treatment for HL is available?	164(65.6%)	31(12.4%)	55(22.0%)
Children with HL can attend regular school?	89(35.6%)	143(57.2%)	18(7.2%)
Are There institute dedicated to deaf and dumb people?	207(82.8%)	23(9.2%)	20(8.0%)
Breast feeding for the first 6months can reduce or prevent ear infection	141(56.4%)	59(23.6%)	50(20.0%)
Routine childhood vaccination can reduce OM	164(65.6%)	49(19.6%)	37(14.8%)
Screen and treating maternal infection during pregnancy can reduce HI?	176(70.4%)	28(11.2%)	46(18.4%)
Referring infant at high risk as with family history of deafness or those with low birth weight for early assessment can reduce HI	186(74.4%)	23(9.2%)	41(16.4%)

The analysis of parental attitudes toward childhood hearing impairment (Table 4) showed largely positive views. Notably, 79.6% of parents were willing to have their infants tested shortly after birth, and 86.4% supported testing during school years. The acceptance of

treatments was also high, with 82.8% agreeing to hearing aids and 80.4% to ear surgery. Furthermore, 88.0% would consider enrolling their child in special institutions for the deaf and mute if needed.

Table 4: Attitude Toward Childhood Hearing Impairment.

Question	Yes ¹	No1
I would like my baby to be tested for hearing soon after birth.	199 (79.6%)	51(20.4%)
I would like my child to be tested for hearing while at school.	216 (86.4%)	34 (13.6%)
I accept the use of hearing aids as part of the treatment for hearing impairment.	207 (82.8%)	43 (17.2%)
I accept ear surgery as part of the treatment for hearing impairment.	201 (80.4%)	49 (19.6%)
I accept taking my child to special institutions for the deaf and mute.	220 (88.0%)	30(12.0%)

Table 5 shows that parents had a mean knowledge score of 16.8 ± 5.11 , with 61.2% having moderate knowledge. Positive attitudes were prevalent, with a mean score of

4.2 ± 1.11 ; 91.2% of parents supported early detection and management of hearing impairment, while only 8.8% had negative attitudes.

Table 5: level of Knowledge and Attitude Toward Hearing Impairment.

Characteristic	N = 250
Knowledge of hearing impairment	16.8 ± 5.1^1
Good	78 (31.2%) ²
Moderate	153 (61.2%) ²
Poor	19 (7.6%) ²
Attitude toward hearing impairment	4.2 ± 1.1^1
Positive	228 (91.2%) ²
Negative	22 (8.8%) ²

The analysis found a significant association between parents' roles and knowledge of hearing impairment,

with mothers showing higher knowledge (74.4%) than fathers (25.6%). No significant links were found with

parent age, education level, consanguinity, or prior hearing tests. Although more educated parents tended to

have better knowledge, these differences were not statistically significant; Table (6).

Table 6: association between sociodemographic profile of the parent with the level of knowledge of hearing impairment.

Characteristic	Good, N = 78 ¹	Moderate, N = 153 ¹	Poor, N = 19 ¹	P-value
Parent				0.003 ²
Mother	58 (74.4%)	79 (51.6%)	13 (68.4%)	
Father	20 (25.6%)	74 (48.4%)	6 (31.6%)	
Age of the parent				0.2 ³
<20	2 (2.6%)	10 (6.5%)	5 (26.3%)	
21-30	33 (42.3%)	66 (43.1%)	8 (42.1%)	
31-40	30 (38.5%)	62 (40.5%)	5 (26.3%)	
41-50	11 (14.1%)	13 (8.5%)	0 (0.0%)	
>50	2 (2.6%)	2 (1.3%)	1 (5.3%)	
Education level of the parent				0.1 ³
Illiterate	11 (14.1%)	37 (24.2%)	10 (52.6%)	
Primary school	15 (19.2%)	28 (18.3%)	4 (21.1%)	
Secondary school	21 (26.9%)	53 (34.6%)	4 (21.1%)	
University and above	31 (39.7%)	35 (22.9%)	1 (5.3%)	
Presence of consanguinity	35 (44.9%)	91 (59.5%)	11 (57.9%)	0.10 ²
Child underwent a hearing test	7 (9.0%)	8 (5.2%)	0 (0.0%)	0.3 ³
¹ n (%)				
² Pearson's Chi-squared test				
³ Fisher's exact test				

The analysis examining the association between parents' sociodemographic characteristics and their attitude toward hearing impairment revealed a significant relationship with the parent's role ($P < 0.001$). Specifically, fathers were more likely to exhibit a negative attitude (77.3%) compared to mothers (22.7%), whereas mothers predominated among those with a

positive attitude (63.6%). No statistically significant associations were observed between attitude and other factors, including age of the parent ($P = 0.63$), education level ($P = 0.33$), presence of consanguinity ($P > 0.92$), or whether the child had undergone a hearing test ($P = 0.43$) (table 7).

Table 7: association between sociodemographic profile of the parent with the level of attitude of hearing impairment.

Characteristic	Negative, N = 22 ¹	Positive, N = 228 ¹	P-value
Parent			<0.001 ²
Mother	5 (22.7%)	145 (63.6%)	
Father	17 (77.3%)	83 (36.4%)	
Age of the parent			0.6 ³
<20	3 (13.6%)	14 (6.1%)	
21-30	8 (36.4%)	99 (43.4%)	
31-40	8 (36.4%)	89 (39.0%)	
41-50	3 (13.6%)	21 (9.2%)	
>50	0 (0.0%)	5 (2.2%)	
Education level of the parent			0.3 ³
Illiterate	4 (18.2%)	54 (23.7%)	
Primary school	10 (45.5%)	68 (29.8%)	
Secondary school	5 (22.7%)	42 (18.4%)	
University and above	3 (13.6%)	64 (28.1%)	
Presence of consanguinity	12 (54.5%)	125 (54.8%)	>0.9 ²
Child underwent a hearing test	0 (0.0%)	15 (6.6%)	0.4 ³
¹ n (%)			
² Pearson's Chi-squared test			
³ Fisher's exact test			

DISCUSSION

Early detection of hearing impairment in children is pivotal to ensuring timely interventions, yet its success heavily depends on the awareness and attitudes of caregivers. The current study evaluated parental knowledge and attitudes toward hearing impairment in children under five, revealing moderate knowledge levels among most parents (61.2%) and overwhelmingly positive attitudes (91.2%). These results highlight both opportunities for public health promotion and persistent knowledge gaps, particularly around less overt risk factors and early diagnostic milestones.

Parental Knowledge of Hearing Impairment

Understanding the scope and specificity of parental knowledge about hearing impairment in children is essential for guiding interventions and policy planning. In our study, the majority of parents (61.2%) demonstrated a moderate level of knowledge, while 31.2% showed good knowledge, and only a minority (7.6%) exhibited poor knowledge.

In comparison, a study conducted by Alsudays et al 2020 in the Qassim region of Saudi Arabia found that 42.4% of parents had good knowledge while 57.6% had poor knowledge—a much higher deficit in awareness than in our study.^[13] This indicates that Iraqi parents, at least within our sample, may possess relatively better baseline knowledge compared to some neighboring regions, possibly due to community health education efforts, higher exposure to public health messaging, or sampling variability.

Similarly, a study in Rawalpindi, Pakistan, by Mazlan et al 2024, reported that many parents could recognize clear signs of hearing loss (like not reacting to sound), but only one-third knew about causes like infections or premature birth.^[12] This is similar to our findings—parents know the obvious signs, but not the hidden causes or when hearing loss can be diagnosed.

Awareness of Causes and Risk Factors

This part of study consist of 17 questions about awareness of parents toward causes and risk factor of hearing impairment in children under 5 years Parents were most familiar with genetic and infectious causes, including family history of deafness (89.2%), ear infections (84.0%), and central nervous system infections (78.0%). A substantial portion also recognized consanguineous marriage (72.8%) and head trauma (66.4%) as contributing factors. These findings align with those reported by Alsudays et al 2020, who found similar knowledge levels among Saudi parents, especially regarding hereditary and infectious etiologies of hearing loss.^[13]

However, there was notable lack of awareness about several critical neonatal and environmental risk factors. For example, only 29.6% of parents recognized maternal rubella as a potential cause, 17.2% acknowledged

jaundice, and just 15.2% identified low birth weight and prematurity as risks. Furthermore, conditions such as delayed crying at birth (21.2%), passive smoking (24.0%), and recurrent respiratory infections (27.6%) were poorly recognized. These gaps reflect the findings of Alharbi et al 2025, who reported similarly low awareness levels of perinatal complications and environmental risks among Saudi parents.^[14]

Interestingly, awareness about treatment-related causes—such as medications during pregnancy (43.2%), chemotherapy (44.0%), and radiotherapy (44.0%)—was moderate, suggesting some baseline understanding of ototoxicity, though not necessarily its clinical implications. This pattern is also seen in studies from other low- and middle-income countries, such as Kaspar et al 2017, in the Solomon Islands, where knowledge of biomedical causes outpaced awareness of environmental or neonatal risks.^[15]

5.1.2 Knowledge of Diagnosis and Early Indicators

Most parents in our study showed good awareness about how babies should react to sounds as they grow. Over 90% knew that babies should startle to sound by 3 months (91.2%), turn their head toward sound by 6 months (96.0%), and respond to their name by around 6 to 10 months (96.4%). These results are similar to a study by Mazlan et al 2024, in Pakistan, where parents also recognized these signs.^[12]

However, only 45.2% of the parents knew that hearing problems can be found right after birth. This shows a lack of knowledge about early hearing screening. A study from South Africa by Ehlert et al 2020, showed the same thing—parents knew the behavior signs but not about early testing.^[16]

Other results showed that 74.4% of parents knew that babies at high risk should be tested early. Also, 70.4% knew that checking the mother's health during pregnancy can help prevent hearing loss. About 65.6% of parents said vaccines can help prevent ear infections, and 56.4% understood that breastfeeding helps protect-hearing.

But when it comes to school and social inclusion, the awareness was lower. Only 35.6% thought that children with hearing loss can go to regular schools. This shows that there are still some wrong ideas or stigma about children with hearing problems.

Al sudays et. al., 2020, found similar beliefs in their study.^[13]

In summary, parents knew many things about signs and causes of hearing loss, but they still need more information about early testing and accepting children with hearing issues in schools. These gaps are common in places where there is no national program for hearing screening or education for parents.

Association Between Sociodemographic Characteristics and Knowledge of Hearing Impairment

Our study found that mothers had more knowledge about childhood hearing problems than fathers. Among the parents who had good knowledge, 74.4% were mothers and only 25.6% were fathers. This difference was statistically important ($P = 0.003$). Other studies found the same thing. For example, Khurayzi et al 2024, in Saudi Arabia and Mazlan et al 2024, in Pakistan also reported that mothers were more informed and involved in their children's hearing care.^{[12][17]} This gender-based disparity may be attributed to greater maternal exposure to pediatric healthcare interactions during pregnancy, postnatal visits, and vaccination schedules, which often serve as points for counseling and health education.

Parental Attitude Toward Hearing Impairment in Children

The results from this study present an encouraging picture of parental attitudes toward early detection and intervention for childhood hearing impairment. With a mean attitude score of 4.2 ± 1.11 out of 5, a substantial 91.2% of parents exhibited a positive attitude, and only 8.8% had a negative attitude. These findings are highly relevant, as positive parental attitudes are essential for the timely identification and management of hearing impairment, especially in the critical early years of development. Our results are similar to a study in Saudi Arabia by Alsudays et al 2020, where 92.2% of parents also had a positive attitude.^[13] Even though their knowledge was low, their attitude was good. This shows that even if parents don't know everything, they are still open and supportive. It's a good starting point for health education.

In conclusion, most parents in our study are willing and ready to act. We just need to provide the right information and make services easier to reach.

Sociodemographic Factors and Attitude Variability

A key finding from our study was the significant association between parental gender and attitude ($P < 0.001$). Mothers overwhelmingly exhibited positive attitudes (63.6%), whereas fathers dominated the negative category (77.3%). This supports a consistent theme across the literature that mothers are more involved in the caregiving and healthcare processes, and are often more receptive to pediatric health interventions. For instance, Ravi et al 2016, systematic review emphasized that maternal roles consistently shape positive attitudes toward early childhood hearing services, regardless of educational or socioeconomic background.^[18]

CONCLUSION

The majority of parents exhibited moderate knowledge about hearing impairment, with only few demonstrating good knowledge, indicating a general awareness but limited depth in specific risk factors and interventions.

Parental attitudes were predominantly positive, with majority supportive of early hearing screening and interventions such as hearing aids, surgery, and special education services. A statistically significant association was found between the parent's gender and level of knowledge, with mothers more likely than fathers to exhibit good knowledge, though other sociodemographic factors were not significant.

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