

**To Cite:**

Elrefaie A, Alreefi TM, Alsubhi BH, Alzahrani AA, Al-Dundur AA, Alzahrani KT. Parents and caregivers knowledge, awareness and attitude toward childhood hearing loss in western district of KSA. *Medical Science*, 2022, 26, ms91e2118.  
doi: <https://doi.org/10.54905/disssi/v26i121/ms91e2118>

**Authors' Affiliation:**

<sup>1</sup>ENT Consultant, Royal Commission Medical Center, Yanbu, Saudi Arabia

<sup>2</sup>Medical student, Taif University, Taif, Saudi Arabia

<sup>3</sup>Medical student, King Abdulaziz University, Jeddah, Saudi Arabia

<sup>4</sup>Medical student, Najran University, Najran, Saudi Arabia

<sup>5</sup>BDS, PGD Endo, Ministry of Health, Taif, Saudi Arabia

**Peer-Review History**

Received: 05 February 2022

Reviewed & Revised: 06/February/2022 to 01/March/2022

Accepted: 02 March 2022

Published: 06 March 2022

**Peer-review Method**

External peer-review was done through double-blind method.

URL: <https://www.discoveryjournals.org/medicalscience>



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## Parents and caregivers knowledge, awareness and attitude toward childhood hearing loss in western district of KSA

Ahmed Elrefaie<sup>1</sup>, Taif Majid Alreefi<sup>2</sup>, Baraa Hameed Alsubhi<sup>3</sup>, Atheer Ahmed Alzahrani<sup>2</sup>, Alhassan Ahmed Al Dundur<sup>4</sup>, Khames T Alzahrani<sup>5</sup>

**ABSTRACT**

**Background:** Depending on the findings of the hearing test, a kid may be diagnosed with hearing loss if they can't hear sounds below a specific volume level in either one ear (known as unilateral) or both ears (bilateral). The most basic threshold is generally 15 – 20 (dB), which is approximately equivalent to the sound of leaves rustling or people speaking. To assess caregivers and parents' awareness and knowledge about hearing loss, its causes, its effects in children, and their attitude toward childhood audiology services in the western district of SA. **Methods:** This study is a cross-sectional conducted in western district in Saudi Arabia. A pre-designed online questionnaire covers study objectives. The "Microsoft Office Excel Software" was used to organize data on the PC, analyzed with (SPSS) version 20, where it was statistically analyzed. **Results:** Out of 1618 participants, most study participants were females 72.1% and 29% aged between 20- 30 years old. 84.6% of parents reported that babies may be born with a lost sense of hearing. Regarding causes of loss of hearing in kids, 57.8% reported the infection of (CNS) can led to loss of hearing in kids, 38.6% reported new-born infections, 32.1% reported maternal infection during pregnancy. **Conclusion:** in conclusion, this report highlighted the importance of generating and maintaining appropriate health education programs to enhance parents' and caregivers' awareness of child hearing problems.

**Keywords:** Hearing loss, children, voice resolution, speech and learning.

**1. INTRODUCTION**

Hearing loss is a condition that reduces voice resolution in children and disturbs the comprehension of speech and learning (Shekari et al., 2017; AlOtaibi et al., 2020). Many factors can lead to hearing loss throughout one's life. One of the leading causes of loss of hearing is a prolonged ear infectious

disease, which can be avoided through medical and surgical procedures, also exposure to high noise, ototoxic substances and diseases like meningitis, measles, mumps, rubella, can lead to hearing loss (Alyoubi et al., 2020). Hearing impairments among school students have been documented at various rates in various studies from around the world. China had 1.4 percent, the UK had 1.49 percent, Sweden had 2%, Southwestern Saudi Arabia had 4.4 percent (Al-Rowaily et al., 2012). Hearing is crucial for a child's language development, particularly within first and second years. Normal hearing is essential for brain growth and learning capability by providing enough experience and information. Speech, linguistic, intellectual, and socioemotional development may be harmed by HL during this important age, it has an impact not just on the individual who is affected, but it also has a long-term social cost (Ravi et al., 2016).

According to a statement released by the (WHO), the majority of persons effected by loss of hearing are recognized in advanced stage and have inadequate admittance to investigative and management services (Ravi et al., 2016). Impairment of hearing is a major concern in countries with low to middle economy, this for the situation that preventative, diagnostic, and management services are either unavailable or expensive (Sambah et al., 2020). EHDI, in which families are major partners with other professionals, are the most effective strategy to reduce and mitigate the impact of HL during childhood (Maluleke et al., 2021). The previous research recommends assessing parents' knowledge of loss of hearing is essential to establishing appropriate and comprehensive children's hearing programs. In Qassim, Saudi Arabia, a research evaluating fathers and mother's information and attitude on kid's loss of hearing was done in 2020. There were 243 individuals in this research, according to the report. According to the findings, 103 individuals (42.4 percent) had excellent knowledge, whereas 140 respondents (57.6 percent) had low knowledge (Alsudays et al., 2020).

In Al-Ahsa, Saudi Arabia, a research was published in 2020 on maternal knowledge and awareness of new born hearing loss. The research included a total of 384 moms. Head injuries/slaps on the ear (78%) and ear infections (74.30%) were identified as risk factors for new born HL by the widely held of mothers. Other risk factors, such as delayed crying at delivery (17.50%), neonatal jaundice (12.60%), high-grade fever, and infections during pregnancy (17.80 percent), were, however, poorly identified by the participant (Al-Yahya et al., 2020). Another research was done in UAE on parental' awareness of kids loss of hearing. A total of 295 parents took part in the research. In answer to the question on "consanguineous marriage and hearing loss," parent's indicated a high degree of awareness (57.5 percent and 42.4 percent, respectively). They also demonstrated a high degree of understanding for "new borns can born with hearing damage" (48.2% and 44.6 percent, respectively) (Ayas & Yaseen, 2021).

Recent research in Saudi Arabia suggested that there is poor knowledge around the reasons of loss of hearing in kids. Also, there is insignificant number of studies related to our topic, especially in western district of KSA. This study is objective to assess caregivers/parents' awareness and knowledge about loss of hearing, its causes, its effects in children, and their attitude toward childhood audiology services in the western district of KSA.

## 2. METHODOLOGY

This is an observational research based on online questionnaire survey was carry on between April 2021 to 2021 December.

### Study Settings

This research was preformed among parents and caregivers either male or female in the western district of KSA.

### Population and Sampling

The size of the sample was estimated using the Qualtrics calculator with a confidence level of 95%; a sample size of 384.

#### *Inclusion criteria*

Parents/caregivers who have child/children  
Guardian of child/children  
Resident in the western district of KSA  
Saudi/non-Saudi  
Agree to Participate.

#### *Exclusion criteria*

Those who don't have child/children or not guardian of child  
Not resident in western district of SA

Not agree to participate.

### Study Tool

For collecting the data a pre-designed electronic questionnaire was used. The survey involved characteristics of the target population, specialty (healthcare or non-healthcare), and district of residence and education level. The participants asked about their knowledge about risk factors of SNHL and CHL, knowledge about intervention and identification for HL and their attitude toward childhood audiology services.

Pilot research has been performed on 10% of the gathered sample to test reliability and applicability of the study to ascertain the feasibility, applicability, and clarity, but no changes were made. We didn't include the Nurses who contributed in the pilot trial in our sample.

### Data Collection

The researchers have developed an electronic google form for data collection during the period of one month. The questionnaire was shared via the internet through Chat, Instagram, and Facebook pages). The study group moved over each subject's info and responses individually via email account, ensuring that they'd never fill out the form again.

### Data Analysis

The SPSS software version 21.0 was utilised, process of information analysis and tabulation. Descriptive statistical analyses were used in this study (e.g., proportion, occurrence,).

## 3. RESULTS

According to table (1): of all 1618 participants, most study participants were females 72.1%, 29% aged between 20- 30 years old, 27.5% age between 31- 40 and 27.1% between 41- 50 years old. 97.1% were Saudi. 73.2% were married and 22.5% were single. As for educational level, 62.7% had bachelor degree and 19.2% had high school diploma.

**Table 1** Sociodemographic characteristics of participants (n=1618)

Parameter		No.	Percent
Gender	Male	452	27.9
	Female	1166	72.1
Age	Less than 20	66	4.1
	20 - 30 years old	469	29.0
	31 - 40 years old	445	27.5
	41 - 50 years old	439	27.1
	51 - 60 years old	160	9.9
	More than 60	39	2.4
Nationality	Saudi	1571	97.1
	Non-Saudi	47	2.9
Social status	single	364	22.5
	married	1185	73.2
	divorced	50	3.1
	widow	19	1.2
Education level	Less than high school diploma	53	3.3
	High school diploma	310	19.2
	Bachelor's degree	1015	62.7
	diploma	144	8.9
	Master's Degree	96	5.9

A total of 1163 (71.9%) of participants have a child or more and 44.4% are caregivers or guardian of a child or more. 15.9% of our participants work in health field (Table 2).

**Table 2** Number of parents and Caregivers among study Participants and health filed work (n=1618)

Variable	Yes	No
Have any children	1163 71.9%	455 28.1%
Caregiver or guardian of a child/children	718 44.4%	900 55.6%
Work in health field	258 15.9%	1360 84.1%

In table 3, 84.6% of mothers and fathers informed that babies may be born with a lost sense of hearing. Regarding reasons of loss of hearing in kids, 57.8% reported that central nervous system infection can led to hearing loss in kids, 38.6% reported new-born infections, 32.1% reported maternal infection during pregnancy, 52.2% reported chemicals/medications, 17.8% reported jaundice, 26.2% late crying just at while of delivery, 17.3% low birth weight, 61.7% congenital malformations of the head, 69.4% head trauma, 55% exposure to noise, 65.5% ear secretions and otitis media, 54.4% repeated upper respiratory infections , and 33.3% fumes (tobacco/fires). As for cultural thoughts, 12.9% of participants think that evil spirits could contribute in hearing impairment and 49.4% think that envy could contribute in hearing impairment.

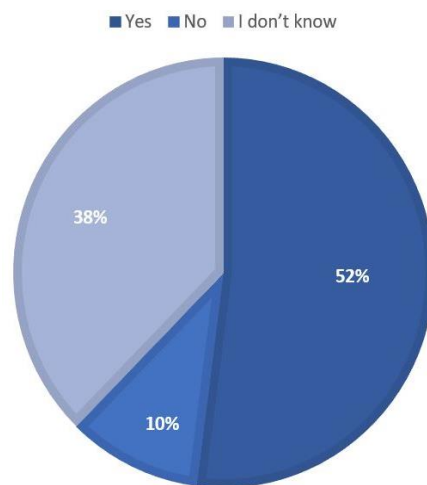
**Table 3** Parents knowledge of Causes of loss of hearing among children (n=1618)

Variable	Yes	No	I don't no
Babies may be born with a lost sense of hearing	1369 84.6%	34 2.1%	215 13.3%
Central nervous system infection can led to loss of hearing in kids	936 57.8%	66 4.1%	616 38.1%
New-born infections can led to loss of hearing in kids	625 38.6%	199 12.3%	794 49.1%
Maternal infection during pregnancy can led to loss of hearing in kids	519 32.1%	327 20.2%	772 47.7%
Chemicals/medications can led to loss of hearing in kids	845 52.2%	148 9.1%	625 38.6%
Jaundice can led to loss of hearing in kids	288 17.8%	506 31.3%	824 50.9%
Late crying just at while of delivery can lead to hearing loss	424 26.2%	377 23.3%	817 50.5%
Low birth weight can lead to hearing loss in babies	222 13.7%	582 36.0%	814 50.3%
Congenital malformations of the head can lead to loss of hearing in kids	999 61.7%	123 7.6%	496 30.7%
Head trauma can lead to loss of hearing in kids	1123 69.4%	98 6.1%	397 24.5%
Exposure to noise can lead to loss of hearing in kids	890 55.0%	287 17.7%	441 27.3%
Ear secretions and otitis media can lead to hearing loss	1059 65.5%	164 10.1%	395 24.4%
Repeated upper respiratory infections might be result to otitis media	881 54.4%	178 11.0%	559 34.5%
Evil spirits may reason of loss of hearing	209 12.9%	750 46.4%	659 40.7%
Envy may reason of loss of hearing	799 49.4%	338 20.9%	481 29.7%
The fumes (tobacco/fires) can led to otitis media	538 33.3%	344 21.3%	736 45.5%

As for table 4, 67.9% of participants knew that family history can be a risk for hearing loss while 61.7% knew that consanguinity between parents is a risk influence as well. The prevention of loss of hearing was reported for breastfeeding for the first 6 months by 58.8% of participants and routine vaccinations for children to reduce middle ear infections by 53.6% (Figure 1). 49.1% think that it is conceivable to diagnose impairment and loss of hearing in kids immediately after birth. 80.7% think that children affected by hearing loss and impairment can go to school. 74.3% think that delayed acquisition of communication skills (speak/language) can be a sign of loss of hearing and impairment in children. 78.7% think that children with loss of hearing can have similar educational opportunities as their hearing peers.

**Table 4** Participant's knowledge of risks factor, prevention and factors related with loss of hearing in kids (n= 1618)

Variable	Yes	No	I don't no
Family history can be a risk factor for loss of hearing in kids	1099 67.9%	167 10.3%	352 21.8%
Consanguineous marriage can be a risk factor for loss of hearing in kids	998 61.7%	228 14.1%	392 24.2%
Breastfeeding for the first 6 months may reduce/prevent otitis media	951 58.8%	124 7.7%	543 33.6%
Routine vaccinations for children can reduce middle ear infections	868 53.6%	171 10.6%	579 35.8%
It is conceivable to diagnose impairment and loss of hearing in kids immediately after birth	794 49.1%	460 28.4%	364 22.5%
Children affected by hearing loss and impairment can go to school	1305 80.7%	147 9.1%	166 10.3%
Delayed acquisition of communication skills (speak/language) can be indicator of loss of hearing and impairment in children	1202 74.3%	180 11.1%	236 14.6%
Children with loss of hearing might have similar educational opportunities as their hearing peers	1274 78.7%	189 11.7%	155 9.6%



**Figure 1** Participant's knowledge about Routine vaccinations for children can reduce middle ear infections or not

Regarding participants' attitude in (table 5), 74.3% of all participants desiring to obtain a hearing examination for my child soon after birth. 69.3% don't mind having screening tests by hearing their baby's otoacoustic emissions. 86.7% would like to have their child's hearing tested before entering school. 87.8% would allow their kids to get ear surgery if it is medically necessary. According to table (6, 7); there was a strong linked between participants willing to undergo hearing screening after child birth directly with gender and age.

**Table 5** Participants attitude towards screening and management of loss of hearing in kids (n= 1618)

Variable	Yes	No	I don't no
I desiring to obtain a hearing test for my baby soon after birth	1202 74.3%	191 11.8%	225 13.9%
I don't mind having screening tests by hearing my baby's otoacoustic emissions	1122 69.3%	126 7.8%	370 22.9%
I desiring to obtain my child's hearing tested before entering school	1402 86.7%	104 6.4%	112 6.9%
I desiring to allow my child to use hearing aids/earphones in case he is diagnosed with hearing problems	1455 89.9%	45 2.8%	118 7.3%
I will admit ear operation for my kid if it is medically necessary	1420 87.8%	48 3.0%	150 9.3%
Worried about your child's hearing and need more information	762 47.1%	684 42.3%	172 10.6%

**Table 6** Association between participant's attitude and sociodemographic characteristics of participants

		Ddon't mind having screening tests by hearing baby's otoacoustic emissions			Total (N=1020)	P value
		Yes	No	I don't no		
Gender	Male	303	39	110	452	0.440
		27.0%	31.0%	29.7%	27.9%	
	Female	819	87	260	1166	
		73.0%	69.0%	70.3%	72.1%	
Age	Less than 20	43	5	18	66	0.518
		3.8%	4.0%	4.9%	4.1%	
	20 - 30 years old	328	31	110	469	
		29.2%	24.6%	29.7%	29.0%	
	31 - 40 years old	314	43	88	445	
		28.0%	34.1%	23.8%	27.5%	
	41 - 50 years old	307	30	102	439	
		27.4%	23.8%	27.6%	27.1%	
Nationality	51 - 60 years old	107	14	39	160	0.218
		9.5%	11.1%	10.5%	9.9%	
	More than 60	23	3	13	39	
		2.0%	2.4%	3.5%	2.4%	
	Saudi	1084	124	363	1571	
		96.6%	98.4%	98.1%	97.1%	
Education level	Non-Saudi	38	2	7	47	0.012
		3.4%	1.6%	1.9%	2.9%	
	Less than high school diploma	28	4	21	53	
		2.5%	3.2%	5.7%	3.3%	
	High school diploma	213	26	71	310	
		19.0%	20.6%	19.2%	19.2%	
	Bachelor's	715	72	228	1015	

Social status	degree	63.7%	57.1%	61.6%	62.7%	0.134
	diploma	95	11	38	144	
	Master's	8.5%	8.7%	10.3%	8.9%	
	Degree	71	13	12	96	
		6.3%	10.3%	3.2%	5.9%	
	single	254	28	82	364	
		22.6%	22.2%	22.2%	22.5%	
	married	829	87	269	1185	
		73.9%	69.0%	72.7%	73.2%	
	divorced	28	9	13	50	
		2.5%	7.1%	3.5%	3.1%	
	widow	11	2	6	19	
		1.0%	1.6%	1.6%	1.2%	

**Table 7** Association between participant's attitude and sociodemographic characteristics of participants

		Desiring to obtain a hearing test for baby soon after birth			Total (N=1020)	P value
		Yes	No	I don't no		
Gender	Male	314	54	84	452	0.003
		26.1%	28.3%	37.3%	27.9%	
	Female	888	137	141	1166	
		73.9%	71.7%	62.7%	72.1%	
Age	Less than 20	43	5	18	66	0.001
		3.6%	2.6%	8.0%	4.1%	
	20 - 30 years old	349	50	70	469	
		29.0%	26.2%	31.1%	29.0%	
	31 - 40 years old	341	57	47	445	
		28.4%	29.8%	20.9%	27.5%	
	41 – 50 years old	339	47	53	439	
		28.2%	24.6%	23.6%	27.1%	
	51 - 60 years old	110	25	25	160	
		9.2%	13.1%	11.1%	9.9%	
	More than 60	20	7	12	39	
		1.7%	3.7%	5.3%	2.4%	
Nationality	Saudi	1166	186	219	1571	0.934
		97.0%	97.4%	97.3%	97.1%	
	Non-Saudi	36	5	6	47	
		3.0%	2.6%	2.7%	2.9%	
Education level	Less than high school diploma	36	7	10	53	0.483
		3.0%	3.7%	4.4%	3.3%	
	High school diploma	233	30	47	310	
		19.4%	15.7%	20.9%	19.2%	
	Bachelor's degree	751	128	136	1015	
		62.5%	67.0%	60.4%	62.7%	
	diploma	104	16	24	144	



		8.7%	8.4%	10.7%	8.9%	
	Master's	78	10	8	96	
	Degree	6.5%	5.2%	3.6%	5.9%	
Social status	single	249	43	72	364	0.021
		20.7%	22.5%	32.0%	22.5%	
	married	903	139	143	1185	
		75.1%	72.8%	63.6%	73.2%	
	divorced	35	7	8	50	
		2.9%	3.7%	3.6%	3.1%	
	widow	15	2	2	19	
		1.2%	1.0%	0.9%	1.2%	

#### 4. DISCUSSION

Loss of hearing in kids is a wide phrase that refers to a multitude of conditions. Pediatric hearing loss has a substantial effect on the on the evolution of words, spacing and psychosocial skills, so the early discovery and appropriate care is critical. Furthermore, early detection may reveal potentially reversible causes or other underlying issues that can be addressed (Morton, 2002) according to previous literature, assessing mothers and father's information's and attitudes to loss of hearing. As shown in a study, conducted in the Mideast, notably in KSA, fewer than 50 percent of respondents have appropriate awareness concerning hearing loss, while approximately 93 percent of parents have a positive attitude toward audiology-related services (Alsudays et al., 2020). However, in another study, 60 percent of mothers and fathers said they had a decent understanding of subjects such body temperature, auditory problems, and hearing impairment (Wang et al., 2017).

Regarding Causes of loss of hearing in kids, 57.8% reported the infection that affected (CNS) can led to loss of hearing in kids, 38.6% reported new-born infections, 32.1% reported maternal infection during pregnancy, 52.2% reported chemicals/medications, 17.8% reported jaundice, 26.2% late crying just at while of delivery, 17.3% low birth weight, 61.7% congenital malformations of the head, 69.4% head trauma, 55% exposure to noise, 65.5% ear secretions and otitis media, 54.4% repeated upper respiratory infections, and 33.3% fumes (tobacco/fires). As for cultural thoughts, 12.9% of participants think that evil spirits could be reason of loss of hearing and 49.4% think that envy could be reason of loss of hearing.

Previous research found that knowledge about consanguinity and maternal malnutrition during pregnancy was the most frequent among mothers. There have been reports of expectant mothers working during the solar eclipse, resulting in congenital malformations of the ear, lip, or face. Other prenatal risk influences for loss of hearing, such as maternal infections and iodine deficiency, were not reported. Perinatal RF such as low birthweight, hypoxia, jaundice, infections, and ototoxicity of hearing loss, as well as postnatal RF such as otitis media, measles, and mumps, were not mentioned (Narayansamy et al., 2014). A research in a South Indian urban city found that 64.1 percent of people were aware of consanguinity exposure to high level of noise comes in second as a potential cause for deafness. (61.2 percent), ear discharge (57.3 percent), and family history (53.4 percent) (Rajagopalan et al., 2014). Poor awareness of medications, asphyxia, jaundice, measles, and preterm/low birthweight as danger influences for loss of hearing has already been informed amongst mothers living in Nigeria and South Africa (Kaspar et al., 2017).

Conferring to one more research, 53.9 percent of participants were unaware that pregnant rubella can lead to baby hearing loss. Almost three-quarters of the respondents were uninformed that their infants' loss of hearing could be triggered by low birth weight, preterm, or jaundice. (78.4 percent) were aware that to toxic medicine (81.37 percent) and middle ear infections (78.4 percent) might cause hearing loss in their kid. In terms of cultural beliefs, 60.8 percent of participants cited angry ancestors as sources of loss of hearing in their infants, while 54.9 percent identified curses as sources of loss of hearing in their new-borns (Govender & Khan, 2017).

Our findings on the amount of survey respondents who've been aware that ototoxic medications may impact hearing were consistent with the findings in the Swanepoel and Almec study (2008). In the 2008 research, 69 percent of moms were aware of this, compared to 50 percent in Olunsanya et al., (2005) study. Respondents had a strong understanding of middle ear infectious diseases as a disease risk for deafness, which might be owing to the visible character and frequent feature of just such a disorder, like as secretory (OM) in third world countries, which affects people's standard of living (Vohr et al., 2000). Another research defined that, mothers' understanding of serious head injury to the ear, followed by ear pain/discharge, was much higher. Furthermore, eight out of ten moms feel that family history is a major trigger for deafness (Vohr et al., 2000). This is in line with this articles, Swanepoel and



Almec's investigation (2008), due to the apparent form of this disease, mothers from Nigeria (73 percent) and South Africa (79 percent) reported a high incidence of recognizing ear discharge as a risk factor (Olusanya et al., 2005).

Deaf children are at a developed hazard of abuse, so a social worker should always accompany them. To provide the highest quality of care and support, services must work together, including primary and secondary care (Al-Rowaily et al., 2012). In our study, 74.3% of participants think that delayed acquisition of communication skills (speak/language) can be a sign of deaf and impairment in children. 78.7% think that kids with def can have similar educational opportunities as their hearing peers. According to a prior study, both mothers and caregivers had much higher knowledge (over 65 percent) of talking and verbal issues that might indicate hearing loss (Ayas & Yaseen, 2021). Until now, only a few researches have looked into this variable. Parents have limited information's, according to them (Kaspar et al., 2017). Prevention of loss of hearing was reported for breastfeeding for the first 24 weeks by 58.8% of participants and routine vaccinations for children to reduce middle ear infections by 53.6%. An knowledge of avoidable reasons of loss of hearing such as ear infections, trauma, and any illness during pregnancy was revealed in a research among inhabitants of an urban neighbourhood in New Delhi (Gupta et al., 2010).

In terms of mothers' attitudes regarding seeking pediatric hearing care, 74.3% of all participants would like to have a hearing check for his kid soon after birth. 69.3% don't mind having screening tests by hearing their baby's otoacoustic emissions. According to a prior survey, the bulk of fathers and mothers were generally positive and in support of infant auditory screening child birth. Furthermore, parents were enthusiastic about having their child tested for deafness at school (Ayas & Yaseen, 2021). These are interesting findings, considering that effectiveness of new-borns hearing screening (NHS) and other auditory testing approaches in schools was mainly contingent on parental approval (Alsudays et al., 2020; Jatto et al., 2018; Khoza-Shangase et al., 2021; Meherali et al., 2021).

Another study found that parents had a favourable attitude toward paediatric audiology services. As a result, rolling out awareness programmes for parents at the grassroots level is critical. Mothers expressed a strong initiative to brought their kids for follow up testing if necessary (Lam et al., 2018). This was reinforced by another study, which found that mothers have a positive attitude toward the importance of screening, follow-up testing, and the aids of initial intervention for infant loss of hearing (Dudda et al., 2017). This is also consistent with the fact that children language development in children participating in early intervention throughout the first 12 month of life was shown to be inside this normal range. by the age of 5 (Shulman et al., 2010). In contrast, a lack of understanding about the management of hearing loss, age-appropriate hearing aid fitting, the necessity of therapy, and the use of household medications will cause a delay in treatment.

## 5. CONCLUSION

Despite having a favourable attitude about kid's loss of hearing, the bulk of fathers and mothers and caregivers were unfamiliar with the problem. As a consequence, the need of establishing and executing suitable health education programs to develop mothers' understanding of kid's loss of hearing is emphasized in this study.

### Ethical approval

The research proposal was approved by the Regional Research and Ethics committee Royal Commission for Jubail & Yanbu with Ethical approval number (No. 246/8).

### Funding

This study has not received any external funding.

### Conflict of interests

The authors declare that there are no conflicts of interests.

### Data and materials availability

All data associated with this study are present in the paper.

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