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Exploring Knowledge Attitude and Experiences Regarding Infant Hearing Impairment among Mothers of Infants in Chennai Tamilnadu

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Abstract:

- ***Objective:***
This study intends to explore mothers' knowledge, beliefs and exposure concerning infant hearing loss in Chennai, Tamil Nadu.

- ***Methodology:***
A Cross-sectional survey lasting for 2 months conducted at Government Medical College & Hospital, Omandurar Government Estate Chennai. The study involved 262 conveniently selected mothers of infants attending the tertiary care centre. A structured interviewer administered questionnaires were used to collect data which were prepared in English and translated into Tamil. Thereafter, data was entered into a Google form for statistical analysis purposes.

- ***Results:***
Demographics: Most of the participants came from lower middle-class (46.2%) and upper lower-class (29.0%) backgrounds, with the majority being Hindu (82.4%). The most common occupation among family heads was skilled workers in shops and markets (30.9%).

- ***Knowledge:***
The participants showed high awareness of risk factors like a family history of hearing loss (58.8%) and maternal alcohol consumption during pregnancy (58.8%). However, they had low awareness of maternal infections during pregnancy and complications during delivery.

- ***Awareness of Support Services:***
The participants had low awareness of support groups (59.2%), auditory verbal therapy (52.7%), and government programs (51.1%). On the other hand, they had high awareness of technological aids (80%).

- ***Attitudes:***
The participants displayed positive attitudes, with 78.6% believing that education could dispel superstitions, 76.7% being willing to support awareness initiatives, and 84.4% believing that increased awareness could lead to better outcomes.Training: 80% of the mothers had not received any formal education or training on infant hearing impairment.

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➢ ***Statistical Analysis:***

The analysis was conducted using SPSS, with significance set at P<0.05 (two-tailed). Significant associations were found between knowledge and socioeconomic status, religion, occupation, and education.

➢ ***Conclusion:***

The findings highlight significant gaps in knowledge and awareness about infant hearing impairment among mothers, despite their positive attitudes towards early identification and intervention. These results emphasize the need for targeted educational programs to improve understanding and support for hearing-impaired infants. Further research is recommended in more diverse and rural settings to enhance generalizability.

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I. INTRODUCTION

Infant hearing impairment affects language development, academic performance, and social integration, making it a serious public health concern (1). There are significant regional and population-level differences in the prevalence of hearing impairment in infants. According to studies, the incidence in general populations is estimated to be between one and three per 1,000 infants; nevertheless, greater rates have been seen in some localities and among premature infants(2–4). Roughly 12.3 million children in South Asia are affected by hearing impairment; the causes range from acquired to hereditary and unexplained(5). These figures emphasize the necessity of focused awareness-raising and intervention initiatives, especially in areas with high incidence rates and little access to healthcare facilities (6).

For children with hearing loss, better outcomes and mitigation of these negative impacts depend on early detection and care. Mothers are essential in identifying early indicators of hearing loss, which can have a big impact on when and how well intervention techniques work (2,3). Enhancing early identification and intervention efforts consequently requires an understanding of mothers' knowledge, attitudes, and practices regarding infant hearing loss (7,8).

The value of maternal expertise in the early diagnosis of hearing impairment cannot be overstated. Mothers are frequently the first to discover symptoms of hearing loss, such as lack of response to sounds and delayed speech development (3,9). Studies indicate that timely interventions can lower the likelihood of long-term developmental impairments by increasing maternal awareness and facilitating prompt medical consultation (4,10). Research has examined a range of maternal attitudes and knowledge regarding hearing loss, highlighting major obstacles to early identification and treatment, including lack of access to healthcare facilities and lack of awareness (5,11).

Despite the critical importance of maternal awareness in detecting infant hearing impairment, there is a paucity of literature on the subject among mothers in Chennai. This study aims to evaluate the awareness of hearing impairment among mothers of infants in this region and to explore the cultural and socioeconomic factors contributing to their lack of awareness in a tertiary care hospital in Chennai.

II. METHODOLOGY

The investigation described herein received ethical approval from the institutional ethical committee, ensuring adherence to ethical standards in research involving human subjects.

A. Study Population

Conducted during June and July 2024 at the Government Medical College in Chennai, Tamil Nadu, this study focused on 263 mothers with infants. Participants were recruited from various hospital departments: paediatric outpatient, postnatal ward, paediatric wards, and immunization clinic. Each participant provided informed consent prior to their involvement in the study.

B. Sampling

Convenience sampling was employed to select mothers of infants, ensuring practicality in participant recruitment. The sample size was determined using Cochran's formula, factoring in a 10 percent margin of error to accommodate potential participant dropouts. Statistical confidence interval was set at 95 percent with an alpha error of 0.05.

C. Questionnaire

A pretested, semi-structured questionnaire was utilized for data collection, available in both English and Tamil languages to cater to the linguistic diversity of the participants. The questionnaire covered several domains: Demographic Characteristics: Included 11 items to gather data on age, education, occupation, and household income. Knowledge of Risk Factors: Assessed awareness regarding factors linked to infant hearing impairment, comprising 7 items.

Knowledge of Identification and Intervention Strategies: Examined understanding of methods to identify and intervene in infant hearing impairment, involving 7 items. Attitudes Towards Superstitions: Explored beliefs concerning superstitions related to infant hearing impairment through 4 items. Attitudes Towards Infant Hearing Impairment:

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Investigated general attitudes towards infant hearing impairment using 3 items.

D. Data Management

Data were collected using a Google Form, ensuring efficient and secure data entry. This method facilitated subsequent statistical analysis, maintaining data integrity throughout.

E. Socioeconomic Scale

Participants' education, occupation, and household income were utilized to determine their socioeconomic status, employing the modified Kuppuswamy scale. This categorization enabled robust analysis of socioeconomic influences on attitudes and knowledge related to infant hearing impairment.

F. Statistical Analysis

The collected data were subjected to rigorous statistical analysis to derive meaningful insights. Descriptive statistics provided an overview of participant demographics and questionnaire responses. Inferential statistics, such as chi-square tests or regression analysis, were employed to explore relationships between variables, offering deeper understanding and inference regarding factors influencing knowledge and attitudes towards infant hearing impairment.

G. Significance of the Study

Understanding maternal knowledge and attitudes towards infant hearing impairment is crucial for developing targeted interventions and educational programs. By identifying gaps in knowledge and misconceptions, healthcare providers can enhance awareness among mothers, potentially leading to early identification and intervention for infants at risk of hearing impairment.

H. Ethical Considerations

Ethical approval and informed consent were integral parts of this study, ensuring participant welfare and confidentiality. Researchers adhered to guidelines set forth by the institutional ethical committee, maintaining ethical integrity throughout the research process

III. RESULTS

The questionnaire on knowledge, attitude and experiences regarding infant hearing impairment was administered to 262 mothers of infants. Participants in this study include mothers belonging to socioeconomic class of lower middle (46.2%), upper lower (29.0%) and upper middle (24.8%). There are no participants belonging to upper and lower socioeconomic classes. The most common occupation category of the head of the family among the participants was skilled worker, shop and market sales worker(30.9%) while the least common category is legislators, senior officials and managers with 0.4%.

The mothers participating in the study are predominantly Hindus (82.4%) which leads to lack of diversity. Majority of the husbands had education level of high school (34.7%) or graduate (30.9%) with the minority with professional degree (5%) , primary school (3.8%) or illiterate(1.9%)5 risk factors were identified correctly by more than 50% of mothers .

The two most identified risk factors among mothers were family history of hearing loss(58.8% , mean score 2.26) and maternal alcohol consumption during pregnancy(58.8% , mean score 2.28) . Scores on risk factors were lowest for maternal infections during pregnancy (mean score 1.89) and maternal complications during delivery(mean score 1.94).

More than 50% mothers were not aware of the availability of support groups(59.2%) , auditory verbal therapy(52.7%) and Government programs(51.1%) for hearing impaired infants .About 80% mothers were aware of technological aids for hearing impaired infants(mean score 2.68) 78.6% mothers of infants believed that education could help dispel superstition and cultural believes regarding hearing impairment.

More than 75% mothers are willing to support initiatives to raise awareness regarding infant hearing impairment in the community (76.7%, mean score 2.64) and believed that increased awareness on identification and intervention could lead to better outcomes (84.4% ,mean score 2.81)

About 80% mothers have not received any formal education or training on infant hearing impairment.
The Chi square value and p-value of socioeconomic status, religion, occupation and education were calculated and is given in table 2.

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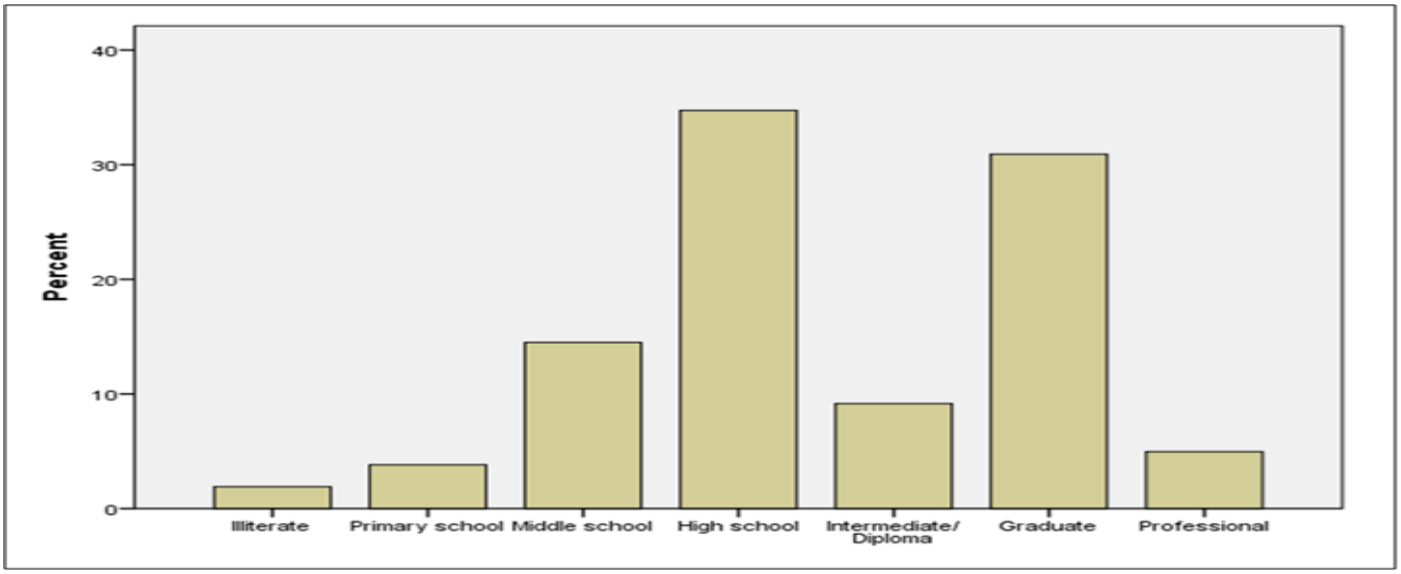

Fig 1 Frequency Distribution over Occupation

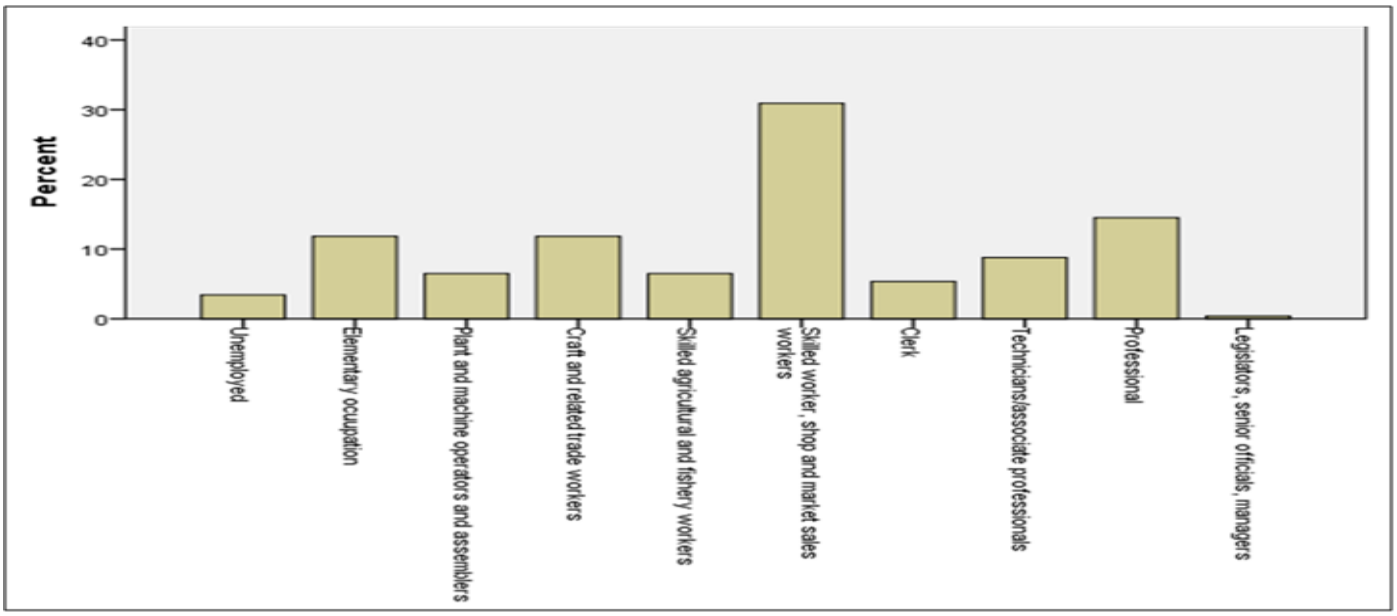

Fig 2 Frequency Distribution over Education

Fig 3 Frequency Distribution over Socioeconomic Class (According To Modified Kuppusamy Scale)

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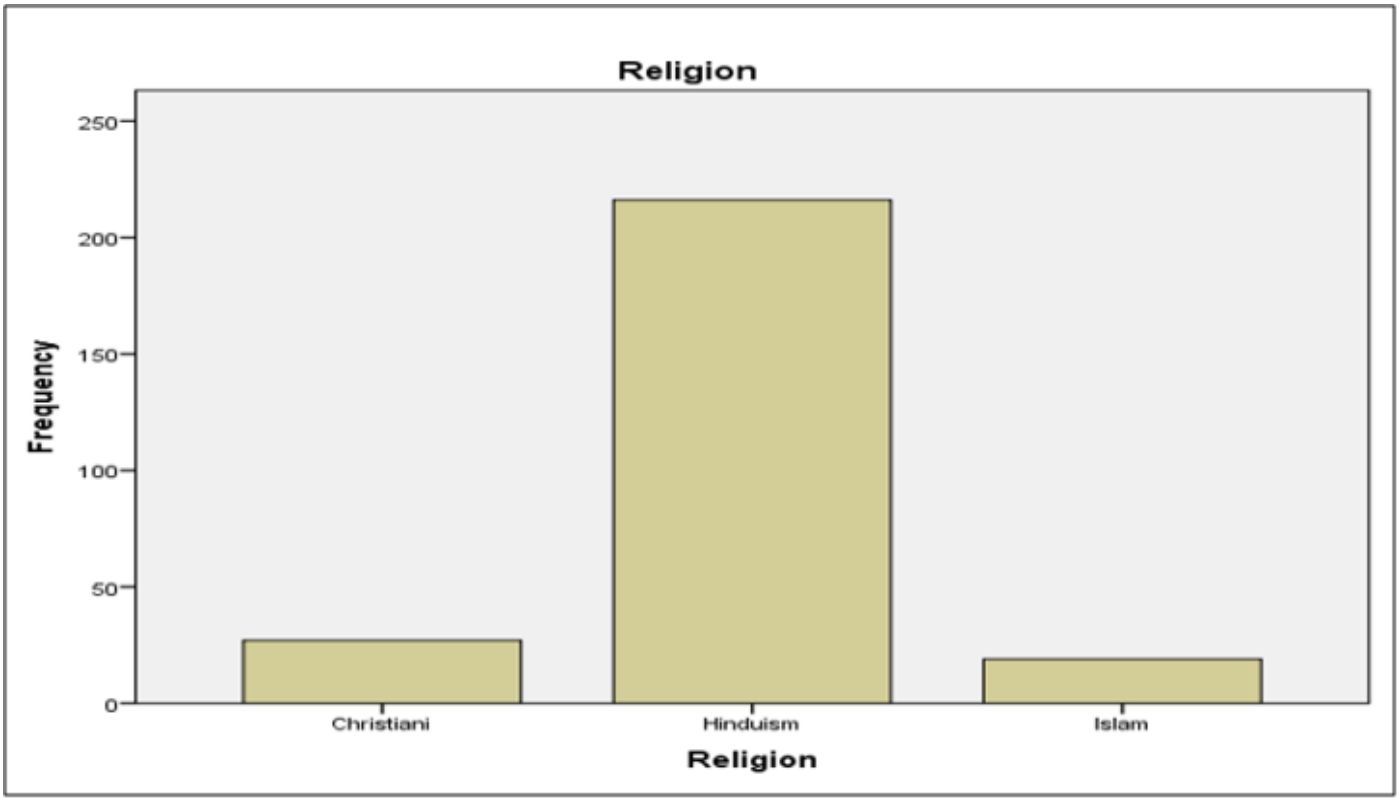

Fig 4 Frequency Distribution over Religion

Table 1 Descriptive Statistics for all the Parameters Considered in the Study

	FREQUENCY [PERCENTAGE OF RESPONSES (%)]						
	NO	NOT SURE	YES	MEAN	SD	MEDIAN	INTERQUARTILE RANGE
KNOWLEDGE ON RISK FACTORS							
Family history of hearing loss	87[33.2]	21[8]	154[58.8]	2.26	0.926	3	2
Maternal infections during Pregnancy such as rubella, toxoplasmosis, cytomegalovirus	127[48.5]	36[13.7]	99[37.8]	1.89	0.924	2	2
Complications during delivery such as premature birth, lack of oxygen or jaundice	128[48.9]	21[8]	113[43.1]	1.94	0.959	2	2
Exposure to loud noises	88[33.6]	28[10.7]	146[55.7]	2.22	0.921	3	2
Use of certain medications during pregnancy	96[36.6]	22[8.4]	144[55]	2.18	0.941	3	2
Maternal smoking or nicotine exposure during pregnancy	83[31.7]	33[12.6]	146[55.7]	2.24	0.905	3	2
Maternal alcohol consumption during preganancy	80[30.5]	28[10.7]	154[58.8]	2.28	0.904	3	2
KNOWLEDGE REGARDING IDENTIFICATION AND INTERVENTION							
Familiar with signs and symptoms that indicate hearing impairment	89[34]	45[17.2]	128[48.9]	2.15	0.9	2	2
Availability of Screening tests to diagnose hearing impairment	63[24]	31[11.8]	168[64.1]	2.4	0.851	3	1
Aware of Early intervention services/Government programs for hearing impaired infants	134[51.1]	37[14.1]	91[34.7]	1.84	0.914	1	2
Aware of socialized professionals such as Audiologists, Speech therapists for hearing impaired infants	82[31.3]	25[9.5]	155[59.2]	2.28	0.911	3	2
Aware of technological aids for hearing impaired infants	33[12.6]	18[6.9]	211[80.5]	2.68	0.687	3	0
Familiar with any technique like sign language/auditory-verbal therapy	138[52.7]	29[11.1]	95[36.3]	1.84	0.93	1	2
Aware of availability of support groups for hearing impaired infants	155[59.2]	28[10.7]	79[30.2]	1.71	0.901	1	2
KNOWLEDGE AND ATTITUDE REGARDING SUPERSTITIONS AND CULTURAL BELIEFS							
Aware of any superstitions causing hearing impairment in infants	132[50.4]	11[4.2]	119[45.4]	1.95	0.979	1	2
Aware of any superstitions that is believed to prevent or cure hearing impairment	150[57.3]	16[6.1]	96[36.3]	1.79	0.949	1	2
Perspective on whether these practices influence the perception & treatment of hearing impaired infants	106[40.5]	36[13.7]	120[45.8]	2.05	0.929	2	2
Perspective on whether education could help dispel these practices regarding hearing impairment	30[11.5]	26[9.9]	206[78.6]	2.67	0.672	3	0
ATTITUDES TOWARDS INFANT HEARING IMPAIRMENT							
Perspective on whether society supports families with hearing impaired infants	64[24.4]	97[37]	101[38.5]	2.14	0.782	2	1
Do they support initiatives to raise awareness regarding infant hearing impairment in the community	33[12.6]	28[10.7]	201[76.7]	2.64	0.696	3	0
Do they believe that increased awareness on identification & intervention could lead to better outcomes	9[3.4]	32[12.2]	221[84.4]	2.81	0.473	3	0
PERSONAL EXPERIENCES & EXPOSURE							
Do they know any child diagnosed with hearing impairment	184[70.2]	1[0.4]	77[29.4]	1.59	0.912	1	2
Have they received any formal education or training on infant hearing impairment	214[81.7]	10[3.8]	38[14.5]	1.33	0.716	1	0
Have they witnessed discrimination or exclusion towards hearing impaired infants	197[75.2]	14[5.3]	51[19.5]	1.44	0.799	1	0

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Table 2 Inferential Statistics Using Kruskal Wallis H Test

	(Kruskal Wallis H test)							
	Socio-economic status		Religion		Occupation		Education	
	Chi-square value	p' value	Chi-square valu	p' value	Chi-square valu	p' value	Chi-square valu	p' value
KNOWLEDGE ON RISK FACTORS								
Family history of hearing loss	4.920	.085	.877	.645	13.338	.148	5.306	.505
Maternal infections during Pregnancy such as rubella, toxoplasmosis, cytomegalovirus	1.516	.469	2.521	.283	13.658	.135	4.127	.659
Complications during delivery such as premature birth, lack of oxygen or jaundice	1.232	.540	1.032	.597	5.025	.832	16.145	.013
Exposure to loud noises	2.696	.260	6.245	.044	3.302	.951	3.708	.716
Use of certain medications during pregnancy	.712	.701	2.179	.336	4.758	.855	10.044	.123
Maternal smoking or nicotine exposure during pregnancy	1.799	.407	.497	.780	9.403	.401	14.863	.021
Maternal alcohol consumption during preganancy	1.586	.452	1.083	.582	6.427	.697	11.657	.070
KNOWLEDGE REGARDING IDENTIFICATION AND INTERVENTION								
Familiar with signs and symptoms that indicate hearing impairment	3.465	.177	.101	.951	6.965	.641	5.898	.435
Availability of Screening tests to diagnose hearing impairment	2.754	.252	3.139	.208	11.787	.226	11.531	.073
Aware of Early intervention services/Government programs for hearing impaired infants	5.187	.075	5.292	.071	9.066	.431	11.653	.070
Aware of socialized professionals such as Audiologists, Speech therapists for hearing impaired infants	11.708	.003	2.095	.351	15.540	.077	15.364	.018
Aware of technological aids for hearing impaired infants	11.927	.003	2.627	.269	18.615	.029	26.694	.000
Familiar with any technique like sign language/auditory-verbal therapy	.123	.940	.105	.949	7.132	.623	7.795	.254
Aware of availability of support groups for hearing impaired infants	5.067	.079	2.669	.263	11.473	.245	19.800	.003
KNOWLEDGE AND ATTITUDE REGARDING SUPERSTITIONS AND CULTURAL BELIEFS								
Aware of any superstitions causing hearing impairment in infants	6.433	.040	2.102	.350	17.593	.040	8.398	.210
Aware of any superstitions that is believed to prevent or cure hearing impairment	7.588	.023	5.220	.074	21.086	.012	10.357	.110
Perspective on whether these practices influence the perception & treatment of hearing impaired infants	.867	.648	.804	.669	14.509	.105	10.644	.100
Perspective on whether education could help dispel these practices regarding hearing impairment	.178	.915	5.927	.052	5.162	.820	10.354	.111
ATTITUDES TOWARDS INFANT HEARING IMPAIRMENT								
Perspective on whether society supports families with hearing impaired infants	.740	.691	.501	.779	6.771	.661	4.884	.559
Do they support initiatives to raise awareness regarding infant hearing impairment in the community	2.218	.330	2.336	.311	11.061	.272	7.630	.266
Do they believe that increased awareness on identification & intervention could lead to better outcomes	7.343	.025	4.608	.100	7.946	.540	29.628	.000
PERSONAL EXPERIENCES & EXPOSURE								
Do they know any child diagnosed with hearing impairment	4.313	.116	7.114	.029	10.721	.295	5.842	.441
Have they received any formal education or training on infant hearing impairment	1.409	.494	1.694	.429	9.718	.374	9.839	.132
Have they witnessed discrimination or exclusion towards hearing impaired infants	.147	.929	.002	.999	6.283	.711	13.940	.030

IV. DISCUSSION

Comprehending the level of maternal awareness of hearing impairment in children is essential for timely identification and remediation. Our study administered a questionnaire on infant hearing impairment to 262 mothers from various socioeconomic classes. Key identified risk factors were family history of hearing loss and maternal alcohol consumption during pregnancy. Awareness of support groups, therapies, and government programs was low, but 80% knew about technological aids. Most mothers believed education could dispel superstitions and supported awareness initiatives. However, about 80% lacked formal training on the topic.

Numerous global studies have been carried out to evaluate the degree of knowledge, perspectives, and variables impacting mothers' comprehension of their children's hearing impairment. Mothers in Saudi Arabia were generally socially supportive of children with hearing loss, but their level of knowledge was insufficient. Age and education played a role in this, with older and better educated mothers demonstrating greater comprehension (12). This highlights the necessity of educational initiatives aimed at raising mothers' awareness of infant hearing loss and stressing the value of early detection and intervention. Similar disparities were seen in mothers' knowledge of the causes of hearing loss in developing countries; however, mothers' attitudes toward newborn screening and the use of hearing aids were generally positive, suggesting a reasonably high level of awareness and readiness for newborn screening (13) This favorable view of early detection and intervention is tempered, although, by a lack of thorough understanding regarding the etiology of hearing impairment, underscoring the necessity of educational programs (14).

In Southern India, parents frequently learn about services through word-of-mouth, highlighting a significant gap in formal information dissemination. Other major barriers to timely diagnosis and treatment included financial constraints, lack of awareness, and accessibility issues in rural areas (15). The age at which implantation occurred considerably affected the communication, social skills, academic achievement, and general quality of life that parents of children with cochlear implants in Saudi Arabia expected of their children (16). Parents are positive about the advantages of cochlear implants, but in order to control expectations and give accurate information about results, they require realistic counseling and assistance. Parents' advocacy efforts and attitudes can be positively impacted by increasing their general and contextual science knowledge, which will ultimately promote the general well-being of children with hearing impairments (10,17). Scientific literacy is important because effective advocacy for children with hearing impairments is correlated with high scores in contextual science knowledge (10).

Another study emphasized the importance of early diagnosis of neurodevelopmental disorders (NDD) in newborns with hearing impairments. Early indicators of NDD can be identified using specific criteria and tools, such as the Olliac grid, facilitating timely interventions. (18). Furthermore, as important markers like fundamental frequency, intensity, and voice pauses can help distinguish

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between infants with hearing impairments and those with normal hearing, acoustic analysis of infant cries can be a useful tool in the early detection of hearing impairment (19). This thorough investigation emphasizes how critical it is to raise awareness in mothers and remove obstacles to the early identification and treatment of childhood hearing impairment. To support mothers and enhance the outcomes for children with hearing impairments, more organized interventions and improved educational campaigns are necessary (20).

➢ *Limitations*

- Information regarding the education of the mother and the number of children she had, has not been included in the study. Hence the study is not able to determine the association between the education level of the mother and her awareness and the correlation between the number of children and her knowledge and attitude.
- The study was conducted in an urban area and hence the cultural beliefs and superstitions prevalent in many rural and tribal areas aren't well known to the mothers. There are no mothers from the lower or upper class included in the study as it was conducted in an urban tertiary care centre.
- The data was collected from a conveniently available group of participants who were not randomly selected. Therefore, the study cannot be generalized to the larger population. There is a lack of diversity in the subjects which may lead to poor external validity.

V. CONCLUSION

This study reveals gaps in knowledge and awareness about infant hearing impairment among mothers in Chennai, despite their generally positive attitudes towards early detection and intervention. The majority of participants were aware of common risk factors but had limited understanding of support services and formal training on the topic. These findings underscore the need for targeted educational programs that address these knowledge deficiencies and promote awareness of available resources and intervention strategies. Further research in more diverse and rural settings is essential to generalize these findings and develop comprehensive public health strategies.

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➢ *Declaration of Interest*

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