

Original Research Article

Comparison of responses of parents of hearing and hearing impaired children for the questionnaire 'awareness of aspects related to hearing'

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ABSTRACT

Background: Congenital hearing loss has a profound enervating impact on the child and the family's global development in many domains. If identified during the earlier years of life and apt rehabilitative measures are sought, it would aid in the child's near-normal development and optimize the educational placement. However, parental involvement in this process is crucial. The present study aimed to 'develop, administer and compare the scores of the questionnaire on 'Parent's awareness on aspects related to hearing' among the parents of children with normal hearing and hearing impairment.

Methods: A total of eighty participants, divided into group I (parents of normal hearing children) and group II (parents of children with hearing impairment), participated in the study.

Results: Mann-Whitney test showed that there was a significant difference between the groups for all the subsections. The receiver operating characteristic curve was analyzed, and the cut-off scores of 26.5 were obtained. The sensitivity of 0.825 and 1-specificity of 0.225 was achieved.

Conclusions: More awareness to be created among the parents of normal-hearing children not only on the risk factors of hearing loss but also on the educational options which would hoist towards inclusion.

Keywords: Questionnaire, Early identification, Rehabilitation, Education, Parents, Hearing loss/impairment

INTRODUCTION

Hearing loss refers to the lack of ability of a person to be aware and recognize sounds. It has been estimated that about 466 million inhabitants have disabling hearing loss, and 34 million of these populations are children.¹ According to a survey, 4 out of 1000 children born were found to have severe to profound hearing loss.² Hearing loss as a condition itself is very debilitating. When present from birth, it can profoundly impact the child, affecting speech, language development, social, educational, and personality development.^{3,4} The hearing loss of the child also affects the family in many domains.⁵ Identifying the hearing impairment in a child at an early age can minimize these adverse effects. Early identification and

rehabilitation are essential factors for the success of an intervention program. Therefore, whenever a hearing difficulty is suspected, instant action is vital. According to Joint committee on infant hearing (JCIH), screening for hearing loss to be completed by one month of age, audiologic diagnosis completed by two months of age, and early intervention initiated no later than three months of age.⁶ With due advancement in technology, a range of solutions ranging from hearing aids and cochlear implantation to the therapy-related management strategies are pertinent. Congenital hearing loss, if identified during the earlier years of life, and if apt rehabilitative measures are sought, there are high chances that it will aid in the child's near-normal development. Early identification and intervention of a child with hearing loss often lead to

improved school adjustment and performance.⁷ However, for these optimal measures to be taken up, parental and family support is highly essential.

Many parents are unaware of their roles and do not understand how they raise their children dramatically influences the child's learning and development.⁸ There are research reports which had aimed to survey the parents' knowledge and their outlook towards risk factors of infant hearing loss, early identification and intervention. The results revealed that parents are aware of some of the causes like head injury, slap to the ear and family history of hearing loss, and less awareness concerning the early identification and intervention.⁹ The knowledge of mothers in Durban, South Africa, regarding risk factors of hearing loss in infants and their responsiveness to audiology services was studied. The result reports that there was average awareness about the risk factors but less awareness about the audiological services.¹⁰ However, these studies indicate the knowledge about risk factors related to hearing loss, identification, and intervention, superstitious cultural beliefs, and attitudes associated with hearing impairment on mothers of normal-hearing children. But there is a lack of evidence on the parents' knowledge of education support and education options for the child with hearing impairment by parents of not only normal hearing children but also by the parents, mothers, and caregivers of children with hearing impairment. Children with normal hearing abilities should also be aware that children with disabilities and special needs should enjoy the same access as all other students to a typical school setting. Also, they require an extensive, balanced, and relevant curriculum, which is the basic premise of inclusive education.^{11,12}

Early identification and intervention aim to improve the development of the speech, language, emotional, and social relationship of the child and educational achievement, ultimately requiring support from the parents or caregivers. It would bridge the gap between a normal hearing child and a child with hearing impairment. Just creating awareness to the mothers, parents or the caregivers on the general aspects of risk factors related to hearing loss, early identification and rehabilitation merely will not be enough for the global development of the child. The awareness also needs to incorporate the education and educational placement related knowledge, knowledge on the aspects of hearing aid for mainstreaming has to be involved. The success of any intervention program not only requires the professionals but definitely, it requires a commitment and involvement from the parents. Hence, there is a need to survey the caregivers regarding these conditions like knowledge by the parents not only for risk factors, early identification, and rehabilitation but also about the hearing aids and educational placement of the child. In a country like India where 63 million people (6.3%) endure significant hearing impairment, four in every 1000 children suffer from severe to profound hearing loss, with more than 100,000 babies born with hearing deficits every year.¹³ It has also been reported that

only 5% of children with hearing impairment get necessary schooling, and 1% of the total hearing-impaired population has access to quality education in the country.¹⁴ There is a lack of awareness among the parents that a child with hearing loss also has the right to education in a mainstream school, and the child can participate in school like any other child in the class.¹⁵ According to JCIH three-fourths of the children with disabilities at the age of 5 years and one-fourth between 5-19 years do not go to any educational organization.⁶ The quantities of children enrolled in school plunges significantly with each following level of schooling. According to the United Nations educational, scientific and cultural organization (UNESCO) report, parents and teachers' attitudes towards including children with disabilities into mainstream education are also crucial to inclusive education.

The current study aimed to develop, administer, and compare the questionnaire scores on 'parent's awareness on aspects related to hearing' among the parents of normal-hearing children and children with hearing impairment. The questionnaire is being administered on the parents of normal hearing children also in order to know their awareness related to hearing loss so that it can facilitate in early identification and rehabilitation.

METHODS

Study setting and participants

Standard group convenient purposive sampling procedure was used to select the participants of the present study. A total of eighty participants, participated in the present study. These participants were divided into two groups. Group I consists of forty parents of normal hearing children (mean age-32.88 years, SD±10.4 years) and their children mean age of 4.4 years, SD of ±1.3 years. The group I participants were parents who had taken admission for their children in different normal play school in Mysuru, Karnataka. Group II had forty parents of children who have a hearing loss and fitted with a binaural digital hearing aid (mean age-29.75 years, SD±4.8 years) and their children mean age of 5.3 years, SD±2.56 years. These children were identified for hearing loss at a mean age of 2.42 (SD±1.92) and rehabilitated with hearing aid at the mean age of 2.91 years (SD±1.99). The group II participants were parents who accompany their children with hearing impairment for listening training at All India Institute of Speech and Hearing, Mysuru, Karnataka. The study was conducted during the period from 10 September 2019 to 30 January 2020. The methodology consists of two phases. The phase I is the development and validation of the questionnaire, and phase II is the administration of the developed questionnaire.

Phase I

As there are very less literature regarding the questionnaire-based report on awareness and knowledge on different aspects of hearing loss like causes of hearing

loss, early identification, early rehabilitation, educational placement, and attitude towards children with hearing impairment, a questionnaire with total 60 questions were developed from resource books, public education material and research articles related to awareness on hearing loss. These questions were given to 18 speech and hearing professionals and ten parents for content validation. The experts were asked to check if the questionnaire's sentences met the criteria regarding familiarity, absence of emotional, cultural, and religious overlay. They were asked to mark as highly relevant or not relevant. The items were revised based on the suggestion and comments provided by the expert for rephrasing and relevancy. The content validity index (CVI) and obtained a value of 0.8.¹⁶ The modified questionnaire consists of 41 questions, which included the suggestions provided at the time of content validation. And each item consists of 'yes' or 'no' choices for the response. The developed questionnaire had five subsections.

Section I consists 11 questions that are related awareness on causes and risk factor of hearing loss, section II consists of 8 questions that are related to the awareness on early identification of hearing loss, section III consists of 10 questions that are related to the need for hearing aid and therapy, section IV consists of 7 questions that are related to the educational placement of a child with hearing impairment, section V consists of 5 questions that are related to the attitude of parents towards a child with hearing impairment (appendix-I).

Phase II

In this phase, the developed questionnaire was administered in their respective language of the two groups' parents. The responses were scored as '1' for correct response and '0' for an incorrect response. The collected data was documented for further statistical analysis across the groups and subsections of the questionnaire.

Ethical issues

In the present study, all testing procedures were carried out using non-invasive techniques, adhering to the conditions of the ethics approval committee of the institute.¹⁷

Statistical analysis

The data were collected and subjected to statistical analysis using the statistical package for social sciences (SPSS v20) software (released 2011; IBM Corp., Armonk, NY). The data were expressed as mean±standard deviation and frequency (percent) for numeric variables. The normality of the distribution of numeric variables was evaluated using the Kolmogorov–Smirnov test. Standard group comparison method was used for the obtained data.

Crosstabs Pearson Chi-square test was done to see the association between the participants' responses and the Mann-Whitney test for comparing the scores of subsections in the questionnaire across two groups. Cut-off scores for the questionnaire were obtained using the receiver operating characteristic (ROC) curve. All statistical analyses were performed by a blind analyzer about the details of the research.

RESULTS

The item analysis of the questionnaire was done descriptively. Kolmogorov-Smirnov and Shapiro-Wilk test for normality indicated that the data of the current study didn't follow a normal distribution (p>0.05). Hence non-parametric statistical tests were carried out for each of the subsections separately. Table 1 is the descriptive data of mean, median, and standard deviation (SD) of the raw scores for the responses of the questions across different subsections for the two groups of participants.

Table 1 shows that the mean scores of all the subsections for group II are higher than the group I, which indicates the knowledge on the different aspects related to hearing loss are less in parents of individuals with normal hearing, than those parents whose children have hearing impairment.

Further crosstabs Pearson Chi-square test was done to see the association between the response and the participant group for each of the questions. The results reveal a significant difference between the groups across most of the questionnaire questions. Table 2 depicts the results of the Chi-square test.

Table 1: Mean, median and standard deviation (SD) of the raw scores for the responses of the questions across different subsections of the two groups.

Subsections in questionnaire	Group I			Group II		
	Mean	Median	SD	Mean	Median	SD
Subsection 1	5.63	6	1.90	7.55	7.5	1.88
Subsection 2	5.3	6	1.70	6.75	7	1.42
Subsection 3	5.6	6	1.84	7.60	8	1.72
Subsection 4	3.87	4	1.38	4.85	5	1.64
Subsection 5	2.87	3	1.34	3.57	4	1.08
Total scores	23.27			30.32		

Table 2: Results of Crosstabs Pearson chi-square test of both the group of participants.

Questions	Group I		Group II		χ^2 (1)
	Yes (%)	No (%)	Yes (%)	No (%)	
Subsection 1					
Q1	62.5	37.5	50.0	50.0	1.270*
Q2	50.0	50.0	27.5	72.5	4.266**
Q3	75.0	25.0	50.0	50.0	5.33**
Q4	70.0	30.0	35.0	65.0	9.825**
Q5	50.0	50.0	37.5	62.5	1.270*
Q6	57.5	42.5	42.5	57.5	1.800*
Q7	27.5	72.5	15.0	85.0	1.867*
Q8	35.0	65.0	22.5	77.5	1.526*
Q9	32.5	67.5	20.0	80.0	1.614*
Q10	22.5	77.5	7.5	92.5	3.529*
Q11	55.0	45.0	37.5	62.5	2.464*
Subsection 2					
Q1	35.0	65.0	27.5	72.5	.524*
Q2	60.0	40.0	22.5	77.5	11.605**
Q3	37.5	62.5	12.5	87.5	6.667**
Q4	25.0	75.0	7.5	92.5	4.501**
Q5	25.0	75.0	12.5	87.5	2.051*
Q6	30.0	70.0	12.5	87.5	3.660*
Q7	15.0	85.0	12.5	87.5	0.105*
Q8	42.5	57.5	17.5	82.5	5.952**
Subsection 3					
Q1	22.5	77.5	5.0	92.5	5.984**
Q2	40.0	60.0	25.0	75	2.856*
Q3	27.5	72.5	17.5	82.5	1.147*
Q4	65.0	35.0	52.5	47.5	1.289*
Q5	30.0	70.0	25.0	75	0.251*
Q6	32.5	67.5	20.0	80.0	1.614*
Q7	47.5	52.5	12.5	87.5	11.667**
Q8	35.0	65.0	12.5	87.5	5.591**
Q9	67.5	32.5	60.0	40.0	0.487*
Q10	65.0	35.0	42.5	57.5	4.073**
Subsection 4					
Q1	65.0	35.0	55.0	45.0	0.833*
Q2	50.0	50.0	32.5	67.5	2.527*
Q3	27.5	72.5	20.0	80.0	0.621*
Q4	45.0	55.0	30.0	70.0	1.920*
Q5	32.5	67.5	17.5	82.5	2.4*
Q6	65.0	35.0	50.0	50.0	1.841*
Q7	27.5	72.5	10.0	90.0	4.021**
Subsection 5					
Q1	37.5	62.5	17.5	82.5	4.013**
Q2	52.5	47.5	50.0	50.0	0.050*
Q3	67.5	32.5	57.5	42.5	0.853*
Q4	32.5	67.5	12.5	87.5	4.588**
Q5	22.5	77.5	7.5	92.5	3.529*

*p>0.05, **p<0.05

Table 2 provides a clear representation in the percentage of the responses for individual questions obtained by both

the Group of participants. The Chi-square value with significant indicates the items that had a significant

response for that question across groups. Further Mann-Whitney test was done to compare if there is any significant difference in the subsections across the two groups. Table 3 depicts the results of the Mann-Whitney test for the scores of subsections across two groups (Table 3).

Table 3 reveals that there is a significant difference across the two groups of participants across all the subsections of the developed questionnaire. Further, the cut-off score for the questionnaire scores and the sensitivity and specificity were analyzed using the ROC curve. Figure 1 depicts the questionnaire's sensitivity and specificity for the response obtained between the scores of participants in group I and group II (Figure 1).

Table 3: Results of Mann-Whitney test comparing the scores of subsections across the two groups.

Subsections in questionnaire	Z value
Subsection 1	-3.956***
Subsection 2	-4.185***
Subsection 3	-4.425***
Subsection 4	-2.997***
Subsection 5	-2.423*

*p<0.05, p<0.005

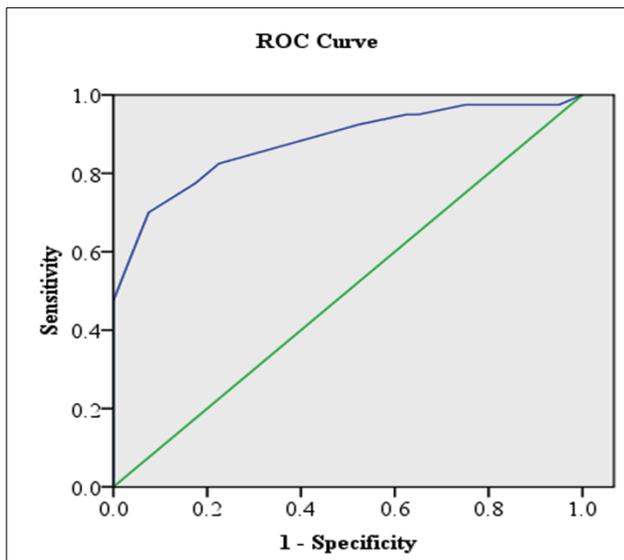


Figure 1: The sensitivity and specificity of the questionnaire.

The closer the blue line curve in Figure 1 follows the left-hand border and then the top border of the ROC space, the more accurate the test. The area covered under the curve (AUC) is 0.88. From the raw scores, the cut-off would be 26.5 (sensitivity is 0.825 and 1-specificity is 0.225). So if the total score of the questionnaire is below 26.5, then the awareness regarding the aspects related to the hearing loss is very less.

The questionnaire was also re-administered on 10 participants in each of the groups to check for the test's re-test reliability. The Cronbach's alpha scores ($\alpha=0.86$) indicate there was high reliability in the responses obtained in the scores of the questionnaire that was administered.

DISCUSSION

The present study was carried out to determine the awareness of a different aspect related to hearing by parents of normal hearing individuals and parents of children with hearing impairment through a developed questionnaire. The analyzed data revealed that the parents of normal hearing individuals had lesser knowledge of the causes of hearing loss, early identification, early rehabilitation, educational placement of the child, and attitude towards the child compared to parents of individuals with hearing impairment. It is clearly evident that since the parents of children with hearing impairment are experiencing difficulties, they get to know some of the necessary information through various resources and professionals. However, parents of normal hearing individuals are unaware of the essential information that is the risk related to hearing impairment. Lack of awareness of causes or risk factors of congenital or acquired hearing loss could lead to late identification of hearing impairment, which can have adverse effects not only on speech, language, academic and socioemotional development.¹⁸ The questions in the sections related to their knowledge on early identification and early rehabilitation are feeble which might delay the parents in the identification of the hearing impairment and early rehabilitation which is also in consensus with the reports which states that “wait-and-see” attitude exhibited by parents.¹⁹

Discussing the issues on knowledge related education of the child with hearing impairment and view of parents towards them, both the group of parents have lesser information. Though there was a significant difference between scores, the scores are lower in both, indicating a lack of knowledge among parents that the ultimate aim of aural rehabilitation is an appropriate educational placement of the child. In countries like India, there are various policies, acts, and programs like right to education, Sarva Shiksha Abhiyan, person with disability act, individuals with disability act, which provides numerous opportunities for equal education to individuals with hearing impairment. However, due to the parents' lack of awareness of educational needs for the children, the opportunities provide by the government through policies are not been utilized by the needy efficiently. Hence, parents play a critical role in early intervention and proper and timely educational placement of a child.⁹ By assessing their knowledge and awareness through this developed questionnaire, various steps can be taken to impart adequate knowledge to the parents on diverse issues and aspects related to risk identification at an early stage for early rehabilitation and out coming the attitudinal barrier on mainstreaming among the public. Hence, depending upon the cut-off scores obtained, more awareness related

orientation can be provided by counselling through pamphlet, videos, pictures, and testimonies to impart knowledge related to risk factors and the need for early rehabilitation, which will in turn help for better placement and mainstreaming of the child in school.

Limitations

The present study was limited to only among parents of normal hearing children in Mysuru. Hence the generalization of the study results is difficult as it does not involve any other community data. Also, the educational background, socio-economic status of the participants was not focussed though there were heterogeneity among the groups can be considered as a limitation in this study. However, this study sheds light onto the knowledge and awareness among the parents related to hearing aspects.

CONCLUSION

The present study concludes that a regular, systematic, and structured sensitization program is required mandatorily. It would create better awareness of the parents of normal hearing children toward the disability, and also to improvise the attitudinal barrier of the society towards hearing disability.

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ANNEXURE

Questionnaire

Sl. no.	Section 1: questions related to awareness on causes of hearing loss	Response
1	Do you think that hearing loss can be hereditary?	
2	Do you think that the mother's health during pregnancy can affect the child's hearing at or after birth?	
3	Do you think that a baby born before 8 months (i.e. a preterm baby) might have a chance for having hearing loss?	
4	Do you think a baby with low birth weight (i.e. <1500 grams at birth) or a malnourished baby might have a chance for having hearing loss?	
5	Do you think child which did not cry immediately after birth might have a chance for hearing loss?	
6	Do you think that the insertion of a pin, chalk, pencil, stick, rubber, and others into the ear canal have no effect on hearing loss?	
7	Do you think that any infections to the ear can cause HL?	
8	Do you think that frequent watery/pus discharge from ear can cause HL?	
9	Do you think that consistent exposure to a loud sound for a prolonged period of time (listening to loud music with personal music system) may lead to HL?	
10	Do you think that any physical assault/ injury to the ear can cause HL on that side?	
11	Do you think that certain medications taken during pregnancy might cause HL?	
Sl. no.	Section 2: questions related to awareness on early identification of hearing loss	Response
1	Do you think that HL can be there from birth of a child?	
2	Can hearing loss be identified within the first week of birth?	
3	Do you think that every newborn in the hospital should be tested for their hearing?	
4	Do you know that an audiologist who is an expert is required to test the degree of HL for a child at birth?	
5	Do you think that 'hearing' in the first three years of life is very important for speech and language development?	
6	Did you know that if HL is identified before 6 months of age and fitted with a correct hearing aid the child can pick up language like a normal child of that age?	
7	Did you know the child can pick up language like a normal child of that age only if appropriate speech stimulation (therapy) is provided along with fitting of a correct hearing aid?	
8	Do you think that there can be HL after the child has learnt how to speak and understand the language i.e. few years after birth (within adulthood)?	
Sl. no.	Section 3: questions related to need for hearing aid and therapy	Response
1	Do you know that children with HL can be benefitted with a hearing aid?	
2	Are you aware of the different types of hearing aids like body level, behind the ear hearing aids and other types?	
3	Do you know that children with HL can be provided rehabilitation (therapy) to learn speech with a hearing aid?	
4	Do you think, at times the hearing aid might not be beneficial for a child?	
5	Do you know circumstances where other advanced technologies other than a hearing aid like a cochlear implant can be provided for hearing?	
6	Do you know that a HA cannot give a permanent cure, but can improve the quality of life of the individual?	
7	Do you think that therapy after fitting the HA to a child before the child has learnt to speak and understand the language is compulsory?	
8	Do you know that parents should be completely involved in speech input for the child to improve communication?	
9	Do you think that short term speech input to the child is enough to improve communication?	
10	Do you think the short term speech input need not have to involve day to day activities of the child?	

Continued.

Sl. no.	Section 1: questions related to awareness on causes of hearing loss	Response
Sl. no.	Section 4: questions related to the education of the child	Response
1	Do you think that a child with HL can study only in special school?	
2	Do you know that child with hearing problem can study along with the child with normal child in a normal classroom?	
3	Do you think that there are special changes that can be done to the classroom to aid the child with hearing loss to learn better?	
4	Do you think that children with HL can be benefitted in the classroom with appropriate seating?	
5	Do you know that the teacher can use a special microphone during teaching so that the child with HL can understand clearly?	
6	Do you know that child can be exempted to study one language in a school?	
7	Do you think the classroom teachers and children in normal school should know details of the child with hearing problem?	
Sl. no.	Section 5: questions related to the attitude of parents towards their child with hearing impairment	Response
1	Do you think you being motivated during the therapy and at home help your child to pick up better language?	
2	Do you think that the therapy provided in the therapy clinic is sufficient to your child to improve communication (speech and language)?	
3	Do you think that it is sufficient to understand what you say just by looking at your lips and not to hearing what was said?	
4	Do you think that the active involvement of your family members can contribute to your child's learning?	
5	Do you think that your child with hearing impairment can be like their normal hearing peers in the future?	