

## **Knowledge, Behavior and Preferences Concerning Noise – From Childhood To Adolescence**

**Nafeesa Arafat, MASLP  
Dr. Binoy Shany M S, Ph.D.**

---

---

### **Introduction**

The word *noise* is obtained from Latin word 'Nausea' implicating "unwanted sound" or sound that is loud, unpleasant or unexpected. It can be defined as wrong sound, in the wrong place and at the wrong time (Isma, Muhammad Abdul, & Shahid, 2017). The action against noise pollution is weak in India. Most of the people in India do not consider it as a pollutant and they accept it as a part of their routine life. Of late, it has been recognised as a pollutant. The present century has been described as the century of noise where humans are being exposed to an increasingly noisy environment. The increasing level of pollution is largely imputed to the high point of rapid global urbanisation process, industrialisation and development of means of transportation and communication.

Noise-induced hearing loss (NIHL) is often unrecognized problems especially in children and adolescents in non-occupational settings. Many Parents do not perceive that really loud sound exposure to prolonged duration can be dangerous to auditory function in children and young adults. According to the World Health Organization (2011), the prevalence of hearing impairment in school-aged children ranges from 0.05% to 7.7%. Hearing impairment among children and young adults leap up due to most frequent exposure to loud noise. Health professionals need to address a blockade to the use of hearing protection, intentional exposure to loud music, and other modifiable risk factors, which cause and aggravate hearing loss among those exposed to loud noise (Daniel, 2007)

Children's auditory complaints were relevant and prevalent, but most of the parents and even children are unaware of their hearing complaints. Sound intolerance and auditory hallucination in children has to be considered as an immediate audiological intervention.

In addition to it, there is a growing rejection of silence, which is often experienced with discomfort and quickly filled with words. Maybe the fear of emptiness turned silence into something undesirable and anguish. The experience of participating in a moment of silence is

intense, this intensity does not come from the remembrance, but from the affective experience of the here and now brought by the perception of the sounds made by the functioning of our bodies, from which one never escape. As usually said, silence brings us back to ourselves (cited in Brown, 2012).

### **Children are Often Exposed to the Excessive Level of Sounds**

Susan, Robert & Willam (2008) conducted a hearing conservation program to study the effectiveness of the "Dangerous Decibels" educational program in increasing the students' knowledge and positively changing their attitudes and behaviors related to hearing and hearing loss prevention. The 4<sup>th</sup> grade students who participated in the Dangerous Decibels presentation showed significant improvements in knowledge and attitudes regarding hearing and hearing loss prevention but attitudes and intended behaviors in seventh graders returned to baseline levels 3 months post presentation.

Jadid, Klein & Meinke (2011) in their study reported that Noise levels to which the pediatric dental resident was exposed fell below the Occupational Safety and Health Administrations and National Institute for Occupational Safety and Health's damage-risk thresholds for NIHL.

### **Noise-Induced Hearing Loss in Children**

When humans of any age are repeatedly exposed to hazardous sound levels without using adequate hearing protection, the common result is NIHL. Several studies have reported that the prevalence of noise-induced hearing loss among children is increasing (Woodford & O'Farrell, 1983; Chermak & Peters-McCarthy, 1991; Montgomery & Fujikawa, 1992). Anderson in 1967 reported a high prevalence of NIHL in school-aged children more than 30 years ago. Blair et al., (1996) reported that 1% of the school-age population has some degree of noise-induced hearing loss.

### **The Effectiveness of Hearing Conservation Program for Children**

Numerous studies reported the effectiveness of hearing conservation programs conducted in elementary schools (Chermak & Peters-McCarthy, 1991; Blair et al., 1996; Chermak et al., 1996; Bennett & English, 1999), middle schools (Lass et al., 1987; Knobloch & Broste, 1998), and high schools (Lewis, 1989; Lerman et al., 1998; Lukes & Johnson, 1998). All these studies concluded that, compared to pre-instruction responses, students' performance on hearing knowledge and noise awareness questionnaires improved significantly after they participated in hearing conservation programs (Susan, Robert & William, 2008). Even if hearing conservation programs began immediately in all of the nation's classrooms, it would take years to identify if such instruction had any effect on the prevalence of NIHL in the United States. However, every person who can be spared the debilitating consequences of noise-induced

hearing loss including communication difficulties, isolation, frustration, depression, or chronic tinnitus is worth the effort.

### **Need for the Study**

As indicated earlier the available research report effects of noise and the need to protect the hearing. There are fewer studies on knowledge, behavior and preferences regarding noise carried out in Indian scenario especially on school children, and there are no policies requiring hearing loss prevention practices to be taught in our nation's classroom. A major reason for this omission is the fact that "Hearing Health" is not a priority of the Healthy Youth programs. So the hearing conservation and noise pollution should receive attention and resources similar to all other hazards. This field of research is of very special interest, as the understanding of the relation of awareness of the damaging effects of loud levels of sounds and the knowledge about hearing protection with age, gender, and their parent's educational level will assist the development of effective prevention messages for children and teenagers.

### **Aim of the Study**

The aim of the present study is to identify the relations among knowledge about the damaging effect of loud levels of sound, reported engagement by children in activities that are potentially hazardous to hearing, preference related to sound levels and influence of parent's educational level on children's auditory behavior from childhood to adolescence among males and female participants selected from private and public school randomly.

### **Method**

#### ***Participants***

A total of 700 students from the primary and upper primary school of grade III to IX from private and public schools situated in the urban areas were selected for the study. The participants included 350 Malayalam speaking boys and girls ranging in age from 8 to 14 years studying in different schools in the city of Kasaragod. Parents (Number: 700) of the participants were also selected for the study to complete the survey regarding their child's hearing behaviors. All the subjects were provided with verbal information about the study. Ethical committee clearance was taken for the study and confidentially and privacy of the participants was also maintained.

#### ***Materials***

A questionnaire with a set of 30 Questions for children and 10 questions for parents was prepared from Knobel & Lima (2014) and from various questionnaires available on the internet. The questionnaire was first prepared in English and then translated in Malayalam by a person proficient in English and Malayalam. The questionnaire was verified and validated by 5 experienced Audiologists. The Questionnaire thus prepared was used to elicit the response of

students about knowledge, behavior and preference towards the noise. The final Questionnaire consisted of 4 sections.

- 1) Knowledge about noise (Section-I)
- 2) Behavior towards noise (Section-II)
- 3) Preference towards the noise. (Section-III)
- 4) Questionnaire for parents regarding their child's auditory behavior. (Section-IV)

Questions 1 to 10 of (Section-I) of the questionnaire collected information on knowledge about hearing protection, questions 11 to 20 (Section-II) on behavior towards noise and questions 21 to 30 of (Section-III) on preference towards the noise. A set of 10 separate questions (Section-IV) was given to the parents to seek the information about the child's auditory behavior and complaints, history of exposures to loud sound, the number of times of otitis media and basic information such as name, age, educational qualification and occupation.

### ***Procedure***

The permission was taken from the school principals to carry out the survey. The consent form was distributed to parents to be the participant for the survey. The subjects were selected based on the consent by the parents. The questionnaire was administered in schools, one class at a time. Help was provided for lower level grade students whenever necessary to follow the questions. Care was taken while interviewing the child whether he or she can follow the instructions and the answers was noted. Subjects were asked to mark for each question as "yes" or "no". Subjects were told that there would be no punishment for incorrect answers. As a token of thanks for the co-operation, toffees were distributed to each of the participants. Children took the printed parent's questionnaire to home and got back within 1 to 6 days.

### ***Data Analysis***

Statistical analysis was done for the collected data. ANOVA and t-test was done to find out the relationships among knowledge, behavior and preference towards noise across the gender from childhood to adolescents. Chi-Square test was done to find out the influence of parents educational level among children's auditory behavior.

### **Results and Discussion**

The aim of this present study was to identify the relations among awareness about the damaging effect of loud levels of sounds, reported engagement by children in activities that are potentially hazardous to hearing, preference related to sound levels and knowledge about hearing protection with age, gender and their parent's educational level among primary and secondary school students.

In the present study of the knowledge, behavior and preference towards noise from

childhood to adolescence which was conducted on school students, the obtained scores were subjected to descriptive statistics. The performance of the subjects with respect to their knowledge, behavior and preference towards the noise and parental awareness regarding children's auditory behavior is indicated in the four subsections of the questionnaire and the results obtained are explained in following sections:

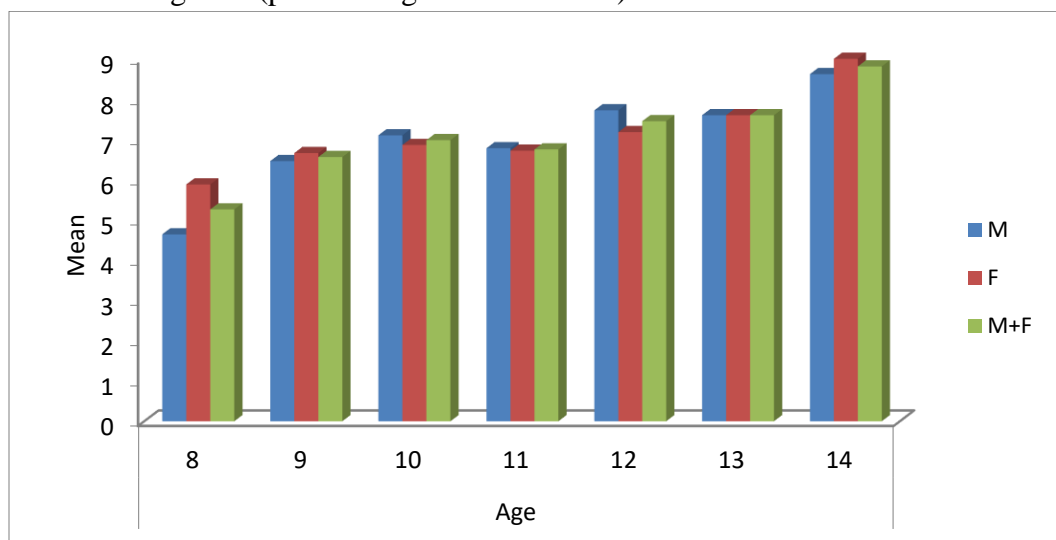
**1) Performance of individuals in the section-knowledge about the noise:**

	Age	Gender	N	Mean	Std. Deviation	t value	P	
knowledge about the noise	8	M	50	4.64	1.083	5.45	.000	HS
		F	50	5.88	1.189			
		Total	100	5.26	1.292			
	9	M	50	6.46	.994	.99	.324	NS
		F	50	6.66	1.022			
		Total	100	6.56	1.008			
	10	M	50	7.10	1.403	1.00	.322	NS
		F	50	6.86	.969			
		Total	100	6.98	1.206			
	11	M	50	6.78	1.516	.22	.825	NS
		F	50	6.72	1.161			
		Total	100	6.75	1.344			
	12	M	50	7.72	1.278	2.33	.022	Sig
		F	50	7.18	1.024			
		Total	100	7.45	1.184			
	13	M	50	7.60	.926	.00	1.000	NS
		F	50	7.60	.756			
		Total	100	7.60	.841			
	14	M	50	8.62	.805	2.56	.012	Sig
		F	50	9.00	.670			
		Total	100	8.81	.761			

**Table-1: Indicates the performance for the questions in the section “Knowledge about the noise”.**

The performance of individuals for the section-Knowledge about noise and comparison of gender in each age group are shown in table-1. From the table, it can be observed that the mean values increase with the age indicating that older children were much aware of what could harm the ears than the younger ones, and were informed about hearing protection devices. With respect to the gender comparison, the p-value shows that there is a significant difference between males and females only in the age groups (8 years, 12 years and 14 years) were p-value was less than 0.05. The other age groups (9yrs, 10yrs, 11yrs&13yrs) showed no significant difference

between the gender(p-value is greater than 0.05).



**Figure-1: Indicates the performance of the individuals for the questions in the section “Knowledge about the noise”.**

Figure1: shows the mean scores of males and females for different age groups. The x-axis denotes the age ranging from 8 to 14 years and y-axis denotes the mean value of each questions included in the section of knowledge about noise. From the graph, it can be observed that as age increases the scores improves.

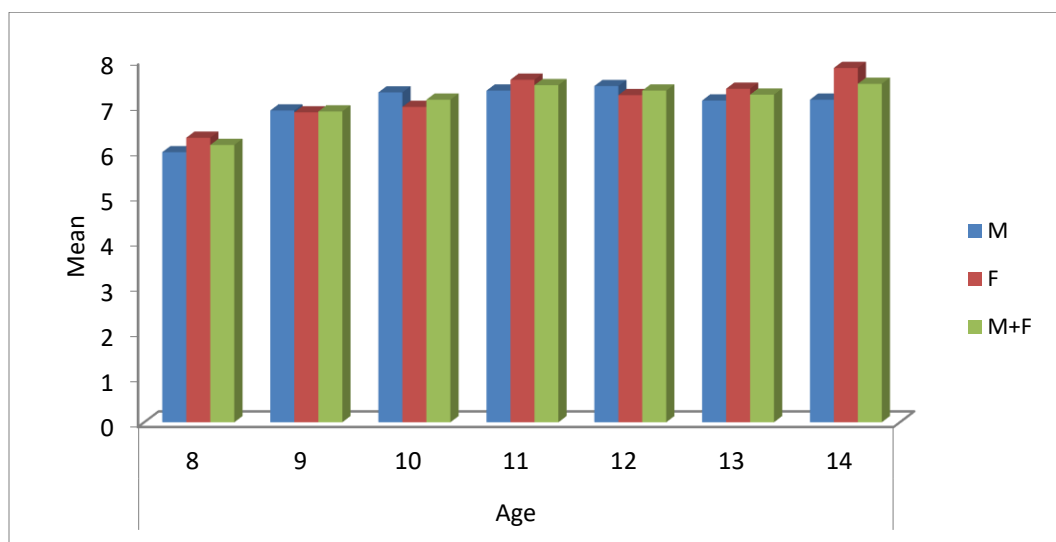
**2) Performance of individuals in the section-Behavior towards the noise:**

	Age	Gender	N	Mean	Std. Deviation	t value	P	
Behavior towards the noise	8	M	50	5.96	.968	1.84	.069	NS
		F	50	6.28	.757			
		Total	100	6.12	.879			
	9	M	50	6.88	.872	.23	.818	NS
		F	50	6.84	.866			
		Total	100	6.86	.865			
	10	M	50	7.28	1.144	1.67	.098	NS
		F	50	6.96	.727			
		Total	100	7.12	.967			
	11	M	50	7.32	1.406	.96	.340	NS
		F	50	7.56	1.072			
		Total	100	7.44	1.250			
	12	M	50	7.42	.883	1.19	.235	NS
		F	50	7.22	.790			
		Total	100	7.32	.839			

13	M	50	7.10	.839	1.66	.100	NS
	F	50	7.36	.722			
	Total	100	7.23	.790			
14	M	50	7.12	.982	3.72	.000	HS
	F	50	7.82	.896			
	Total	100	7.47	1.000			

**Table-2: Indicates the performance for the questions in the section “behavior towards the noise”.**

Table-2 indicates the performance of individuals for the section-behavior towards noise and comparison of gender in each age group. From the table-2 it can be observed that the mean values increase with the age indicating that as children gets older there is a clear tendency to show positive behaviors towards the noise. With respect to the gender comparison, the p-value shows that there is a significant difference between gender only in the age group of 14 years (p-value is less than 0.05), the other age groups (8 yrs,9yrs, 10yrs,11 yrs,12yrs&13yrs) shows no significant difference between the gender (p-value is greater than 0.05).



**Figure-2: Indicates the performance of the individuals for the questions in the section “behavior towards the noise”.**

Figure-2: shows the mean scores of males and females for different age groups. The x-axis denotes the age ranging from 8 to 14 years and y-axis denotes the mean value of each question included in the section-behavior towards the noise. From the graph, it can be observed that as age increases the scores improves.

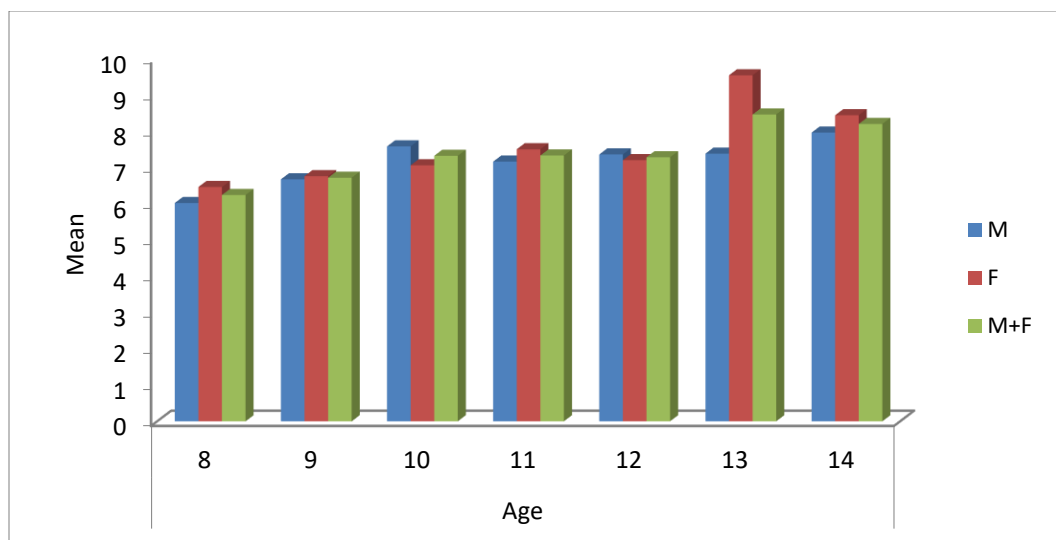
### 3) Performance of individuals in the section-Preference towards the noise:

	Age	Gender	N	Mean	Std. Deviation	t value	P	
Preference towards the noise	8	M	50	6.02	1.286	1.98	.051	NS
		F	50	6.46	.908			
		Total	100	6.24	1.129			
	9	M	49	6.67	1.197	.42	.678	NS
		F	50	6.76	.847			
		Total	99	6.72	1.031			
	10	M	50	7.58	1.090	2.54	.013	Sig
		F	50	7.06	.956			
		Total	100	7.32	1.053			
	11	M	50	7.16	1.583	1.16	.250	NS
		F	50	7.50	1.344			
		Total	100	7.33	1.471			
	12	M	50	7.36	1.174	.76	.447	NS
		F	50	7.20	.904			
		Total	100	7.28	1.045			
	13	M	50	7.38	.987	1.32	.189	NS
		F	50	9.54	11.493			
		Total	100	8.46	8.188			
14	M	50	7.96	.727	2.76	.007	HS	
	F	50	8.44	.993				
	Total	100	8.20	.899				

**Table-3: Indicates the performance for the questions in the section-preference towards the noise.**

Table-3 indicates the performance of individuals for the section-preference towards noise and comparison of gender in each age group. From the table-3 it can be observed that the mean values slightly improve with the age indicating that as children get older they shows positive preferences towards the noise. The p-value shows that there is a significant difference between gender for the age groups 10 and 14 years (p-value less than 0.05). The other age groups (8 yrs, 9yrs, 11yrs,12yrs,&13yrs) shows no significant difference between the gender (p-value greater than 0.05).





**Figure-3: Indicates the performance of the individuals for the questions in the section “preference towards the noise”.**

Figure-3: shows the mean scores of males and females for different age groups. The x-axis denotes the age ranging from 8 to 14 years and y-axis denotes the mean value of each question included in the section-preference towards the noise. From the graph, it can be observed that as age increases the scores slightly improves.

**4) The analysis of exposure to loud sounds, knowledge, and risk preference reported by children according to gender:**

	QUESTIONS	Female(350)	Male(350)	Testing proportion : Z value	p value	
		YES	YES			
1	Do you know what hearing protector is	5%	11%	1.56	0.119	NS
2	Do you think loud music will damage your ears	80%	81%	0.18	0.859	NS
3	Do you often visit fireworks often?	10%	15%	1.07	0.286	NS
4	Do you go for parties with loud music often	55%	65%	1.44	0.150	NS
5	Do you listen to loud music at home?	47%	50%	0.42	0.672	NS
6	Do you listen to loud music in the car	55%	64%	1.30	0.196	NS
	Do you listen to loud music with headphone	40%	65%	3.54	0.000	HS
8	Do you prefer to reduce the volume of music if its too loud	0%	0%	-	-	NS
9	Do you think listening to music will help me to do homeworks	55%	64%	1.30	0.196	NS

0	Do you prefer to use earplugs?	0%	0%	-	-	NS
---	--------------------------------	----	----	---	---	----

**Table-4: Shows the percentage of the participant's response to each question.**

**Previous exposure to loud sounds**

Table-4 explains the analysis of the exposures to loud sounds reported by the children. The results showed that listening to loud music with headphone (65%) were the most common exposures followed by parties (65%), in the car (64), followed by at home (50%) in male subjects. In female subjects, most common exposure is going for loud sound parties and listening loud music in the car (55%) followed by listening music at home (47%) followed by using headphone (40%). According to p-value there is no significance between male and female participants except for using the headphone ( $p < 0.01$ ). For questions included in the questionnaire "who sets the volume of the music?" less than half of them (43.6%) said that they could choose the volume of the music. All the others said that an adult family member or older brothers and sisters usually set the volume.

**Risk perception and hearing preferences**

For the question about "Do you think loud music will damage your ears"? 80% male and 81% female participants considered noise to be harmful to the ears. Most of the children (75%) said that they would like to protect their hearing if they were told that loud sounds could harm their hearing, while 23% said that they wouldn't care and 6% answered that they wouldn't believe it. According to the analysis the results show that there is no significant difference between male and female participants ( $p > 0.01$ ). Gender doesn't influence preferences in relation to exposure to loud noises and loud music (table-4). From this study, it can be justified that boys and girls equally are at the risk of hazardous auditory problems.

**Protective behavior**

To the question about hearing protection strategies that children could use if they were in a very noisy place, the response was 0% in both male and female participants, and turning the volume down was (0%). A significant difference regarding the use of protective strategies was not found between genders. The analysis of exposure to loud sounds, knowledge, and risk preference reported by children according to gender shows that gender has no significant impact on it, but better responses were observed in girls compared to boys.

**5) The occurrence of exposures to potentially hazardous sounds, according to age groups:**

QUESTIONS	8 -10 years(300)	10 -14 years(400)	Testing proportion : Z	p value

		YES	YES	value		
1	Do you know what hearing protector is	5%	10%	1.342	0.18 1	NS
2	Do you often visit fireworks often?	6%	11%	1.268	0.20 6	NS
3	Do you go for parties with loud music often	48%	55%	0.990	0.32 3	NS
4	Do you listen to loud music at home?	36%	67%	4.386	0.00 0	HS
5	Do you listen to loud music in the car	43%	78%	5.063	0.00 0	HS
6	Do you listen to loud music with headphone	34%	71%	5.239	0.00 0	HS
7	Do you prefer to reduce the volume of music if it's too loud	23%	16%	1.249	0.21 3	NS
8	Do you think listening to music will help me to do homeworks	47%	78%	4.528	0.00 0	HS
9	Do you prefer to use earplugs?	0%	5%	2.265	0.02 5	Sig
10	Do you think loud music will damage your ears	56%	85%	4.497	0.00 0	HS

**Table-5: Shows the percentage of the participant's response to each question between older and younger children**

### ***Previous exposure to loud sounds***

Table-5 shows the analysis of the exposures to loud sounds reported by the children. The results showed that in younger age group listening to loud music with headphone were (34%), parties (48%), car (43%), and listening to loud music at home was (36%) respectively. In older children listening to loud music with headphone were (71%), car (78%), home (67%), and parties were (55%) respectively. According to the p-value (p-value < 0.01), there is a significant difference between boys and girls in using different ways of listening to music.

### ***Risk perception and hearing preference***

To the question "Do you think loud music will damage your ears"? 85% of older children and 56% younger participants considered noise to be harmful to the ears. Most of the young children (57%) said that they would like to protect their hearing if they were told that loud sounds could harm their hearing. Younger participants (0%) wouldn't prefer to use earplugs and

(5%) of older participants would prefer to use the earplugs. According to the analysis the results show that there is significance between the age group ( $p < 0.01$ ). Older children were more aware of risk perception and hearing preference when compared to young children.

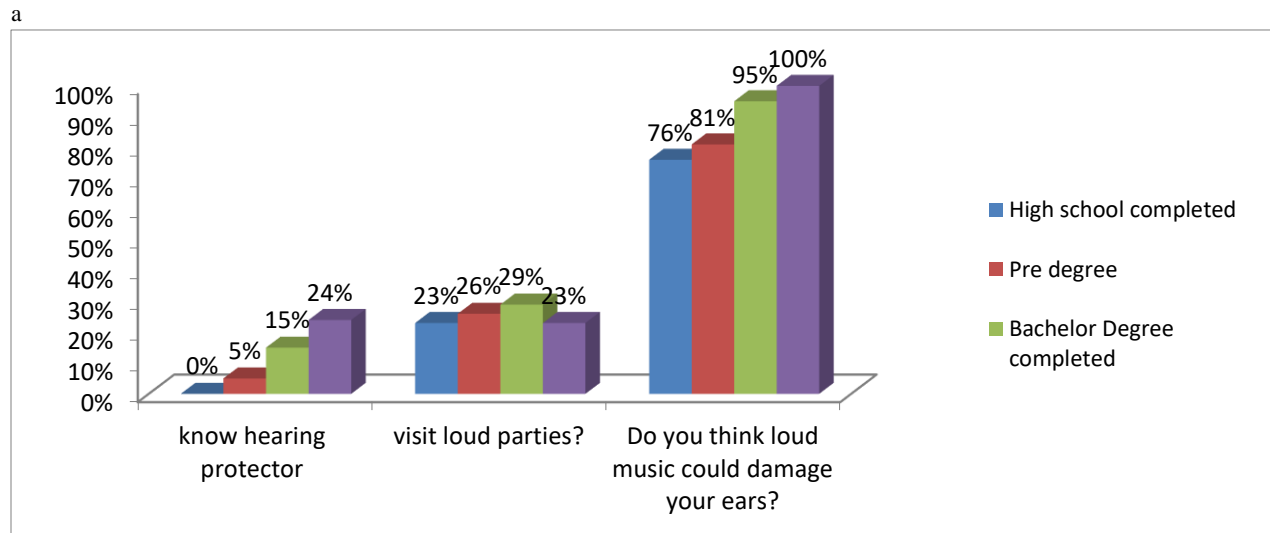
**Protective behavior**

The use of hearing protection (5%), turning the volume down (0%) was seen among the age group (10 to 14 years). But younger participant’s awareness to protect their auditory system is very less compare to the older participant. A significant difference regarding the use of protective strategies was found between different age group ( $p < 0.05$ ). The results indicate that knowledge about the risks related to exposures to loud sounds and about strategies to protect their hearing increases with age, but preference for loud sounds and exposures to it increases too.

**6) Influence of parent's educational level on their children's preferences related to exposure to loud sounds**

	Parents knowledge	High school completed (100%)	Pre degree (85%)	Bachelor Degree completed (25%)	Masters degree (10%)	chi square test- x2 value	p-value	
1	know hearing protector	0%	5%	15%	24%	12.318	0.002	HS
2	Visit loud parties?	23%	26%	29%	23%	0.980	0.806	NS
3	Do you think loud music could damage your ears?	76%	81%	95%	100%	4.386	0.223	NS

**Table-6: Shows the influence of parent’s educational level on their children’s auditory behavior.**



***Figure-4: Shows the influence of parent's educational level on their children's auditory behavior.***

Table-6 and figure-4 show that children from families with higher educational level (Masters degree) know more about hearing protection and damaging effect of loud noise that can affect their auditory skills, followed by children from families with a bachelor degree, pre-degree and the parents who completed high school. According to p-value, there is a significant difference between hearing protection and educational degree of the parents. The study reveals that very less awareness about hearing protection devices was seen even among highly educated parents. Awareness about hearing protection devices and earplugs has to be taken into consideration. From the findings, it states that parental educational level really influences children's auditory behavior.

In the present study, the results indicate that the knowledge, behavior, and preference towards noise increasing with the age. Older children have more knowledge concerning noise, but preference and behavior towards noise are better among young group compared to adolescents, it might be the result of learned behavior. The higher mean value signifies the better parental awareness regarding children's auditory behavior and also the chi-square test results show that parental educational qualification influenced the children's auditory behavior; it can be due to the good knowledge and experience of parents about hazardous effect of noise on hearing. According to this study there is no significant difference between boys and girls, but results of the analysis shows higher percentage and positive responses for girls when compared to boys, it explains that boys are more aware of risk associated with noise exposure but their behaviors and preference towards noise is worse when compared to girls, it may be due to the effect of social media and boys are vulnerable to advancing technologies.

Safe listening should be encouraged at an early age Widén & Erlandsson, (2004). This present study agrees with Bistrup et al (2008) that children of a certain age and maturity are competent and active about their own situation, but younger ones mostly depend on their adults to guide them to protect their hearing or prohibiting them from being exposed to hearing-damaging loud sounds. If the data are combined with the recommendations by the World Health Organization that focused on protecting children against loud noise exposure, we come to the conclusion that adults should be part of any educational hearing conservation program for children and also the Indian school system has to be the part of hearing conservation program.

### **Summary and Conclusion**

The aim of the present study was to identify the knowledge, behavior and preferences concerning noise, from childhood to adolescence. The present study was conducted in different private and public school in Kasargod. In the present study, a total of 700 students from the

primary and upper primary school of grade III to IX from private and public schools were selected for the study. Participants included 350 Malayalam speaking boys and girls ranging in age from 8 to 14 years studying in different schools in the city of Kasaragod. Parents of the participants were also selected for the study to complete the survey regarding their child's hearing behaviors.

According to the results of the current research, most of the children consider that the exposure to loud sounds can be harmful to the hearing, but they do not have a full understanding of the risks associated with it. Knowledge about the risks related to exposures to loud sounds and about strategies to protect their hearing increases with age, the preferences and behaviors also improve as age increases. This field of research is of special interest, as the understanding of the relation of awareness of the damaging effects of loud sounds and the knowledge about hearing protection with age, gender, and their parent's educational level will assist the development of effective prevention messages for children and adolescents. The data collected suggest that children are not at all aware about the hazardous effect of noise and reports engagement by children in activities that are potentially hazardous to hearing. In the present study, the subjects were aware of the effects of noise exposure, but they did not avoid loud sound exposures. The most frequent occurrences of noise exposure were listening to loud music with headphone parties or concerts with loud music, and listening to loud music at home or in the car, were well-known dangers to the ears. It really looks like that most of the exposures to loud sounds also include exposure to loud sounds during temple festivals and sports event

When the question about the hearing protection ways was asked, most of the children answered such as; covering the ears with hands, going away etc, but they never took steps to turn the volume down, the use of hearing protection was mentioned only by 5% in older children and 0% in younger participants. It reveals that knowledge about protective behavior improves with age. Only 5% of the older children (age 10 to 14 years) knew what an HPD is and were able to describe its usage. Even more alarming is the fact that none of the younger children knew about HPD and the study shows that none of the participants used hearing protection device or have seen it. The parents survey results reveals that only highly educated parents know about hearing protection devices but never recommended to use it for their children to protect their hearing. Information regarding the use of hearing protection is to be considered as an important step towards the prevention of hearing impairments.

### ***Parents' educational level***

Parent's educational level did influence children's knowledge about the effects of noise on the auditory system, also their risk perception or hearing preferences. According to the survey, many parents and children were unaware of HPD and earplugs that are used for hearing protection. The finding agrees with the notion that the higher the socioeconomic status, the

higher was the individual's worry about noise and the use of hearing protection.

### ***Gender***

Children's knowledge about the effects of noise on the auditory system and hearing protection strategies did not vary according to gender. Furthermore, girls and boys tend to involve themselves in risky behaviors as also reported by Bohlin & Erlandsson (2007)

### ***Age***

Older children were much more aware of what could harm the ears than the younger ones, including the risks related to exposures to loud sounds, and were better informed about HPD. This may be a positive influence of the social media. According to survey answers, interestingly 45% younger children and 68% older ones said that the volume of the music was set by them. It agrees with the observation that children have full control over their listening environments.

### ***Implications***

From this study to conclude the hearing conservation programs can be included in the Indian school curriculum like teaching younger children about the hazardous effect of noise through cartoon animations in the text books as a chapter and teaching the older students about the safe noise level and frequency of listening to loud sounds. Awareness campaigns must be part of the public health agencies and the goals to make parents, younger and older children aware of hazardous effect of noise and the different hearing protective device that is available in the market.

### ***The limitations of the study***

1. The study did not focus on rural and urban areas
2. The reliance on self-reported measures of noise exposure and the lack of data about how frequent or infrequent the exposures were are limitations of the study.
3. The study did not widespread the data to the different population in other geographic regions of Kerala.

---

---

## **References**

- Anderson, U. M. (1967). The importance of hearing conservation instruction. *The Journal of school Nursing*. 19(3):140-8. doi: 10.1177/10598405030190030401
- Bennett, J. A. & English, K. (1999). Teaching hearing conservation to school children: comparing the outcomes and efficacy of two pedagogical approaches. *Journal of Educational Audiology*; 7, 29-33. Retrieved from: <https://doi.org/10.1177/10598405030190030401>
- Bistrup, M.L., Haines, M., Hygge, S., MacKenzie, D.J., Neyen, S. & Petersen, C.M. (2002). In: Bistrup, M.L., Keiding, L., editors. *Children and Noise - Prevention of Adverse Effects*.



Denmark: National Institute of Public Health. p. 215

- Blair, J. C., Hardegree, D., Benson, P.V. (1996). Necessity and effectiveness of a hearing conservation program for elementary students. *Journal of Educational Audiology*, 4:12-16. Retrieved from: [www.dangerousdecibels.org](http://www.dangerousdecibels.org)
- Bohlin, M. C., & Erlandsson, S. I. (2007) Risk behaviour and noise exposure among adolescents. *Noise Health* .9:55-63. Retrieved from:  
<http://www.noiseandhealth.org/text.asp?2007/9/36/55/36981>
- Brown, S. D. (2012). Two minutes of silence, *Theory and Psychology*, 234-52. Retrieved from: <http://doi.org/10.1177/0959354311429031>
- Chermak, G. D. & Peters, E. (1991). The effectiveness of an educational hearing conservation program for elementary school children. *Language, Speech and Hearing Services in Schools*, 22:308-312. doi: 10.1055/s-2007-1021774
- Chermak, G. D., Curtis, L. & Seikel, J. A. (1996). The effectiveness of an interactive hearing conservation program for elementary school children. *Language, Speech and Hearing Services in Schools*, 27, 29-39. doi: 10.1055/s-2007-1021774
- Daniel, E. (2007). Noise and hearing loss: A review. *International Journal of School Health*. 77(5), 225-31. doi:10.1111/j.1746-1561.2007.00197.
- Isma, Y., Muhammad, S., Abdul G. & Shahid, M. (2017). Spatial Patterns of Noise Pollution and Its Effects in Lahore City. Anchor Academic Publishing.
- Jadid, K., Klein, U. & Meinke, D. (2011). Assessment of noise exposures in a pediatric dentistry residency clinic. *Pediatric Dentistry*, 33 (4), 343-8. Retrieved from:  
<https://www.ncbi.nlm.nih.gov/pubmed/21903003>
- Knobloch, M. J. & Broste, S. K. (1998). A hearing conservation program for Wisconsin youth working in agriculture. *Journal of School Health*. 68(8), 313-318. Retrieved from:  
<https://www.ncbi.nlm.nih.gov/pubmed/9800180>
- Knobel, K. A., & Lima, M. C. (2014). Influences of age, gender, and parents' educational level in knowledge, behavior and preferences regarding noise, from childhood to adolescence. *Noise and Health*. 16 (73), 350-60. doi:10.4103/1463-1741.144400
- Lass, N. J., Woodford, C. M. & Lundeen, C. (1987). A hearing-conservation program for a junior high school. *Hearing Journal*. 20 (2), 32- 40. Retrieved from:  
<https://pdfs.semanticscholar.org/e8f6/e2b233adbbd49ffcb47fd6fcb00d5bc67823>
- Lerman, Y., Feldman, Y. & Shnaps, R. (1998). Evaluation of an occupational health educational program among 11<sup>th</sup> grade students. *American Journal of Industrial Medicine*. 34 (6), 607-613. doi:10.1002/(SICI)1097-0274(199812)34:6<607::AID-AJIM9>3.0.CO;2-1
- Lewis, D. A. (1989). A hearing conservation program for high-school-level students. *Hearing Journal*. 42 (3), 19-24. doi: 10.1177/10598405030190030401
- Lukes, E. & Johnson, M. (1998). Hearing conservation: community outreach programs for high school students. *Aaohn Journal*. 46 (7), 340-3. Retrieved from:  
<https://www.researchgate.net/.../13536835>



- Montgomery, J. K. & Fujikawa, S. (1992). Hearing thresholds of students in the second, eighth, and twelfth grades. *Language, Speech, and Hearing Services in Schools*, 23, 61-63.
- Susan, G., Robert, F. & William, H. M. (2008). Effectiveness of “Dangerous Decibels,” a School-Based Hearing Loss Prevention Program. *American journal of audiology*. 16(2),165-81. doi: 10.1044/1059-0889(2007/021
- Woodford, C. M., & O’Farrell, M. L. (1983). High-frequency loss of hearing in secondary school students: an investigation of possible etiologic factors. *Language, Speech, and Hearing Services in Schools*. 14, 22-28. doi: 10.1055/s-2007-102177

=====

Nafeesa Arafat, MASLP,  
Marthoma College of Special Education,  
Institute of Speech & Hearing,  
Badiadka, Kasaragod-671551  
[nafiaraf19@yahoo.co.in](mailto:nafiaraf19@yahoo.co.in)

Dr. Binoy Shany M S, Ph.D.  
Professor,  
Marthoma College of Special Education,  
Institute of Speech & Hearing,  
Badiadka, Kasaragod-671551  
[Shany003@yahoo.com](mailto:Shany003@yahoo.com)