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TEACHER AND PARENT KNOWLEDGE AND ATTITUDE REGARDING HEARING LOSS IN PRIMARY SCHOOL STUDENTS IN TABUK, KSA

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ABSTRACT

Background: There is an increasing awareness regarding noise-induced hearing loss. The present study aimed to assess knowledge, attitude, and practice among parents and teachers regarding noise-induced hearing loss in Tabuk City, Saudi Arabia.

Materials and Methods: This is a cross-sectional study conducted among 326 teachers and parents in Tabuk City during the period from January 2019 to March 2019. A face to face interview was conducted to collect demographic data, knowledge (eleven questions), attitude (seventeen questions), and practice (sixteen questions). The ethical committee of the University of Tabuk approved the research and the statistical Package for Social Sciences was used for data analysis.

Results: There were 326 participants (61.7% were parents), their ages mean \pm SD was 34.86 ± 10.64 years, the female dominance was obvious (75.2%). The attitude regarding noise-induced hearing loss was optimal. However, the participant's knowledge was sub-optimal (34.7% were average or poor). It is interesting to note that the majority (80.1%) of students were exposed to high noise, nearly a half were using an ear headphone, 23.6% were living near a highway. In spite of high-noise exposure, nearly one-third of the students did not check for a hearing problem.

Conclusion: Exposure to loud noise was high among Tabuk students. However, a considerable number did not check their ears. The attitude of the parents and teachers was acceptable, but the knowledge regarding hearing loss was sub-optimal. Measures to prevent, increase the awareness regarding noise-induced hearing loss and regular check-up implementation in schools are highly recommended.

Keywords: Knowledge, attitude, practice, parents and teachers, Tabuk

INTRODUCTION

Noise-induced hearing loss (NIHL) can result from exposure to extremely high noises (above 80 decibels) that damage the structures and/or nerve fibers in the inner ear. One-time exposure to a very high-decibel sound, blast, intense impulse sound or hearing loud noise over a prolonged period can result in NIHL, which can't be treated medically or surgically [1].

Hearing plays a key role in communication, speech and language development, and learning. Even mild hearing loss produces a significant negative effect on speech, language understanding, communication, and learning in class, and social development with deleterious consequences on the patients, family, and the whole community [2]. Studies showed that children with mild to moderate hearing impairment, on average, do not perform as well at school as children with the normal hearing without suitable intervention. This decreased academic achievement broadens as students grow at school [2,3].

Interestingly, it has been estimated that one-third of all cases of hearing loss can be attributed to noise exposure, the most common preventable cause of hearing loss. In the United States, an estimated 5.2 million children and adolescents (12.5%) and 26 million adults (17%) age 20 to 69 years have impaired hearing as a result of exposure to excessively loud noise, and the incidence is increasing [4,5].

Research conducted through observation and experimental methods confirms that noise exposure can annoy and affect sleep, causing daytime sleepiness, which then affects patient health and work performance. Harmful effects from noise exposure also include increased incidence of high blood pressure and cardiovascular disease and impaired intellectual performance in schoolchildren [6].

Although it is one of the more widespread disabilities, little is known about the current level of awareness and attitude towards NIHL among teachers and parents in Saudi Arabia. We conducted this study to assess teacher and parent knowledge, attitude, and practice (KAP) regarding the impact of loud noise on hearing in primary school students in Tabuk, Saudi Arabia.

MATERIALS AND METHODS

We conducted this cross-sectional KAP study of teachers and parents of primary school students in Tabuk, Saudi Arabia, from January 2019 to March 2019. All parents and teachers of primary school students in Tabuk were invited to participate in the study. Parents and teachers of preparatory and secondary schools were excluded. The sample size was calculated from the formula: $n=Z^2 P Q/d^2$ where $Z = 95\%$ confidence (1.96), $P =$ prevalence assuming that 50% prevalence at 5% CI. The number stranded at 326 after excluding incomplete data.

Data collection

Data were collected through personal interviews using a predesigned questionnaire, including all the relevant questions to address the study objectives. The questionnaire collected data on gender, relation to the child, educational level of the respondent, child order between siblings, and chronic diseases. The questionnaire also contained three sections of questions assessing teacher and parent KAP on the impact of loud noise on hearing loss among primary school students. The questionnaire included four items: demographic data, knowledge (eleven questions) asking about loud noise

effects on sleep, concentration, cardiovascular disorders, and permanent hearing loss, whether the hearing loss is painless and may be accompanied by tinnitus, questions also inquire if children with hearing loss may have communications difficulties and language problems, the knowledge regarding ear headphones duration of use and volume were also assessed, attitude (seventeen questions), and practice (sixteen questions), each question with five choices (strongly agree=5, agree=4, not sure=3, disagree=2, and strongly disagree=1), then a total score was given to each participant with scores from 80-100% regarded as excellent, 60-79 as good, 40-59 as average or fair, and less than 40 as poor. The questionnaire was obtained from the previous literature [7,8] and approved by an Otolaryngologist and an Internist.

Ethical considerations

Ethical approval to carry out the study was obtained from the research ethics committee of the University of Tabuk. The study objectives were briefly explained, and informed consent was obtained in a special section of the questionnaire. Respondent confidentiality was maintained as no names were included in the questionnaire or responses.

Statistical analysis

Data were analyzed using IBM SPSS Statistics for Windows version 20.0 (Armonk, NY: IBM Corp.). Qualitative data were expressed as number and percentage. Percentages and frequencies were used to describe the demographic profile of the respondents and the answers regarding awareness of the impact of loud noises on hearing loss among primary school students. The data were presented as percentages or $\text{mean} \pm \text{SD}$ unless otherwise specified.

RESULTS

Out of three hundred and twenty-six parents and teachers, age ($\text{mean} \pm \text{SD}$) was 34.86 ± 10.64 years, the females dominance was obvious (75.2%), nearly two-thirds were parents (61.7%), while 38.3% were teachers, 67.6% received University educations, and 11.4%, 3.7%, and 17.3% had secondary school, intermediate, and primary education respectively. Table 1.

In the study, 80.1% of the students were exposed to high sounds, 23.6% are living near highways, and nearly a half (43.3%) were using ear headphones (nearly one in five were using them more than three hours/day), the previous findings were reflected in 5.2% hearing difficulty in this young age group despite the regular check-up in 67.5%. Table 2, depicted other characters of 326 students whose parents and teachers participated in the current study

Table 3 presents the results of the knowledge of parents and teachers on the impact of loud noises on hearing difficulty among primary school students in Tabuk. Most respondents (47.5%) strongly agreed that exposure to loud sounds like music players might lead to sleep disorders, more than half (54%) strongly agreed that exposure to loud sounds might lead to concentration problems, 17.5% strongly agreed and 27.3% agreed that exposure to loud sounds might lead to cardiovascular disorder. Some participants (41.4%) strongly agreed, and 38.7% agreed that exposure to loud sounds might lead to hearing difficulty. We found that 28.2% of respondents strongly agreed, and 44.8% agreed that hearing difficulty may be painless and may be accompanied by tinnitus. Most respondents (59.8%) strongly agreed, and 34% agreed that children with hearing difficulty have language problems, and 61.7% strongly agreed, and 25.2% agreed that that hearing difficulty leads to a loss of communication. Also, 31% of the respondents strongly agreed, and 50% agreed that hearing difficulty from noise affects a child's auditory nerve.

Table 4 presents the results of attitude assessment among parents and teachers. Of those surveyed, 42.9% of participants strongly agreed, and 37.4% agreed that intense impulse sound could induce hearing difficulty, and 48.5% of participants strongly agreed, and 43.9% agreed that continuous exposure to social noise and environmental noise could affect sleep in children. Also, 42.6% of participants strongly agreed, and 48.8% agreed that continuous exposure to social noise and environmental noise could affect cognitive performance in children. We found that 36.2% of respondents strongly agreed, and 39% agreed that exposure to social noise and environmental noise could affect a child's speech, and 64.1% think that NIHL can affect children's language and cognitive functions. Of our respondents, 34.4% strongly agreed, and 40.2% agreed that noise can induce hearing difficulty and could be prevented.

The current data showed that 65.3% of parents and teachers had excellent knowledge regarding noise-induced hearing difficulty and 73.3% had an excellent attitude towards the same. However, more effort is needed for 34.7% and 26.7% of participants who showed average-poor knowledge and attitude respectively. Table 5.

DISCUSSION

Noise exposure has been linked to a range of non-auditory health effects, including annoyance, sleep disturbance, cardiovascular disease, and impairment of cognitive performance in children [9-12]. Our study assessed the KAP of parents and teachers on the impact of loud noises on hearing and found that most respondents agreed that exposure to loud sounds might lead to hearing loss, sleep disorders, and concentration problems, while fewer respondents agreed that exposure to loud sounds might lead to cardiovascular disorders in school children. In the current study, 5.2% of children reported some degree of hearing loss. The findings were lower than a study conducted in Korea (17%). [13]. A plausible explanation could be the frequent check-up observed in our study, while a study conducted in South Africa showed a lower level of hearing screening [14]. In the present study, nearly half of children were using ear headphones which may put them at a higher risk of hearing loss, previous literature reported a poor hearing threshold in the ears of headphone users. The authors interpreted their results as ear headphones may negatively impact hearing [15]. Buzz and temporary shift thresholds are two other common complications of NIHL. Tinnitus is the perception of sound without external stimuli, that is, a sensation of a ringing, buzzing, or whistling sound in the ear. In our study, 28.2% of respondents strongly agreed, and 44.8% agreed that hearing loss may be painless and may be accompanied by tinnitus. Prospective cohort studies are needed to determine whether widespread exposure to loud music increases the prevalence of hearing loss and tinnitus [16].

Hearing loss can affect many aspects of life. In young children, hearing loss impairs language acquisition and is associated with learning disabilities, anxiety, and attention-seeking behaviors [17,18]. Most respondents in our study (59.8%) strongly agreed, and 34% agreed that children with hearing loss have language problems, and 61.7% strongly agreed, and 25.2% agreed that that hearing loss led to a loss of communication. Also, 31% of the respondents strongly agreed, and 50% agreed that hearing loss from noise affects a child's auditory nerve. Similar previous studies concluded that poor knowledge regarding noise-induced hearing loss, hearing conservation programs and raising awareness among both families and school-teachers are highly needed [19]. Given the known harmful effects of acute noise, enduring exposure to environmental noise may cause lasting deficits in children's cognitive development. Exposure to noise can affect higher cognitive processing demands, including attention, problem-solving, and memory as well as tasks that involve language, such as reading [10]. Children's learning outcomes and cognitive performance are negatively affected by environmental noise exposure [20,21]. Some authors

reported that the development of basic language function has special importance in reading acquisition, and enduring exposure to noise in early childhood can affect language development [22]. In our study, 36.2% of respondents strongly agreed, and 39% agreed that exposure to social noise and environmental noise could affect a child's speech, and 64.1% think that NIHL can affect children's language and cognitive functions.

NIHL in school-aged children is a major cause of hearing loss, and hearing impairment amongst children and teenagers is increasing due to voluntary exposure to loud noise. In a study carried out in the United States on the effect of health education teaching materials on hearing loss, it was found that teachers mostly have limited knowledge about hearing loss, specifically on the prevention of NIHL [20]. In our study, only 34.4% of respondents strongly agreed, and 40.2% agreed that NIHL could be prevented, yet 69% reported that wearing hearing protection was the best way of preventing NIHL. The current data showed that the parent's and teachers' knowledge and attitude are suboptimal indicating an urgent need for hearing conservation programs to improve public awareness about this disabling health problem.

Our study was limited in that most of the respondents were female, and most responses were from highly educated respondents. Also, the reliance on a questionnaire-based interview is more prone to subjectivity and the fact that the study was conducted at a single City, so generalization to the Kingdom of Saudi Arabia cannot be insured. Future larger studies assessing this morbid health problem in the whole Kingdom should be designed

CONCLUSION

Our study respondents have a suboptimal knowledge of noise harm, and most agreed that noise could induce hearing loss. Most reported that NIHL could affect a child's language and cognitive functions, and some reported that their children were already exposed to high noise levels in their schools. We recommend health education sittings to improve public and stakeholder awareness of the prevention and treatment of NIHL in school-age children. Additional large-scale studies are warranted in Saudi Arabia, the results of which may encourage the adoption of preventive measures and potentially help in preventing the development of complications from auditory damage.

Conflict of interest: The authors declare that there is no conflict of interest

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Table 1. Basic characters of the study group (parents and teachers)

Character	No %
Participants (number 326)	
Teachers	125 (38.3%)
Parents	201 (61.7%)
Sex	
Males	81 (24.8%)
Females	245 (75.2%)
Level of education	
Primary	56 (17.3%)
Intermediate	12 (3.7%)
Secondary school	37 (11.4%)
University	219 (67.6%)
Age (mean± SD)	34.86±10.64

Table 2. Characteristics of the study group (students).

Character	No %
Hearing difficulty	17 (5.2%)
Family history of hearing difficulty	97 (29.8%)
Hearing check-up	220 (67.5%)
Exposure to high sounds	249 (80.1%)
Living near a highway	77 (23.6%)
Living near a construction zone	43 (13.2%)
Using an ear headphone	141 (43.3%)
Duration of headphone-wearing/day	
One hour	228 (69.9%)
Two hours	47 (14.4%)
Three hours	51 (15.6)
The way to school	
On foot	35 (10.7%)
School bus	45 (13.8%)
Private car	246 (75.5%)

Table 3: The knowledge of parents and teachers towards loud noise induced hearing loss in Tabuk, Saudi Arabia

Questions	Strongly agree (%)	Agree (%)	Neutral (%)	Refuse (%)	Strongly refuse (%)
Do you know that your child's exposure to loud sounds like music players may lead to sleep disorders?	155(47.5)	124(38.0)	32(9.8)	14(4.3)	1(0.3)
Do you know that exposure to loud sound may lead to concentration problems?	176(54.0)	112(34.4)	28(8.6)	7(2.1)	3(0.9)
Do you know that exposure to loud noise may lead to cardiovascular disorder?	57(17.5)	89(27.3)	99(30.4)	64(19.6)	17(5.2)
Do you know that exposure to loud noise may lead to hearing loss?	135(41.4)	126(38.7)	39(12.0)	23(7.1)	3(0.9)
Do you know that the loud sound of factories may lead your son to hear loss forever?	84(25.8)	119(36.5)	78(23.9)	39(12.0)	6(1.8)
Do you know that hearing loss from noise affects the child's auditory nerve?	101(31.0)	163(50.0)	48(14.7)	11(3.4)	3(0.9)
Do you know that hearing loss may be painless and may be accompanied by tinnitus?	92(28.2)	146(44.8)	59(18.1)	22(6.7)	7(2.1)
Do you know that children with hearing loss have language problems?	195(59.8)	111(34.0)	16(4.9)	3(0.9)	1(0.3)
Do you know that hearing loss can lead to loss of communication	201(61.7)	82(25.2)	25(7.7)	14(4.3)	4(1.2)

Do you know that the use of headphones should be limited to 3 to 4 hours per day?	244(74.8)	63(19.3)	17(5.2)	1(0.3)	1(0.3)
Do you know that headphone volume should be lowered when in use?	223(68.4)	84(25.8)	18(5.5)	1(0.3)	0

Table 4: The attitude of parents and teachers towards loud noise induced hearing loss in Tabuk, Saudi Arabia

Questions	Strongly agree (%)	Agree on No. (%)	Neutral No. (%)	Refuse (%)	Strongly refuse(%)
Do you think that intense impulse sound can induce hearing loss?	140(42.9)	122(37.4)	45(13.8)	17(5.2)	2(0.6)
Do you think that continuous exposure to social noise and environmental noise can affect sleep in children?	158(48.5)	143(43.9)	21(6.4)	3(0.9)	1(0.3)
Do you think that exposure to different types of noise in early life might have cumulative effects on hearing impairment in adulthood?	107(32.8)	140(42.9)	60(18.4)	18(5.5)	1(0.3)
Do you think that continuous exposure to social noise and environmental noise can affect cognitive performance in children?	139(42.6)	159(48.8)	18(5.5)	8(2.5)	2(0.6)
Do you think that exposure to social noise and environmental noise can affect the relationship of a child with other people?	122(37.4)	156(47.9)	31(9.5)	15(4.6)	2(0.6)
Do you think that exposure to social noise and environmental noise can affect the child's speech?	118(36.2)	127(39.0)	63(19.3)	16(4.9)	2(0.6)
Do you think that the use of headphones and earphones should be prevented in a child younger than 12 years?	213(65.3)	75(23.0)	25(7.7)	12(3.7)	1(0.3)
Do you think that children should be screened for each period for auditory examination?	143(43.9)	136(41.7)	41(12.6)	6(1.8)	0 (0)

Do you think that noise-induced hearing loss can be prevented?	112(34.4)	131(40.2)	69(21.2)	11(3.4)	3(0.9)
Do you think that listening to a music player at high volume through earbuds and headphones can induce hearing loss?	165(50.6)	123(37.7)	24(7.4)	12(3.7)	2(0.6)
Do you think that teachers and parents should insist the students practice preventive techniques to protect their hearing?	202(62.0)	102(31.3)	18(5.5)	2(0.6)	2(0.6)
Do you think that the public needs to be educated about noise-induced hearing loss to protect themselves?	234(71.8)	77(23.6)	7(2.1)	5 (1.5)	3(0.9)
Do you think that noise-induced hearing loss can affect children's language skills?	209(64.1)	91(27.9)	20(6.1)	5(1.5)	1(0.3)
Do you think that children's ears are more vulnerable to noise than adults?	178(54.6)	106(32.5)	27(8.3)	13(4.0)	2(0.6)
Do you think that schools should monitor the noise levels in classrooms, cafeteria, and gymnastics areas?	196(60.1)	94(28.8)	26(8.0)	99(2.8)	1(0.3)
Do you think that hearing screening in the school should be performed to identify early onset of noise-induced hearing loss?	173(53.1)	120(36.8)	25(7.7)	5(1.5)	3(0.9)
Do you think that the use of personal noise protection during high-level noise exposure should be encouraged as part of the education program?	190(58.3)	117(35.9)	16(4.9)	1(0.3)	2(0.6)

Table 5. Knowledge and attitude score of parents and teachers regarding noise-induced hearing difficulty

Character	No %
Knowledge	
Excellent	213 (65.3%)
Average	106 (32.6%)
Poor	7 (2.1%)
Attitude	
Excellent	239 (73.3%)
Average	83 (25.4%)
Poor	4 (1.3%)

***Table 6.** Depicted a comparison between parents and teachers knowledge and attitude regarding noise induced hearing difficulty

Character	Parents=276	Teachers=108	P-value	95% CI
Knowledge and attitude total scores	120±13.16	54.77±60.1	<0.001	57.7-72.74

*independent-Samples T-Test