Original Research Article

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Awareness and knowledge of hearing loss, hearing management modalities, speech and language pathology among general public in Buraidah, Saudi Arabia

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ABSTRACT

Background: Awareness toward ear health, hearing loss hearing management modalities, speech and language pathology is necessary for early treatment and management.

Methods: This is a cross-sectional study that was conducted at two malls during October 2020 in Buraidah city, Qassim province. The questionnaire was designed to examine the demographics, education and awareness. Specific awareness questions about hearing loss, hearing management modalities, speech and language pathology were included to examine their knowledge about these pathologies. All statistical analyses were carried out using SPSS version 21.

Results: The overall mean awareness score of hearing loss was 5.03 ± 1.78 out of 13 points with poor and good level had been detected among 62.6 and 37.4% of respondents, respectively. For the awareness of ear and hearing management, the overall awareness score was 4.82 ± 1.36 out of 7 points with 52.7 and 37.4% being classified into poor and good level, respectively. In the awareness toward speech development, the total awareness score was 2.64 ± 0.98 out of 4 points with 41.8 and 58.2% were considered as poor and good awareness level, respectively. Statistical test revealed that individuals >25 years had significantly better awareness toward hearing loss (T=-4.331; p<0.001) and awareness toward speech development (T=-2.628; p=0.009).

Conclusions: The awareness toward hearing loss, ear and hearing management seems to be lacking. More awareness campaigns, lectures, advertisement in social media about these pathologies and other educational methods are needed in order to fill the gaps in general awareness, more importantly in the awareness of hearing loss, ear and hearing management.

Keywords: Hearing loss, Awareness, Knowledge, Speech pathology, Hearing impairment, Delayed language development

INTRODUCTION

Hearing loss restricts one's ability to differentiate between sounds correctly, which would be difficult to make basic conversation. Similarly, hearing loss in early stages of life can considerably affect the development including educations and communications, thus adversely affecting social interaction in everyday life. ^{1,2} There are many factors during different stages of life that might cause hearing loss. One of the leading causes of hearing loss which can be managed and prevented using medical and surgical treatment is chronic ear infection.²

Furthermore, exposure to loud noises, use of ototoxic medication and diseases such as meningitis, measles, mumps and rubella are additional factors that can lead to hearing loss.² The world health organization (WHO) reports that out of 466 million individuals who suffer from hearing impairment, 34 million with hearing impairment are children.^{2,3} In Saudi Arabia, the incidence of hearing loss among preschoolers was estimated at 1.75%.4 Similarly, a study by Al-Abduljawad et al in 2003 on 10,000 children reported a 1.27% hearing loss in the left ear and 2.26% hearing loss in the right ear.⁵ Since public awareness toward hearing loss and ear health is necessary for early intervention and prevention, various articles have been published on ear condition awareness and their management. Al Sheri et al reported that female respondents exhibited better correct answers related to awareness questionnaire.6 In addition, they noted that respondents with positive history of hearing loss showed better knowledge. Similarly, in the study by Zabeeri et al conducted a cross-sectional study measuring the knowledge of general public by means of pre and post educational interventions. They found that higher knowledge about hearing loss was significantly better after interventions. 7

A study published in Italy reported that, female participants were observed to have significantly more knowledge about non-verbal individuals with severe hearing loss and toward the use of cotton bud for ear cleaning with an overall positive response rate about knowledge of such problems. 8 Correspondingly, a similar paper conducted in India documented that parents who were not accustomed with the topic of hearing loss were less aware that late response to speech and late speech development could be related to hearing loss. 9 In South Africa, only 14% of respondents were aware of the existence of an audiology specialty and fewer than 6% were able to check for their ear health. 10 The "wise ears" campaign is an international campaign to inform the public about hearing loss that has been going on for many years. There is only one study that publicly circulated the results of the campaign assessment.¹¹

The development of speech and language is a significant indicator for the young ages as it signifies the overall improvement and intellectual capability.12 A study conducted in United States on measuring the public awareness in relation to location and education of speechlanguage pathologists (SLPs) found that there was a great need to increase public awareness toward speechlanguage treatment, as approximately 60% were unaware of these services.¹³ Likewise, studies conducted in the United Kingdom reported that the limited public awareness of speech-language pathology were obviously seen in their outcome. 11,14 However, this could be explained that the limited awareness might be associated with poor means of communications and technology at that period of time in which those surveys were conducted.

Patients who are at risk of hearing loss can be managed and be cured successfully if the intervention could take place at the early stages. Therefore, to improve early recognition, referral, diagnosis and management of these pathologies, community awareness has a vital role. There are limited reports that discuss public understanding of hearing loss, management modalities, speech and language pathology. This research is aimed to measure and assess the knowledge and awareness among general public of Buraidah City, Qassim, Saudi Arabia to increase the understanding and knowledge of among community.

METHODS

Research design and sample

This is a self-administered survey cross-sectional study that was done during October 2020. The convenience sample consisted of adult visitors of Othaim mall and Alnakhil plaza in Buraidah, Qassim, Saudi Arabia. Othaim mall and Alnakhil plaza are the largest malls in Buraidah city, gathering visitors of different age groups, education, socioeconomic status of the general public. The study was approved by the institutional review board of Qassim University. Sample size was calculated based on the number of visitors per month which was around 5,000 visitors. A confidence interval of 95% with a margin of error of 5 gave us an estimated sample of 357 to be collected.

Data collection

Data were collected using a previous validated self-administered questionnaire electronically that assessed demographics, educational experience and awareness about hearing loss, hearing management modalities, speech and language pathology. Their knowledge of awareness was assessed using specific questions to assess each category. One of the authors along with the data collectors helped the participants to understand the procedure and how to fill the questionnaire electronically. Inclusion criteria included all visitors who consented to fill the survey who were above 18 years of age. Meanwhile, we excluded incomplete questionnaires and individuals below the age of 18.

Statistical analysis

Quantitative variables were presented with mean and standard deviation while qualitative variables were presented with number and percentages. Between comparison of variables, Mann Whitney U tests (non-parametric) were applied. Normality tests i.e., statistical collinearity was assessed using Shapiro Wilk test or Kolmogorov-Smirnov test. P value of 0.05 was considered as statistically significant. The data analyses were performed using statistical packages for software sciences (SPSS) version 21, Armonk, New York, IBM corporation

The criteria for overall awareness score were drawn from 24 questions. The awareness scores were subdivided into three domains as follows; awareness toward hearing loss (13 questions), hearing management (7 questions) and speech development (4 questions) that was distributed to 273 visitors. The correct answer for each question had been identified and had been coded with 1 while the incorrect answer had been coded with 0. The total awareness score related to hearing loss, hearing management and speech development were obtained by adding all questions related to each domain, which indicates that the higher the score, the higher awareness toward hearing loss, hearing management and speech development and by using the mean scores, participants above the mean were considered as good awareness whereas those below the mean were considered as poor awareness toward hearing loss, hearing management and speech development.

RESULTS

We enrolled 273 participants to measure their awareness toward hearing loss, management modalities, speech and language. As seen in Table 1, most commonly mentioned age group was 18-25 years old (48.0%) with nearly 57.5% were females and the majority of the participants were single (65.9%). With respect to their educational status, a total of 186 (68.1%) of them had bachelor's degree or higher education. In addition, 11.0% have previously visited an audiologist and 24.2% have visited an ENT doctor. Moreover, 36.6% of them believed that it is greatly important to examine hearing while approximately 55% thought that it should be applied to all ages (Table 2). Regarding causes of hearing loss, the most frequent cause of hearing difficulties reported was noise i.e., MP3 players or music (13.9%), followed by ear infection (9.9%). When asked to whom should consult in case of hearing impairment, majority of them will go to the doctor (58.6%). Furthermore, 40.7% of them indicated that hearing test are done by private doctor, followed by hospital (27.5%). The most frequently stated items to be used when ears are itchy was cotton buds (53.1%). Furthermore, more than a half (51.6%) thought that music or noise can damage hearing while (71.1%) thought that excessive loud noise can damage hearings. The most frequently mentioned sounds that can damage hearings was listening to MP3 player (14.3%) then listening to cell phone (11%). Likewise, approximately 36.3% of them considered ear infection cause hearing loss. When asked how often they had ear infections, more than a half (54.2%) stated that it is hardly ever. When asked how often they clean ears, approximately one third of them (31.9%) stated that it is only occasionally. The most frequently cited material to clean ears was cotton buds (67.4%) followed by wet cloth (13.9%).

The most frequent cause of hearing difficulties was noise i.e., MP3 players or music (13.9%), followed by ear infection (9.9%), followed by family history (8.4%),

followed by wax (7.3%), followed by some medications (4.8%) (Figure 1).

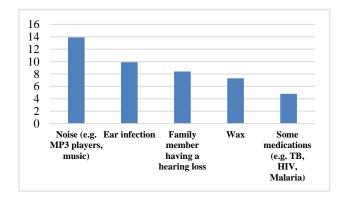


Figure 1: Causes of hearing loss.

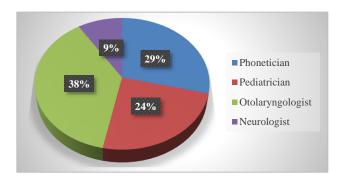


Figure 2: The most common expert doctor in treating delayed language development according to participants.

Table 1: Socio demographic characteristics of participants (n=273).

Study data	N (%)
Age group (year)	
18-25	131 (48.0)
26-35	86 (31.5)
36-45	37 (13.5)
46-65	19 (7)
Gender	
Male	116 (42.5)
Female	157 (57.5)
Marital status	
Never been married	180 (65.9)
Been married	93 (34.0)
Educational status	
Diploma or below	87 (31.9)
Bachelor or higher	186 (68.1)
Previous visit to audiologist	
Yes	30 (11.0)
No	243 (89.0)
Previous visit to ENT doctor	
Yes	66 (24.2)
No	207 (75.8)

Following the results of awareness towards hearing management, nearly two-third (65.2%) thought that the possibility of deafness in infants can be diagnosed shortly after birth. We further observed that, 49.1% believe that hearing loss may cause attention deficits which affected their school performance. Moreover, 60.8% of them did not believe that ear drops are sufficient enough to treat earache. Likewise, 77.7% of them disagreed that drug abuse does not provoke auditory hallucinations or modifications of hearing quality. Meanwhile, 85% of respondent agreed that it need to fit accurately to provide the maximum benefit while 53.1% thought that no tables recommending a reduction in the duration of exposure to high intensity noises and for the statement of that sudden hearing loss is an emergency and requires an immediate audiological examination, (87.5%) agreed it is true.

In Table 4, it showed assessment of awareness toward delayed language development (DLD)and reported that three quarters were aware of the DLD disorder in children. Regarding the best advice to tell to a parent of 2 years old child with delayed language development, majority answered to consult a doctor (88.3%). The most expert doctor who were capable of treating DLD in children was phonetician (39.6%) followed by pediatrician (29.3%) while the correct age parents believe they should seek medical advice for a child with delayed language was two years (60.8%). The most common expert doctor in treating Delayed Language Development was phonetician (39.6%) followed by pediatrician (29.3), otolaryngologist (21.2%) and neurologist (9.9%).

Table 5 present the descriptive statistics of the awareness toward hearing loss, hearing management modalities,

speech and language pathology. The overall mean score of hearing loss was 5.03±1.78 out of 13 points. For the awareness of ear and hearing management, the overall awareness score was 4.82±1.36 out of 7 points. In the awareness toward speech development, we found that the total awareness score was 2.64±1.00 out of 4 points. With regards to the level of awareness toward hearing loss, we found that poor and good awareness had been detected among 62.6 and 37.4% of participants, respectively. Regarding the level of awareness for ear and hearing management, it was observed that poor and good awareness were accounted for 52.7 and 47.3% of participants, respectively. Finally, with regards to awareness toward speech development, it was determined that good and poor awareness had been found among 41.8% and 58.2%, respectively.

When measuring association between the total score of awareness toward hearing loss and the socio demographic characteristics of participants, we observed respondents who were in the older age group (>25 years) showing significantly better awareness toward hearing loss (T=-4.331; p<0.001) and awareness of speech development showing (T=-2.6281 p=0.009). Furthermore, females exhibited better awareness toward speech development than males (T=-2.962; p=0.001). In addition, respondents who were married were observed to have significantly higher awareness score toward hearing loss (T=-4.389; p<0.001) and speech development (T=-3.345; p=0.001). Lastly, respondents who had higher education were significantly more associated with better awareness toward ear and hearing management (T=-1.686; p=0.047) (Table 6).

Table 2: Assessment of awareness toward hearing and hearing loss (n=273).

Statement	N (%)	
How important is it to have your hearing tested?		
Greatly important *	105 (38.5)	
Considerably important	30 (11.0)	
Important	57 (20.9)	
Somewhat important	47 (17.2)	
Not important at all	34 (12.5)	
For whom hearing test would be?		
Babies	58 (21.2)	
Children	21 (07.7)	
Teenagers	09 (03.3)	
Young adults	10 (03.7)	
Adults	16 (05.9)	
Everyone *	159 (58.2)	
Cause of hearing difficulties		
Ear infection *	27 (09.9)	
Noise (e.g., MP3 players, music) *	38 (13.9)	
Some medications (e.g., TB, HIV, Malaria) *	13 (04.8)	
Family member having a hearing loss *	23 (8.4)	
Wax *	20 (07.3)	
None of the above	128 (46.9)	
Other	24 (08.8)	

Continued.

To whom you go when you have hearing difficulties	Statement	N (%)
Clinic * 90 (33.0) Traditional healer 02 (0.70) Mosque 01 (0.40) Doctor * 160 (38.6) No one 20 (07.3) Where can hearing test be done		11 (70)
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Where can hearing test be done Clinic *		
Clinic * 65 (23.8) Hospital * 75 (27.5) Private doctor 111 (40.7) I don't know 22 (08.1) What do you use when your ears are itchy? **** Cotton buds 145 (53.1) Matchsticks 05 (01.8) Pen or pencil 03 (01.1) Finger 77 (28.2) Nothing * 43 (15.8) Music or noise can damage your hearing **** Yes * 141 (51.6) No 31 (11.4) Maybe 93 (34.1) I don't know 98 (02.9) Excessive loud noise can damage your hearings *** Yes * 194 (71.1) No 14 (05.1) Maybe 90 (22.9) Excessive loud noise can damage your hearings *** Wes * 90 (20.2) Excessive loud noise can damage your hearings *** Wes * 90 (20.2) The following can damage hearings *** Wusic in car 23 (08.4) Listening to Call plane 30 (11.1) <td></td> <td>20 (07.3)</td>		20 (07.3)
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Table 3: Assessment of awareness toward hearing management (n=273).

Statement	N (%)	
It is possible to diagnose deafness in infants shortly after birth		
True *	178 (65.2)	
False	95 (34.8)	
Hearing loss may cause attention deficits thus reducing school performance		
True *	134 (49.1)	
False	139 (50.9)	
Ear drops are sufficient to treat earache		
True	107 (39.2)	
False *	166 (60.8)	
Drug abuse does not provoke auditory hallucinations or modifications of hearing quality		
True	61 (22.3)	
False *	212 (77.7)	
Hearing aids need to fit accurately to provide the maximum benefit		
True *	232 (85.0)	
False	41 (15.0)	
There are no tables recommending a reduction in the duration of exposure to high intensity noises		
True	128 (46.9)	
False *	145 (53.1)	
Sudden hearing loss is an emergency and requires an immediate audiological assessment		
True *	239 (87.5)	
False	34 (12.5)	

^{*} Signifies correct answer.

Table 4: Assessment of awareness toward delayed language development (n=273).

Statement	N (%)	
Are you aware of delayed language development (DLD) disorder in children?		
Yes *	205 (75.1)	
No	68 (24.9)	
If you met a parent of a 2-year-old child with delayed language, what would your advice he	r/him?	
Wait and see	23 (08.4)	
Herbal therapy	09 (03.3)	
Consult a doctor *	241 (88.3)	
Who is best doctor capable of treating DLD in children?		
Pediatricians	80 (29.3)	
Otolaryngologist	58 (21.2)	
Neurologist	27 (09.9)	
Phoniatrician *	108 (39.6)	
At which age should the parent seek medical advice for her/his child with delayed language? (year)		
Two*	166 (60.8)	
Three	69 (25.3)	
Four	30 (11.0)	
Older	08 (02.9)	

^{*} Signifies correct answer.

Table 5: Descriptive statistics of the overall awareness toward hearing loss, hearing management modalities, speech and language pathology (n=273).

Awareness domains	Overall mean±SD
Awareness total score	
Hearing loss (score=13)	5.03±1.78
Ear and hearing management (score=7)	4.82±1.36
Speech development (score=4)	2.64±1.00

Continued.

Awareness domains	N (%)
Level of awareness	
Hearing loss	
Poor	171 (62.6)
Good	102 (37.4)
Ear and hearing management	
Poor	144 (52.7)
Good	129 (47.3)
Speech development	
Poor	114 (41.8)
Good	159 (58.2)

Table 6: Statistical association between the total score of awareness to hearing loss, speech development, ear and hearing management in relation to the socio demographic characteristics of participants (n=273).

	Awareness		
Factor	Hearing loss	Ear and hearing management	Speech development
	Total score (13) Mean±SD	Total score (7) Mean±SD	Total score (4) Mean±SD
Age group (year)			
≤25	4.59 ± 1.75	4.94±1.29	2.49 ± 1.00
>25	5.50±1.69	4.69±1.41	2.80±0.98
T test	-4.331	1.563	-2.628
P value	<0.001**	0.164	0.009**
Gender			
Male	5.23±1.87	4.78±1.29	2.42±0.97
Female	4.90±1.71	4.85±1.41	2.78±1.00
T test	1.480	-0.369	-2.962
P value	0.062	0.583	0.001**
Marital status			
Never been married	4.68±1.78	4.82±1.29	2.48±1.00
Been married	5.62±1.63	4.83±1.47	2.89±0.95
T test	-4.389	-0.045	-3.345
P value	<0.001**	0.668	0.001**
Educational status			
Diploma or below	5.08±1.87	4.58±1.28	2.62±1.00
Bachelor or higher	5.02±1.76	4.89±1.38	2.64±1.00
T test	0.224	-1.686	-0.150
P value	0.818	0.047**	0.822

§ P value has been calculated using Mann Whitney U test. Significant at p≤0.05 level.

DISCUSSION

This study sought to determine the awareness and knowledge of hearing loss, hearing management modalities, speech and language pathology among general public in Buraidah, Saudi Arabia and to improve early recognition, referral, diagnosis and management of these pathologies. In this study, the awareness toward hearing loss, ear and hearing management were found to be poor. Nearly two third (62.6%) of the respondents were classified as having insufficient awareness toward hearing loss while more than a half (52.7%) were considered with poor awareness toward ear and hearing management. These results are comparable from the study of Zabeeri et al which reported that there was a poor awareness toward hearing loss among 52.7% of

respondents while awareness toward ear and hearing management was found among 45.5%. Another study conducted in the Western region of Saudi Arabia, showed that the awareness of ear health and hearing loss management was fair which was also comparable with our results. 6

In relation to the awareness of speech and language pathology, our results indicated that the public awareness was deemed moderate, 58.2% of the respondents were classified as having good awareness level and the rest were poor (41.8%). This result is consistent from the paper of Zabeeri et al which reported around 70% of the participants were likely to have better understanding with the subject. However, in Amman et al reports indicated that there was limited public awareness and knowledge

toward speech-language pathology and the sample was unfamiliar with different types of communication disorders with the exemption of stuttering. Studies in Africa reported that most parents of children under five years of age have good awareness and practice in the analysis of the level of knowledge. Mukara et al in their study found that about half of mothers were unaware that maternal rubella would contribute to hearing loss. Similarly, approximately 79% of respondents were aware that their child's ototoxic medicine and middle ear infections would lead to hearing loss.

Moreover, it can be noted that the hearing loss awareness of individuals older than 25 was significantly better than the younger age group of \(\preceq 25 \) years) (p < 0.001). We further observed that, married respondents were significantly more associated with having better awareness toward hearing loss (p<0.001). These results were likely better compared to the study done by Elbaltagy et al as they found no significant association between the knowledge toward hearing loss and all the demographic characteristics of participants.¹⁷ Similarly, in speech and language development associated factors, we noticed that awareness toward speech and language development was significantly better in the older age group (p=0.009) while females also exhibited better awareness level than males (p=0.001). Consistently, in a study of Mahmoud et al they documented that females with children had better accurate knowledge of speechlanguage pathology and communication disorders. 15 Similarly, they further noted that bachelor degree in health-related fields had better knowledge about the subject. In our study, educational level did not vary significantly when compared to speech and language development awareness which was not in accordance with previous report. In addition, we have known that the awareness level for ear and hearing management of those educated participants were significantly higher than those in the less educated group (p=0.047).

Regarding assessment of awareness toward hearing and hearing loss, our results noted that the knowledge toward the importance of hearing examination was lacking. Only 36.6% stated that it has great importance which was similar from the study of Zabeeri et al.7 but differed from the paper of Joubert and colleagues. 10 Joubert et al reported that 87% acknowledged that hearing test is very important. However, they further indicated that there was only 5% who had previously visited audiologist which was lower than our study, as 11.0% in our result reported to have audiologist visitation. Similarly, the participants in our study were aware that hearing test should be applied for all ages (58.2%) and that the cause of hearing difficulties was associated with their family member with hearing loss history. Moreover, 58.6% were aware that doctors should be consulted when the person experience hearing difficulties and the test should be done mostly in the hospital or in the clinic. In addition, 53.1% stated that cotton buds should be used for ear itchiness while 51.6% believed that loud sounds can damage hearing including exposure to excessive loud noise. These results are very similar from the paper of Joubert and associates. ¹⁰ They reported that majority of the participants were aware that excessive noise exposure can lead to hearing loss and many thought that ears should be kept clean and cotton buds should be used in cleaning the ears to maintain ear hygiene. Another study conducted in the Eastern part of Saudi Arabia⁷ indicated that, respondents were aware that family members who were diagnosed with hearing loss could lead to hearing difficulties and they knew that it was the doctor who should give them advise or to provide necessary treatment which was also consistent with reports.

Upon the evaluation of the awareness towards ear and hearing management, we came to know that nearly two third (65.2%) were aware that there was a possibility that the deafness in infants can be diagnosed right after birth. Our results also revealed that hearing loss may affect the children with their school performance. On the other hand, 60.8% believe that ear drops are not sufficient for the treatment of ear pain. Incidentally, 23.2% of our respondents do not believe that drug abuse would incite modifications of hearing quality however, most of them (85%) agreed that appropriate size of hearing aids is necessary to obtain maximum benefit. Additionally, respondents disagreed that there were no tables suggesting a reduction in the prolonged exposure to loud sound. Finally, most of them (89.4%) were aware that sudden hearing loss is an emergency situation which requires immediate treatment by the audiologist expert. The findings of our study were concordance than that of Di Berardino et al on the issues related to childhood deafness, effect of hearing loss in school, hearing that triggers attention deficits, substance abuse, slaps, listening to music, abrupt hearing loss, and behavioral age-related hearing loss.8

For the specific assessment of awareness toward delayed language development. Respondents were aware that DLD disorder was more common among children (75.1%). Relatively, Mostafa as well as Zabeeri et al documented that many of the respondents were aware of DLD which were consistent with our outcome. 7,18 Incidentally, it has been reported that providing advice to parents with a 2-year child to seek medical advice were more common among respondents.^{7,18} This had also been described in our study as 88.3% would provide an advice to consult a doctor whenever they saw a child with DLD, specifically those aged 2 years old. On the other hand, our respondents showed poor awareness when asked "who is the best doctor capable for DLD treatment", only 39.6% correctly identified phonetician however, they awareness was better when ask "at which age should the parent seek medical advice if they noticed their child with delayed language", 60.8% were correct that it should be during two years of age. Our study limitation includes the use of self-reported questionnaires, which entail self-report bias, the generalizability of the overall findings is limited. Secondly, due to the cross-sectional design of the study,

nonresponses may have biased the emergent results. And lastly, the study only 2 places.

Limitation of the study include the relatively small data as the sample size was set at 357, instead, a total of 273 participants were enrolled. Furthermore, due to supervision of the data collectors, participants might have been choosing the correct answer rather than their knowledge.

CONCLUSION

Despite that the awareness of general public toward speech and language development were moderate however, the awareness toward hearing loss, ear and hearing management seems to be lacking. Being mature comes with better awareness while being a single comes with insufficient knowledge. More awareness campaigns, lectures, advertisement in social media about these pathologies and other educational methods are needed in order to fill the gaps in general awareness, more importantly in the awareness of hearing loss, ear and hearing management. Healthcare workers had the vital role in providing awareness campaigns related to hearing loss, hearing management, speech and language pathology among the community.

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