

# Hearing Health Practices and Beliefs among over 20 year-olds in the Omani Population

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## لممارسات والمعتقدات الصحية المتعلقة بالسمع بين السكان العمانيين فوق سن عمر 20 سنة

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**المخلص:** الهدف: استعراض الممارسات والمعتقدات المتعلقة بالسمع بين السكان العمانيين فوق سن العشرين عاما. الطريقة: أجريت هذه الدراسة الوصفية في سلطنة عمان بين عامي 2007 - 2008 م. أجرى المقابلات أحد العاملين في المجال الصحي والمتحدث للعربية مع 598 فردا اختيروا من المناطق الحضرية والريفية والعاملين في المجال الصناعي في سلطنة عمان. استخدم استبيان يحوي 15 سؤالاً من النوع الاختياري مغلق النهايات. صنفت ردود المشاركين على الأسئلة في مجال ممارسات السمع لعدة مستويات: الممتاز (≤ 20 نقطة) والمتوسط (19-10) والضعيف (أقل من 10 نقاط). كما تم تصنيف الردود المرتبطة بالمعتقدات عن السمع أيضا إلى المستويات التالية: الممتاز (≤ 25 نقطة) وجيد (24-5) والمتوسط (-4 إلى 4) والضعيف (-24 إلى -5) والضعيف جدا (> -25). قمنا بحساب التكرارات والنسب المئوية و 95٪ كفترة ثقة لمختلف مستويات المعتقدات والممارسات المتعلقة بالسمع. كما تمت مقارنة المعدلات بين مختلف المجموعات الفرعية. وقمنا بتطبيق تحليل التحوف للتعرف على مؤشرات الممارسات الجيدة والمعتقدات ذات التفسير العلمي. النتائج: كانت الردود من مستوى <ممتاز> للممارسات والاعتقادات السمعية الصحيحة ملحوظة لدى 386 فرداً (64.5٪ [95٪ فترة الثقة 60.7 - 68.4]) والمستوى المتوسط لدى 205 فرداً (34.3٪ [95٪ فترة الثقة 29.5 - 37.1]). وقد تبين أيضا أن الانتماء للفئة العمرية 20-39 سنة (نسبة الأرجحية = OR = 1.67) والانتماء إلى المناطق الحضرية (نسبة الأرجحية = 0; OR = 0.53) كانت متنبأت للدرجة الممتازة من الممارسات السمعية، بينما كان الانتماء للذكورة (نسبة الأرجحية = 1.71; OR = 1.71) والانتماء للأممية (نسبة الأرجحية = 1.80; OR = 1.80) من المتنبأت لوجود معتقدات غير علمية. الخلاصة: لوحظ وجود مستويات مرتفعة للممارسات السمعية الصحيحة وكذلك وجود مستويات منخفضة من المعتقدات العلمية العصرية بين المشاركين العمانيين. لذلك ينبغي على برنامج الرعاية الصحية للأذن في سلطنة عمان التركيز على تحسين المعرفة بالسمع الصحي بحيث يتم تحسين التوجهات والممارسات السمعية لمنع أو تأخير ظهور فقدان السمع الناتج عن الضوضاء.

**مفتاح الكلمات:** ضوضاء، معتقدات، ممارسات صحية، فقدان السمع

**ABSTRACT: Objectives:** The objective of this study was to investigate hearing health practices and beliefs among people over 20 years old in the Omani population. **Methods:** This descriptive study was conducted in Oman during 2007-2008. Arabic speaking health staff interviewed a total of 598 selected people from urban and rural Oman and also industrial workers using a closed ended questionnaire with 15 questions. Participants' responses to the hearing practice related questions were graded into excellent (≥20 points), average (10 to 19) and poor (<10 points). The responses to the questions about hearing beliefs were grouped into excellent (≥25 points), good (5 to 24), average (-4 to 4), poor (-24 to -5) and very poor (<-25) grades. We calculated the frequencies, percentage proportions and 95% confidence intervals of the different grades of beliefs and hearing practice. The rates were also compared among different subgroups. We performed regression analysis to identify predictors of good hearing practice and scientific beliefs. **Results:** Among the 598 participants, an 'excellent' grade of hearing practice and belief was noted in 386 (64.5% [95% CI 60.7-68.4]) and average in 205 (34.3% [95% CI 29.5 - 37.1]). Being in the 20 to 39 years age group (OR = 1.67) and an urban resident (OR= 0.53) were both predictors of an excellent grade of hearing practice, while male gender (OR = 1.71) and illiteracy (OR= 1.80) were predictors of scientific beliefs. **Conclusion:** We noted high levels of good hearing practice and low levels of modern scientific beliefs among Omani participants. The Ear Health Care program of Oman should focus on improving the knowledge about healthy hearing so that attitudes and hearing practices are improved and noise-induced hearing loss can be prevented or delayed.

**Keywords:** Noise pollution; Beliefs; Practices; Hearing impairment.

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**ADVANCES IN KNOWLEDGE**

1. *The current level of hearing health practices and beliefs in Oman could be seen through this study.*
2. *The level of healthy hearing practices was very good in 64.5% of the over 20 year-old group in the Omani population.*
3. *The level of scientific beliefs about healthy hearing was good in 33% of the over 20 year-old group in the Omani population.*
4. *Awareness and beliefs regarding healthy hearing are keys for good practice.*
5. *The Hearing Loss Program of Oman should promote safe and healthy hearing practices in the community.*

**APPLICATION TO PATIENT CARE**

1. *Health promotion should focus on improving awareness and targeting wrong beliefs about healthy hearing.*

**N**OISE IS DEFINED AS ACOUSTIC (SOUND) signals which can negatively affect the physiological or psychological well being of an individual.<sup>1,2</sup> Exposure to excessive noise is a major avoidable cause of permanent hearing impairment worldwide. By avoiding excessive noise that damages the cochlea, peoples' hearing could remain healthy.<sup>3</sup> Rapid industrialisation and unsafe hearing practices threaten the health of the younger generation;<sup>4</sup> therefore, the community should be informed regarding the hazards of noise pollution. Correct knowledge about hearing is essential for adopting healthy behaviour.<sup>5</sup> A literature review suggested a number of studies that focused on the knowledge, attitude and practices (KAP) in regard to hearing of teenagers, industrial workers and army personnel<sup>6,7,8</sup> and there was recommendation for further research in this field.<sup>9</sup> However, to our knowledge, KAP about hearing in the general community has not been investigated in any Middle Eastern country.

Oman is a country in the Arabian Peninsula which has undergone rapid socioeconomic changes and urbanisation in recent years. The prevalence of hearing loss in 1997 was 5.5% among the Omani population of all ages, while the prevalence of a disabling grade of hearing loss was 2%.<sup>10</sup> Infection related hearing loss was predominant in the population under 25 years of age. In contrast, presbycusis was the major cause of hearing loss in the over 45 year-old population. Noise pollution is associated with early presbycusis;<sup>11</sup> therefore, the Ear Health Care Program in Oman has adopted the strategy of promoting healthy hearing habits in the community.<sup>12</sup> To implement a systematic hearing health promotion campaign, it is essential to know the current levels of beliefs and practices in the community. Hearing practices can be defined as the ways that hearing apparatuses are used in day to day life to collect sound stimuli. Hearing beliefs

are defined as views regarding what should be the norms for using this hearing apparatus.

A study related to noise pollution in Oman was conducted in 2007–08. As a part of this wider study, we aimed to estimate the level of beliefs and practices regarding hearing and their determinants among over 20 year-olds in the Omani population so as to be able to present recommendations for improving the ear health care of the community.

## Methods

Omani citizens of over 20 years of age were our study population. We assumed that unsafe hearing practices would be in found in 10% of the population. To achieve a 95% confidence interval and a 90% power of the study, we needed to interview 72 people in each of the chosen subcategories. To compensate for drop outs, we enrolled an additional 25% sample. Thus, we needed a sample of 600 people: 100 from each of the subgroups: male, female, rural, urban, and in age groups '20 to 30' and '30 to 40' years old.

Arabic speaking health staff members were our interviewers and were trained in the art of interviewing. They used a structured questionnaire so that the responses could be collected in a uniform manner. The community support group members liaised with the local leaders to ensure better cooperation of participants in the randomly selected villages of Dakhiliya and North Sharqiyah regions and two areas of towns of South Sharqiyah and North Batinah regions.

In the randomly selected two locations in each rural and urban area, they visited houses in sequential order. They enrolled 100 males and 100 females in each of the urban and rural locations. Those agreeing to participate were interviewed. We randomly selected industries in two large regions of Oman: Muscat and North Batinah regions. In each industry, we randomly selected 100 workers, in the

**Table 1:** Questions and responses for hearing health beliefs and practices among over 20 year-olds in Oman

| Hearing health practice related questions*                 | Excellent | Average | Poor |
|--|-----------|---------|------|
| 1. How many hours in a day do you watch to TV?             | 19        | 110     | 469  |
| 2. How many hours in a day do you listen to the radio?     | 10        | 15      | 573  |
| 3. How many hours do you drive with window of a car open?  | 451       | 4       | 143  |
| 4. How many hours in a day do you listen to a walkman/MP3? | 451       | 4       | 143  |
| 5. Do you like listening to loud music?                    | 36        | 190     | 369  |

  

| Hearing health belief related questions **   | Excellent | Good | Average | Poor | Very Poor |
|--|-----------|------|---------|------|-----------|
| 1. Do you believe that people should talk loudly so that they can be heard better  | 200       | 200  | 17      | 90   | 90        |
| 2. Do you believe that by talking loudly a person can better project his/her personality?                                | 225       | 227  | 41      | 64   | 36        |
| 3. Do you believe that loud sound damages the hearing of young people?   | 33        | 32   | 28      | 250  | 255       |
| 4. Do you believe that loud sound damages the hearing of old people?   | 60        | 48   | 36      | 300  | 154       |
| 5. Do you believe that one should listen to loud music or TV in a closed room to avoid disturbance to others?            | 103       | 290  | 29      | 100  | 76        |
| 6. Do you believe that too much noise can cause headaches and could make a person become angry even for trivial reasons? | 184       | 367  | 47      | 0    | 0         |
| 7. Do you believe you should keep the ring-tone at the highest level on your phone?                                      | 75        | 79   | 61      | 200  | 183       |
| 8. Do you believe that loud ring tones of mobile phones can damage hearing?  | 100       | 197  | 85      | 95   | 221       |
| 9. Do you believe that mobiles should be on vibrator mode to avoid noise pollution?                                      | 30        | 25   | 36      | 255  | 262       |
| 10. Do you believe that there should be a law against noise due to traffic (horn and engine noises)?                     | 222       | 178  | 17      | 80   | 70        |

Legend: \*Hearing practices were graded as 'Excellent' (score of  $\geq 20$  points), 'Average' (10 to 19) and 'Poor'  $< 10$  points)

\*\*Hearing beliefs were graded as 'Excellent' (score of  $\geq +25$  points), 'Good' (score of +5 to +24) 'Average' (-4 to +4), 'Poor' (-24 to -5) and 'Very poor' ( $\leq -25$ )

Oman Oil Refinery in Muscat and the Oman Steel Works in Sohar, and enrolled them in our study. The identity of participants was de-linked from other information to maintain confidentiality.

Demographic information was collected. A close-ended questionnaire was used to collect the responses on the hearing health beliefs and knowledge of participants [Table 1]. There were five possible responses to each question. The correct response to the questions on safe *hearing health practices* had been determined prior to the study by experts. These correct answers were used as the gold standard and participants' responses were compared with them. If the responses matched this gold standard of safe hearing health practice, five

points were allotted, but if the reply did not match the gold standard, we deducted five points. For an equivocal response, no point was awarded. The points for all hearing health practice questions were summed and then graded. If the participant scored more than 20 points, out of a maximum of 50, his/her hearing health practice was considered to be of 'excellent' grade. Those having a score of '10 to 19', were considered as having 'good' hearing health practice, while a person with a score below ten was considered to have 'poor' hearing health practice.

To have an overall idea on the level of *hearing health beliefs*, all points related to questions on beliefs were summed. We categorised the beliefs regarding the hearing and ear care of the participants into

**Table 2:** Levels of hearing health practices among over 20 year-olds in Oman

|                          |                | Excellent |      | Average |      | Poor |      |
|--------------------------|----------------|-----------|------|---------|------|------|------|
|                          |                | n         | %    | n       | %    | n    | %    |
| <b>Gender</b>            | Male           | 239       | 61.9 | 117     | 57.1 | 3    | 75.0 |
|                          | Female         | 147       | 38.1 | 88      | 42.9 | 1    | 25.0 |
| <b>Age-group</b>         | 20 to 39       | 217       | 56.2 | 137     | 66.8 | 3    | 75.0 |
|                          | 40 to 59       | 118       | 30.6 | 48      | 23.4 | 1    | 25.0 |
|                          | 60 and +       | 37        | 9.6  | 14      | 6.8  | 0    | 0.0  |
|                          | Missing        | 14        | 3.6  | 6       | 2.9  | 0    | 0.0  |
| <b>Education</b>         | Illiterate     | 97        | 25.1 | 35      | 17.1 | 0    | 0.0  |
|                          | Primary        | 236       | 61.1 | 138     | 67.3 | 3    | 75.0 |
|                          | Schooling +    | 53        | 13.7 | 32      | 15.6 | 1    | 25.0 |
| <b>Location</b>          | Rural          | 148       | 38.3 | 53      | 25.9 | 0    | 0.0  |
|                          | Urban          | 113       | 29.3 | 82      | 40.0 | 4    | 100  |
|                          | Industrial     | 125       | 32.4 | 70      | 34.1 | 0    | 0.0  |
| <b>Hearing screening</b> | Normal         | 297       | 76.9 | 151     | 73.7 | 3    | 75.0 |
|                          | Impaired       | 69        | 17.9 | 48      | 23.4 | 1    | 25.0 |
|                          | Not conclusive | 20        | 5.2  | 6       | 2.9  | 0    | 0.0  |
| <b>Total</b>             |                | 386       | 64.5 | 205     | 34.3 | 4    | 0.7  |

Note: Three participants did not opt to respond in selected practice questions and were omitted from analysis.

'Excellent', 'Good', 'Average', 'Poor' and 'Very Poor' grades. The score range for each category was  $\geq +25$ ; 5 to 24; -4 to +4; -24 to -5; and  $\leq -25$  respectively. Scientific beliefs about hearing health were defined as the sum of the 'Excellent' and 'Good' grades of beliefs.

We used a pretested data collection form. The data were then transformed on a spreadsheet using EPI Data software.<sup>13</sup> Univariate analysis was conducted by the parametric method. We used the Statistical Package for Social Studies (SPSS 11) for the analysis. We calculated frequencies and percentage proportions. For statistical validations, we used the STATCALC package of EPI 6 software and calculated relative risk and chi square values, 95% confidence intervals (CI), while *P* values that were set at the 0.05 level of significance. To determine the predictors of the 'Excellent' grade of safe practices and scientific beliefs regarding hearing and ear health (excellent + very good), we conducted multi-nominal regression analysis. Age group, gender, literacy, hearing disability and location were the independent variables that we included in the model by using the 'step in' method.

The method of inquiring about beliefs and practices could have introduced observer bias. To minimise this, the following precautions were taken: 1) organisation of an interview standardisation workshop; 2) provision of a manual for the field

investigators so that they could refer it when needed; 3) pre-testing of the forms that were used to collect the responses; 4) no prompting of the participant by the investigator and the accompanying family member; 5) avoidance of leading questions; 6) formulation of questionnaire in the local language (Arabic) and reference to a standard text book for writing questions for such studies.<sup>14</sup>

Participants with poor levels of hearing health belief and practice were counselled by the field investigators as follows: 1) listening to loud music in a closed environment should be avoided; 2) judicious use of volume in gadgets like telephones, motor vehicle horns, and 3) industrial workers were advised to use protective gear to avoid the harmful effects of noise pollution at work. The outcomes of this survey were used as baseline information to formulate policies regarding healthy hearing.

The Ethical and Research Committee of the Ministry of Health of Oman approved the study which was a cross-sectional descriptive study and was conducted in 2007–2008.

## Results

We interviewed 598 participants from six locations. Half of the participants had primary education only. There were more male than female participants. In the industrial clusters, all participants were males.

**Table 3:** Levels of beliefs about hearing health among over 20 year-olds in Oman

|                          |                      | Excellent |      | Good |      | Average |      | Poor |      | Very poor |       |
|--------------------------|----------------------|-----------|------|------|------|---------|------|------|------|-----------|-------|
|                          |                      | n         | %    | n    | %    | n       | %    | n    | %    | n         | %     |
| <b>Gender</b>            | Male (1 missing)     | 116       | 58.3 | 166  | 58.9 | 28      | 70.0 | 49   | 71.0 | 2         | 28.6  |
|                          | Female               | 83        | 41.7 | 116  | 41.1 | 12      | 30.0 | 20   | 29.0 | 5         | 71.4  |
| <b>Age-group</b>         | 20 to 39             | 121       | 60.8 | 177  | 62.8 | 15      | 37.5 | 42   | 60.9 | 4         | 57.1  |
|                          | 40 to 59             | 57        | 28.6 | 74   | 26.2 | 13      | 32.5 | 20   | 29.0 | 3         | 42.9  |
|                          | 60 and + (1 missing) | 11        | 5.5  | 21   | 7.4  | 11      | 27.5 | 5    | 7.2  | 0         | 0.0   |
| <b>Education</b>         | Illiterate           | 33        | 16.6 | 60   | 21.3 | 13      | 32.5 | 20   | 29.0 | 5         | 71.4  |
|                          | Primary              | 136       | 68.3 | 177  | 62.8 | 22      | 55.0 | 44   | 63.8 | 1         | 14.3  |
|                          | Schooling +          | 30        | 15.1 | 45   | 16.0 | 5       | 12.5 | 5    | 7.2  | 1         | 14.3  |
| <b>Location</b>          | Rural                | 48        | 24.1 | 109  | 38.7 | 12      | 30.0 | 27   | 39.1 | 5         | 71.4  |
|                          | Urban                | 91        | 45.7 | 79   | 28.0 | 11      | 27.5 | 20   | 29.0 | 0         | 0.0   |
|                          | Industrial           | 60        | 30.2 | 94   | 33.3 | 17      | 42.5 | 22   | 31.9 | 2         | 28.6  |
| <b>Hearing screening</b> | Normal               | 143       | 71.9 | 222  | 78.7 | 31      | 77.5 | 50   | 72.5 | 7         | 100.0 |
|                          | Impaired             | 45        | 22.6 | 47   | 16.7 | 9       | 22.5 | 17   | 24.6 | 0         | 0.0   |
|                          | Not conclusive       | 11        | 5.5  | 13   | 4.6  | 0       | 0    | 2    | 2.9  | 0         | 0.0   |
|                          |                      | 199       | 33.3 | 282  | 47.2 | 40      | 6.7  | 69   | 11.5 | 7         | 1.2   |

The questionnaire and participants' responses in are shown in Table 1.

The level of *hearing health practice* among participants by subgroup is given in Table 2. Hearing health practice was of 'Excellent' grade in 386 people (64.5% [95% CI 60.7–68.4]), 'Average' in 205 (34.3% [95% CI 30.5–38.1]) and 'Poor' in four participants (0.7% [95% CI 0.03–1.37]). Hearing health practice was further analysed by gender, age group, location, level of education and hearing disabilities. Hearing health practices were better among male compared to female participants, (relative risk [RR] = 1.17 [95% CI 1.02–1.34,  $P = 0.02$ ]), but they did not differ by age group ( $X^2 = 6.37$ ; degree of freedom (DF) = 2;  $P = 0.04$ ). The level of education was also not significantly associated to the level of hearing health practices. ( $X^2 = 5.55$ ; DF = 2;  $P = 0.06$ ). Hearing health practices differed significantly among participants of the urban, rural and industrial clusters. ( $X^2 = 12.5$ ; DF = 2;  $P = 0.002$ ). The practices did not differ significantly among the participants with normal hearing and those suspected to have hearing disabilities (RR = 1.07 [95% CI 0.92–1.23]).

An 'Excellent' grade of *hearing health beliefs* was present in 33.3% of participants (95% [CI 29.5–37.1]). Beliefs regarding hearing and ear care were grouped by different variants [Table 3]. We also conducted univariate analysis to associate different epidemiological variables to the 'Excellent' grade of

scientific hearing health beliefs. Females had better grades of scientific hearing health beliefs compared to male participants. However an element of chance cannot be ruled out in this observation (RR = 1.51; 95% [CI 0.96- 2.37]). Participants aged 20 to 39 had significantly better grades of scientific hearing health beliefs compared to those aged 40 and over. (RR = 1.56 [95% CI 1.01–2.41]). Literate participants had significantly more scientific beliefs compared to illiterate participants. (RR = 1.61 [95% CI 1.00–2.60]). Beliefs were similar among participants in urban and rural locations. (RR = 1.08 [95% CI = 0.99–1.19]).

To study the interaction of different variables in determining excellent grade of practices and beliefs, we conducted binominal regression analysis [Table 4]. Being in the age group 20 to 39 years and resident in urban locations were the two predictors of healthy hearing health practices. In this regression analysis, variables such as illiteracy, urban residence and male gender were strongly determinant of beliefs that parallel the current biomedical view.

## Discussion

This is the first time that an assessment of hearing health beliefs and practices has been carried out among the adult Omani population. One third of participants had scientific hearing health beliefs while nearly two third of participants showed safe

**Table 4:** Predictors of excellent practice and positive beliefs for hearing

| Predictor  |                        | Adjusted Odds Ratio | 95% CI     | P value |
|--|------------------------|---------------------|------------|---------|
| <b>'Excellent' grade of Hearing Practice</b>           |                        |                     |            |         |
| Intercept  |                        | -0.707              |            |         |
| Gender   | Male                   | 0.72                | 0.47–1.10  | 0.13    |
|  | Female                 | 1.00                |            |         |
| Age group  | 20 to 39 year olds     | 1.67                | 1.10–2.52  | 0.02    |
|  | 40 years old and more  | 1.00                |            |         |
| Location   | Urban                  | 0.53                | 0.31–0.91  | 0.02    |
|  | Rural                  | 1.45                | 0.87–2.40  | 0.15    |
|  | Industrial             | 1.00                |            |         |
| Education  | Illiterate             | 0.67                | 0.42–1.06  | 0.09    |
|  | literate               | 1.00                |            |         |
| Hearing status   | Normal                 | 1.20                | 0.76–1.91  | 0.43    |
|  | Bilateral hearing loss | 1.00                |            |         |
| <b>'Positive' beliefs about hearing and ear health</b> |                        |                     |            |         |
| Intercept  |                        | -1.51               |            |         |
| Gender   | Male                   | 1.71                | 1.02–2.85  | 0.04    |
|  | Female                 | 1.00                |            |         |
| Age group  | 20 to 39 years         | 0.64                | 0.40 -1.02 | 0.06    |
|  | 40 yrs and more        | 1.00                |            |         |
| Location   | Urban                  | 1.33                | 0.74–2.39  | 0.34    |
|  | Rural                  | 0.71                | 0.38–1.33  | 0.29    |
|  | Industrial             | 1.00                |            |         |
| Education  | Illiterate             | 1.80                | 1.12–2.89  | 0.02    |
|  | literate               | 1.00                |            |         |
| Hearing status   | Normal                 | 0.88                | 0.51–1.51  | 0.64    |
|  | Bilateral hearing loss | 1.00                |            |         |

hearing health practices. Being in the 20 to 29 years of age group was the predictor of safe hearing health practices. While male, urban and illiterate were the predictors of scientific hearing health beliefs.

In our study, we noted good practices, but less scientific beliefs, among the adult Omani population. This is in contrast to the findings of Crendell *et al.* in USA. A majority of young adults (18 to 29 years old college students) in his study demonstrated a high degree of knowledge about exposure to excessive noise and the risk of hearing loss, but the use of hearing protection devices (HPDs) in the same population was far less than desired.<sup>6</sup> Differences in literacy and cultural habits of using hearing devices in the two populations could be the reason for the observed variations compared to our study. Adopting good hearing health practices without knowing their rationale, as noted in Oman, should be further investigated. Less awareness and

unhealthy beliefs could negatively affect healthy practices.

The views from international literature fluctuate in complex way. Ologe *et al.* found that workers of a steel mill in Nigeria had high awareness about the hazardous effects of noise on hearing (93%) and about the methods of its prevention (92%), but only 27% of participants possessed hearing protectors and only 28% of them were using them all the time.<sup>7</sup> Okpala noted that army personnel had low awareness about policies for protecting their hearing.<sup>8</sup> There was no significant association between hearing impairment and hearing health practices in our study, but Tamaskar *et al.* noted a high level of knowledge about safe hearing health practices among people with hearing impairment.<sup>15</sup> The small size of the sample and the inclusion of only hearing impaired participants in urban areas in this American study could explain the reasons

for the differences in the outcome compared to our study.

Hearing health practices were better among males compared to females in our study, but we had only male participants in the industrial clusters; therefore, the association of gender to the hearing health practice in this study should be interpreted with caution. The practice of using hearing protective devices by participants in industrial locations did not differ by gender in two other studies in the USA.<sup>16,17</sup> In spite of this observation, gender specific health promotion for improving hearing health practices is recommended and such promotion could be integrated to Oman's commitment to address the gender inequity issue.<sup>18</sup>

The exposure to cell-phones and loud music on radio/TV are known risk factors for hearing impairment.<sup>17,20</sup> A study in the USA of college students revealed poor hearing health beliefs and practices;<sup>21</sup> therefore, any study that aims to determine the level of hearing health practices and beliefs should include these risk factors for poor hearing. Unfortunately, questions in our study were not specific enough to quantify the frequency and duration of use of these devices. As a result, the responses related to this question could be influenced by misclassification bias. More focused studies are recommended to generate detailed information on this issue.

Based on the association of hearing health practices to the age group and literacy status in our participants, we recommend that health promotion could be more specifically targeted for younger versus older and, educated versus illiterate people.

Daniel suggested that, because of limited possible interventions to avoid hearing impairment due to noise pollution, there should be more focus on health promotion to prevent risky hearing health behaviour in young people.<sup>22</sup> In the Norwegian County Audiometry Survey, a distinct association of noise pollution to hearing impairment was shown. The authors of this study suggested that the permanent hearing threshold shift which they noted could be an indicator to study the current status and impact of health promotion on the hearing health of the community.<sup>23</sup> We have also assessed the noise levels in these locations. Therefore, the outcomes of our study and the noise levels could serve as baseline information. A similar study could be conducted again after a few years of a health

promotion campaign to assess the changes and using the suggested indicators.

Wiechbold, in 2002, demonstrated that after students received information about hearing damage due to noise pollution they developed positive attitudes and understood the hazards of noise pollution.<sup>24</sup> There was still need for more education regarding the risks of loud music exposure and the benefits of wearing hearing protection even in 2008.<sup>25</sup>

## Conclusion

We noted high levels of healthy hearing health practices (64.5%), but low levels of scientific beliefs (33.3%) among the adult Omani participants. Young and urban residents were associated with healthy hearing health practices, while male and illiterate participants had a good level of scientific beliefs about hearing health. The Ear Health Care program of Oman should focus on improving the knowledge about healthy hearing health practices so that they will be generally adopted and noise-induced hearing loss prevented.

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