The association between sociodemographic characteristics and knowledge about oral cancer among Jazan Population, Saudi Arabia

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ABSTRACT

Background: Oral cancer (OC) is a cancer of the mucosal lip, oral cavity, and tongue and is linked to drinking, smoking, or both. After lymphoma and leukemia, oral cancer is the third most common malignancy in Saudi Arabia. Materials and methods: A cross-sectional, descriptive, analytical study was conducted in the Jazan province. We used an online questionnaire and the sample was selected in a random, multistage manner, with a total of 400 members from both genders. A representative subregion was randomly selected from each sector, including Baish, Samtah, Faifa, Sabya, Abu Arish, and Jizan. Results: Almost all of the participants in the study appeared to be aware of oral cancer. Oral cancer is not a contagious disease, according to 65% of respondents. Sniffing is a risk factor for oral cancer, according to 85% of respondents; yet, 61.7% believed that it can be healed. Majority of the study participants believed that sun exposure and alcohol consumption are both risk factors for mouth cancer. Chemotherapy, radiation surgery, and mouth augmentation surgery are all options for treating oral cancer. Seventy percent felt that oral self-examination can help detect oral cancer, and that early discovery can speed up treatment. Conclusion: We conclude that the research participants lacked sufficient understanding of early clinical signs and treatment options for oral cancer. A community-wide educational initiative might help to increase awareness and knowledge about oral cancer. Furthermore, additional research should be undertaken to determine the efficacy of the intervention.

Keywords: Awareness About Oral Cancer, Jazan population, knowledge, oral cavity, risk factor

Introduction

Oral cancer (OC) is a malignancy in the mucosal lip, oral cavity, and tongue, which is mainly correlated with alcohol or tobacco use or both and rarely with traumatic irritation of chronic nature and exposure to human papillomavirus (HPV).[10] OC is a significant global health problem, and there is no public awareness about this disease. Also the rate of OC affecting young men and women is increasing. OC is the 10th most common cancer in the world and the third most common cancer in Saudi Arabia.[11] Early detection and diagnosis of OC helps to reduce morbidity and mortality because OC is often preceded by a pre-cancer stage that can be diagnosed through visual examination. Most results of studies according to literature show the screening should be a continuous process for the detection of OC.[9]
A study conducted in 2019 revealed that OC is the third most common cancer in Saudi Arabia, ranking next to lymphoma and leukemia. In Saudi Arabia, the prevalence of OC ranged from 21.6% to 68.6%. It is a major public health issue in the south of Saudi Arabia, particularly in Jazan province, with a male:female ratio ranging from 0.7:1 in Jazan to 1.2:1 in other regions of Saudi Arabia. Several studies have revealed that the main causative agent is associated with Shammah consumption. The majority of OC cases that are diagnosed in hospitals are in advanced stages.\cite{1,3–5}

As cancer, particularly OC, is a global health issue, health-care workers continue to raise community awareness regarding its sources, prevention, and potentially harmful effects. In addition, increased awareness regarding OC contributes positively in terms of prevention by presenting early opportunistic infection and, therefore, helps in early recognition.

The hypothesis of our research: People in the Jazan region have poor knowledge of OC, which leads to a delay in diagnosis.

The research question: What are the factors that cause the delay in diagnosing OC in the Jazan region?

Our objective is to assess people’s knowledge about OC and to determine the association between demographic factors and knowledge about OC.

**Materials and Methods**

**Study region**

Jazan region is the second smallest area of Saudi Arabia, which lies in the southwestern corner of KSA. The region is subdivided into 14 governorates. It has a population of 1,567,547 as per the 2017 census.

**Study design and settings**

This was a cross-sectional, web-based survey that was thorough and inexpensive to conduct, making it easy to enroll large numbers of people or gather data regularly. Data were instantly collected in electronic format. The key rationale for using a web-based survey approach is the government’s announcement of preventative steps as an experiment to reduce the impact of corona pandemic.

**Population and sampling**

**Sample type:** Convenient sampling employing an internet-based survey, while adhering to Saudi Arabian regulations and without exacerbating the disease’s spread.

**Sample technique:** We used the “snowball” technique,\cite{6} in which we gave copies of the electronic survey to a group we knew and urged them to forward them to their contacts.\cite{6} We had significantly less control over who received a copy of the survey using this technique, and it also made sending reminders or follow-up surveys more difficult. We do not know how many copies of the survey were sent; therefore, calculating the response rate is difficult.

**Sample size:** The sample size for this study was estimated to be 400 people based on a sample size formula for a cross-sectional study design. The margin of error selected was 0.05 with a 95% confidence level, as calculated by Raosoft.\cite{7}

The sample size \( n \) and margin of error \( E \) are given by

\[
\begin{align*}
x & = Z \left(\frac{c}{100}\right)^2 r (100 - r) \\
n & = \frac{N x}{(N - 1) E^2 + x} \\
E & = \sqrt{\frac{(N - n) x}{n} / (N - 1)}
\end{align*}
\]

where \( N \) denotes the population size, \( r \) denotes the fraction of replies of interest, and \( Z \left(\frac{c}{100}\right) \) denotes the critical value for the confidence level \( c \).\cite{7}

**Inclusion and exclusion criteria**

**Inclusion criteria:** All residents of the Jazan province, aged from 18 to 60 years

**Exclusion criteria:** Those residing outside Jazan and below 18 years and above 60 years of age

**Data collection tools and process**

An Arabic language 30-item web-based questionnaire was designed to assess the participants’ knowledge of OC.\cite{8} The first eight items of the questionnaire focused on demographic background variables, while item 9 determined whether patients had heard of OC. Subsequently, items 10–14 focused on general information about OC, items 15–20 determined awareness of risk factors, items 21–24 determined awareness of the symptoms of OC, and items 25–30 determined knowledge about the treatments and outcomes of OC.

**Pilot study/pretesting**

We conducted a pilot study among 20 participants, and the results of the pilot study were not included in the final results.

**Primary outcomes**

The primary outcome was to determine the association between knowledge about OC and the demographic factors of people in the Jazan region.

**Study variables**

The first section was a multiple-choice demographics questionnaire with information such as age (18–30, 31–45, 46–60), gender (male/female), nationality (Saudi, non-Saudi), educational level (primary, average, secondary, university, postgraduate), social status (single, married, other) living in (city/village/mountain/island), occupation (governmental, private, military, student unemployed, other), average income (less than 5000 SAR,
between 5000 and 10,000 SAR, more than 10,000 SAR), and governorate (open questions).

The second section was also a multiple-choice questionnaire that evaluated people’s knowledge about mouth cancer with yes/no/I do not know responses such as previous knowledge about OC, how to prevent it, how to cure it, is contagious to others, risk factors such as smoking, sniffing, alcohol, and exposure to sunlight, early detection of OC can be treated, radiotherapy limits the spread of the disease and treats it, the best option to reduce the spread of OC is surgery, etc.

Data entry and statistical analysis
Statistical data entry and analysis were performed using Statistical Package for Social Sciences (SPSS) version 24. Data analyses involved descriptive statistics and inferential statistics according to the required purpose of each relationship. Normally distribution was data managed by tests appropriate for this type of data, for example, t-test, analysis of variance (ANOVA) test. All categorical variables were presented as frequencies and percentages, while continuous variables were presented as means and standard deviations. Association between two categorical variables was investigated using the Chi-square test. Statistical significance was set at a P value <0.05.

Ethical consideration
This work was approved by the Standing Committee for Scientific Research Ethics-Jazan University (HAPO-10-Z-001) Reference No.: REC-43/03/053. on November 03, 2021.
• The first page of the study questionnaire included a statement about the study’s importance and objectives and was used to get an acceptance to informed consent as a prerequisite to participate in the study.
• All data provided by the participants were used only for research purposes, and a written guarantee for keeping confidentiality was provided.
• All team members agree to be held accountable for any scientific or ethical breaching in this study.

Results
A total of 400 participants completed the survey questionnaire. The results showed that 80% of the study participants were aged above 31 years. Moreover, 64.9% of the study participants were female. In addition, 98.9% of the study participants were Saudis. Additionally, half of the study participants were single (45.8%), compared to 52% who were married. In terms of education level, it can be noted that 74% of the study participants attained a university level of education or higher. The results also indicated that 56.4% of the study participants resided in a village. In addition, one-quarter of the study participants were students, 38.3% had a governmental job, and 27.3% were unemployed. Regarding monthly salary, 48.3% obtained a salary of 5000 SAR or less. Table 1 presents the sociodemographic characteristics of the study participants.

The responses to individual knowledge statements about OC are listed in Table 2. Almost all the study participants seemed to be aware of OC. In addition, two-thirds of the study participants believed that OC could be prevented. Moreover, 61.8% of the study participants thought that OC could be cured. Around 67.4% of the study participants indicated that OC is not a contagious disease, as described in Table 2.

The results also revealed that 60% of the study participants visited the dentist at least one time annually. In addition, it seems that the main source of information was mass media followed by family. However, the least source of knowledge was derived from general physicians, as indicated in Table 3.

Table 1: Sociodemographic characteristics of participants (n=400)

| Characteristics          | Frequency | Percentage |
|--------------------------|-----------|------------|
| Age, years               |           |            |
| 18-30                    | 80        | 20.0       |
| 31-45                    | 193       | 48.2       |
| 46-60                    | 127       | 31.8       |
| Gender                   |           |            |
| Male                     | 141       | 35.2       |
| Female                   | 259       | 64.9       |
| Nationality              |           |            |
| Saudi                    | 395       | 98.9       |
| Non-Saudi                | 5         | 1.3        |
| Marital status           |           |            |
| Single                   | 183       | 45.8       |
| Married                  | 208       | 52.1       |
| Divorced                 | 6         | 1.5        |
| Widow                    | 3         | 0.8        |
| Place of living          |           |            |
| Village                  | 225       | 56.4       |
| City                     | 175       | 43.8       |
| Education level          |           |            |
| Primary                  | 14        | 3.5        |
| Intermediate             | 16        | 4.0        |
| Secondary                | 73        | 18.3       |
| University               | 275       | 68.9       |
| Postgraduate             | 22        | 5.5        |
| Occupation               |           |            |
| Student                  | 98        | 24.5       |
| Government               | 153       | 38.3       |
| Private                  | 40        | 10         |
| Unemployed               | 109       | 27.3       |
| Monthly salary           |           |            |
| <5000 SAR monthly        | 193       | 48.3       |
| 5000-10,000 SAR monthly  | 116       | 29.1       |
| >10,000 SAR monthly      | 91        | 22.8       |
| City                     |           |            |
| Jizan                    | 81        | 20.3       |
| Abu Arish                | 86        | 21.6       |
| Bishah                   | 14        | 3.5        |
| Sabha                    | 24        | 6.0        |
| Sammeh                   | 109       | 27.8       |
| Dear                     | 1         | 0.3        |
| Ahd Masarah              | 21        | 5.3        |
| Ardah                    | 16        | 4.0        |
| Dammed                   | 45        | 11.3       |
| Dawah                    | 1         | 0.3        |
Also, 47.3% of the study participants highlighted family history could accelerate the incidence of OC. Results showed that 90% of the subjects indicated that smoking is a risk factor for OC and 85% of the study participants agreed that sniffing is a risk factor for OC. Another risk factor was drinking alcohol (74.2% agreed with it) and 58.4% suggested that exposure to sunlight is the risk factor for OC, as presented in Table 4.

When the study participants were asked about the symptoms of OC, they reported that mouth ulcers could be rated as the prodromal sign. It is apparent from the study participants’ responses that half of them indicated that red and white spot is not an indicator of OC, as presented in Table 4.

Regarding the treatment of OC, the study participants indicated that lumps could be a sign of OC, as 235 responded positively to the question. In addition, 73% believed that oral self-examination could assist in detecting OC. Similarly, the majority thought early detection of OC could accelerate the cure. The study participants indicated that there are several strategies to treat OC, either chemotherapy or radiation surgery, as reported in Table 6.

**Discussion**

The study results showed that the age of the study participants was statistically significantly different based on the response of questions related to hearing about cancer. This is also significant related to the answer question related to the increase in the incidence of oral cancer with age, and mouth ulcers are a sign of oral cancer (p < 0.05). In terms of gender, the male participants believed that oral cancer is preventable and this is statistically significant; they also believed family history increases the risk of mouth cancer, as reported in [Table 7]. The current study was conducted to assess the knowledge about OC in Saudi Arabia and its association with the sociodemographic characteristics, and to evaluate the risk factors correlated with the development of OC in the region of Jazan, Saudi Arabia. OC is considered one of the most common malignancies worldwide; in fact, it is the most common malignancy of the head and neck.[9]

The vast majority of the study participants seem to have heard about OC. Our finding is similar to another study from Saudi Arabia which reported a good knowledge score about OC[10] and contradicts studies from Saudi Arabia that concluded insufficient knowledge about oral malignancy.;[9,11] however, this result is statistically insignificant (P > 0.5). Knowledge is a cornerstone in disease prevention; our results showed that two-thirds of the participants believed that OC could be prevented. Our results also revealed a significant relationship between knowledge about prevention and gender (P < 0.05). In contrast, a study from Sudan revealed negative beliefs and attitudes about oral malignancy in terms of prevention.[12]

When asked about risk factors, the majority showed sufficient knowledge. Overall, the percentage of participants who reported smoking, snuffing, drinking alcohol, and sunlight exposure as the risk factors was high (90%, 85%, 74.2%, and 58.4%, respectively). This result was linked to studies from Sudan and USA, which reported smoking, tobacco, and alcohol drinking as the potential risk factors for developing OC.[12,13] We believed that strategies established by the Saudi Kingdom focusing on increased taxes and advertisement about its harmful effects in the form of images and graphics play an important role in this domain. The religion of Saudi Arabia concerning as the most important reason to

**Table 2: Study participants’ awareness about general information on oral cancer**

| Items                                      | Yes     | No     | I do not know |
|--------------------------------------------|---------|--------|---------------|
| Have you heard of oral cancer?             | 349 (87.3%) | 51 (12.7%) | 0             |
| Do you think that oral cancer is a preventable disease? | 277 (69.3%) | 16 (4%)   | 107 (26.8%)   |
| Do you think that oral cancer is a disease that can be cured? | 247 (61.8%) | 35 (8.8%) | 118 (29.5%)   |
| Do you think that oral cancer is a contagious disease to others? | 45 (12%) | 269 (67.4%) | 86 (21.6%)    |

**Table 3: Information on study participants’ visit to dentist and their source of information on oral cancer**

| Item                                      | Frequency | Percentage |
|-------------------------------------------|-----------|------------|
| How often do you go to the dentist?      |           |            |
| Less than 3 months                       | 69        | 17.3       |
| Every 3-6 months                         | 84        | 21.1       |
| Every 1 year                             | 81        | 20.3       |
| More than 1 year                         | 166       | 41.6       |
| What is the source of your information about oral cancer? | | |
| Mass media                               | 233       | 58.4       |
| Dentist                                  | 49        | 12.3       |
| General physician                        | 36        | 9.00       |
| Family                                   | 82        | 20.6       |

**Table 4: Study participant’s awareness of risk factors for oral cancer**

| Items                                      | Yes     | No     | I do not know |
|--------------------------------------------|---------|--------|---------------|
| Do you think that positive family history (a family member) is a risk factor for oral cancer? | 189 (47.3%) | 91 (22.8%) | 120 (30.1%) |
| Do you think that smoking is a risk factor for oral cancer? | 358 (89.7%) | 13 (3.3%) | 29 (7.3%) |
| Do you think that sniffing is a risk factor for oral cancer? | 339 (84.8%) | 20 (5%) | 41 (10.3%) |
| Do you think that drinking alcohol is a risk factor for oral cancer? | 297 (74.4%) | 27 (6.8%) | 76 (19%) |
| Do you think that exposure to sunlight is a risk factor for oral cancer? | 56 (14%) | 234 (58.6%) | 110 (27.6%) |
Another important finding was that only a small percentage (53.1%, 144/273) of the study participants recognized chronic oral ulceration as a sign of oral cancer. Similar results were also reported by Babiker et al.,[10] Joseph et al.,[11] and Prado et al.[12]

Table 5: Study participant’s awareness of symptoms of oral cancer

| Items                                                                 | Yes     | No      | I do not know |
|----------------------------------------------------------------------|---------|---------|---------------|
| Do you think that the incidence of oral cancer increases with age?   | 212 (53.1%) | 48 (12.0%) | 140 (35.1%)   |
| Do you think that chronic ulcers in the mouth may be a sign of oral cancer? | 131 (32.8%) | 74 (18.5%) | 195 (48.9%)   |
| Do you think that the presence of red spots in the mouth may be a sign of oral cancer? | 144 (36.1%) | 78 (19.5%) | 178 (44.6%)   |

Different studies established the fact that unexplained/chronic or nonhealing mouth ulcer is a common presenting complaint in patients with oral malignancy.[13] Another important sign is a lump in the oral cavity, which has been recognized by 58.9% of the study participants as a sign of OC. This result is similar to the study from Sudan.[14] Lack of knowledge about typical and early signs of OC may lead to a delay in diagnosis or even misdiagnosis. As a result, treatment may be delayed and lead to a catastrophic event and poor outcome.

Performing regular healthy self-examination is a fundamental part of early recognition of many diseases. The majority of the respondents reported that oral health self-examination helps detect OC early.

Regarding treatment options, more than one-third of the study participants reported that they did not know the treatment possibilities; this is undoubtedly an alarming number. This might indicate the majority of responders were not involved in such a difficult condition. On the other hand, more than half of the participants reported surgery, chemotherapy, and radiotherapy as the possible treatment choices; this result is similar to a study conducted in India.[15] Also, the results revealed that only a small percentage of the study participants visited their dentists regularly every 3 or 6 months. This may be because Saudi people believe that they can manage their concerns alone and going to doctors can cause them more anxiety.

Table 6: Study participants’ treatment and outcomes of oral cancer test

| Items                                                                 | Yes     | No      | I do not know |
|----------------------------------------------------------------------|---------|---------|---------------|
| Do you think that a lump or lump in the mouth may be a sign of oral cancer? | 255 (58.9%) | 41 (10.2%) | 124 (31.1%)   |
| Do you think that oral self-examination helps to detect oral cancer early? | 290 (72.7%) | 37 (9.2%) | 73 (18.3%)    |
| Do you think that when oral cancer is detected early, it can be cured?   | 343 (86%) | 8 (2.0%) | 49 (12.3%)    |
| Do you think that when oral cancer is detected, surgery is the best option to limit and treat its spread? | 220 (55.0%) | 47 (11.8%) | 133 (33.3%)   |
| Do you think that when oral cancer is detected, preventive radiotherapy limits its spread and treats it? | 225 (56.3%) | 24 (6%) | 151 (37.8%)   |
| Do you think that when oral cancer is detected late, chemotherapy will be used? | 239 (59.8%) | 26 (6.5%) | 135 (33.8%)   |

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Strengths and Limitations

Further studies should be conducted to establish the efficacy of the intervention implemented. Since the current study is a cross-sectional study, it is not without limitations. This type of study could not establish the cause–effect relationships between the different variables. Furthermore, some participants might have over- or under-reported their results. However, it has the strength of a large study population, and we believe that it will be a solid base of evidence for future research in OC inside as well as outside Saudi Arabia.

Conclusions

We conclude that the study participants did not have satisfactory knowledge regarding OC in terms of early clinical signs and treatment plans. Therefore, educational programs at the level of the community could raise the attention and increase the awareness about OC.

Institutional review board statement

This work was approved by the Standing Committee for Scientific Research Ethics-Jazan University (HAPO-10-Z-001) Reference No.: REC-43/03/053. on November 03, 2021.

Data availability statement

The data used in this study are available and will be provided by the corresponding author on a reasonable request.
Table 7: The association between knowledge and participant characteristics

| Subscale                                                                 | Age 18-30 | 31-45 | 46-60 | Gender M | F | Education level | Beginner | Advanced | Monthly salary, SAR <5000 | 5000 -10,000 | >10,000 |
|--------------------------------------------------------------------------|-----------|-------|-------|----------|---|---------------|----------|----------|---------------------------|----------------|---------|
| Have you heard of oral cancer? Yes                                       | 206       | 111   | 32    | 203      | 146| 208           | 141      | 127      | 110                       | 112            |         |
| Chi                                                                      | 8.5       | 27.1  | 2.65  | 0.07     | 0.12| 0.22          | 0.5      |          |                           |                |         |
| P                                                                        | 0.007     | 0.007 |       | 0.007    | 0.007|              | 0.007    |          |                           |                |         |
| Do you think that oral cancer is a preventable disease?                   | 100       | 77    | 107   | 93       | 150| 127           | 101      | 75       | 101                       |                |         |
| Chi                                                                      | 3.6       | 7.7   | 2.56  | 0.4      | 0.01| 0.74          | 0.35     |          |                           |                |         |
| P                                                                        | 0.4       | 0.01  | 0.74  | 0.35     | 0.01|              | 0.2      |          |                           |                |         |
| Do you think that oral cancer is a disease that can be cured?             | 80        | 80    | 107   | 112      | 140| 135           | 80       | 90       | 74                        |                |         |
| Chi                                                                      | 2.3       | 4.6   | 4.6   | 0.4      | 0.74| 0.24          | 0.2      |          |                           |                |         |
| P                                                                        | 0.4       | 0.74  | 0.24  | 0.2      | 0.24|              | 0.1      |          |                           |                |         |
| Do you think that oral cancer is a contagious disease to others?           | 16        | 18    | 26    | 29       | 21 | 24            | 12       | 13       | 19                        |                |         |
| Chi                                                                      | 7.5       | 19.2  | 10.3  | 0.2      | 0.01| 0.54          | 0.1      |          |                           |                |         |
| P                                                                        | 7.5       | 19.2  | 10.3  | 0.1      | 0.1 |              | 0.1      |          |                           |                |         |
| Do you think that positive family history (a family member) is a risk factor for oral cancer? | 67        | 73    | 59    | 110      | 79 | 101           | 88       | 72       | 68                        | 59             |         |
| Chi                                                                      | 1.2       | 13.3  | 4.36  | 0.8      | 0.02| 0.34          | 2.04     |          |                           |                |         |
| P                                                                        | 1.2       | 13.3  | 4.36  | 0.7      | 0.02|              | 0.7      |          |                           |                |         |
| Do you think that smoking is a risk factor for oral cancer?               | 120       | 137   | 101   | 168      | 178| 180           | 120      | 120      | 118                       |                |         |
| Chi                                                                      | 6.6       | 18.1  | 7.25  | 0.1      | 0.01| 0.74          | 0.3      |          |                           |                |         |
| P                                                                        | 0.1       | 0.01  | 0.74  | 0.3      | 0.01|              | 0.3      |          |                           |                |         |
| Do you think that sniffing is a risk factor for oral cancer?              | 113       | 112   | 114   | 169      | 150| 189           | 100      | 90       | 149                       |                |         |
| Chi                                                                      | 2.2       | 4.3   | 5.37  | 0.1      | 0.11| 0.34          | 0.1      |          |                           |                |         |
| P                                                                        | 2.2       | 4.3   | 5.37  | 0.1      | 0.11|              | 0.1      |          |                           |                |         |
| Do you think that drinking alcohol is a risk factor for oral cancer?      | 100       | 100   | 97    | 157      | 140| 157           | 105      | 100      | 92                        |                |         |
| Chi                                                                      | 4.6       | 2.34  | 4.85  | 0.3      | 0.23| 0.25          | 0.7      |          |                           |                |         |
| P                                                                        | 4.6       | 2.34  | 4.85  | 0.3      | 0.23|              | 0.7      |          |                           |                |         |
| Do you think that exposure to sunlight is a risk factor for oral cancer?  | 21        | 17    | 18    | 23       | 33 | 30            | 26       | 18       | 19                        |                |         |
| Chi                                                                      | 3.3       | 2.4   | 6.41  | 0.5      | 0.2 | 0.47          | 0.54     |          |                           |                |         |
| P                                                                        | 3.3       | 2.4   | 6.41  | 0.5      | 0.2 |              | 0.54     |          |                           |                |         |
| Do you think that the incidence of oral cancer increases with age?        | 50        | 51    | 49    | 73       | 77 | 75            | 75       | 50       | 55                        | 45             |         |
| Chi                                                                      | 18        | 5.4   | 8.54  | 0.01     | 0.07| 0.85          | 0.24     |          |                           |                |         |
| P                                                                        | 18        | 5.4   | 8.54  | 0.01     | 0.07|              | 0.24     |          |                           |                |         |
| Do you think that chronic ulcers in the mouth may be a sign of oral cancer? | 44        | 44    | 106   | 106      | 120| 92            | 55       | 75       | 82                        |                |         |
| Chi                                                                      | 22        | 27.1  | 5.45  | 0.01     | 0.12| 0.14          | 0.2      |          |                           |                |         |
| P                                                                        | 22        | 27.1  | 5.45  | 0.01     | 0.12|              | 0.2      |          |                           |                |         |
| Do you think that the presence of red spots in the mouth may be a sign of oral cancer? | 55        | 50    | 31    | 78       | 53 | 70            | 61       | 45       | 55                        | 31             |         |
| Chi                                                                      | 7.7       | 24.4  | 6.25  | 0.2      | 0.01| 0.41          | 0.35     |          |                           |                |         |
| P                                                                        | 7.7       | 24.4  | 6.25  | 0.2      | 0.01|              | 0.35     |          |                           |                |         |
| Do you think that the presence of white spots in the mouth may be a sign of oral cancer? | 50        | 60    | 44    | 74       | 70 | 80            | 64       | 55       | 50                        | 39             |         |
| Chi                                                                      | 0.7       | 19.2  | 10.3  | 0.9      | 0.01| 0.54          | 0.2      |          |                           |                |         |
| P                                                                        | 0.7       | 19.2  | 10.3  | 0.9      | 0.01|              | 0.2      |          |                           |                |         |
| Do you think that a lump or lump in the mouth may be a sign of oral cancer? | 80        | 80    | 75    | 100      | 135| 125           | 110      | 70       | 90                        |                |         |
| Chi                                                                      | 1.5       | 2.8   | 1.6   | 0.8      | 0.4 | 0.24          | 0.2      |          |                           |                |         |
| P                                                                        | 1.5       | 2.8   | 1.6   | 0.8      | 0.4 |              | 0.2      |          |                           |                |         |
| Do you think that oral self-examination helps to detect oral cancer early? | 110       | 110   | 70    | 107      | 110| 150           | 140      | 90       | 100                       | 100            |         |
| Chi                                                                      | 4.2       | 7.3   | 1.6   | 0.3      | 0.4 | 0.41          | 0.4      |          |                           |                |         |
| P                                                                        | 4.2       | 7.3   | 1.6   | 0.3      | 0.4 |              | 0.4      |          |                           |                |         |
| Do you think that when oral cancer is detected early, it can be cured?    | 100       | 120   | 123   | 170      | 173| 150           | 153      | 110      | 100                      | 123            |         |

Contd...
Table 7: Contd...

| Subscale | Age 18-30 | Gender M | Gender F | Education level Beginner | Advanced | Monthly salary, SAR <5000 | 5000 -10,000 | >10,000 |
|----------|-----------|----------|----------|---------------------------|----------|--------------------------|-------------|---------|
| Chi      | 3.4       | 19.2     | 10.3     | 0.35                      | 0.23     | 70                       | 75          | 80      |
| P        | 0.4       | 0.01     | 0.54     | 0.23                      | 0.23     | 70                       | 75          | 80      |
| Do you think that when oral cancer is detected, surgery is the best option to limit and treat its spread? | 70 | 80 | 75 | 125 | 100 | 150 | 75 | 80 | 70 | 75 |
| Chi      | 1.2       | 2.8      | 1.1      | 2.1                       | 2.1      | 70                       | 75          | 80      |
| P        | 0.2       | 0.4      | 0.03     | 0.24                      | 0.24     | 70                       | 75          | 80      |
| Do you think that when oral cancer is detected, preventive radiotherapy limits its spread and treats it? | 80 | 70 | 75 | 130 | 95 | 125 | 100 | 70 | 80 | 75 |
| Chi      | 2.1       | 2.3      | 1.3      | 1.5                       | 1.5      | 70                       | 75          | 80      |
| P        | 0.3       | 0.4      | 0.53     | 0.2                       | 0.2      | 70                       | 75          | 80      |
| Do you think that when oral cancer is detected late, chemotherapy will be used? | 80 | 80 | 79 | 188 | 151 | 160 | 179 | 110 | 110 | 129 |
| Chi      | 1.8       | 19.2     | 10.3     | 0.74                      | 0.74     | 70                       | 75          | 80      |
| P        | 0.15      | 0.03     | 0.54     | 0.45                      | 0.45     | 70                       | 75          | 80      |

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Conflicts of interest
There are no conflicts of interest.

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