

EFFECT OF HEALTH EDUCATION PROGRAM AND ORAL SELF-EXAMINATION ON ORAL CAVITY AND OROPHARYNGEAL CANCER AMONG SMOKER STUDENTS AT ASSIUT UNIVERSITY- EGYPT

Marwa M. Kamel ^{1*}, Soad S. Bayomi ² and Neama M. Elmaghrabi ³

^{1,2,3}Community Health Nursing, Faculty of Nursing, Assiut University, Egypt.

*Corresponding Author Email: marwa.rayan@aun.edu.eg

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Abstract

Oral cavity and oropharyngeal cancer represent the most prevalent cancers in the head and neck region, constituting approximately 25–30% of all malignancies in the oral cavity. This study aims to assess the impact of a health education program and oral self-examination on oral cavity and oropharyngeal cancer among student smokers at Assiut University in Egypt. A quasi-experimental research design was employed, involving 925 randomly selected participants from practical and theoretical faculties. Participants received the health education program and data were collected using self-administered knowledge questionnaires and observational checklists before, immediately after, and two months post-intervention. The study encompassed demographic information, students' knowledge about smoking and oral cancers, and an observational checklist for oral self-examination. Results indicated that 55.9% of participants were male, with 19.2% being smokers, and 82% had poor knowledge regarding smoking and oral cancers. The findings suggest that the health education program and oral self-examination significantly improved students' knowledge and practices at both post-test and follow-up assessments.

Keywords: Health Education; Oral Cavity; Oral Self-Examination; Oropharyngeal Cancer.

INTRODUCTION / BACKGROUND

Cancer stands as a significant contributor to mortality worldwide, ranking as the second most common cause of death in developed nations and the third most common in developing ones. Among cancers, oral cancers comprise 3% of all cases globally.¹

Oral cancers, categorized within head and neck cancers, refer to abnormal tissue growth in the oral cavity. Neoplasms, or tumors, represent an abnormal and excessive proliferation of tissue. Unlike normal tissue, cancerous growths persist even after removing the initial trigger, displaying irregular growth patterns.²

Oropharyngeal cancer is a group of cancers that occur in the soft palate, throat, and tonsils.³ Risk factors for oral and oropharyngeal cancer include the use of tobacco in smoking and chewable form, alcohol drinking, HPV (human papillomavirus) infections, poor oral hygiene, and nutritional influences that also contribute to its etiology.⁴

Tobacco smoking is a major avoidable cause of morbidity. According to the World Health Organization (WHO), smoking is currently responsible for six million premature deaths each year, of which 600,000 people die from the effects of second-hand smoke.⁵ About 20% of all cancer deaths are attributed to smoking.

Tobacco smoking has been proven to cause oral cancer. About 75% of cancers of the oral cavity and oropharynx are attributed to tobacco smoking and alcohol. Smoking cessation is important for improving survival rates; the risk of developing oral cavity and oropharyngeal cancer is reduced by about 35% within 1-4 years of smoking cessation.⁶

Manifestations of this condition include a white or red sore that does not heal on the gums, tongue, or lining of the mouth, swelling in the jaw, unusual bleeding or pain in the mouth, a lump or thickening, problems with dentures, at the back of the mouth (pharynx), cancer that can cause (trouble breathing or speaking, a lump or thickening, trouble chewing or swallowing food, a feeling that something is caught in the throat, pain in the throat that won't go away, and pain or ringing in the ears or trouble hearing.⁷

The stage of oral cancer describes its size, depth, and whether it has spread. Oral cancer refers to any cancerous tissue inside the mouth involving the front two-thirds of the tongue, floor of the mouth, buccal mucosa, gingiva, lips, retromolar trigone and hard palate. Oropharyngeal cancers involve the base of tongue, soft palate, tonsils, and posterior pharyngeal wall.⁸

The focus for such actions should be a need for increasing their own oral cancer educational programs for the public and healthcare providers, emphasizing regular clinical oral examination (screening), and providing guidelines for investigation (including biopsy, physical exam, health history, neurological exam, a positron emission tomography (PET) scan, and a computed tomography (CT) scan)⁹

Community health nurses have an important role in the early detection of diseases to improve survival rates for oral and oropharyngeal cancer. Knowledge of the etiology and clinical presentation of oral and oropharyngeal cancer and health education are well-recognized approaches for preventing the occurrence of oral and oropharyngeal cancers. Health education has also been instrumental in improving health-related knowledge and behavior.¹⁰

The significance of the study

Oral cancer, ranked as the 13th most prevalent cancer globally, encompasses malignancies affecting the lip, various oral tissues, and the oropharynx. Projections for 2020 estimate approximately 377,713 new cases and 177,757 deaths worldwide attributed to lip and oral cavity malignancies. Notably, oral cancer demonstrates a higher incidence among men and the elderly, with greater lethality observed in men compared to women, and is significantly influenced by socioeconomic factors.

In Egypt, oral cancer accounted for 793 deaths in 2020, representing 0.15% of all recorded deaths, according to the latest World Health Organization (WHO) statistics. Egypt ranks 170th globally, with a mortality rate of 1.16 deaths per 100,000 individuals.

Hypotheses: The implementation of a health education program and oral self-examination will lead to a significant improvement in knowledge and practices related to oral cavity and oropharyngeal cancer among smoker students.

METHODS

Design:

Quasi-experimental research design was used in this study.

Setting:

This study was conducted at (5) faculties selected randomly three practical faculties (Faculty of Physical Education, Faculty of Nursing, and Faculty of Science) and two theoretical faculties (Faculty of Social Services and Faculty of Education) at Assiut University.

Sample

The total number of students in the selected faculties is 27220 students, by using the software EPI/Info, version 3.3 with a confidence level of 99.9% and confidence limits as% of 100 (absolute +/- %) (d): 5%., the estimated sample size was found to be 881 students. To compensate for the dropout (20%) was added to the sample size, the final sample size is 925.

| Faculty | Number of students | Sample size | Percent % |
|-------------------------------|--------------------|-------------|-----------|
| Faculty of Physical Education | 5095 | 173 | 18.7 |
| Faculty of Nursing | 2512 | 85 | 9.2 |
| Faculty of Science | 1755 | 60 | 6.5 |
| Faculty of Social Services | 9784 | 333 | 36 |
| Faculty of Education | 8074 | 274 | 29.6 |
| Total | 27220 | 925 | 100 |

Instruments of study :

Three parts were used to collect data for this study:

Interview Structured Questionnaire: It was designed by the researcher. It included two parts:

- **Part I: Personal characteristics** such as name, age, sex, telephone number, residence, name of faculty, grade, parents' level of education, parents' profession, the reason for smoking, number of years of smoking, number of cigarettes per day, type of cigarettes, dangers of smoking, and causes smoking.
- **Part II: Assess students' knowledge** about the definition of cancer, factors leading to cancer, signs, and symptoms of cancer, methods of cancer diagnosis, anatomical site of oral cavity and oropharynx, the definition of cancer of the oral cavity, oropharynx, risk factors, early signs and symptoms of oral cavity, oropharyngeal cancer, methods of cancer diagnosis of the oral cavity and pharynx, sources of information, family history of cancer, role of nurse, diagnosis prevention, and treatment.^{12,13} **The scoring system of knowledge:** The scoring system followed each correct answer given (1) and incorrectly given (0). Total scoring (97 graded) was classified as poor if the score was <50 % (<49), fair if the score was 50-70 % (49-68), and good knowledge if the score was >70% (>69-97) (**Gray et al., 2019**).¹⁴
- **Part III:** An observational checklist was used for applying oral self-examination developed by (**Jornet et al., 2015**). It was used to study students who are at risk for oral cancer, including six items that assess neck, lips, teeth, cheek, tongue, and palate.¹⁵

Scoring system of practice:

The scoring system was calculated according to the total score of (6). One (1) degree was awarded for each achieved item, and zero (0) was awarded for items not achieved. It was classified as poor practice if the score was <50%, fair if the score was 50–70%, and good knowledge if the score was >70%.¹⁶

Validity:

Five academic experts from the Nursing Faculty, at Assiut University from the community health nursing department performed the validity of the tools. They reviewed the tools for clarity, relevance, comprehensiveness, understanding, and applicability.¹⁷

Reliability

The reliability was analyzed by Cronbach's alpha coefficient test for the knowledge questionnaire and observational checklist of studied students' practices. It was found to be (0.906 and 0.733) respectively.

Assessment of the questionnaire (Pilot study)

A pilot study was carried out on about 47 students (5%), who were included in the study. The pilot study aimed to test the clarity of the tool and to estimate the time required to fill the questionnaire. There is no modification in the tool applied for the study.¹⁶

Data collection:

Data was collected from the first of October 2021 to March 2022, two days weekly/ three hours per day. Oral consent was obtained from the studied students to participate in this study, and a clarification of the purpose of the study was presented to the studied students to get their cooperation before beginning data collection. The teaching and training methods were explained to the students before starting the program intervention. Data collection in the pre-test, immediate post-test, and follow-up test after two months of the training program implementation was done using tool (I), tool (II), and tool (III).

Phases of Program

Pre-test

- The phase was done before the implementation of the program to assess the studied students' knowledge, attitude, and practices about the relationship between smoking and the oral cavity and oropharyngeal cancer.
- It began on the first of October for four weeks/ two days weekly.
- A self-administered knowledge questionnaire sheet was used to collect their knowledge about the oral cavity and oropharyngeal cancer, which students filled out after clarifying the instructions.
- The time of teaching was decided according to the students' time; the average time spent filling each self-administered sheet was (20-30) minutes.

Training Program :

- This phase was carried out for seven weeks from the first week of November to the third week of December, in a sequence of 2days/week.
- The number of smoker students in each faculty: 72 at the Faculty of Education, 58 at the Faculty of Social Services, 29 at the Faculty of Physical Education, 11 at the Faculty of Science, and 8 at the Faculty of Nursing smoker students.
- The studied sample 178 students was divided into thirteen groups concerning the study sample size and setting, about 8-14 students for each group.
- Divided into 5 groups at the Faculty of Education, 4 groups at the Faculty of Social Services, 2 groups at the Faculty of Physical Education, 1 group for each Faculty of Nursing and Faculty of Science were taken as a separate place for conducting the program.

- The program has been implemented for one group/day, each group received five sessions. Every session took about 30 minutes.
- Then, their knowledge and practice were assessed immediately "post-test" after the implementation of the educational program. The educational program was given in five sessions:
- Session 1st included orientation about the importance, purpose, session of the program, expectations, and pre-test assessment.
- Session 2nd included anatomy of the oral cavity and pharynx causes of smoking, the dangers, and benefits of quitting smoking.
- Session 3rd included the definition, factors, signs, symptoms, and method of cancer diagnosis.
- Session 4th included the definition, factors, signs, symptoms, and treatment of oral cavity and oropharyngeal cancer.
- Session 5th included the application of oral self-examination.

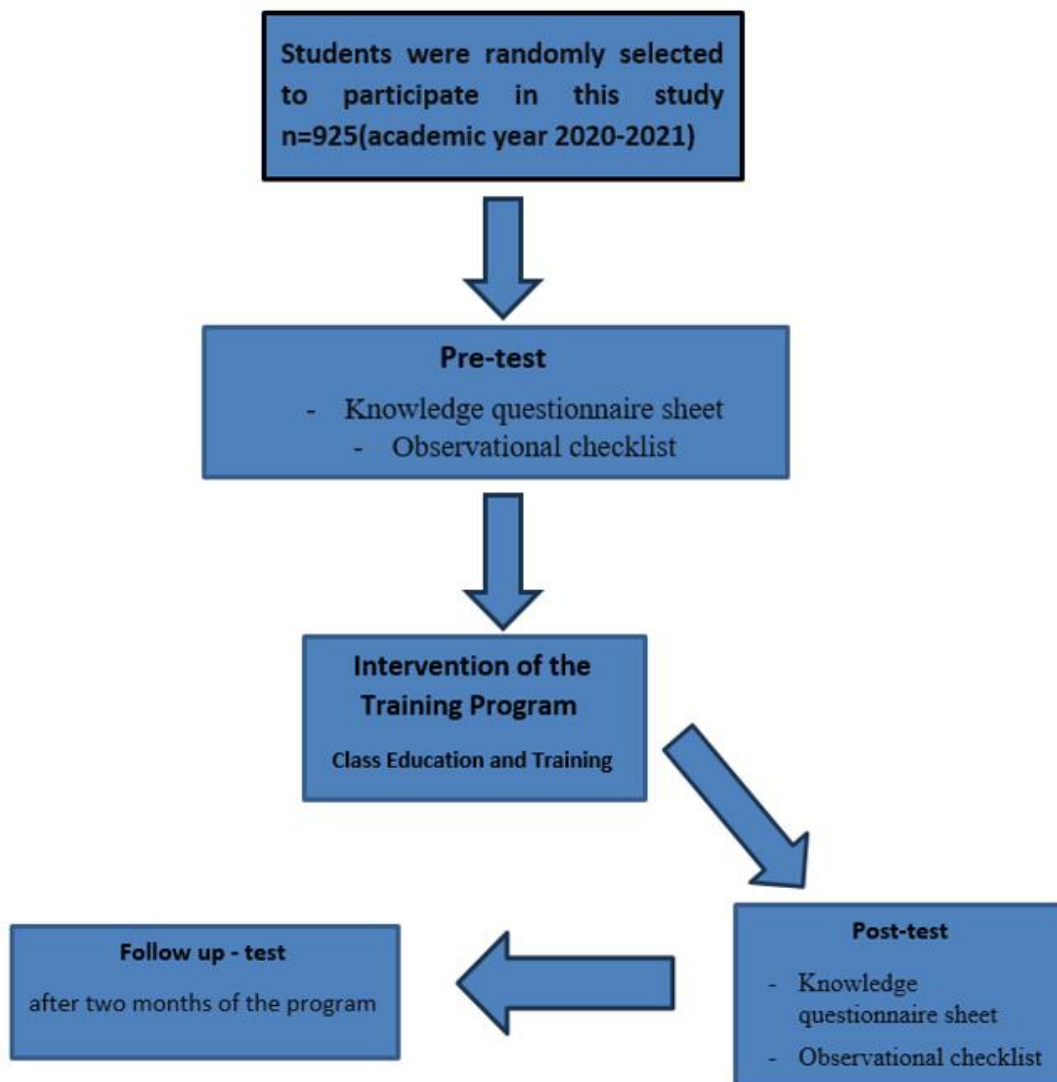


Figure (1): Flow chart of research

Post and Follow-up tests:

The evaluation was performed through:

- Post-test which is done immediately after the program implementation.
- Follow-up test which was performed after two months after the educational program implementation to evaluate studied students' knowledge and practices using the same pre-test tool.
- Follow-up test conducted from the first of March for four weeks.

Ethical considerations:

The ethical committee at the Faculty of Nursing has accepted the study plan (Approval no: 1120240321). There was no danger to the subject of the research during the implementation of the study. Participants were directed by their right to withdraw from research at any time. Confidentiality and anonymity were assured. The study followed common ethical principles in clinical research.

Statistical Analysis

Data entry and data analysis were done using SPSS version 22 (Statistical Package for Social Science). Data were presented as numbers, percentages, means, and standard deviations. The chi-square test was used to compare qualitative variables. Pearson correlation was done to measure the correlation between quantitative variables. The P-value is considered statistically significant when $P < 0.05$.

RESULTS

Table(1): Distribution of studied students according to their socio-demographic data at Assiut University, 2022 (N=925)

| | No. (925) | % |
|--|--------------------------|------|
| Age: (years) | | |
| < 20 | 706 | 76.3 |
| ≥ 20 | 219 | 23.7 |
| Mean ± SD (Range) | 19.05 ± 1.41 (18.0-25.0) | |
| Gender: | | |
| Male | 517 | 55.9 |
| Female | 408 | 44.1 |
| Residence: | | |
| Urban | 335 | 36.2 |
| Rural | 590 | 63.8 |
| Faculty: | | |
| Physical Education | 173 | 18.7 |
| Nursing | 85 | 9.2 |
| Science | 60 | 6.5 |
| Social Services | 333 | 36.0 |
| Education | 274 | 29.6 |
| Family history of an oral cavity and pharyngeal cancer: | | |
| Yes | 8 | 0.9 |
| No | 917 | 99.1 |

Table (1) It was clear that the distribution of studied students regarding their socio-demographic data was found that 76.3% of students aged < 20 years, and the mean age of them \pm SD was 19.05 ± 1.41 . As regards family history of the oral cavity and oropharyngeal cancer, only 0.9% of the studied students had a family history of the oral cavity and oropharyngeal cancer.

Table (2): Distribution of studied students according to smoking history at Assiut University, 2022 (N=925)

| | No. (925) | % |
|--------------------------------------|-----------------------------|------|
| Smoking: | | |
| Smoker | 178 | 19.2 |
| Non-smoker | 747 | 80.8 |
| Number of cigarettes per day: | | |
| < 10 | 68 | 38.2 |
| \geq 10 | 110 | 61.8 |
| Mean \pm SD (Range) | 10.64 ± 7.07 (3.0-30.0) | |
| Duration of smoking: (years) | | |
| < 5 | 88 | 49.4 |
| \geq 5 | 90 | 50.6 |
| Mean \pm SD (Range) | 4.77 ± 2.54 (1.0-9.0) | |

Table (2) It was found that 19.2% of the studied students were smokers, 61.8% had more than or equal to 10 cigarettes per day, and the duration of smoking was more than or equal to five years.

Table (3): Distribution of smoker students according to knowledge about smoking at Assiut University, 2022 (N=178)

| | No. (178) | % |
|--|-----------|------|
| *Dangers of smoking effect: | | |
| Respiratory system | 73 | 41.0 |
| The heart and blood vessel system | 26 | 14.6 |
| The digestive system | 23 | 12.9 |
| Bones | 6 | 3.4 |
| Premature aging | 5 | 2.8 |
| Teeth | 4 | 2.2 |
| Mouth | 3 | 1.7 |
| Reproductive system | 1 | 0.6 |
| * Reasons that encourage smoking: | | |
| Friends | 49 | 27.5 |
| The pressures of life | 47 | 26.4 |
| Advertisement and social media | 21 | 11.8 |
| Parents | 3 | 1.7 |

Table (3) It was revealed that 41.0% mentioned respiratory effects as one of the dangers of smoking. According to reasons that encourage smoking 27.5% of friends are the most common reasons that encourage smoking.

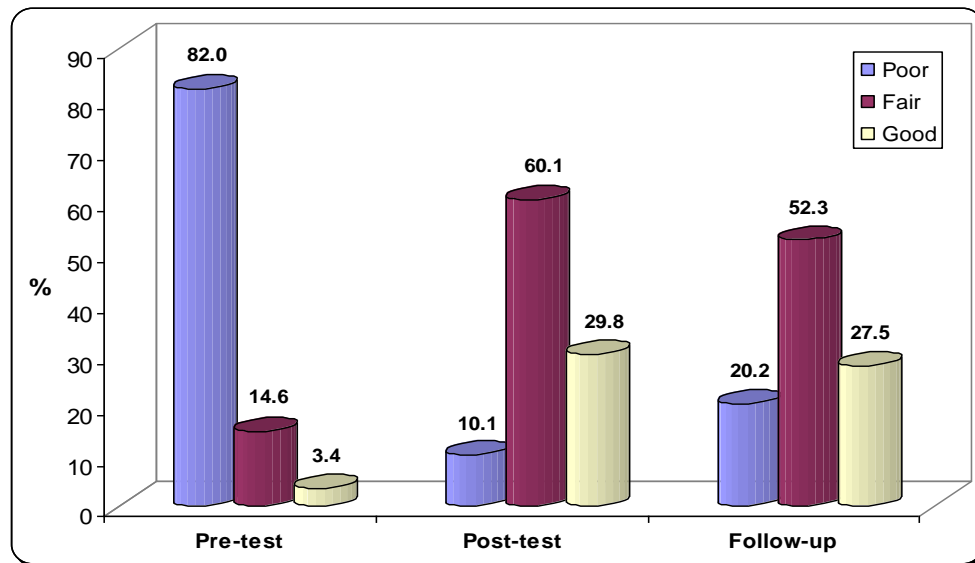


Figure (1): Total score of smoker students knowledge level regarding of the oral cavity and oropharyngeal cancer in pre test, immediate post test and follow up test at Assiut University, 2022 (N=178)

Figure (1): indicated that there was a highly statistically significant difference between the pre-test, immediate post-test, and follow-up tests at all knowledge items ($p = 0.001$)

Table (4): Total score of smoker students' practice regarding the oral cavity and oropharyngeal cancer in the pre-test, immediate post-test test, and follow-up test at Assiut University, 2022(N=178)

| | (n= 178) | | | | | | P-value ¹ | P-value ² |
|--|----------|-----|---------------------|------|---------------------------------|------|----------------------|----------------------|
| | Pre-test | | Immediate post-test | | follow up test after two months | | | |
| | No. | % | No. | % | No. | % | | |
| Examine the lips: - In front of a mirror, a person looks closely at the face and lips, if they are similar, distorted, or injured | 8 | 4.5 | 141 | 79.2 | 132 | 74.2 | 0.001* | 0.001* |
| Examine the cheeks: Opening the mouth by using fingers or depressing the tongue to examine the mucous membrane of the cheek | 13 | 7.3 | 146 | 82.0 | 135 | 75.8 | 0.001* | 0.001* |
| Examine teeth: Open the mouth to examine the areas below the teeth | 15 | 8.4 | 78 | 43.8 | 61 | 34.3 | 0.001* | 0.001* |
| Examine the tongue: Taking out and returning the tongue, observing the lower and upper surface, moving it left or right, and examining the sides of the tongue from its tip to its base. | 9 | 5.1 | 77 | 43.3 | 64 | 36.0 | 0.001* | 0.001* |
| Examine the roof of the mouth: Turn the tip of the tongue back with the mouth open and examine the roof of the mouth. | 16 | 9.0 | 127 | 71.3 | 122 | 68.5 | 0.001* | 0.001* |
| Examine the neck: make sure there are symmetric lumps and discoloration, check the gland, swallow saliva, and place hands on both sides to look for lumps or painful areas, as well as the roof of the throat and the lower side of the jaw. | 12 | 6.7 | 139 | 78.1 | 120 | 67.4 | 0.001* | 0.001* |

*Statistical significant difference ($P < 0.05$)
P1= comparing between Pre-test Vs. Post-test
P2 comparing between Pre-test Vs. Follow-up

Table (4) shows a highly statistically significant difference between the pre-test, immediate post-test, and follow-up test at all practice items (p value= 0.001). Also the table reveals that 82% of students examined the cheeks in the post-test and declined to 75.8% of students in the follow-up test. Also, (79.2%, and 78.1%) examined their lips respectively in the post-test compared to (4.5%, and 6.7%) of them in the pretest.

Table (5): Distribution of smoker students' total practice score regarding the oral cavity and oropharyngeal cancer in the pre-test, immediate post-test test, and follow-up test at Assiut University, 2022(N=178)

| Practice | (n= 178) | | | | | | P-value ¹ | P-value ² |
|----------|----------|------|---------------------|------|---------------------------------|------|----------------------|----------------------|
| | Pre-test | | Immediate post-test | | follow up test after two months | | | |
| | No. | % | No. | % | No. | % | | |
| Poor | 162 | 91.0 | 15 | 8.4 | 32 | 18.0 | 0.001* | 0.001* |
| Fair | 16 | 9.0 | 110 | 61.8 | 107 | 60.1 | | |
| Good | 0 | 0.0 | 53 | 29.8 | 39 | 21.9 | | |

*Statistical significant difference (P < 0.05)

P1= comparing between Pre-test Vs. Post-test

P2 comparing between Pre-test Vs. Follow-up

Table (5) illustrates that (91.0%) of smoker students had poor practices in the pretest improved to (29.8%) having good practices in the post-test and slightly declined to (21.9%) having good practices in the follow-up test.

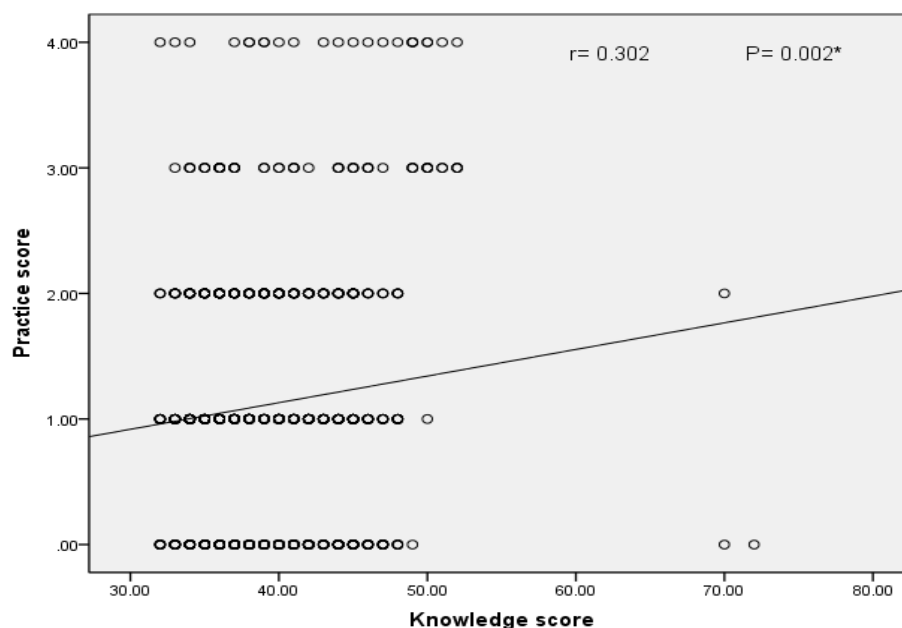


Figure (2): Correlation between studied students' knowledge score and practice score of studied students of the oral cavity and oropharyngeal cancer in the pre-test, immediate post-test, and follow-up test at Assiut University, 2022(N=925)

Figure (2): It found that positive correlation $r = 0.302$ between the total score of students' knowledge and practice score about oral cavity and oropharyngeal cancer of studied students with a statistically significant difference $p = 0.002$.

DISCUSSION

Oral cavity and oropharyngeal cancer are considered highly prevalent in the global population, and their mortality rates have been continually increasing in recent years. They are highly linked to high levels of socio-economic deprivation, and although they preferentially affect males over the age of 45, the incidence in females has also been continually increasing.¹⁸

The results of the present study found that more than three-quarters of students' ages range from 18 to 25 years old. These results agree with **Zhou et al. (2022)**¹⁰, who carried out their study about a survey of the awareness and knowledge of oral cancer among residents and reported that the age of students ranged from 15–29 years. Also, these results agree with **Shubayr et al. (2021)**¹⁹, who carried out their study in Saudi Arabia to assess knowledge, attitudes, and practices of oral cancer prevention among students, interns, and faculty members at the College of Dentistry of Kazan University, and they reported that students age \leq 35 years old.

Concerning the studied students' gender, the current study showed that more than half of the studied students were males. These results agree with **Bukhary et al., (2020)**²⁰, who studied awareness and knowledge of head and neck cancer risks. Do Saudi adults know enough? They reported that more than half of the students were male.

According to the residents of the studied students, the current study found that more than half live in rural areas. These results disagree with **Zhou et al., (2022)**¹⁰, who found that more than half of the studied students live in urban areas.

The current study showed that only 0.9% of the studied students had a family history of oral cavity and oropharyngeal cancer. These results agree with **Shadid et al., (2022)**¹², who carried out a study in Palestine about knowledge, attitudes, and practices of oral cancer prevention among dental students and interns using an online cross-sectional questionnaire and found that only 7.4% of the studied students had a family history of oral cavity and pharyngeal cancer. On the other hand, these results are consistent with **Zachar et al., (2020)**²¹, who conducted a study about awareness and knowledge of oral cancer among adult dental patients attending regional university clinics in New South Wales. A questionnaire-based study in Australia mentioned that more than three-fifths had a family history of oral cavity and oropharyngeal cancer.

The present study showed that less than one-fifth of the studied students were smokers. These results are similar to **Alqaryan et al., (2020)**²², who conducted a study about awareness of head and neck cancers in Saudi Arabia and mentioned that less than one-fifth were smokers. They also supported these results with **Shamala et al., (2023)**¹⁶, who carried out a study in Yemen about oral cancer knowledge, attitudes, and practices among senior dental students in a multi-institution study and mentioned that less than one-fifth were smokers.

The current study showed that there was a highly statistically significant difference ($p = 0.001$) between the pre-test and follow-up tests for all knowledge items. These findings indicated a statistically significant difference in improvement after the educational program due to the ability of students to acquire theoretical knowledge, as well as a lack of health education programs. The improvement that occurred in the post-test and follow-up was due to the effectiveness of the training program implementation. These results agree with **Dhana Priyanka et al. (2023)**¹, Who carried

out a study in Sri Lanka about the effectiveness of health promotion interventions on the knowledge and selected practices related to oral cancer among a group of vulnerable youth, who mentioned that comparing pre- and post-knowledge among the students in the study points to statistically significant differences ($p = 0.000$) between the knowledge of the students in the post-program and the pre-program. Also, these results agree with **Zhou et al. (2022)**¹⁰, who mentioned that comparing pre- and post-knowledge among the respondents in the study points to statistically significant differences ($p = < 0.05$).

The current study displayed the practices about the oral cavity and oropharyngeal cancer among the studied students. It reported a highly statistically significant difference ($p = 0.000$) between the pre-, post, and follow-up tests for all practice items. These results are in line with **Dhana Priyanka et al., (2023)**¹, who found that the practice of doing mouth self-examination MSE for early identification of any abnormal symptoms inside the oral cavity was statistically significant ($P = 0.00$) higher in the intervention group. Also, these results were consistent with **Shah et al., (2023)**²³, who carried out a study in India about the effectiveness of mouth self-examination for screening of oral premalignant, malignant diseases in the Tribal population of Dehradun district.

Who documented that the mouth self-examination habit was found more in participants less than 25 years of age, Individuals with higher education showed a statistically significant difference ($P < 0.05$).

Concerning the correlation between knowledge and practice scores of studied students regarding the oral cavity and oropharyngeal cancer, the study findings illustrated a positive correlation ($r = 0.302$ and 0.245) between the total score of students' knowledge and practice scores, respectively, with a statistically significant difference ($p = (0.002$ and $0.000)$).

These findings were similar to those in a study conducted by **Karunathilaka et al., (2019)**²⁴, who found a significant positive correlation ($r = 0.472$, $p = 0.000$) between participants' knowledge and practice scores.

STRENGTHS AND LIMITATIONS

Multiple measurements were used in this study to measure the duration of the effects over time. The total score reached less than one-third of the studied students who had good knowledge scores and about one-fifth who had good practices score in the post-test compared to the pre-test. In the current study, the health education program and oral self-examination were used as an effective strategy for improving students' awareness. There are some limitations, the training time before the students' final examinations was overloaded.

CONCLUSION

According to the study findings. The studied students had insufficient knowledge about smoking, oral cavity, and oropharyngeal cancer. The majority of them had a positive attitude toward cancer examination, knowledge was improved, and satisfactory practice regarding oral self-examination after the implementation of the education program.

RECOMMENDATION

The current study recommended improving Improve students' knowledge about smoking, oral cavity, and oropharyngeal cancer by continuing educational programs. Libraries of faculties should be rich with adequate Arabic booklets related to the dangers of smoking, oral cavity, and oropharyngeal cancer. Provide counseling for adolescents in universities on the dangers of smoking, oral cavity, and oropharyngeal cancer

Conflict of Interest:

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- 1) Dhanapriyanka, Manori, Kanthi Rdfc, and Prasanna Jayasekara. "Effectiveness of health promotion intervention on the knowledge and selected practices related with oral cancer among a group of vulnerable youth in Sri Lanka." *BMC Public Health* 23.1 (2023): 1355.
- 2) Raghavendran M, Faishal M, Babu A, Sahani A Saxena P, and John S, (2019): A Study to assess the Knowledge and Attitude regarding Prevention of Oral Cancer among the Patient attending OPD in Rama Hospital, Mandhana, Kanpur *Journal of Nursing Practice and Education JNPE*;5(2)37-40
- 3) Yarbrough G, Zanation A, Patel S, and Mehra S, (2021): *Sabiston Textbook of Surgery*, 21 ed, by Elsevier Inc. Chapter 34 Head and Neck, Pp 771-807
- 4) Arif K T, Elliott E K, Haupt LM and Griffiths, L R, (2020): Regulatory mechanisms of epigenetic miRNA relationships in human cancer and potential as therapeutic targets. *Cancers*, 12(10), 2922.
- 5) Fouda S, Kelany M, Moustafa N, Abushouk A I, Hassane A, Sleem A, and Bassiony M, (2018): Tobacco smoking in Egypt: a scoping literature review of its epidemiology and control measures. *EMHJ-Eastern Mediterranean Health Journal*; 24(02), 198-215
- 6) Jenny G, Adnan A, Hussain A and Mohammed A, (2019): Impact of an oral and oropharyngeal cancer diagnosis on smoking cessation patients and cohabiting smokers *Tob Induc Dis.* ; 17: (75)
- 7) Bray F, Ferlay J, Soerjomataram I, Siegel R L, Torre L A, and Jemal A, (2018): Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*;68(6), 394-424.
- 8) Almangush A, Mäkitie A A, Triantafyllou A, de Bree R, Strojan P, Rinaldo A, and Leivo I, (2020): Staging and grading of oral squamous cell carcinoma: An update. *Oral oncology*, 107, 104799.
- 9) Singh, K., Sharma, D., Kaur, M., Gauba, K., Thakur, J. S., & Kumar, R. (2017). Effect of health education on awareness about oral cancer and oral self-examination. *Journal of Education and Health Promotion*, 6:27. Published online 2017 May 5. doi: 10.4103/jehp.jehp_82_15
- 10) Zhou X.H, Huang Y, Yuan C, Zheng S G, Zhang J G, Lv X.M, and Zhang J.(2022): A survey of the awareness and knowledge of oral cancer among residents in Beijing. *BMC BioMed Central Oral Health* (2022) 22(1), p.367.
- 11) World Health Organization (WHO),(2023):oral-health available at <https://www.who.int/news-room/fact-sheets/detail/oral-health> 2023
- 12) Shadid RM, Abu Ali MA, and Kujan O,(2022): Knowledge, attitudes, and practices of oral cancer prevention among dental students and interns: an online cross-sectional questionnaire in Palestine. *BMC Oral Health*. Sep 5;22(1):381.

- 13) EElif O, Mehmet U, and Tahir S, (2020): Development of an Attitude Scale for Cancer Screening, Turkish Journal of Oncology Turk J Oncol;35(4):394–404
- 14) Gray L, Al Maghlouth A, Al Hussain H, and Al Sheef M, (2019): Impact of oral and oropharyngeal cancer diagnosis on smoking cessation patients and cohabiting smokers. Tobacco induced diseases;17(75)400-450
- 15) Jornet P, Garcia FJ, Berdugo M, Perez F, and Lopez A, (2015): Mouth self-examination in a population at risk of oral cancer, Australian Dental Journal; 60: 59–64
- 16) Shamala A, Halboub E, Al-Maweri SA, Al-Sharani H, Al-Hadi M, Ali R, Laradhi H, Murshed H, Mohammed MM, and Ali K,(2023): Oral cancer knowledge, attitudes, and practices among senior dental students in Yemen: a multi-institution study. BMC Oral Health. Jun 30;23(1):435.
- 17) Rupel K , Biasotto M , Gobbo M , Poropat A , Bogdan Pred , MT , Borruso G, Torelli L , Di Lenarda R. and Ottaviani G , 2023. Knowledge and awareness of oral cancer: A cross-sectional survey in Trieste, Italy. Frontiers in Oral Health, 4, p.1056900.
- 18) Johnson D E, Burtneess B, Leemans C R, Lui V W Y, Bauman J E, & Grandis J R. (2020). Head and neck squamous cell carcinoma. Nature reviews Disease primers, 6(1), 92.
- 19) Shubayr MA, Bokhari AM, Essa AA, Nammazi AM, Al Agili DE. Knowledge, attitudes, and practices of oral cancer prevention among students, interns, and faculty members at the College of Dentistry of Jazan University. BMC BioMed Central Oral Health. 2021 Dec;21:1-7.
- 20) Bukhary S, Alreheli R, Albahiti MH, Al-Dabbagh RA, Al-Hazmi N, and Alhazzazi T, (2020): Awareness and knowledge of head and neck cancer risks: Do Saudi adults know enough? Journal of International Oral Health. 1;12(3):226.
- 21) Zachar J J, Huang B and Yates E, 2020. Awareness and knowledge of oral cancer amongst adult dental patients attending regional university clinics in New South Wales, Australia: a questionnaire-based study. International dental journal, 70 (2), pp.93-99.a questionnaire-based study International Dental Journal 2020; 70: 93–99
- 22) Alqaryan S, Aldrees T, Almatrafi S, Alharbi A and Alhumaid H (2020). Awareness of head and neck cancers in Saudi Arabia: A questionnaire-based study. Saudi Medical Journal, 41(4), p.400.
- 23) Shah A, Bhushan B, Akhtar S, Singh P K, Garg M and Gupta M. (2020): Effectiveness of mouth self-examination for screening of oral premalignant/malignant diseases in tribal population of Dehradun district. Journal of Family Medicine and Primary Care, 9(8), p.4381.
- 24) Karunathilaka CD, Fernando MS, Kavindi KG, Rathnayaka RM, Kumara KP, Senavirathna DM, Kumarasinghe IH., 2019. Knowledge and Attitudes regarding Oral Cancer and Self-examination of the Mouth and Risk Assessment for Oral Cancer in Individuals above 30 years of Age in Divisional Secretariat Kesbewa.