RESEARCH ARTICLE

Effectiveness of an Intervention Program on Knowledge of Oral Cancer among the Youth of Jazan, Saudi Arabia

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Abstract

Background: The study is the first of its kind to be conducted in Saudi Arabia (KSA), aiming to analyze the effectiveness of an intervention program in improving the knowledge of oral cancer among the youth. Materials and Methods: A total of 1,051 young Saudis (57% males and 43% females with a mean age of 20.4±1.98) were selected using multi-stage cluster sampling. Knowledge assessment was accomplished using a closed-ended questionnaire which was subjected to reliability tests. Prevalence of risk factors in relation to gender was analyzed using the chi-squared test. Effectiveness was calculated by comparing the pre- and post-intervention means, using the two-tailed paired t-test. Multiple logistic regression was employed in order to determine factors associated with awareness of risk habits, signs/symptoms and prevention of oral cancer. The significance level in this study was set at 0.05. Results: Females were seen to be more into the habit of sheesha smoking (3.3% rather than the use of other forms of risk factors. Prevalence of diverse risk factors such as cigarette smoking (20%), sheesha (15.3%), khat (27%) and shamma (9%) was seen among males. Gender and the use of modifiable risk factors among the study sample were significantly (p<0.001) associated with effectiveness of the intervention. The intervention program was highly effective (p<0.001) in improving the knowledge of oral cancer among the youth in Jazan, KSA. Multivariate analysis revealed that age and gender are the most significant factors affecting knowledge. Conclusions: The study gives a direction for further public health initiatives in this oral cancer prone region.

Keywords: Oral cancer - prevention - knowledge assessment - youth - Saudi Arabia

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Introduction

The world has been under a threat of cancer for a long time. This dreadful disease and its spread is a challenge for any health care system. Oral cancer is the eleventh most common cancer (Warnakulasuriya, 2009) in the world and exhibits a large amount of variation geographically in its occurrence (Parkin et al., 2005; Rao et al., 2013). The developing parts of the world have been hit superiorly when compared to the developed parts (Petersen 2005; Cancela et al., 2010). Most of the cases have been reported from countries like India, Europe, South America and Oceania (Warnakulasuriya, 2009). If major cancers such as breast, skin, testis, prostate, uterus and urinary bladder are considered; oral cancer ranks among the ones with the lowest survival rate (Pisani et al., 1999), with a mean value of 0.54 for females and 0.41 for males (Berrino et al., 2003). It ranks second, next to cardiovascular disease in causing death among the population (Andisheh-Tadbir et al., 2008). According to the World Health Organization (WHO), the rate of people dying due to untreated oral cancer accounts for 2 in 100,000 (UK, 2013) of which 90%-95% are Squamous cell carcinomas (SCC's) (Ame´zaga et al., 2007). In 30% of these cases a regional metastases was observed, which accounts for the severity of the disease (Ame´zaga et al, 2007).

Chronic use of tobacco, alcohol (Lin et al., 2011), use of ill-fitting dentures, poor oral hygiene, improper diet, human papilloma virus (HPV) and long term irritation from the surfaces of rough and broken teeth are some of the major causes of oral cancer. Alcohol and smoking alone are responsible for 80% of the cases in males, 61% in females and 74% overall (Warnakulasuriya et al., 2005; Gillison, 2007; Petersen, 2009). Lack of awareness of the risk factors among the community (Pakfetrat et al., 2010; Peker and Alkurt, 2010), un-presented early lesions or delayed diagnosis of cancer makes the job even more challenging for the health care provider (Warnakalasuriya et al., 1999). Increase in incidence of the pre malignant lesions is mainly due to high-risk behavior of the people

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(Petti, 2009; Cogliano et al., 2004); and these lesions which are not treated for a long time are transformed into malignancies (Lumerman et al., 1995). Most of the consequences of cancers occurring in the oral cavity can be prevented by abstaining from the known risk factors and also by early detection (Llewellyn et al., 2004; Amarasinghe et al., 2010). It was reported (Blot et al., 1988), that in continents like North America and Europe, a complete ban on the use of alcohol and smoking will be able to reduce the incidence of oral cancer by 60%-80% (Blot et al, 1988). Any increase in the understanding about signs, symptoms and early detection of oral cancer among the general population can thus help in prevention, better cure and prognosis of the disease. Efforts are required for the early detection and primary prevention of oral cancer among the community by the means of a variety of outreach programs related to education and awareness of oral cancer. Dental students may be particularly important in this context (Halawany et al., 2013).

Very less is known about the community programs carried out on oral cancer in Jazan city, which has the highest incidence rate reported every year in the whole of Saudi Arabia (Allard et al., 1999). This study is first of its kind in Jazan, which aims in dealing with the prevalence of risk factors among the youth and to analyze the effectiveness of an intervention program on the knowledge of oral cancer among the target population. The results obtained will form an initiative for future implementation of effective health promotion strategies and programs in promoting prevention and early detection, thereby helping to reduce the incidence rate of oral cancer in the region.

Materials and Methods

Study sample and ethical approval

This study was carried out in the city of Jazan, Kingdom of Saudi Arabia (KSA) during the month of November and December, 2013. The target population consisted of higher secondary school and the University students. Sampling was done using multi-stage cluster sampling method. Six higher secondary schools (three male and three female schools) and six university colleges (Colleges of Business Administration, Engineering and Community; Jazan University, belonging to male and female students, respectively) were selected. Each school/college, represented as one cluster making it 12 altogether.

The study was approved and funded by the Medical Research Centre at Jazan University. A written consent was obtained from the Department of Education at Jazan, KSA before approaching the schools. A similar consent was obtained from the respective colleges of Jazan University before the students were involved in the research. All the children who fulfilled the inclusion criteria (non-science students and aged between 15-25 years) were invited to participate and those who provided the consent comprised the final sample. A total of 1051 subjects were approached, with a response rate of 100%.

Questionnaire and its validation

Apart from the socio-demographic information, the questions were mainly pertaining to the use of cigarette, sheesha and shamma (smokeless tobacco) among the target group. The knowledge of oral cancer, involvement of various risk factors, early appearance of the lesions, self-examination and the role of health care provider were also assessed by a closed-ended questionnaire. The initially prepared English questionnaire was translated into Arabic language with the help of two bilingual dentists who had Arabic as their first language. This was again subjected to a reverse translation by an independent professional translator and no discrepancies were observed between the two translations. A convenience sample of 20 was first selected for conducting a pilot study and thus, the validity and reliability (Cronbach alpha coefficient of 0.74) were checked. The questionnaire was expected to be internally consistent if it acquired an alpha of at least 0.70 (Nunnally and Bernstein, 1994).

A group of nine dental graduates (5 male and 4 female) from the College of Dentistry, Jazan University were trained as field staff. The respondents were asked to fill the questionnaire, the answers to which were categorized as "yes", "no", "don't know". The subjects were expected to tick the one which they felt was most appropriate. After the completion of the questionnaire the field staff conducted a supervised intervention program. This intervention comprised of distribution of brochures, educational session and finally a question-answer period. To avoid the dropping-out of the participants and to minimize any extraneous interfering event to happen, the second set of similar questions was distributed to the exact same respondents immediately after the intervention program.

Data management and analysis

Each of the correct response was scored as 1 and the incorrect answer was scored as 0. The data obtained was subjected to descriptive and inferential analyses using the SPSS (IBM, version 20). Factor analysis of the questionnaire was done to see the uniformity of the data obtained. Prevalence of risk factors against gender was analyzed using chi-squared test. Significance level of gender and risk factors against the impact of intervention was checked by comparison of the means. The impact of intervention was measured using the paired t-test. P-value of less than 0.05 was considered statistically significant. Finally, multiple logistic regression using ENTER method was employed in order to determine factors associated with knowledge of risk habits, sign and symptoms, and prevention of oral cancer, with 0.05 significance.

Results

Out of the complete sample of 1051, the gender description showed a participation of 57% males (n=601) and 43% females (n=450) in the study. The mean age of the sample was calculated as 20.3±1.98 (years) indicating that there were more number of university students who participated in the study when compared to the higher secondary school students.

Prevalence of risk factors and association with age and gender

In the city of Jazan with regards to the prevalence

Table 1. Prevalence of Risk Factors as Cross-Tabulated by Gender

Risk factors**	Female (n=450)			Male (n=601)		
	Yes	No	Ex-user	Yes	No	Ex-user
Smoking	15 (3.3%)	429 (95.3%)	6 (1.3%)	120 (20%)	449 (74.7%)	32 (5.3%)
Sheesha	31 (6.9%)	415 (92.2%)	4 (0.9%)	92 (15.3%)	447 (74.4%)	62 (10.3%)
Khat	5 (1.1%)	445 (98.9%)	0 (0.0%)	162 (27.0%)	383 (63.7%)	56 (9.3%)
Shamma	1 (0.2%)	449 (99.8%)	0 (0.0%)	54 (9.0%)	521 (86.7%)	26 (4.3%)
Total	450 (42.8%)			601 (57.2%)		

*Percentages were calculated as per gender; **Chi- squared test showed significant (P <0.001) association between gender and risk factors

Table 2. Descriptive Statistics of Impact of the Intervention Program

Item	Category	Mean±S.D Before	Mean±S.D After
Risk Factors**			
1	Swelling	0.60±0.48	0.67±0.46
2	Smoking	0.85±0.35	0.98±0.13
3	Shamma	0.66±0.47	0.95±0.20
4	Chronic Irritation	0.27±0.44	0.89±0.30
5	Life style	0.20±0.40	0.71±0.45
Progress**			
6	Equal susceptibility among people	0.08±0.27	0.19±0.39
7	Can it occur in any part of oral cavity	0.66±0.47	0.95±0.21
9	Is it painful in early stages	0.20±0.40	0.65±0.47
10	Is it contagious	0.44±0.49	0.80±0.39
11	Can late diagnosis or treatment lead to death	0.60±0.48	0.91±0.27
12	Can it spread to other parts of the body	0.55±0.49	0.87±0.33
13	Will it affect your immune system	0.44±0.49	0.88±0.31
Prevention**			
14	Is it preventable	0.78±0.41	0.95±0.21
15	Can it be detected early	0.56±0.49	0.93±0.25
16	Is self examination possible	0.17±0.38	0.75±0.43
	Total*	0.45±0.18	0.81±0.13

*Two-tailed paired t-test showed significant (<0.001) effect of the intervention program; **Iterations by factor analysis

of habits among the youth aged between 15-25 years; it was observed that tobacco smoking either in the form of cigarette or sheesha was more common in males when compared to females (Table 1). The use of shamma alongside smoking was also seen to be mainly prevalent among the male students (Table 1). Out of the four hundred and fifty female participants only one female candidate reported to be indulged in the habit of shamma dipping (Table 1). The females were seen to be more into the habit of sheesha smoking rather than the use of other forms of risk factors (Table 1). Chi-square test showed a significant value ($p<0.001$) as seen in Table1, indicating a high association between gender and the prevalence of the use of risk factors (cigarettte, sheesha and shamma) associated with the occurrence of oral cancer among the studied sample. A Kruskal-Wallis test was done to observe the association between age and the use of risk factors prevalent among the youth inhabiting in Jazan city; the results of which showed a strong association ($p<0.05$) between age - khat and age - smoking.

Pre-intervention

Out of the sixteen questions that were asked on knowledge of oral cancer before the intervention; males managed a mean score of 6.8±3.06 (mean±S.D) and females a mean score of 8.0±2.75 (mean±S.D). Although most of the students were aware that smoking (85%) and shamma (66.4%) are risk factors for oral cancer, only 27% of them knew that chronic irritation caused by ill-fitting dentures or crowns could also lead to a pre-malignant lesion (Table 2). Among the sample, 44.7% of them did not think that oral cancer could spread to other parts of the body. Eighty two percent had no clue that self-examination could be done by an individual for detecting the presence of a lesion or any tissue overgrowth in the oral cavity (Table 2). Thus, overall pre- intervention showed a real lack of knowledge with regards to the signs, symptoms, risk factors and prevention of oral cancer among the youth of Jazan. (Table 2).

Intervention

Trained field staff of 10 dental graduates conducted the intervention program among the target population; one cluster sample at one time. The intervention program consisted of a lecture, distribution of educational brochure and a question-answer session. There existed a chance of bias in checking the effectiveness of the current intervention program by the occurrence of external events such as other advertisement-campaigns or visits to health specialties. In order to overcome this, the second set of questionnaire was distributed immediately after the intervention program.

Post-intervention

There were no drop-outs after the intervention program was completed. It was also made sure that the respondents were exactly the same as before the intervention program, as it would give a more accurate result in checking the effectiveness. A significant change with more number of correct answers was observed post-intervention (Table 2). The questions pertaining to the causal habits such as the use of smoking, sheesha and shamma had an increase in their mean values (Table 2). A drastic change in the value was observed in the questions pertaining to the use of ill-fitting dentures, self-examination of lesions and metastases. By comparing the means of both "before and after values" using a two-tailed T-test, a P-value of 0.000 (Table 2) was obtained. This clearly indicates the success and effectiveness of the intervention program in transferring the knowledge about oral cancer among the target population. Gender and the use of modifiable risk factors among the study sample were also significantly associated with the effectiveness of the intervention program (Table 3 and Table 4).

Multivariate analysis

Finally, multiple logistic regression using ENTER method was employed in order to determine factors associated with knowledge of risk habits, signs -

Table 3. Role of Gender on the Effectiveness

	Gender	Mean	SD	*p value
Before	Male	0.43	0.19	0.00
	Female	0.5	0.17	
	Total	0.46	0.19	
After	Male	0.8	0.15	0.00
	Female	0.83	0.12	
	Total	0.82	0.14	

*p value <0.05=significant

Table 4. Role of Risk Factors on the Effectiveness of the Intervention Program

	*Before			*After		
	Yes	No	Ex-user	Yes	No	Ex-user
Smoking	0.40±0.01	0.46±0.00	0.45±0.028	0.79±.013	0.82±0.00	0.74±0.03
Sheesha	0.38±0.01	0.47±0.00	0.42±0.02	0.78±0.01	0.81±0.00	0.82±0.01
Khat	0.40±0.01	0.47±0.00	0.43±0.02	0.78±0.01	0.82±0.00	0.80±0.02
Shamma	0.36±0.02	0.46±0.00	0.38±0.03	0.75±0.02	0.82±0.00	0.75±0.04

*Value mean±SD

Table 5. Factors Associated with Knowledge on Oral Cancer Determined Using Multiple Logistic Regression Method

Variables	B	S.E.	p value	Adjusted OR	95%CI for OR Lower	Upper
Age	0.103	0.034	0.003	1.108	1.036	1.186
Gender (Male)*	0.803	0.152	0.00	2.232	1.658	3.005
Smoking (Yes)*			0.53			
No	0.169	0.235	0.472	1.184	0.747	1.878
Ex-user	0.437	0.402	0.277	1.548	0.704	3.405
Sheesha (Yes)*			0.226			
No	0.305	0.227	0.18	1.356	0.869	2.116
Ex-user	-0.068	0.324	0.833	0.934	0.495	1.763
Khat (Yes)*			0.24			
No	0.221	0.236	0.35	1.247	0.785	1.979
Ex-user	0.575	0.347	0.097	1.777	0.901	3.507
Shamma (Yes)*			0.375			
No	0.437	0.325	0.178	1.549	0.819	2.927
Ex-user	0.202	0.52	0.698	1.224	0.441	3.392
Constant	-2.919	0.778	0.00	0.054		
-2 Log likelihood			1280.166			
Hosmer and Lemeshow Test			Chi-square=14.002, df=7, p value 0.51			

*Reference group; Variables entered on logistic regression model are age, gender, smoking, sheesha, khat and shamma

symptoms and prevention of oral cancer. Variable entered on logistic regression model are age, gender, smoking, sheesha, khat and shamma. Analysis revealed that age and gender are the most significant ($p<0.05$) risk factors for knowledge on oral cancer with odds ratio of 1.108 and 2.232, respectively (Table 5).

Discussion

The study announces to be the first of its kind conducted in Jazan, KSA where the youth population were targeted. The city records for the highest incidence of oral cancer per year in Saudi Arabia making it an 'oral cancer prone area (Allard et al., 1999). A twenty year (1976-1995) data on Tumor Registry obtained from King Faisal Specialist Hospital and Research centre concluded that 35.4% of all cases of oral cancer in Saudi Arabia were reported just from this region (Allard et al., 1999). Thus, there existed a need to obtain recent data on the prevalence of habits such as use of cigarette, shamma and sheesha among the young generation in the community. The intervention program was also proved to be the "need of the hour" for the improvement of knowledge on oral cancer among the target population. The study revealed that the use of tobacco in the form of, sheesha and shamma was observed to be on a higher side in the young population. Shamma (smokeless tobacco) dipping is one of the leading causes of oral cancer in the region (Allard et al., 1999).

Surprisingly, the use of it was reported to be less than cigarette smoking in this study. As per the pre-intervention data; lack of knowledge was observed among the study population regarding appearance, spread and prevention of lesion. In females the Shamma use could be under reported as studies have found that there are more females who suffer from oral cancer than males in the Jizan region (Brown et al., 2006). Many of them were unaware of the consequences of late diagnosis when it could prominently affect the prognosis of the disease (Gomez et al., 2010). The lack of knowledge regarding self examination of the lesions was also observed among the youth which can be critical at times. Self-examination is currently considered as one of the forms of early detection of a pre malignant lesion and any type of lumps, sores and lesions (red/white) seen in the mouth should not be ignored (Mathew et al., 1995; Elango et al., 2011; Al-Attas et al., 2014). The post intervention results showed a significant improvement in the knowledge of the respondents as the mean value obtained was fairly high. Similar studies conducted elsewhere also showed the same results, but there was a dropping-out of the participants from their studies and also the authors had not taken significant steps to avoid interference of any extraneous event which may have given false positive results (Patton et al., 2004; Sankaranarayanan et al., 2006; Elango et al., 2009). Unlike the current study which had a short duration of time between the pre and post intervention, Stefano Petti and Crispian Scully (2007) conducted a study on knowledge and awareness of oral cancer with a long-term gap (one year) and reported a similar result (Petti and Scully, 2007).

The young generations are usually seen to be more vulnerable to potentially harmful exposures and it is a challenge for them to be able to withstand the hostile environment. Some factors are modifiable and the detrimental repercussions of this dreadful disease can be prevented if the population is made aware of the causative risk factors, various available prevention strategies and existing early detection modalities through community programs (Ghani et al., 2013). Like in most of the developing parts of the world, Saudi Arabia also faces scarcity in organized cancer intervention or early detection screening programs. The knowledge obtained by community out-reach programs can certainly assist the youth in abstaining from the use of the risk factors and hence avoiding the dire consequences. It was seen that the death rates were reduced by a significant margin of 21% in comparison to the control group when a randomized control trial was conducted in India involving the prevalent habits among the population (Sankaranarayanan et al., 2006).

Hence, prevention should hence be the first criteria of any intervention program, but early detection through screening and self-examination should also be given

utmost importance. This would help in treating the disease at a stage where there is a hope for better prognosis. Health care providers, media and various other community sectors should be used up to their full potential to get the best out in terms of community service. It is the duty of a health care provider to fill the gap of knowledge by educating their patients about oral cancer if they observe him/her to be more prone of developing the disease depending on the risk factors involved. Studies show that there is a lack of general awareness even among the health care professionals also with regards to knowledge on oral cancer (Reed et al., 2005; Powe and Finnie, 2004; Cannick et al., 2005).

In conclusion, the knowledge and awareness of oral cancer among the sample was low and thus, oral cancer education programs and facilities for early screening is the "need of the hour" in Jazan, KSA. The study effectively increased the knowledge and awareness among the youth about oral cancer per se and its prevention measures. Hence, giving a direction for further public health initiatives in this prone oral cancer region. Many educational programs should be conducted on a regular basis targeting a larger sector of the community.

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