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Research Article

Oral Cancer Awareness among Smokeless Tobacco (Toombak) Dippers

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Abstract

Objective: Toombak is a form of smokeless tobacco, which is widely used in Sudan. Toombak is playing a significant role in oral cancer and it consider a major risk factor for squamous cell carcinoma. Therefore, the aim of this study was to evaluate the oral cancer awareness among Toombak dippers in Sudan.

Methods: A descriptive cross-sectional study questionnaire- based survey was performed on the general population in different geographic areas of Sudan. A total of 338 Participants were included in this study from January 2015 and January 2016.

Result: Three hundred thirty-eight participants were included in this study, 299 (88.5%) were male and 39 (11.5%) were female. Toombak dipping is most common in individual with age (45 - 54 years) and more than 65 years old. A statistically significant correlation was reported between age and Toombak dipping ($r = 0.342$ and $p \leq 0.00$). Results revealed that most of the Toombak dippers were male. Of all participants, 82% heard about oral cancer but the general knowledge was low since 86.4% of them mentioned that they don't have enough knowledge and 58.0% mentioned that they know nothing about the treatment.

Conclusion: This study provides a general overview of oral cancer awareness among Toombak dippers in Sudan as they are considered a high-risk group for oral cancer development. It is important to have healthcare professionals informed about oral cancer, as their knowledge and awareness of oral cancer and its risk factors, are vital in prevention and early detection of oral cancer.

Keywords: *Oral Cancer; Toombak; Smokeless Tobacco; Awareness*

Introduction

Toombak is a native tobacco plant of the species *Nicotiana rustica*, it is the most popular form of smokeless tobacco found in Sudan [1]. It is made locally from tobacco powder that contains a high level of nicotine called Nicotiana Rustica and sodium bicarbonate with a 4:1 ratio. The alkalinity of sodium bicarbonate increases the absorption of the nicotine from the mucosal surfaces [1].

Toombak is confined almost exclusively to males, with a daily consumption rate of 10 to 20 dips [1]. Toombak dipping is practiced by taking a small portion from plastic bag or hookah with three fingers, usually of the right hand, putting it in the palm of the left hand and manipulating it by the thumb and middle finger of the right hand until it forms a ball called saffa which is of about 10 g in weight [2]. Men

prefer dipping between the lower lip and gum, while women prefer dipping between cheeks and gum. The dipping continues for a period ranging from a few minutes to several hours, until the saffa becomes bland and it is sometimes retained in the mouth during sleep [2].

Alcohol and all forms of tobacco, including smokeless forms and snuff dipping, are considered well established risk factors for oral cancer [3]. Several carcinogens in snuff had been studied including N-nitrosamines, polycyclic aromatic hydrocarbons (PAH) and volatile aldehydes [4-6]. The N-nitrosamines (volatile and non-volatile) have been reported to be the most abundant carcinogens. The tobacco specific nitrosamines (TSNA) derived from nicotiana alkaloids contribute about 70-90% of the total N-nitrosamines and the N-nitrosonornicotine (NNN) is the strongest carcinogenic factors in many species [4,7]. The presence of NNN metabolites in Toombak suggests that the TSNA could be responsible for neoplastic transformation in the oral mucosa of Sudanese Toombak users [8].

The most substantial evidence of the association between squamous cell carcinoma (SCC) and the use of Toombak is in the study by Elbashir., *et al.* of squamous cell carcinoma patients where 81% of whom had used Toombak and the site of carcinoma was the site where the snuff was kept [9]. Osman., *et al.* (2010) reported that 28.7% of the oral cancer patients were Toombak users and 88% of those patients had SCC [10]. Another study by Idris., *et al.* confirmed the hypothesis of the importance of the direct contact between the Toombak and the tissues when intraoral cancer sites in direct contact with Toombak was compared to those with little or no contact [11].

Oral cancer public awareness is generally low as reported by Peker and Alkurt [12] and is lesser than other types of cancers [13]. In 2017, a study by Eltayeb., *et al.* revealed that 66.6% of the selected Sudanese population was aware of oral cancer to varying extents and more than 80% of the respondents were aware that smokeless tobacco (Toombak) as a risk factor for oral cancer [14].

Lack of awareness of the public about oral cancer and its associated risk factors usually result in delayed presentation and increased treatment morbidity and reduced survival rates [15].

Aim of the Study

The aim of this study was to evaluate the oral cancer awareness among Toombak dippers in Sudan and their attitudes towards the signs and symptoms of oral cancer as they are considered a high-risk group for oral cancer development.

Materials and Methods

A questionnaire- based survey was performed on the general population in different geographic areas of Sudan (Khartoum, Dongula, Shandi, Gadarif, Kosti, Senar and North Kurdofan). The campaign was providing a free dental treatment, oral cancer screening followed by oral cancer information leaflets. The questionnaire was distributed before oral cancer health education conducted and was divided to four sections: (1) socio-demographic information (2) General awareness of oral cancer (3) risk factors (4) clinical signs and symptoms and treatment seeking behavior.

Sampling procedure

A total of 338 Participants were included in this study from January 2015 and January 2016. Questionnaires were distributed among participants while they are waiting for dental treatment by well-trained investigators. Ethics approval was obtained from the Khartoum Teaching Dental Hospital Ethics Committee, Ministry of Health of Sudan. Written consent was obtained from all participants prior to the administration of the questionnaire. Participation was voluntary, and participants were informed that their responses would be treated confidentially. An educational brochure was provided to the participants with description of the risk factors, signs and symptoms of oral cancer, and the importance of early detection of the disease.

Data were entered, cleaned and coded by Microsoft excel 2007 and analyzed by Statistical Package for Social Science, version 20 (IBM. Chicago Illinois, USA. The level of significance was set at p-value < 0.05 and 95% confidence intervals.

Results

Three hundred thirty-eight participants were included in this study, 299 (88.5%) were males and 39(11.5%) were females. Table 1 shows the demographic data of the Toombak dippers.

Characteristic	Total n (%)
Age	
14 - 24 Years	48 (14.2%)
25 - 34 Years	47 (13.9%)
35 - 44 Years	58 (17.2%)
45-54 Years	64 (18.9%)
55-64 Years	58 (17.2%)
65+ Years	63 (18.6%)
Gender	
Male	299 (88.5%)
Female	39 (11.5%)
Marital status	
Unmarried	77 (22.8%)
Married	257 (76%)
Education level	
None	63 (18.6%)
Primary school	93 (27.5%)
Secondary school	122 (36.1%)
University	60 (17.8%)
Residence	
Khartoum	84 (24.8%)
Shandi	30 (8.9%)
Doungula	83 (24.6%)
Kordufan	23 (6.8%)
Kosti/Senar	23 (6.8%)
Gadarif	95 (28.1%)
Habits	
Smoking	71 (21%)
Alcohol drinking	127 (37.6%)
None	140 (41.4%)
Total	338 (100%)

Table 1: *Demographic characteristics and habits of the participants (n = 338).*

Age was ranged from 14 to 65 years. Results presented in figure 1 shows the distribution of age among Toombak dippers where the highest percent were among age group (45 - 54 years) followed by above 65 years age group. A statistically significant correlation was reported between age and Toombak dipping ($r = 0.342$ and $p \leq 0.00$).

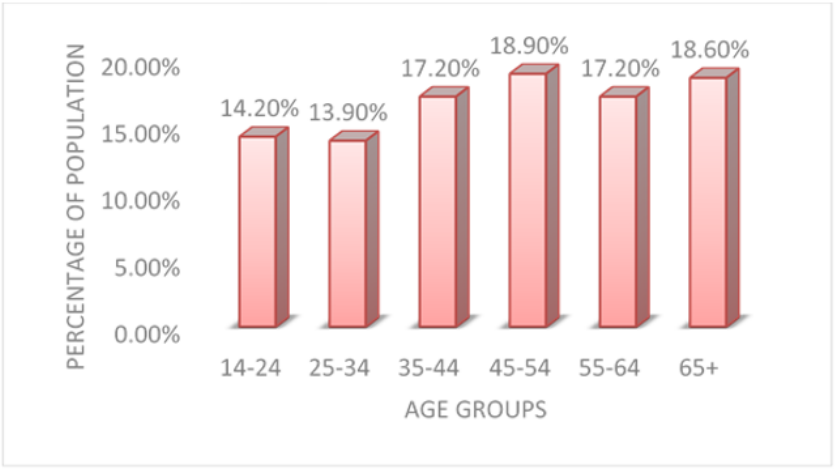

Figure 1: *Age distribution among Toombak dippers.*

Most of the Toombak dippers were males, females formed only 11.5%. A significant correlation was found between age and gender (P-value 0.00) (Figure 2).

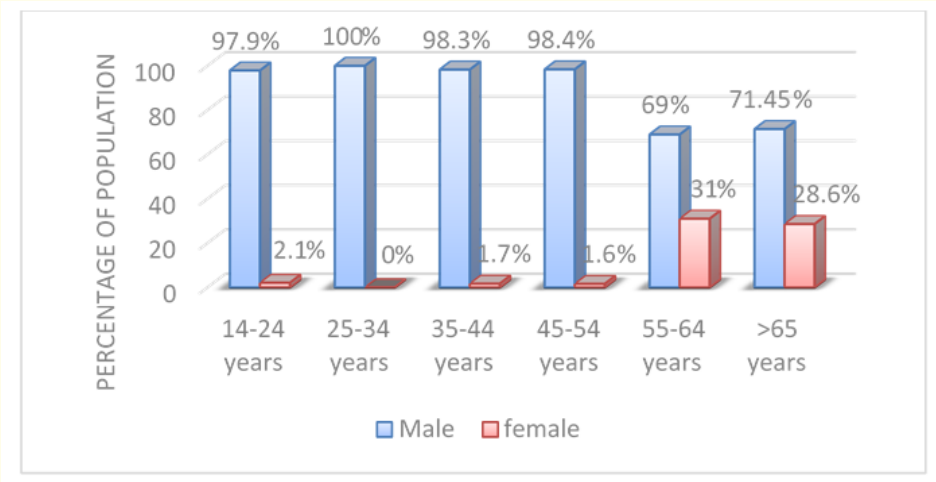

Figure 2: *Shows the correlation between age and gender among Toombak dippers.*

Participants with secondary school education formed the highest percent (36.1%), while illiterate participants formed 18.6% of the Toombak dippers (Figure 3). The Pearson correlation shows significant correlation ($r = 0.071$ and $p \leq 0.001$) between education and Toombak dipping.

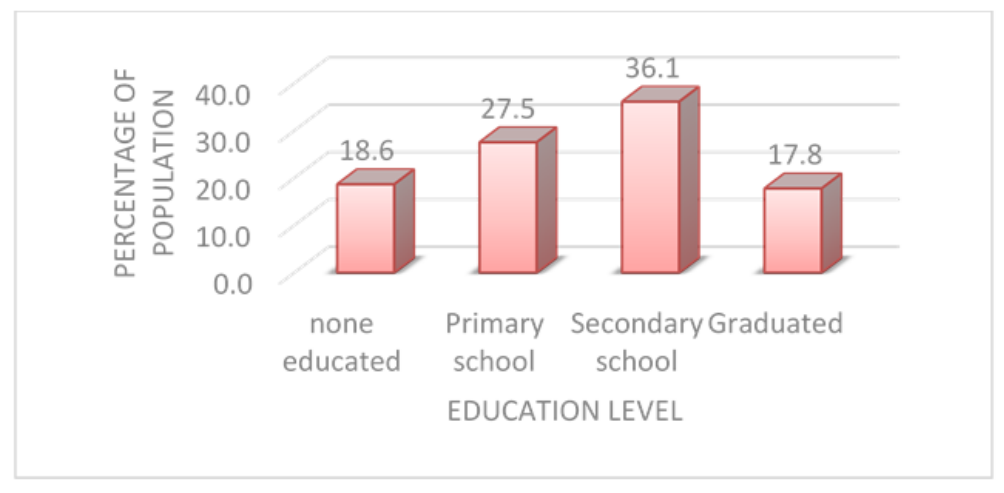

Figure 3: *Education levels of the Toombak dippers.*

Our results revealed that 82% of snuffing participants previously heard about oral cancer. Dentists were the most common source of information and 86.4% of participants believe that they know a lot about oral cancer. When participants were asked about any family history of cancer, 40.8% mentioned prostate cancer and none of them mentioned oral cancer. Regarding the oral cancer treatment, 46.4% of participants think that oral cancer is a curable disease but only 7.4% of participants think it should be treated surgically while 58.0% mentioned that they know nothing about treatment. The effect of treatment delay on oral cancer prognosis was mentioned by 56.2% of participants while 40.2% didn't know if there are any effects. (Table 2).

	Frequency	Percent
Did you hear about OC		
Yes	277	82%
No	61	18%
If yes, from where		
GP	15	4.4%
Dentist	178	52.7%
Media	38	11.2%
People and family	107	31.7%
How much do you know about cancer?		
A lot	46	13.6%
Some	292	86.4%
Any family history of OC		
Yes	46	13.6%

No	292	86.4%
Type of cancer in family history		
Breast	22	6.5%
Abdomen	59	17.5%
Lung	119	35.2%
Prostate	138	40.8%
Do you think it's curable?		
Yes	157	46.4%
No	33	9.8%
I don't know	148	43.8%
If yes! What is the treatment?		
Surgery	25	7.4%
Medication(antibiotic)	28	8.3%
Chemotherapy	73	21.6%
Radiotherapy	16	4.7%
I don't know	196	58.0%
Do treatment delay affect the final results		
Yes	190	56.2%
No	12	3.6%
I don't know	136	40.2%

***Table 2**: Toombak dippers knowledge's regarding oral cancer.*

When participants were assessed regarding the risk factors of oral cancer, 37.6% of the Toombak dippers were consuming alcohol and only 21% were smokers. The most common risk factor mentioned by participant was Toombak dipping (86.1%) (Figure 4).

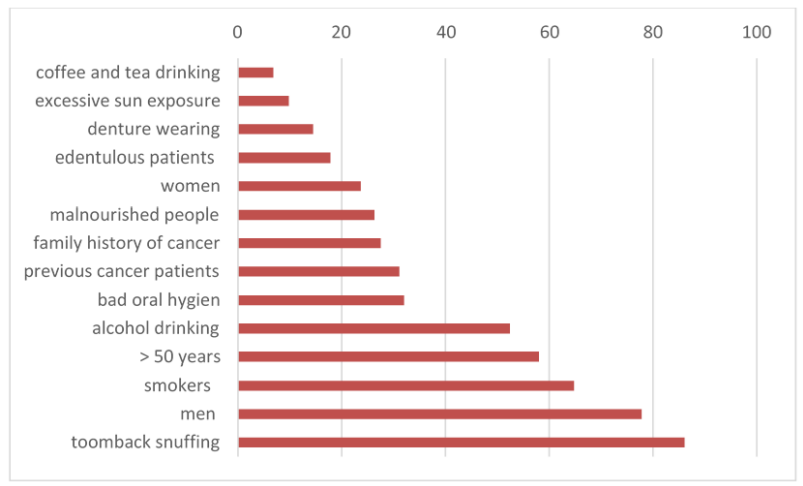

***Figure 4:** Rik factors as mentioned by Toombak dippers.*

Discussion

Smokeless tobacco products are traditionally classified as snuff or chewing tobacco [16]. In Europe and North America the most common use is oral application, while nasal use of finely ground "dry snuff" has become rare [17]. In the United States, moist snuff or chewing tobacco is held or chewed in the gingival buccal area. In Scandinavia snuff like snus in Sweden, its commonly placed under the upper or lower lip [18]. Toombak (smokeless tobacco) is highly linked to the oral cancer in Sudan. It contains at least 100-fold higher concentrations of the tobacco-specific N-nitrosamines (TSNA) than United States and Swedish commercial snuff brands [19,20]. An association between the longer duration of Toombak use and oral cancer has been suggested. However, inconsistent results were observed from previous results regarding the effect of Toombak on the oral mucosa [21,22].

A study on the adverse effects of Sudanese Toombak and Swedish snuff on human oral cells concluded that Toombak has a higher potential to damage normal oral keratinocytes and fibroblasts than Swedish snuff. The study also found that higher cumulative adverse effects were observed on the normal oral keratinocytes with the use of Toombak extracts when compared to Swedish snuff. In contrast, less adverse effects were observed on dysplastic oral keratinocytes. The study suggested that the dysplastic oral keratinocytes were more prone to progress to malignant transformation by Toombak but not by Swedish snuff [23].

Idrees., *et al.* 1998, have shown that snus in Sweden is increasingly used by young individuals while Toombak is increasingly used as persons get older [24]. A similar finding was revealed in the current study, a significant correlation was found between age and the habit of Toombak dipping since most of the Toombak dippers were older than 45 years of age.

Toombak use is uncommon among females in Sudan, it is gender-specific mostly restricted to men [25]. A survey by Idris., *et al.* [19] revealed that Toombak dipping was common among males specially above 40 years. Among women toombak dipping is considered as a social stigma that's why it was less common especially below age of 40 years. In the current study, a statistically significant correlation was found between gender and Toombak snuffing (P-value 0.00). Most of the Toombak dippers were males, females formed only 11.5%. Moreover, a significant correlation between Toombak dipping and education level since secondary school educated people had the higher percent.

Smokeless tobacco users has four to six times higher risks of oral and pharyngeal cancer than non-users [26]. There is a clear benefit to quitting tobacco use because the risks of oral cancer and periodontal disease decline with increasing time after smoking cessation and some oral mucosal lesion may resolve with cessation of smokeless tobacco use. The risk of oral cancer appears to decline to the level of nonsmokers in most studies, but it may take two decades or more for this to occur [27].

In the current study, 82% of study population had previously heard about oral cancer, which is higher than what was reported by Nigerian study which found only 33% of participant had previously heard about oral cancer [28] and less than Indian study where 86% of participant had previously heard about oral cancer [29]. The major source of information about oral cancer was the dentist 52%, this result is controversies to other studies by Eltayeb., *et al.* 2017 and Ghani., *et al.* 2013 which found The media was the common source of information 75.7% [14, 30].

The risk factors for oral cancer are alcohol, solar radiation, genetic predisposition, and tobacco (smoking and smokeless). Smoking has been estimated to pose twice as high a risk of oral cancer as does smokeless tobacco use [31]. In this study, 21% of the participants were smokers and 37.6% consume alcohol regularly. The majority of participants mentioned that they thought the major risk factor for oral cancer is Toombak dipping and some of them linked it to smoking and alcohol. This could be explained by the fact that the relationship between smoking and alcohol and many other health conditions is vastly spread by the media.

The general knowledge about oral cancer was extremely low, 86.4% of Toombak dipper mentioned that they don't have enough knowledge about oral cancer, the results is agreed with Adebola., *et al.* which found 81% had low knowledge [28]. The level of education has a direct role in patient's oral cancer knowledge [32]. A Brazilian study revealed that poor knowledge about oral cancer is not only related to schooling years but also to the quality and impact of oral cancer campaign in whole society as part of a solid public health policy on oral cancer prevention [33]. Education has played a role in this study since graduate people had the least percentage among participants (17.8%) while participants at secondary school reported 36.1% which can be explained by the desire of the teenagers to explore new habits and the beer pressure they might be exposed to.

Regarding the oral cancer treatment, 46.4% of participants think that oral cancer is a curable disease but only 7.4% of participants think it should be treated surgically. The effect of treatment delay on oral cancer prognosis was mentioned by 56.2% of participants which is lower than a result reported in Portugal where 94.5% agreed that early detection could improve the treatment outcome [34].

Conclusion

The area surveyed and the sample size was sufficiently large to provide information about Toombak use in Sudan. However, this information can't be generalized since there is wide variation in Toombak use in different area of Sudan. A need for a systematic campaign on risk of oral cancer and the implementation of a system that can mobilize health professionals in earlier detection of primary oral lesions to allow diagnose of oral cancer in its initial phase.

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Statement Conflict of Interest

The authors declare no conflict of interest.

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