

Oral cancer in young Jordanians: potential association with frequency of narghile smoking

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Objective. The aim of this study was to investigate the relationship between narghile (water-pipe) smoking and the age of patients when diagnosed with oral cancer.

Study Design. Patients with oral cancer registered in the Jordanian National Cancer Registry were asked about frequency of cigarette, narghile, and alcohol use. Relationship between age at diagnosis and risk factors was assessed using multiple regression analysis.

Results. In this sample, 66% of patients were cigarette smokers, and 36% and 17% were narghile smokers and alcohol drinkers, respectively. The multivariate regression analysis adjusted for sex, cigarette smoking, and alcohol drinking found that narghile smokers were significantly younger when diagnosed with oral cancer compared with nonsmokers.

Conclusions. Narghile smoking is an independent risk factor associated with the development of oral cancer at a younger age. Prospective studies of its effect on the earlier development of oral cancer are needed to establish a cause-effect relationship. (Oral Surg Oral Med Oral Pathol Oral Radiol 2014;118:560-565)

Cancer is a major health problem worldwide, with more than 14 million new cancer cases and more than 8.2 million deaths reported annually throughout the world.¹ Oral cancer is ranked among the top 10 cancers worldwide. However, this ranking shows high variation between countries. For example, whereas oral cancer is the ninth most common cancer in the Eastern Mediterranean region, the ranking jumps to number 1 in men from countries of the Indian subcontinent.² This regional variation is believed to be related to lifestyle risk factors practiced by different communities.

Most oral cancers are histologically squamous cell carcinomas that are linked to unhealthy lifestyle habits (such as tobacco smoking, alcohol drinking, and forms of smokeless tobacco) and to high-risk types of human papillomavirus.³ Tobacco's health hazards have been extensively studied, particularly in relation to cancer.

One of the forms of smoking tobacco is narghile, also called sheesha, hubble-bubble, water-pipe, hooka, and arghila. It consists of flavored tobacco that is burnt by a charcoal and inhaled through a water-filled glass container. There is a general misperception that this

method of inhaling burnt tobacco is less harmful,^{4,5} despite the high concentration and large volume of carbon monoxide generated.⁶⁻⁹ Narghile's effect on the cardiovascular system is evident in causing endothelial cell dysfunction,¹⁰ in decreasing heart rate variability, and in increasing blood pressure and heart rate.¹¹ Narghile smoking was found to increase nicotine concentration in the blood,¹² a finding that can explain its association with dependence.^{13,14} Narghile not only is addictive but also is seen as a factor that leads to the habit of cigarette smoking.^{15,16}

Narghile smoking has significant associations with diseases of the respiratory system (including lung cancer) and low birth weight, and it has possible associations with bladder, nasopharyngeal, and esophageal cancers and oral epithelial dysplasia.¹⁷

Narghile smoking is becoming a fashion among youth, but it is not a recent form of tobacco smoking. For centuries, narghile has been confined to Middle Eastern and Asian communities.¹⁸ With migration to the west, migrants carried this traditional smoking method to their new habitat, which was transferred to their succeeding generations. This was evident in some studies that found that a relatively high percentage of American youth of Arab decent preferred this smoking method compared with their non-Arab American counterparts, who preferred cigarettes.¹⁹ Other studies

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Statement of Clinical Relevance

This study found an important association between narghile (water-pipe) smoking and oral squamous cell carcinoma at a younger age of diagnosis.

found that narghile smoking is not restricted to specific communities but rather is a habit quickly spreading among the youth in many places in the world.^{15,19-22} For example, in the United States, studies found that between 10% and more than 20% of high school students reported smoking narghile.^{23,24} Another study performed among secondary school students in London found that nearly one-quarter of students have tried narghile smoking and that 7.6% were current narghile smokers.²⁵

Despite worldwide awareness campaigns on smoking health hazards, the prevalence of narghile smoking is rising. A prospective longitudinal study in which Jordanian school teenagers were followed up for a period of 2 years found an increase in the prevalence of current narghile smoking from 13.3% to 18.9%.²⁶ Prevalence studies among Jordanian university students found rates between 30% and 40%,^{27,28} which were similar to the rates among university students in other countries.^{29,30}

This pervasion of narghile smoking among the younger generations, particularly girls and young women,²⁰ can be explained by the perception of narghile smoking as being associated with joyful gatherings and togetherness. Another encouraging factor for young people is the fact that this method is socially acceptable compared with cigarette smoking, which is often seen as stigmatizing.^{4,18,31} As a result, narghile's prevalence was found to be fairly distributed among people from various socioeconomic classes compared with cigarette smoking, which was more prevalent among richer people.²⁷ Narghile smoking by parents and family members was found to be an encouraging factor for youngsters to start this habit.²⁰

Jordan, an Arabian Middle Eastern country, has a population of 6.39 million.³² Between 1996 and 2008, more than 21 000 Jordanians were diagnosed with cancer. Among those, 729 (3.3%) had cancers affecting the lip, mouth, and pharynx.³³ No data on the prevalence of tobacco and alcohol use among those patients with cancer are available. The rapid spread of narghile smoking among young people in different parts of the world¹⁸⁻³¹ and the lack of data on the topic of narghile-associated diseases in younger persons serve as the impetus of this research. In this study, we investigated the relationship between the frequency of narghile smoking and the age of cancer development in a cohort of Jordanian patients previously diagnosed with squamous cell carcinoma.

MATERIALS AND METHODS

All cases of oral cancer registered with the Jordanian National Cancer Registry between the years 1996 and 2008 were identified and extracted. Sites included in this study were the lip (excluding the external lip), mouth, and oropharynx, identified by codes C00-C10 of

the International Classification of Diseases for Oncology, Third Edition, excluding C08 (salivary glands). Inclusion criteria were biopsy-proven squamous cell carcinoma, Jordanian nationality, and valid patient contact details.

Personal information and tumor characteristics were collected from each case file. Participants were telephone-interviewed by 2 research assistants who were trained in cancer data collection and patient communication by the National Cancer Registry. Participants were asked if, before their cancer diagnosis, they smoked cigarettes, smoked narghile, drank alcohol, or had any combination of those habits. Those who answered positively were asked about the frequency of their consumption. Answers were entered into an online survey form, then extracted into Excel 2010 (Microsoft Corp, Redmond, WA, USA). Data were later categorized based on duration and frequency of use of tobacco and alcohol; regularity of use was defined as being a cigarette smoker of at least 10 cigarettes per day and an alcohol drinker at least once per month in the 3 years before cancer diagnosis. Frequency of narghile smoking was determined by asking patients to choose the best option that describes their narghile use during the 3 years before their cancer diagnosis: Daily, a few times per week, a few times per month, a few times in life, or never. Participants were then clustered into regular users (if daily use or a few times per week to a few times per month) or occasional users (a few times per year). Those who never used or used only a few times in their lives were considered nonsmokers. Deceased patients were excluded from this study.

Statistical analysis

IBM SPSS/PASW, version 20 (IBM Corp), was used for data processing and analysis. Descriptive statistics were computed for the total sample. Participant characteristics were described using frequency distribution for categorical variables and means and SDs for continuous variables. Independent *t* test was used to assess the association between age at diagnosis and sex according to frequency of narghile smoking (regular, occasional, or never). Analysis of variance was also used to evaluate the bivariate association between age at diagnosis and narghile smoking. Additional multiple regression analysis was used, in which the association between age at diagnosis (dependent variable) and narghile smoking (independent variable) was examined, after adjustment for alcohol drinking, cigarette smoking, and gender. In this analysis, age at diagnosis in regular and occasional narghile smokers was compared with the age in nonsmokers (reference group). Parameter estimates with 95% CIs were calculated and reported with *P* values.

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