

Smoking pattern among female college students in Dammam, Saudi Arabia

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ABSTRACT

Background: Smoking is the most important avoidable cause of premature morbidity and mortality in the world. The estimated annual death rate of 4.9 million people in 1999 is expected to rise to 10 million by the 2020s and 2030s, 7 million of which will occur in developing countries. **Aim:** The aim of the present study was to estimate the prevalence of smoking and assess its pattern among non-medical female college students in Dammam, Saudi Arabia. **Materials and Methods:** A cross-sectional study was conducted of 1020 female students selected from the literature and science colleges by multi-stage stratified random sampling technique with proportional allocation. Data were collected using a self-administered modified WHO Global Youth Tobacco Survey questionnaire. **Results:** Results revealed that occurrence of smoking among female college students was 8.6%. It was significantly higher among literature college students (12.1%) than among Science College students (3.4%). The mean age at which smoking started was 16 ± 2.4 years, with a minimum of 11 years. More than half of the students who smoked were cigarette smokers, while 43.2% were shisha smokers. There was a strong relationship between parents who smoked and daughters who smoked. The main motive for smoking was curiosity (44.3%), followed by relief of tension (26.1%). **Conclusions:** It may be concluded that smoking is increasing among female college students in Saudi Arabia. Accordingly, it is recommended that a preventive comprehensive health education program on smoking be initiated for females in middle schools, that stricter tobacco control measures be adopted by the government, and that anti-smoking clinics be established in colleges.

Key words: College students, females, Saudi Arabia, smoking

INTRODUCTION

Smoking is a major worldwide public health problem. It is the most important avoidable cause of premature morbidity and mortality in the world, placing the heaviest burden of morbidity and mortality compared to any other risk factor on people. The estimated death rate of 4.9 million people in 1999 is expected to rise to 10 million by the 2020s and 2030s, 7 million of which will occur in developing countries. Smoking is more prevalent globally among males than among females. In developing

countries, it is estimated that about 48% of males and 7% of females are smokers.^[1] Most smokers start the habit during adolescence; less than 2% of them start smoking after their 22nd birthday.^[2,3]

In Saudi Arabia, smoking is increasing particularly among the youth. The prevalence of smoking in adults in 2000 was reported as 11.6%, being higher among males (21.1%) than among females (5.2%).^[4] In the Eastern Province, Saudi Arabia, a study conducted among female paramedical students in 1999 revealed that the overall smoking prevalence was 5.6%.^[5]

Tobacco consumption causes multiple health risks. Cigarette smokers are 2–4 times more likely to develop coronary heart disease than nonsmokers. Cigarette smoking approximately doubles a person's risk for stroke. Smokers are more than 10 times as likely as nonsmokers to develop peripheral vascular disease. It is estimated that nearly one-fifth of deaths from heart disease is attributable

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to smoking and the WHO cancer agency indicated that cigarette smoking has been linked to about 90% of all lung cancer cases. It also reported that active smoking was linked to cancer of stomach, liver, uterus, kidneys and myeloid leukemia.^[6,7]

In women, smoking reduces fertility and increases the rate of spontaneous abortions and complications of pregnancy such as abruptio placenta, placenta previa, bleeding and premature rupture of membranes. The risk of coronary heart disease is increased among women smokers who use oral contraceptives. Among postmenopausal women, current smokers have an increased risk of osteoporosis than non-smokers and have an increased risk of hip fracture. Smoking also carries an increased risk of facial wrinkling.^[8,9]

Smoking poses adverse social, economic and developmental effects on the lives of individuals, their families and communities. The economic burden includes direct medical care for tobacco-induced illnesses, absence from work, reduced productivity and loss of life from early death.^[10] Smoking has been known in Saudi Arabia for more than 50 years, but of late tobacco imports have increased, with an average annual expenditure of 600 million Saudi Riyals.^[11,12] Smoking is increasing, particularly among the young in Saudi Arabia, partly due to aggressive marketing by tobacco companies.^[1]

The aim of the present study was to estimate the prevalence and assess the smoking patterns among female non-medical college students in Dammam, Saudi Arabia.

MATERIALS AND METHODS

A cross-sectional study was conducted in University of Dammam. The study population included all female students enrolled in the literature and science colleges in 2005. The total number of college students was 9286. The sample size was calculated by EpiInfo based on a prevalence of 12% of smoking among females in previous studies^[1] and a worst expected frequency of $\pm 3\%$ at a confidence level of 95%. Accordingly, the minimum required sample size was 920. Taking into account the expected response rate based on the pilot study, which was 75%, the sample size was increased to 1200 college students, selected by a multi-stage stratified random sampling technique with proportional allocation as follows. First, colleges were sub-classified by type into literature and science, then by specialties, and educational levels. Students were selected by systematic random sampling, choosing every fifth student from the list of registered students at each educational level and specialty,

till the desired proportionate sample size was obtained. Data were collected by a pre-designed self-administered Arabic questionnaire. It was modified from the WHO Global Youth Tobacco Survey questionnaire.^[13] The code of confidentiality was kept throughout the study period. After data collection, all variables were checked for accuracy and completeness, coded and entered into a personal computer and analyzed using the SPSS program.

The smoking index was calculated by multiplying the average number of cigarettes smoked per day (one shisha was considered equal to 18 cigarettes) by the number of years of smoking.^[14] Data were presented in frequency tables, bar and pie charts. The appropriate statistical analytical techniques were performed. Bivariate analysis was conducted using χ^2 -test for qualitative data and Fisher's exact P for expected frequency less than 5 in more than 20% of the cells.

RESULTS

Of the total sample of 1200 science and literature students, 1020 responded to the self-administered questionnaire, giving a response rate of 85%.

Figure 1 demonstrates that 8.6% of the college students were smokers: 2.2% were regular smokers, 3.3% were occasional smokers and 3.1% were ex-smokers.

Table 1 shows the distribution of female students by college. Smoking was significantly more common among students of the literature college (12.1%) than those of the science college (3.4%) ($P < 0.001$).

Figure 2 illustrates the type of smoking done by female college students. More than half of students who smoked were cigarette smokers (54.5%) and 43.2% were shisha smokers.

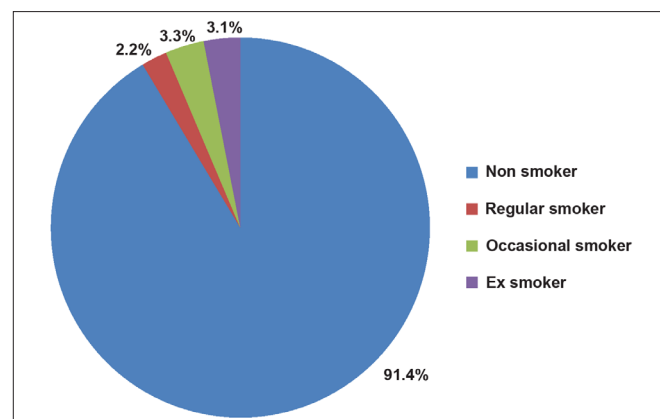


Figure 1: Smoking among literature and science college students, Dammam

Table 2 reflects the attributes of tobacco consumption practice among smokers. The mean age of the studied students was 20.4 ± 1.6 years. The mean age at which smoking was initiated was 16 ± 2.4 years, with a minimum of 11 years. The mean duration for smoking was 3.2 ± 2.1 years. The mean number of cigarettes smoked per day was 3.4 ± 2.3 , while for shisha it was almost two, and the mean smoking index was 44.4.

Table 1: Distribution of female students by smoking and college

Smoking status	College				Total	
	Literature		Science		No.	%
	No.	%	No.	%		
Smoker	74	12.1	14	3.4	88	8.6
Nonsmoker	538	87.9	394	96.6	932	91.4
Total	612	100	408	100	1020	100

$\chi^2(1) = 23.29; P < 0.001$

Table 2: Characteristics of female smokers

Characteristics	Mean \pm SD	Min.	Max.
Age (years)	20.4 ± 1.6	17	27
Age of starting smoking (years)	16 ± 2.4	11	23
No. of cigarettes/day	3.4 ± 2.3	1	10
No. of shisha/day	1.8 ± 0.7	1	3
Duration of smoking (years)	3.2 ± 2.1	1	10
Smoking index	44.4 ± 58.4	1	230

Table 3: Factors related to initiation of smoking among female college students

Factors	Female smokers (n = 88)	
	No.	%
Source of first cigarette		
Parents	31	35.2
Friends	26	29.5
Self	16	18.1
Brothers, sisters	11	12.5
Others	4	4.5
Motives for smoking*		
Curiosity	39	44.3
To relieve tension	23	26.1
To occupy the free time	18	20.5
To help concentrate on studies	12	13.6
Imitation of friends	12	13.6
Sign of maturity	8	9.1
Imitation of parents	6	6.8
Imitation of actors	5	5.7
Others	7	8.0
Place of smoking the first cigarette		
Home	33	37.5
Trip with friends	18	20.4
Coffee shop	16	18.2
College	5	5.7
School	3	3.4
Exercise club	3	3.4
Others	10	11.4

*Answers were not mutually exclusive

Table 3 shows the factors related to initiation of smoking. It was found that parents or friends were the main source of the first cigarette smoked (35.2% and 29.5%, respectively). The main motive for smoking was curiosity (44.3%), followed by relief of tension (26.1%). About 40% of the students started smoking at home, while about one-fifth started while on trips with friends or in coffee shops.

Figure 3 demonstrates what the parents smoked. It shows that 72.4% smoked cigarettes and 24% smoked shisha. Most of the fathers smoked cigarettes (81.8%), while most of the mothers smoked shisha (76.9%). The difference was statistically significant ($P < 0.001$).

Table 4 shows the relationship between students who smoked and parents who smoked. It reveals that 236 out of 1020 fathers (about 23%) and 39 out of 1020 (4%) mothers smoked. It was found that 15.5% of the fathers who smoked had daughters who smoked, while only 6.6% of non-smoking fathers had daughters who smoked. The rate was even higher for mothers who smoked, as 33.3% of those mothers had daughters who smoked, compared to only 7.6% daughters of mothers who did not smoke. Both the differences were statistically significant ($P < 0.001$).

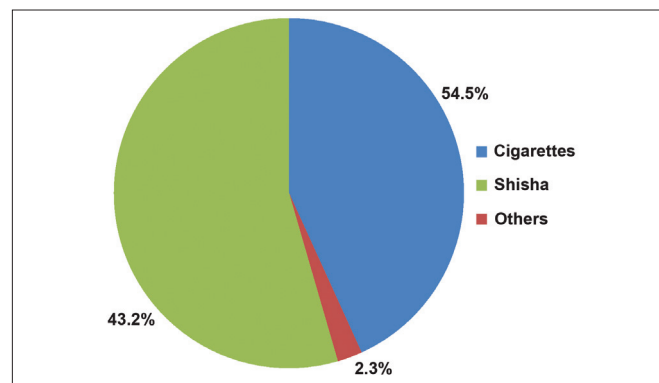


Figure 2: Types of smoking among female literature and science college students

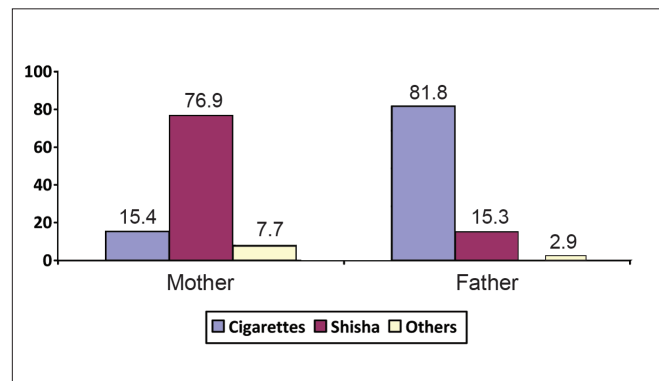


Figure 3: Types of smoking among parents of female college students, Damman

Table 4: Relationship between students' smoking and parents' smoking

Smoking parents		Smoking students				Total (N = 1020)		$\chi_{(1)}^2$	P
		Yes (n = 88)		No (n = 932)		No.	%		
		No.	%	No.	%				
Smoking fathers	Yes	36	15.5	200	84.7	236	100	17.1	<0.001
	No	52	6.6	732	93.4	784	100		
Smoking mothers	Yes	13	33.3	26	66.7	39	100	Fisher's exact test	<0.001
	No	75	7.6	906	92.4	981	100		

DISCUSSION

The prevalence of smoking among women varies markedly from country to country, ranging from an estimated 7% in developing countries to 24% in developed countries.^[1] Stopping further increases in tobacco use among women is one of the greatest challenges in the prevention of disease in the world today.

The present study reveals that the prevalence of smoking among female students of the literature and science colleges in Dammam was 8.6%. Recent studies conducted in Riyadh (2000) and in Jeddah (2006) on female college students revealed that the prevalence of smoking was 9% and 14%, respectively.^[15,16] These figures were higher than those of previous studies conducted in Dammam (1999) and in Riyadh (1992), which revealed the prevalence of smoking among female college students to be 5.6% and 6.3%, respectively,^[5,17] indicating an increasing prevalence of smoking among female students in Saudi Arabia. These results on smoking in Saudi Arabia should be of public health concern. Women/mothers, who are role models for their children and in constant contact with their offspring, should be in good health to function effectively and fulfill their responsibilities to their families and their communities. The effect of this startling trend among women would be detrimental to health and socioeconomic conditions, if it is allowed to continue.

EMRO statistics in the late 1990s revealed that the prevalence of smoking among adult females in Saudi Arabia was higher than in all other Gulf countries.^[18-22] In comparison with other EMRO countries, smoking was more prevalent among adult females in Saudi Arabia than in Sudan, West Bank and Gaza strip, Tunisia, Iran, Egypt, Iraq and Jordan.^[23-29] However, it was slightly lower than in Pakistan, Syria, Djibouti and Morocco^[30-33] and much lower than in Yemen.^[34] Smoking was more prevalent among adult males in all EMRO countries than among females, as female smoking is still socially unacceptable, though the trend is rising.

In developed western countries like the USA, though the prevalence of smoking is decreasing in males, it is still high among females.^[35]

According to our results, out of the 8.6% female college students who smoked, 3.3% had stopped smoking. Similarly, the study conducted in Riyadh in 1993 among female non-medical college students revealed that one-third of students had stopped smoking.^[36]

According to the present study, the mean age at which smoking was initiated was 16 years, the minimum being 11 years. Similar studies had reported comparable findings, where the age at which female college students started smoking ranged between 10 and 22 years.^[5,36,37] These figures reaffirm the importance of effective health education as early as possible in schools and through the mass media in order to protect children, especially girls, from adopting this dangerous habit.

According to the present study, the mean number of cigarettes smoked by non-medical female college students was about three per day. These figures were higher than those reported by Mandil *et al.* on paramedical female college students in Dammam. However, the two studies had similar findings on the number of shisha smoked per day (about two).^[5]

The present findings showed a statistically significant relationship between student smokers and parent smokers. It was found that 15.5% of the fathers who smoked had daughters who smoked. The rate was even higher for mothers who smoked, as one-third of the mothers who smoked had daughters who smoked. The same results were found in another study conducted in Saudi Arabia which showed that smokers were more likely to have a parent who smoked.^[16] This shows that parents, particularly mothers, are role models for their daughters.

Concerning the factors relating to the initiation of smoking, it was found that parents were the main source of the first cigarette, followed by friends. Other recent studies conducted among female college students in Saudi Arabia revealed that the main source of first cigarette was friends followed by parents,^[5,15,18] indicating that among the youth, peer pressure played a role in starting the habit.

According to the present study, most of the students had their first cigarette at home, which is in agreement with

the Dammam study conducted among paramedical female college students.^[5]

In our study, most students indicated that the reason for starting to smoke was curiosity. Relief of tension was the next reason. Similar findings were reported by Mandil *et al.* for the adoption of the habit.^[5]

A study conducted in 2002 revealed that the transition from high school to college was a time of personal growth with its attendant developmental stress. Some young women use smoking as a means of trying to cope. Therefore, finding ways to understand psychosocial development and caring for college-age women can effect changes in smoking behavior.^[38]

The present study shows that more than half of the students who were smokers smoked cigarettes, while 43% smoked shisha. Mandil *et al.* reported that 40% of the students smoked shisha.^[5] Moreover, most of the fathers in our study smoked cigarettes, while most of the mothers preferred shisha. This indicates that shisha smoking among females is common in our society and that the mothers' habit affected the habits of their daughters.

Some reports reveal an erroneous belief by the public that water pipes held fewer health risks than cigarettes.^[39] Among the university students in Syria,^[40] one-third of those sampled thought water pipes were less harmful than cigarettes, while in Egypt one-fifth of adult male water pipe users reported that they preferred the use of water pipe to cigarette smoking because it was less harmful.^[41] This may explain the current popularity of shisha.

In some societies, gender plays an important role in maintaining the low rate of cigarette smoking among women, though the use of water pipe seems unaffected to the same extent. A recent study in Syria examined the perceptions of the use of a water pipe and cigarette smoking by sex of the respondent and sex of the smoker. The perception of the use of water pipe was generally more positive than cigarette smoking, especially for women. Respondents were particularly enthusiastic about the positive aspects of water pipe, including the fact that it seemed traditional, familiar, and socially attractive. Overall, water pipe smoking may be on its way to becoming the norm in the EMR, especially for women and girls.^[42-44]

Water pipe smoke contains significant amounts of dangerous constituents, including nicotine and heavy metals such as arsenic, cobalt, chromium, and lead.^[45-47] Under normal conditions, the smoke produced from a single water pipe use contains approximately the same amount of nicotine-free, dry particulate matter ("tar") as that present in

approximately 20 cigarettes.^[45] However, the tar produced by a water pipe may differ from that produced by a cigarette because in a water pipe, tobacco is heated to about half the temperature of tobacco in a cigarette. Temperature may be positively associated to tar related tumorigenicity and mutagenicity.^[48]

Aside from the direct effect of smoke constituents, since it is customary to share a water pipe in many cultures, the social dimension of the use of water pipe may help the spread of infectious agents. For example, in Aleppo, Syria, the majority of water pipe smokers among university students share the same water pipe with their friends.^[49] In Beirut, Lebanon, 90% share the water pipe.^[50] In India, it is an insult not to offer one's water pipe to a guest.^[51] This practice can spread tuberculosis^[52] and viruses like herpes and hepatitis, particularly since the temperature of the smoke that comes out of the mouthpiece of the water pipe is similar to that of air.^[45]

It may be concluded that the prevalence of smoking among female college students in Saudi Arabia is increasing. Accordingly, it is recommended that a preventive comprehensive health education program on smoking be initiated for females in middle schools, that stricter tobacco control measures be adopted by the government, and that anti-smoking clinics are established in colleges.

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