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Prevalence of Tobacco Use and its Socio-demographic Determinants among Saudi Female School Adolescents in Jeddah

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ABSTRACT

Tobacco use among females is a rising public health issue. Further insight into the smoking epidemic can be gained from studying a specific subgroup of interest within the population. Determining predictors of each tobacco smoking type is necessary for planning tobacco specific intervention programmes. The aim of this study was to determine the prevalence of ever tobacco use and its associated socio-demographic factors among Saudi female adolescents aged 12 to 19 in Jeddah. A cross-sectional analytical study was conducted among female students from intermediate and high secondary schools in Jeddah during the academic year 2012-2013. Sampling with probability proportionate to size was used to select a sample of 5,150 students from 40 schools. The data were collected using validated self-administrated questionnaire that required information on tobacco use behaviours and selected socio-demographic characteristics. A total of 5,073 students participated in this study of whom 51.6% were from intermediate grades, and 83.1% from public schools. The prevalence of ever tobacco use was 44.2% (36.2% water pipe and 30.9% cigarettes). The significant predictors of ever tobacco use were student's age, mother's education, family structure, residence location and monthly student's allowance. In conclusion, ever tobacco used is highly prevalent among female adolescents in Jeddah. Designing intervention programmes aimed at preventing Saudi female adolescents from smoking should include all forms of tobacco use.

Keywords: Tobacco use prevalence, Water pipe smoking, Tobacco smoking predictors, Female adolescents

INTRODUCTION

The growing prevalence of tobacco use is a global public health concern. By 2030, the number of smokers is expected to rise from the current 1.3 billion to 2 billion, of whom 84% will be living in developing countries.[1] Worldwide, it is estimated that the prevalence of smoking among men (48%) is four times higher than women (12%).[2] However, the trend of male tobacco use prevalence has decreased in many parts of developed and developing countries. Contrariwise, World Health Organisation (WHO) indicates that there is a potential increase in global tobacco epidemic among females.[3] Presently, it is estimated that there are about 250 million daily smoking women around the world, of whom 22% are in developed and 9% in developing countries. If no effective action is taken to prevent the current trend, it is estimated that about one fifth of the global female population will be tobacco smokers by 2030 as compared to merely12% in 2005.[4]

The gap in tobacco use prevalence between males and females has narrowed because of the growing prevalence of smoking among young girls.[3] As people become more aware about the harms of smoking cigarettes, various new inventive tobacco products have been introduced and promoted by tobacco companies to further encourage smoking habits among youth. There is no such thing as a safe tobacco product. All types of tobacco use are linked to health risks, at least equal to, if not more than the risks caused by cigarettes.[5]

Smoke and smokeless tobacco use behaviours are mostly initiated during adolescence. Young people are the most vulnerable group to become tobacco users, as they are susceptible to various social and environmental influences that make them easy target for tobacco industries. Once hooked, they will possibly become everlasting tobacco consumers throughout their lives.[6] The Global Youth Tobacco Survey (GYTS) in 2008, reported that 14% of female

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adolescent aged 13 to 15 years currently use any forms of tobacco. Overall, 7% of girls smoke cigarettes, and 8% use other tobacco products. While smoking cigarettes is significantly higher among girls in the European (17%) and American regions (15%), the use of other tobacco products is significantly higher among girls in both African (11%) and Eastern Mediterranean regions (9%).[7] Evidence reveals an alarming increase in water pipe smoking (WPS) around the world, particularly among the youngsters in the Middle East countries.[8] Over the past two decades, several studies indicated that tobacco use epidemic has increased in the Kingdom of Saudi Arabia (KSA). However, most of the studies on adolescent's smoking were focused among males in central region of the kingdom.[9] This study was conducted to determine the prevalence of ever tobacco use and its associated socio-demographic factors among Saudi female school adolescents in Jeddah.

MATERIAL AND METHODS

Study Design

A cross-sectional analytical study was conducted among Saudi female secondary school students (grade 7 to 12) in Jeddah. Jeddah represents the major urban centre in the western province of Saudi Arabia. The educational system in KSA is gender-segregated and it has three main pre-college levels: elementary (grades 1 to 6), intermediate (grades 7 to 9) and high school (grades 10 to 12). The city has a total of 176 intermediate and 161 high female secondary schools, with a total of 95,695 female students, of whom 66,065 are Saudi citizens. About 84% of the students are enrolled in government schools and 16% in private schools. The estimated sample size for this study was derived from the formula provided for hypothesis testing for two population proportions.[10] Considering the prevalence of smoking, 11% and 7% among public and private school students, respectively,[11] with a confidence level of 95% and power of 80%, the minimum sample size calculated was 1606 students. Additional adjustment to the sample size was carried out, taking into account the estimated sample effect, expected response rate and expected proportion of eligible responds.[10] The final total sample size of the respondents was 5,150. In order to ensure a representative sample, all schools were stratified into four strata according to school grade (intermediate versus high) and school type (government versus private). Forty schools were needed to yield the desired sample size of 5,150 students from 28 governments and 12 private schools. A proportionate allocation was used to define the number of respondents needed from each stratum and school. A simple random sampling method was performed to select the respondents from the student's name lists provided by the schools, using random number generator.

Data Collection/ Study Instrument

The data were collected during the academic year from 1st October 2012 to 25th May 2013. Anonymous closed-ended self-administered questionnaires were distributed to a total of 5,150 students. The instrument was administrated in the Arabic language and was pre-tested and validated.

Measures

Tobacco use questions were adopted from the Arabic version of GYTS, 2008.[12] The prevalence of eight tobacco use types were measured in this study including cigarettes, water pipes (WP), cigars, pipes, bidis, kreteks and *shammah* (moist snuff tobacco). Ever use was defined as reporting ever using/smoking tobacco products (even a single puff) at any time in life.

Ethics

The study was approved by the Medical Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM). Prior to data collection, permission for conducting the study was obtained from the school health department and directorate of female education in the Ministry of Education, Saudi Arabia. The selected schools were contacted via e-mail and/or telephone calls. The principal of each school was provided with a copy of the written approval from the local education directorate explaining the purpose of the study and seeking permission to conduct the survey among the students in their schools. The approval letter was accompanied by copies of consent forms for the respondents and their parents.

Data Analysis

The data was analyzed using *SPSS*, version 21. The normality tests (Kolmogorov-Smirnov) indicated that the data were not violated the normality of distribution. Descriptive statistics for socio-demographic and smoking characteristics were presented as frequencies and percentages. The data was analysed by comparing the prevalence of never versus ever smokers according to the socio-demographic factors using the Pearson chi-squared test (χ^2). Cigarettes and WPS were analysed separately. Multivariate binary logistic regression models were conducted to determine the socio-demographic predictors for each of smoking type. The results were expressed as odd ratio (OR) with 95% confidence interval (CI), and p-value < 0.05 was considered statistically significant.

RESULTS

Out of 5,150 students, 5,073 participated in this study, giving a response rate of 98.5%. Table 1 presents the socio-demographic characteristics of the study respondents. The overall mean age was 15.5 years and ranged from 12 to 19 years. Approximately half of them (51.6%) were from intermediate grades. Majority (83.1%) of the respondents were from public schools, 86.7% were living with both parents. Almost one third of both parents achieved college educational level (39.7% of the fathers and 35% of the mothers). Majority of the respondents (74.4%) received monthly allowance (pocket money) of ≤ 300 Saudi Riyal and half of them (50.6%) reported monthly family income from 10,000 to 20,000 Saudi Riyal.

Table 1. Socio-demographic characteristics of the respondents (N=5073)

Characteristics		Frequency	Percentage
Age in years	12	159	3.1
	13	642	12.7
	14	894	17.6
	15	877	17.3
	16	920	18.1
	17	813	16.0
	18	639	12.6
	19	129	2.6
School grade	Intermediate	2617	51.6
	High	2456	48.4
School type	Public	4218	83.1
	Private	855	16.9
Father's	No formal education	112	2.2
educational	Elementary school	332	6.5
level	Intermediate school	559	11.0
	High school	1165	23.0
	College	2012	39.7
	Post college	893	17.6
Mother's	No formal education	251	4.9
educational	Elementary school	453	9.0
level	Intermediate school	760	15.0
	High school	1395	27.5
	College	1811	35.7

	Post college	403	7.9
Family structure	Live with both parents	4400	86.7
	Live with father alone	210	4.1
	Live with mother alone	414	8.2
	Live with others	49	1.0
Residence location	North districts	1674	33.0
	Center districts	1333	26.3
	South districts	2066	40.7
Monthly family income	< 5000 SR	278	5.5
	5000 SR to < 10000SR	1234	24.3
	10000 SR to < 20000 SR	2565	50.6
	≥ 20000 SR	996	19.6
Student's monthly allowance	≤ 300 SR	3776	74.4
	301 SR to 500 SR	643	12.7
	501 SR to 700 SR	330	6.5
	>700 SR	324	6.4

SR: Saudi Riyal, (1 SR= 0.27 US Dollar)

Prevalence of Smoking

The overall prevalence of ever tobacco use in any form was 44.2%. Water pipe smoking (36.2%) was the main form of ever tobacco use followed by cigarette smoking (30.9%). The prevalence of other type of smoking was low (smoking cigars 1.9%, pipes 0.5%, *shamma* 0.3%). No respondent ever smoked bidis or kreteks.

The Characteristics of Ever Cigarettes and Water pipe Smoking

Table 2 shows that majority of ever cigarette smokers (57.7%) and ever WP smokers (64.1%), stated that they experienced their first puff of smoking at age of 14 years or older. Further analysis (chi-square test) was conducted to determine the association between the age at smoking initiation and tobacco smoking type. Cigarette smoking was significantly initiated at younger age (≤ 13 years) compared with WP smoking (χ^2= 14.45, p = 0.0001). Regarding the companion of first smoking experience, 30.6% of the respondents started smoking cigarettes, and 36.2% started WPS with one of their family members. Initiation of WPS was more significant with family members companion (χ2= 19.02, p = 0.0001) while cigarette smoking initiation was significantly more common with friends companion. The results also showed that two fifths of the ever cigarette smokers initiated their first cigarette smoking at their own house while 36.5% of ever WP smokers initiated the habit at a cafe or restaurant. The most common reasons for initiating cigarette smoking were because of its availability (39.1%), out of curiosity (38.8%) and its affordability (38.3%), while the most reported reasons for smoking WP were its flavours and appealing smells (70.4%), for fun (62.3%) and because of friend's influence (57%).

Table 2. Distribution of ever smokers by age, place and accomplice at initiation and reasons for initiating by tobacco smoking type

Characteristic of first smoking		Cigarette (N= 1567)		Water pipe (N=1834)	
		n	%	n	%
Age at initiation	≤ 13	663	42.3	658	35.9
smoking	≥ 14	904	57.7	1176	64.1
Company of ever	Alone	311	19.8	181	9.9
smoking	With one of family member	479	30.6	663	36.2
	With group of family members	221	14.1	389	21.2
	With one friend	187	11.9	174	9.5
	With group of friends	331	21.1	378	20.6
	With Others	38	2.4	49	2.7
Place of ever	At home	612	39.1	359	19.6
smoking	At school	64	4.1	-	-
	At family member's house	265	16.9	381	20.8
	At friend's house	176	11.2	198	10.8
	Restaurant/ café	235	15.0	670	36.5
	Other place	215	13.7	226	12.3
Reasons for initiation	Because of parents smoking	577	36.8	638	34.8
tobacco smoking*	Because of friends smoking	525	33.5	1045	57.0
	Out of curiosity	608	38.8	922	50.3
	For fun	484	30.9	1143	62.3
	It creates social atmosphere	329	21.0	863	47.1
	In line with my traditions	332	21.2	596	32.5
	Its less harmful than other tobacco type	338	21.6	707	38.5
	Its available everywhere	612	39.1	692	37.7
	Its affordable	599	38.2	492	26.8
	It has good smell and flavor	314	20.0	1292	70.4

*Participants were allowed to choose more than one answer

Factors Associated with Tobacco Use

Table 3 shows a significant association between tobacco use and age, school grade, mother's education, family structure, residence location, monthly family income and monthly student's allowance ($p < 0.05$). School type and father's education were significantly associated with WPS but not with cigarettes smoking ($p > 0.05$). The prevalence of ever tobacco use was higher among high school students (53.3%) compared to intermediate students (35.6%). The prevalence of ever tobacco use was higher among the respondents living in north districts of Jeddah (49%), respondents with monthly family income of more than 10000 SR (45.6%) and respondents who received monthly allowance of more than 500 SR (60.9%). The prevalence of ever cigarette smoking was significantly higher among the respondents who reported living with other than their parents (46.9%), and higher WPS rate (52.9%) was found among the respondents who live with single mothers. The prevalence of ever WPS was significantly higher among respondents in private schools (41.1%) than of public schools (35.2%). Water pipe smoking prevalence was also significantly higher among the respondents with tertiary educated fathers (38.9%), and secondary educated mothers (38.2%).

Table 3. Association between student's socio-demographic characteristics and smoking

Variables		Ever tobacco users (N=2242)		Ever cigarettes smokers (N=1567)		Ever WP smokers (N=1834)	
		n (%)	*P*-value	n (%)	*P*-value	n (%)	*P*-value
Age in years	12	18 (11.3)	<0.001*	6 (3.8)	<0.001*	16 (10.1)	<0.001*
	13	160 (24.9)		84 (13.1)		126 (19.6)	
	14	311 (34.8)		203 (22.7)		246 (27.5)	
	15	386 (44.0)		254 (29.0)		305 (34.8)	
	16	462 (50.2)		343 (37.3)		380 (41.3)	
	17	451 (55.5)		320 (39.4)		382 (47.0)	
	18	370 (57.9)		289 (45.2)		307 (48.0)	
	19	84 (65.1)		68 (52.7)		72 (55.8)	
School grade	Intermediate	932 (35.6)	<0.001*	596 (22.8)	<0.001*	741 (28.3)	<0.001*
	High	1310 (53.3)		971 (39.5)		1093 (44.5)	
School type	Public	1849 (43.8)	0.135	1295 (30.7)	0.520	1483 (35.2)	0.001*
	Private	393 (46.0)		272 (31.8)		351 (41.1)	
Father's	Primary	192 (43.2)	0.416	135 (30.4)	0.968	136 (30.6)	<0.001*
educational	Secondary	743 (43.1)		535 (31.0)		569 (33.0)	
level	Tertiary	1307 (45.0)		897 (30.9)		1129 (38.9)	
Mother's	Primary	269 (38.2)	0.001	201 (28.6)	0.304	185 (26.3)	<0.001*
educational	Secondary	991 (46.0)		682 (31.6)		823 (38.2)	
level	Tertiary	982 (44.4)		684 (30.9)		826 (37.3)	
Family structure	Live with both parents	1838 (41.8)	<0.001*	1273 (28.9)	<0.001*	1482 (33.7)	<0.001*
	Live with father alone	126 (60.0)		86 (41.0)		109 (51.9)	
	Live with mother alone	249 (60.1)		185 (44.7)		219 (52.9)	
	Live with others	29 (59.2)		23 (46.9)		24 (49.0)	
Residence location	North district	820 (49.0)	<0.001*	583 (34.8)	<0.001*	724 (43.2)	<0.001*
	Center district	647 (48.5)		452 (33.9)		526 (39.5)	
	South district	775 (37.5)		532 (25.8)		584 (28.3)	
Monthly	< 10000 SR	618 (40.9)	0.001	431 (28.5)	0.009*	462 (30.6)	<0.001*
family income	≥ 10000 SR	1624 (45.6)		1136 (31.9)		1372 (38.5)	
Monthly students' allowance	≤ 500 SR	1844 (41.7)	<0.001*	1270 (28.7)	<0.001*	1475 (33.4)	<0.001*
	> 500 SR	398 (60.9)		297 (45.4)		359 (54.9)	

Chi-square (χ^2) was used to test all the associations, *significant at p value < 0.05, Primary, (non-formal and elementary), Secondary: (intermediate and high), Tertiary: (college and post collage).

Logistic Regression Analysis

Table 4 presents the results of the three multivariate logistic regression models with the dependent variables being ever tobacco use, ever cigarette smoking and ever WPS. Each multivariate model includes the socio-demographic variables, which showed p-value of less than 0.25 in the univariate logistic regression test. This p-value was recommended by Hosmer and Lemeshow,[13] as the use of higher p value level (such as 0.05) may fail to count the influential variables. The cigarette smoking model was adjusted with students' ever WP smoking behaviour, while the WP smoking model

was adjusted with students' ever cigarette smoking behaviour. The results showed that older students were significantly more likely to report ever tobacco use (AOR=1.34). Students live with mother alone were two times more likely to be ever tobacco users compared to those who live with both parents. Compared with those students who live in the south districts of Jeddah, ever cigarette smoking was more likely among students living in the central districts (AOR=1.27), and students who live in the north districts were more likely to be ever WP smokers (AOR=1.54). Students who reported receiving more than 500 SR per month were significantly more likely to be ever tobacco users (AOR=1.69) compared with those who received 500 SR or less.

Table 4. Multivariate logistic regression analysis of predictors of smoking

Variables		Ever tobacco users (N=2242)		Ever cigarettes smokers (N=1567)		Ever WP smokers (N=1834)	
		AOR (95%CI)	*P*-value	AOR (95%CI)	*P*-value	AOR (95%CI)	*P*-value
Age		1.34 (1.30, 1.39)	<0.001*	1.26 (1.21, 1.32)	<0.001*	1.19 (1.15, 1.25)	<0.001*
School type	Public	NS		NS		1	
	Private					1.07 (0.87, 1.32)	0.512
Father's	Primary	NS		NS		1	
educational	Secondary					0.97 (0.72, 1.29)	0.812
level	Tertiary					1.17 (0.87, 1.58)	0.293
Mother's	Primary	1		1		1	
educational	Secondary	1.50 (1.24, 1.82)	<0.001*	0.95 (0.75, 1.20)	0.643	1.78 (1.39, 2.28)	<0.001*
level	Tertiary	1.40 (1.13, 1.72)	0.002	0.97 (0.75, 1.25)	0.791	1.53 (1.17, 2.0)	0.002*
Family structure	Live with both parents	1		1		1	
	Live with father alone	1.99 (1.48, 2.68)	<0.001*	1.15 (0.82, 1.61)	0.426	1.89 (1.35, 2.64)	<0.001*
	Live with mother alone	2.03 (1.64, 2.52)	<0.001*	1.35 (1.06, 1.73)	0.016	1.91 (1.49, 2.44)	<0.001*
	Live with others	1.80 (0.99, 3.29)	0.055	1.57 (0.80, 3.10)	0.192	1.42 (0.72, 2.82)	0.313
Residence	South district	1		1		1	
location	Center district	1.56 (1.34, 1.82)	<0.001*	1.27 (1.05, 1.53)	0.014	1.36 (1.13, 1.63)	0.001*
	North district	1.54 (1.33, 1.78)	<0.001*	1.19 (0.99, 1.42)	0.065	1.54 (1.29, 1.84)	<0.001*
Monthly	< 10000 SR	1		1		1	
family income	≥ 10000 SR	0.88 (0.75, 1.02)	0.084	0.85 (0.71, 1.02)	0.087	0.99 (0.83, 1.19)	0.945
Monthly student's	≤ 500 SR	1		1		1	
allowance	> 500 SR	1.69 (1.41, 2.02)	<0.001*	1.25 (1.02, 1.55)	0.034	1.55 (1.26, 1.92)	<0.001*

AOR: adjusted odd ratio, 95% CI: 95% Confidence interval, * Significant at p < 0.05, NS: non-significant at the bivariate logistic regression

DISCUSSION

The prevalence of ever tobacco use among female students in this study was 44.2%. Consistent with other studies conducted in Saudi Arabia,[9] this study revealed that both cigarettes and WPS were the most common types of tobacco used by Saudi female adolescents in Jeddah. The prevalence of ever smoking cigarettes (30.9%) among females adolescents in this study was found to be higher than that reported among adolescent girls from Tabuk (23.1%) and other cities of KSA.[14] A survey among 16 to 18 year old male and female adolescents in Riyadh City reported similar prevalence of ever cigarettes smoking (31.4%) among female students.[15] However, the prevalence of ever WPS in this study was found three times higher than that stated for WPS among the young females in Riyadh (11.3%).[16] The difference in WPS prevalence probably reflects the fact that Jeddah has more places that serve WP (cafes and restaurants), and females in Jeddah may have fewer cultural restrictions for accessing these places, which may contribute to the spread of smoking habit among them. As in other Arab countries, Saudi culture opposes and stigmatizes female smoking practices. This norm differs from that of Western societies where female smoking is a common practice. However, this study indicated that the prevalence of tobacco smoking was much higher than those rates reported among female adolescents in London where ever smoking was found to be 16.7% and 25.2% for cigarettes and WPS, respectively.[17] This may indicate the growing change of female smoking norms among female society in Jeddah.

The prevalence of other tobacco use in this study showed no significant results. This finding is consistent with other study conducted among adolescents in Jeddah, which revealed no significant report for *shamma* use among the young females. This low prevalence could be attributed to the government ban on smokeless tobacco products. However, most of these banned products could be illegally imported and sold in Saudi Arabia. Hence, the clear risk of these products should not be neglected.[18] Comparable data on whether there is increase or decrease on ever use of cigars, pipes, bidis and kreteks among Saudi female adolescents are not available.

Assessing practices related to cigarettes and WP smoking behaviours among school girls represents an important starting point for formulating smoking prevention programmes, because smoking habits typically begin around adolescent's age.[19] This study revealed that water pipe smoking started later in life compared to cigarette smoking, and this is consistent with the finding of other studies in Egypt and USA.[11, 20, 21] This study also showed that while 39% of cigarette smokers initiated the smoking experience at home, two fifths of WP smokers experienced the habit outside the home, at cafés and restaurants. These findings are comparable to that reported in previous national and international studies.[20, 21]

In agreement with other findings,[19, 22, 23] the majority of students in this study had attributed their cigarette smoking behaviour to curiosity about smoking and the availability of tobacco product. Similarly a study from Tabuk Saudi Arabia indicated that easy access to cigarette smoking from parents or siblings at home seems to encourage young Saudi females to initiate and carry on cigarette smoking habit.[20] The results of this study revealed the fact that the motivations for either cigarette smoking or WP smoking are quite different. The majority of WP smokers in this study stated that they started WPS because of the flavours accompanied WP tobacco (*meassel*), for fun and because being influenced by of smoking friends. This finding is correlated with other findings in this study which showed that many of the students tended to pick up the habit during social outing with their family members or their friends in café, and restaurants. Similarly, these features were noted as the reasons behind the popularity of WPS among young people worldwide.[24, 25]

Similar to other studies conducted in Tabuk, Oman and London,[14, 17, 26] this study revealed significant association between ever smoking behaviour with age of adolescents and their monthly allowance. The study also found that ever smoking was more common among the private schools students, and those with higher monthly family income. In addition, female adolescents from north and central districts of Jeddah were more likely to use tobacco compared with those who lived in south districts. Another study conducted among school adolescents in Jeddah similarly showed that tobacco use is more common among those adolescents living in middle- and upper middle-class areas (mainly north and central districts).[18] One possible explanation is that north and central areas of Jeddah have more cafes and restaurants that provide a convenient environment for young females from higher economic classes to practice smoking. These findings indicated that female adolescents with more spending power are more likely to smoke as they have enough money to purchase tobacco. In this study, mother's educational level and family structure were significant predictors of WPS, as also reported by other studies in the kengdom.[18, 27] This study found that ever WP smoking was more common among adolescents whose mothers had secondary and tertiary education compared to those with primary-educated mothers. A possible explanation is that higher educated mothers may adopt more open attitudes towards WPS by their daughters. Ever tobacco use was tow times more likely among those adolescents who live with single parent (particularly with mother only). This could be due to lack of effective parent guidance about smoking behaviour on their daughters. Thus, smoking intervention programmes should not only target female adolescents but also their parents.

Strengths and Limitations

The main strength of this study is its large sample size and high response rate. However, the findings were subjected to several limitations. First, the data relied upon self-administrated surveys, which may produce under- or over-reporting. In addition, due to time and monetary constraints smoking reports were not verified by biochemical tests such cotinine analysis.[28] However, the questionnaires were anonymous and were collected under highly confidential environments. Second, the study was confined to only female school adolescents, as sociocultural restrictions limited our ability to include male adolescents in the study. Finally, the conclusions derived from this study are based on associations that are not causal which is an inherent nature of all cross-sectional study designs.

CONCLUSION

Smoking tobacco, in general, and water pipes, in particular, among Saudi female adolescents in Jeddah is an emerging public health concern. Age, mother's educational level, family structure, residence location and monthly student's allowance are significant predictors of smoking behaviours. A holistic approach of tobacco control programmes should be targeted all female adolescents, with due attention to high prevalence smoking areas especially private schools in northern and central districts of Jeddah. Smoking interventions ought to be combined with effective tobacco tax and price policy to limit the accessibility and affordability of tobacco products to the youngsters.

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