

# A private edition of an introduction to reproductive and developmental toxicity studies

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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

## 1. 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 merely 12% 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 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.

## 2. MATERIAL AND METHODS

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 respondents. 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.

## 3. 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  $\leq 300$  Saudi Riyal and half of them (50.6%) reported monthly family income from 10,000 to 20,000 Saudi Riyal.

## 4. 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.

## 5. 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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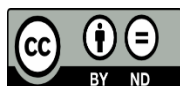
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