

## THE PREVALENCE OF CIGARETTE-SMOKING AMONG MALE INTERMEDIATE SCHOOL STUDENTS IN JEDDAH, SAUDI ARABIA- A CROSS-SECTIONAL STUDY

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### **ABSTRACT**

**Objective:** The aim of this study was to observe the prevalence rate of cigarette smoking among intermediate students in different school types in Saudi Arabia. The effectiveness of an awareness program towards smoking cessation that was administered in this study was also evaluated.

**Materials and Methods:** This cross-sectional study was conducted among 13-15-year-old male intermediate school students (n=435) in Saudi Arabia in three different school types (government, private, international). The Global Youth Tobacco Survey core questionnaire were given to assess the students' tobacco-use along with their demographic information. A clinical examination was performed by calibrated examiners for plaque, gingivitis, caries, and mucosal lesions. An awareness program on smoking cessation was conducted to these students.

**Results:** It was observed that 30.1% of the students had tried cigarette smoking, of which about 4.3% smoked more than 20 cigarettes/day. The majority of the students (87%) had an intent towards smoking cessation, and about 80% of them did not feel compelled because of peer pressure. Also, about 74.3% of the students were not aware of any means to quit smoking and 57.9% of the students had watched media content on tobacco-use.

**Conclusion:** The study concluded that tobacco-use was prevalent among male intermediate school students with a majority of them intending to or have tried to quit the habit. Peer pressure may not have resulted in development of the habit but about half of the population has viewed media content with tobacco-use. Awareness programs on implications of smoking and cessation is warranted at school-level.

**KEY WORDS:** Prevalence; Smoking; Intermediate Students; Awareness; Smoking cessation.

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## INTRODUCTION

Tobacco epidemic is affecting the whole world. By 2025, the numbers of smokers are expected to increase from 1.1 to 1.6 billion adults (Bala et al. 2013), (The W 1999). The use of tobacco products represents the major cause of preventable illness and death in the developed world. It killed about 100 million in the 20<sup>th</sup> century and expected to kill 1 billion in the 21<sup>st</sup> century (World Health Organization 2008). Cigarette smoking causes about 1 of every 5 deaths in the United States each year (Centers for Disease Control and Prevention (CDC) 2008, 200).

In Saudi Arabia an average of 600 million SR (approximately US\$ 150 millions) are spent annually on tobacco (Bassiony 2009). It is the fourth in the world in terms of tobacco sales and ranks 23<sup>rd</sup> on the list of the world's highest consumers of tobacco (Al Moamary 2010), (Jarallah et al. 1996). Since tobacco consumption in students is affected by psychological, physical, emotional, and interpersonal relationships, tobacco companies use all available tactics to lure youth down a path of nicotine addiction and eventual death.

Various studies have reported that smoking and smokeless tobacco use start during adolescence (Office of the Surgeon General (US) and Office on Smoking and Health (US) 2004). According to the 2013 CDC report, 88% of adult smokers who smoke daily report that they started smoking by the age of 18 years ("Ash Action on Smoking and Health Fact Sheets Statistics: Illness and Death Introduction, Deaths Caused by Smoking , Non-Fatal Diseases , Resources" 2013). There is dearth in evidence regarding the prevalence of smoking among students especially adolescents in Saudi Arabia. It is to be noted that the most common approach to adolescent smoking prevention through school based educational programs. This cross-sectional study aims to analyze the prevalence of smoking among intermediate school students in Saudi Arabia and the effectiveness of an awareness program towards the cessation of the habit.

## LITERATURE REVIEW

A cross-sectional study was conducted in January 2010 in Hamadan City, west of Iran. A random sample of 1161 high-school students were enrolled voluntarily. The data collection tool was a self-administered questionnaire that included demographic characteristics as well as questions about knowledge and attitude towards cigarette smoking. The prevalence of cigarette smoking was 10.2% with an increasing trend toward older ages. Of the 118 smokers, 70% were boys, 93% were 15-20 years old, 80% had experienced smoking before age of 15 years, 80.3% used less than five cigarettes per day, and 39% started smoking out of curiosity. Students' mean scores of knowledge and attitude toward smoking were 53% and 74% respectively. Odds ratio estimate of becoming a smoker was 4.44 for those who lived with people other than their parents, 5.68 for those who had siblings who smoke, 10.74 for those who had friends who smoke and 12.56 for those who were frequently offered cigarettes by their friends.

Studies on the prevalence of smoking among students, especially adolescents were scarce in Saudi Arabia. In 1995, the prevalence of smoking in secondary school boys in Riyadh was 17% of the overall students, while in 1996, the prevalence was 13.3% and ranging from 3.2% for 12-13 years old to 31.1% for 18-19 years old (al-Faris 1995), (Jarallah et al. 1996). In 2009, a literature review reported the prevalence of smoking in Saudi Arabia that ranged from 2.4% -52.3%. Among school students, the prevalence of smoking varied from 12-29.8%, among university students from 2.4-37%, and among adults from 11.6-52.3% (Bassiony 2009).

In 2011, two studies showed the prevalence of smoking among secondary school boys in Riyadh was 28.6% and 31.2% respectively (Al Nohair 2011), (Al Ghobain et al. 2011). The prevalence and characteristics of cigarette smoking among 16 to 18

year-old boys and girls, in Jeddah was 37% (Fida and Abdelmoneim 2013). There were only two studies in Saudi Arabia that included intermediate school students and revealed a smoking prevalence of 10.8% and 13.0% respectively (Albedah et al. 2011), (Al-Zalabani et al. 2015).

A cross-sectional study in Wales that included 1375 secondary students aged 15-16 years demonstrated an association between policy strength, policy enforcement, and the prevalence of smoking among students. These findings suggest that the wider introduction of comprehensive school smoking policies may help reduce teenage smoking (Moore 2001).

Preventing Tobacco Use among Young People in India was a research used to assess the effectiveness of a 2-year multicomponent, school-based intervention designed to reduce tobacco-use rates among adolescents in an urban area of India. The sample consisted of students from 32 schools in Delhi and Chennai (India), who were recruited and randomly assigned to an intervention or control group. The baseline, intermediate, and outcome data were collected from two cohorts of 6th- and 8th-grade students in 2004; 14063 students took part in the study and completed a survey in 2004, 2005, or 2006. The intervention consisted of behavioral classroom curricula, school posters, a parental involvement component, and peer-led activism. The main outcome measures were self-reported use of cigarettes, bidis (small hand-rolled, often flavored, cigarettes), chewing tobacco, and future intentions to smoke or use chewing tobacco. The findings showed that students in the intervention group were significantly less likely than their counterparts in the control group, to exhibit increase in cigarette smoking or bidi smoking over the 2-year study period. They were also less likely to have an intention towards smoking or chewing tobacco in the future (Perry et al. 2009).

## OBJECTIVES

### General Objective

To investigate the prevalence of cigarette-smoking among intermediate school students and to apply a smoking awareness program.

### Specific Objectives

1. To study prevalence of cigarette-smoking among intermediate school students using GYTS questionnaire.
2. To assess knowledge of smoking risks and side effects through the GTYS questionnaire and the students' willingness of to quit smoking.
3. To study correlates of intermediate students' smoking.
4. To deliver a tobacco awareness message.

## MATERIALS AND METHODS

### Target population

Male intermediate school students in Jeddah, Saudi Arabia.

**Study setting:** Intermediate schools for boys in Jeddah (governmental, private and international).

**Study design:** Cross-sectional study.

### Sampling technique:

#### *Sample Size:*

According to the Ministry of Education, students at intermediate schools for the year (1434-1435H) in Saudi Arabia, both females and males are 1212029 students. OpenEpi, Version 3.01, open source calculator with a confidence level of 95%, 35% prevalence of lifetime smoking and an allowable error of 6% yielded a required sample size of 243 (@ 300 students to control for non-response) (Kevin M. Sullivan, Dean, and Soe 2009) (Al-Bedah and Qureshi 2011).

**Sample type and selection:**

A multi-stage stratified random sample with equal allocation was used. There were three types of schools; i.e., government, private and international schools. From each school type one school was selected randomly. In each selected school, one class was selected randomly from each grade (a total of three classes were selected) and all students within the selected classes were invited to participate in this study until the sample size was achieved.

**Data collection tools**

Data collection method was done by questionnaire including questions related to demographic data and the Global Youth Tobacco Survey (Al-Bedah and Qureshi 2011). Moreover, a screening of the oral cavity was done for all participants.

**Global Youth Tobacco Survey (GYTS)**

The GYTS (Global Youth Tobacco Survey Collaborative Group, 2012) is a school-based survey designed to enhance the capacity of countries to monitor tobacco-use among youth and to guide the implementation and evaluation of tobacco prevention and control programs. It is designed to gather information about smoking prevalence, knowledge, attitudes and behaviours related to tobacco-use, media, and advertising in addition to prevention activities in schools' curriculum. The information generated from the GYTS can be used to stimulate the development of tobacco control programs and can serve as a means to assess progress in meeting program goals. Our study employed the Global Youth Tobacco Survey (GYTS) Core Questionnaire which was composed of 43 "core" questions with five additional questions in our study considering mother/father education, mother/father work, nationality and one item about gender was removed as our study included only boys. The items were designed to gather data on eight domains; student's background information (8 questions), use of tobacco (6 questions), student's feelings towards smoking cessation (4 questions), student's exposure to other people's smoking (7 questions), getting cigarettes

(4 questions), student's knowledge of messages that are against tobacco-use (4 questions), student's knowledge of advertisements or promotions for tobacco (5 questions), student's attitudes and beliefs about using tobacco (5 questions). Prior to the final administration of the questionnaire among the students, it was pretested among a pilot group (30 students) with similar characteristics. The questionnaire was modified and the final corrected version was used. The final questionnaire was distributed among students in the classroom in the absence of teachers or parents. The clinical exam forms were attached to the questionnaires. Each student returned the questionnaire to the clinical examiner to record the clinical exam on the same form.

**General oral examination**

The students received a general oral examination to identify their need for oral/dental health but not intended to be diagnostic. The examiner observed for plaque, gingivitis, caries and any oral mucosal lesions. This was done using mirror and explorer after calibration of examiners.

**Awareness intervention**

Following the completion of the questionnaire, a tobacco awareness brief PowerPoint presentation regarding the dangers and side effects of smoking was presented to all participants. At the end, an illustrated brochure was given to students in the efforts of providing them with required knowledge.

**Administrative design**

Approval was granted by the Minister of Education to acquire a consent for the questionnaire to be distributed at the school and general oral examination.

**Ethical Consideration**

The approval for this study was obtained from the ethical committee in King Abdul Aziz University, Faculty of Dentistry (KAUFD), Jeddah. Written consent was obtained from parents and informed oral

consent was obtained from the students. Following the oral examination, an examination card was given to each student to regarding the dental-related services indicated for them. In addition, the phone number of KAUFD was listed on the card to help families call and schedule a screening appointment. The teachers were asked not to enter the classroom during both questionnaire administration and clinical examination to assure confidentiality of response result and to avoid response bias.

**Operational design**

After a preliminary visit to the school was conducted, the data was collected through a single field trip to each included school by King Abdul Aziz University Faculty of Dentistry (KAUFD) senior year male students. The inter-examiner and intra-examiner agreement was assessed and a cross check was done following collection of data between the groups to assure reliability of examination.

**Data Analysis**

Data were analyzed using SPSS, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics as mean, standard deviation, and proportion were used as indicated. Chi-square test was used to study the association between smoking and study variables. There is an accepted probability of 0.05% for obtaining such results by chance.

**RESULTS**

The study included 435 students [Table 1]; one third of them from private schools and the rest from government schools. Students were almost equally distributed over grades with an age range from 13-15 years. Most of them were Saudi nationals (89.7%) and the remaining students were from other nationalities. In about 52% of the students, the fathers' education was below university-level, while in 60.7% students, the mothers' education was below university-level. The fathers were in employment for 86.7% of the students, while 25.3%

of the students had working-mothers. The weekly pocket money for the majority of the students was less than 30 SR (83.7%).

TABLE (1) Descriptive statistics on the demographic details of the study population

(N = 435)		No.	%
School	Governmental	292	67.1
	Private	143	32.9
Class	First	150	34.5
	Second	143	32.9
	Third	142	32.6
Age (years)	13	150	34.5
	14	143	32.9
	15	142	32.6
Nationality	Saudi	390	89.7
	Non-Saudi	45	10.3
Father's education	Below University	224	51.5
	University or Higher	211	48.5
Mother's education	Below University	264	60.7
	University or Higher	171	39.3
Father's work	Yes	377	86.7
	No	58	13.3
Mother's work	Yes	110	25.3
	No	325	74.7
Pocket money per week (SR)	<30	364	83.7
	30-	27	6.2
	50+	44	10.1

As shown in [Table 2], 33.1% of the students have tried cigarettes, 30.6 % of them started smoking at age 10 or 11, 4.1% of the students smoked 1-2 days last month. About 26.1% of smokers, smoked at least 1 cigarette per day last month. Also, 43.5% of smokers reported that they smoked occasionally in the morning and 23.9% smoked cigarettes within one hour from their last cigarette.

TABLE (2) Prevalence of Tobacco-use among intermediate male students in Jeddah, Saudi Arabia

Questions	Answers	No.	%
<b>Have you ever tried or experimented with cigarette smoking, even one or two puffs?</b>	Yes	144	33.1
	No	291	66.9
<b>How old were you when you first tried a cigarette?</b>	7 years old or younger	20	13.9
	8 or 9 years old	12	8.3
	10 or 11 years old	44	30.6
	12 or 13 years old	25	17.4
	14 or 15 years old	38	26.4
	16 years old or older	5	3.5
<b>During the past 30 days, on how many days did you smoke cigarettes?</b>	0 days	389	89.4
	1 or 2 days	18	4.1
	3 -5 days	8	1.8
	6-9 days	4	.9
	10-19 days	4	.9
	20-29 days	2	.5
	All 30 days	10	2.3
<b>Please think about the days you smoked cigarettes during the past 30 days. How many cigarettes did you usually smoke per day?</b>	Less than 1 cigarette per day	12	26.1
	1 cigarette per day	12	26.1
	2 to 5 cigarettes per day	13	28.3
	6 to 10 cigarettes per day	5	10.9
	11 to 20 cigarettes per day	2	4.3
	More than 20 cigarettes per day	2	4.3
<b>Do you ever smoke tobacco or feel like smoking tobacco first thing in the morning?</b>	No, I don't smoke tobacco or feel like smoking tobacco first thing in the morning	20	43.5
	Yes, I sometimes smoke tobacco or feel like smoking tobacco first thing in the morning	20	43.5
	Yes, I always smoke tobacco or feel like smoking tobacco first thing in the morning	6	13.0
<b>How soon after you smoke tobacco do you start to feel a strong desire to smoke again that is hard to ignore?</b>	I never feel a strong desire to smoke again after smoking tobacco	19	41.3
	Within 60 minutes	11	23.9
	1 to 2 hours	4	8.7
	More than 2 hours to 4 hours	4	8.7
	More than 4 hours but less than one full day	3	6.5
	1 to 3 days	2	4.3
	4 days or more	3	6.5



The intent towards smoking cessation was recorded with 87.0% of current smokers wishing to quit smoking immediately, 78.3% of them had tried to quit smoking last year and 87.0% of smokers think they could quit smoking if they intend on doing it. The majority of the students (74.3%) felt that they had no advice to help them quit smoking [Table 3].

About 11.5% of the students had someone who smoked every day at his home last week, 22.5%

of the student had someone who smoked 1-2 day's in closed public places last week, 24.6% of the student had someone who smoked 1-2 day's outdoor last week and 29% of the students have seen other students smoking in the school building. Considering students' attitude of passive smoking, 66.4% of them are sure that passive smoking can affect them, 76.3% of the student agreed against indoor smoking, and 67.4% of the student agreed against smoking in public spaces [Table 4].

TABLE (3) Descriptive statistics on the intent towards smoking cessation among intermediate male students in Jeddah

Questions	Answers	No.	%
<b>Do you want to stop smoking now?</b>	Yes	40	87.0
	No	6	13.0
<b>During the past 12 months, did you ever try to stop smoking?</b>	Yes	36	78.3
	No	10	21.7
<b>Do you think you would be able to stop smoking if you wanted to?</b>	Yes	40	87.0
	No	6	13.0
<b>Have you ever received help or advice to help you stop smoking?</b>	Yes from program or a person	2	1.4
	Yes from a friend	19	13.2
	Yes from a family member	9	6.3
	Yes all of the above	7	4.9
	No	107	74.3

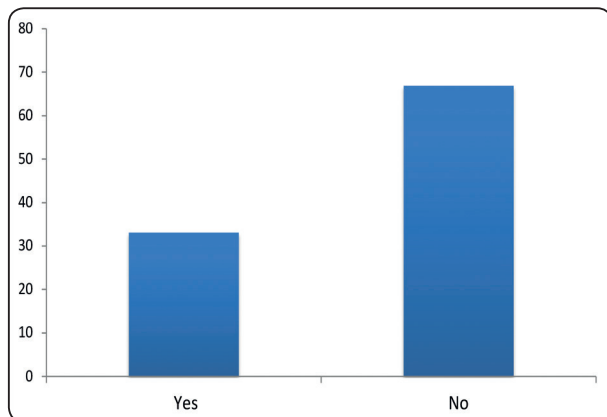


Fig. (1) Ever Use of Tobacco among male intermediate school students in Jeddah, Saudi Arabia

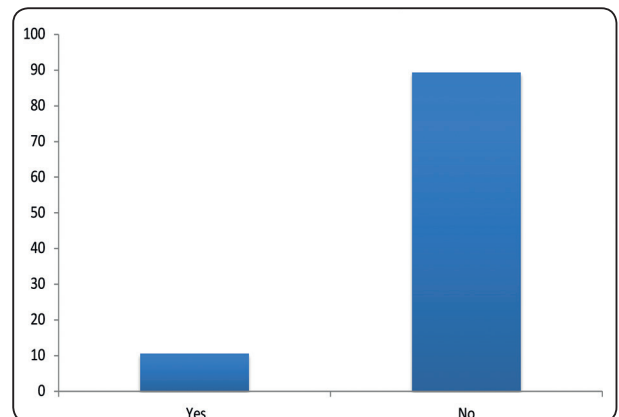


Fig. (2) Current Use of Tobacco among male intermediate school students in Jeddah, Saudi Arabia

TABLE (4) Descriptive statistics on the students' exposure to other people's smoking (Passive smoking)

Question	Answers	No.	%
During the past 7 days, on how many days has anyone smoked inside your home, in your presence?	Never	326	74.9
	1-2 Days	36	8.3
	3-4 Days	14	3.2
	5-6 Days	9	2.1
	7 Days	50	11.5
During the past 7 days, on how many days has anyone smoked in your presence, inside any enclosed public place, other than your home?	Never	241	55.4
	1-2 Days	98	22.5
	3-4 Days	35	8.0
	5-6 Days	18	4.1
	7 Days	43	9.9
During the past 7 days, on how many days has anyone smoked in your presence, at any outdoor public place?	Never	196	45.1
	1-2 Days	107	24.6
	3-4 Days	48	11.0
	5-6 Days	19	4.4
	7 Days	65	14.9
During the past 30 days, did you see anyone smoke inside the school building or outside on school property?	No	309	71.0
	Yes	126	29.0
Do you think the smoke from other people's tobacco smoking is harmful to you?	Definitely No	48	11.0
	Maybe No	14	3.2
	Maybe Yes	84	19.3
	Definitely Yes	289	66.4
Are you in favor of banning smoking inside enclosed public places?	Yes	332	76.3
	No	103	23.7
Are you in favor of banning smoking at outdoor public places?	Yes	293	67.4
	No	142	32.6

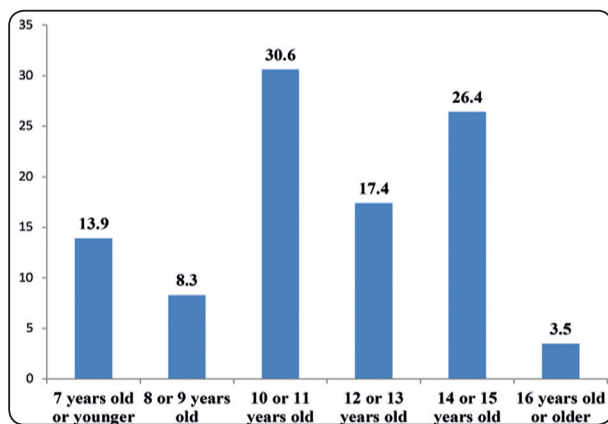


Fig. (3) Start age of tobacco-use among male intermediate school students (Ever-users) in Jeddah, Saudi Arabia

Students who bought cigarettes from a store constituted 76.1% of smokers, 63.0% of smokers had no age problem for buying cigarettes last month, 69.6% of them bought a packet of cigarettes last month and 69.6% of the students were aware of the cost of a single cigarette pack (5-10 SAR) [Table 5]. [Table 6] showed that 70.6% of students have seen anti-tobacco media messages last month, only 14.5% reported that it guided them against the smoking habit and 33.6% agreed that they were taught in the classes about dangers of tobacco use.



It was reported that 57.9% of the students had seen people using tobacco in media content such as TV, videos, or movies, 23.9% have seen advertisements or promotions for tobacco products at points of sale. To understand the students' mindset on promotion of tobacco products, 10.3% agreed

that they would wear something that has a tobacco company/product name/picture, whereas, 9.9% of students have something with a tobacco product brand logo on it. About 9.4% students reported that an employee of a tobacco company had offered them with a free tobacco product.

TABLE (5) Descriptive statistics on the modes of procurement of cigarettes among intermediate male students in Jeddah, Saudi Arabia.

Question	Answers	No.	%
<b>The last time you smoked cigarettes during the past 30 days, how did you get them?</b>	From a store	35	76.1
	From street seller	2	4.3
	Another person	4	8.7
	Other	5	10.9
<b>During the past 30 days, did anyone refuse to sell you cigarettes because of your age?</b>	Yes from a store and the seller refused for my age	17	37.0
	No my age was not an obstacle	29	63.0
<b>The last time you bought cigarettes during the past 30 days, how did you buy them?</b>	By packet	32	69.6
	By piece	8	17.4
	By package	3	6.5
	By rolled tobacco	1	2.2
	Rolled the tobacco by my self	2	4.3
<b>On average, how much do you think a pack of 20 cigarettes costs?</b>	Bought by piece	8	17.4
	5-10 SAR	32	69.6
	More than 10 SAR	6	13.0

TABLE (6) Knowledge awareness of messages against tobacco-use among intermediate male students in Jeddah, Saudi Arabia

Questions	Answer	No.	%
<b>During the past 30 days, did you see or hear any anti-tobacco media messages on television, radio, internet, billboards, posters, newspapers, magazines, or movies?</b>	Yes	307	70.6
	No	128	29.4
<b>During the past 30 days, did you see or hear any anti-tobacco messages at sports events, fairs, concerts, or community events, or social gatherings?</b>	Did not attend sport events last month	194	44.6
	Yes	133	30.6
	No	108	24.8
<b>During the past 30 days, did you see any health warnings on cigarette packages?</b>	Yes and did not think about it	225	51.7
	Yes and guide me to quit smoking or not smoking	63	14.5
		147	33.8
	No		
<b>During the past 12 months, were you taught in any of your classes about the dangers of tobacco use?</b>	Yes	146	33.6
	No	213	49.0
	I don't know	76	17.5

About 77.0% of the students responded that they will never use tobacco and most of them disagree with the statement “I think I might enjoy smoking a cigarette.” It is to be noted that 80% of the students did not feel compelled to smoke a cigarette because of peer-pressure [Table 8].

TABLE (7) Knowledge awareness on the advertisements and promotions for tobacco products among intermediate male students in Jeddah, Saudi Arabia

Questions	Answer	No.	%
<b>During the past 30 days, did you see any people using tobacco when you watched TV, videos, or movies?</b>	Did not watch TV last month	51	11.7
	Yes	252	57.9
	No	132	30.3
<b>During the past 30 days, did you see any advertisements or promotions for Tobacco products at points of sale?</b>	Did not visit any store	111	25.5
	Yes	104	23.9
	No	220	50.6
<b>Would you ever use or wear something that has a tobacco company or tobacco product name or picture on it such as a lighter, t-shirt, hat, or sunglasses?</b>	Yes	45	10.3
	Maybe	78	17.9
	No	312	71.7
<b>Do you have something (for example, t-shirt, pen, backpack) with a tobacco product brand logo on it?</b>	Yes	43	9.9
	No	392	90.1
<b>Has a person working for a tobacco company ever offered you a free tobacco product?</b>	Yes	41	9.4
	No	394	90.6

TABLE (8) Attitudes and beliefs about using tobacco by intermediate male students in Jeddah, Saudi Arabia

Questions	Answer	No.	%
<b>If one of your best friends offered you a tobacco product, would you use it?</b>	Definitely No	348	80.0
	Maybe No	43	9.9
	Maybe Yes	29	6.7
	Definitely Yes	15	3.4
<b>At any time during the next 12 months do you think you will use any form of tobacco?</b>	Definitely No	335	77.0
	Maybe No	40	9.2
	Maybe Yes	45	10.3
	Definitely Yes	15	3.4
<b>Once someone has started smoking tobacco, do you think it would be difficult for them to quit?</b>	Definitely No	109	25.1
	Maybe No	83	19.1
	Maybe Yes	142	32.6
	Definitely Yes	101	23.2
<b>Do you think smoking tobacco helps people feel more comfortable or less comfortable at celebrations, parties, or in other social gatherings?</b>	More relaxed	80	18.4
	Less Relaxed	193	44.4
	No Difference	162	37.2
<b>Do you agree or disagree with the following: “I think I might enjoy smoking a cigarette?”</b>	I smoke currently	28	6.4
	Strongly agree	20	4.6
	Agree	27	6.2
	Disagree	108	24.8
	Strongly disagree	252	57.9

The correlates of ever use and current use of cigarettes among students were evaluated and the factors with high statistical significance were age (p-value-0.005) and pocket money per week (p-value-0.000) [Table 9]. Older children and those with 50 SR or more pocket money per week

had significantly higher prevalence of smoking. Untreated cavities constituted 76.2% in primary teeth and 65.7% in permanent teeth, gingival inflammation (69%), poor oral hygiene in 30.1% and 9.2% required urgent dental care [Table 10].

TABLE (9) Pearson Correlation test for the correlation between ever users and current users of smoking with their demographic background among intermediate male students in Jeddah, Saudi Arabia

		Ever users	X <sup>2</sup>	P	Current users	X <sup>2</sup>	P
School	Public	34.6	.89	.347	12.3	2.90	.089
	Private	30.1			7.0		
Age (years)	13	20.0	18.87	.000*	5.3	10.46	.005*
	14	37.1			9.8		
	15	43.0			16.9		
Nationality	Saudi	34.1	1.70	.192	10.3	.40	.525
	Non-Saudi	24.4			13.3		
Father's education	Below university	35.3	.98	.323	11.6	.52	.471
	University or above	30.8			9.5		
Mother's education	Below university	33.7	.11	.739	12.3	1.96	.161
	University or above	32.2			8.0		
Father's work	Yes	32.1	1.30	.255	10.1	.73	.392
	No	39.7			13.8		
Mother's work	Yes	40.0	3.16	.075	9.1	.34	.558
	No	30.8			11.1		
Pocket money per week (SR)	<30	31.6	19.69	.000*	9.9	10.25	.000*
	30-	11.1			0.0		
	50+	59.1			22.7		

\* P < 0.05 (Significant)

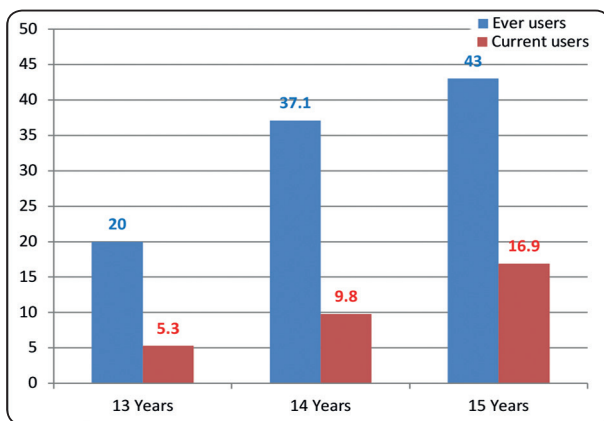


Fig. (4) Percentage of ever users and current users of tobacco by Age

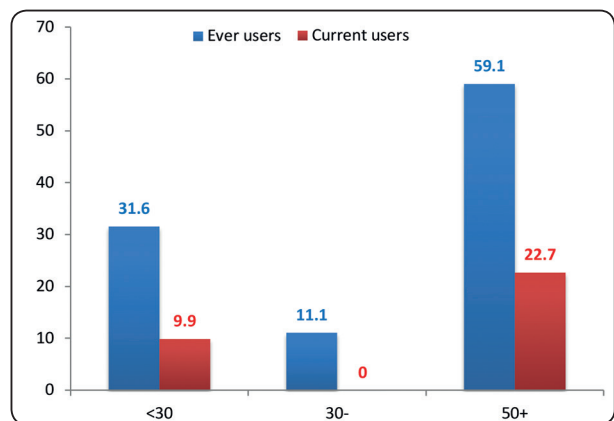


Fig. (5) Ever users and current users of tobacco by pocket money per week

TABLE (10) Descriptive statistics on the Oral Health problems among Intermediate students in Jeddah, Saudi Arabia

		No.	%
Untreated Cavities: Primary Teeth	No cavities	5	23.8
	Untreated cavities	16	76.2
Untreated Cavities: Permanent Teeth	No cavities	149	34.3
	Untreated cavities	286	65.7
Gingival inflammation	No	135	31.0
	Yes	300	69.0
Oral Hygiene:	Good	103	23.7
	Fair	201	46.2
	Poor	131	30.1
Treatment Urgency:	No abnormality detected	187	43.0
	Early dental care	208	47.8
	Urgent care	40	9.2

## DISCUSSION

This cross-sectional study was performed on 435 adolescents (13-15 years male) in Jeddah, Saudi Arabia with the approval from the Ministry of Education towards the evaluation of the prevalence of smoking habit among the students in different types of schools (private, government, international). The majority of the students belonged to government schools and a self-administered GYTS questionnaire was employed to assess the tobacco-usage and awareness on smoking among the school students. The prevalence of smoking was estimated from this study to be about 33.1% which included students who have tried or experimented with cigarette smoking. In 2007, Global Youth Tobacco Survey was conducted among 13-15-year-old students in Saudi Arabia and the prevalence was estimated to be 6.7% with an average response rate of 82.1%. It can be noted that there is a dramatic increase in the prevalence rates of the two studies and our study results are concomitant with the fact that boys were more likely to be current smokers for cigarettes as well as other tobacco-related products (Moh'd Al-Mulla et al. 2008), (Warren et al. 2008).

In this study, it was showed that there were regular smokers with 26.1% who smoke at least 1 cigarette/day, 28.3% smoked 2-5 cigarettes/day, and about 4.3% smoked 11-20 and more than 20 cigarettes/day in the last 30 days. This is in stark contrast to a school-based survey conducted in China that 0.3% of the students excluding girls were regular smokers who smoked at least 1 cigarette per day (Hesketh, Ding, and Tomkins 2001). This data shows that the number of adolescent regular smokers in Saudi Arabia were higher when compared to a developing nation like China. But, the intention towards smoking cessation with immediate effect was observed in 87% of the current smokers in this study. This value is considerably higher than reported in two studies conducted among adolescents in Hong Kong and Cyprus with 51% and 46.1% respectively (Wong et al. 2010), (Savvides et al. 2014). It is also significantly higher than the values observed in study that was conducted among adolescents in Al, Madinah Saudi Arabia that showed 71.7% of the current student smokers intended to quit the habit within one year (Abdulmohsen Hamdan, Ayat Roushdy, and Reem Ibrahim 2015).

A strong predictor of adolescent smoking is parental smoking and the odds are significantly higher when both parents smoke (2.05 vs 1.24) (Xie et al. 2013), (El-Amin et al. 2011). The studies further emphasized that adolescents were more likely to smoke when the mothers smoked and girls were more affected to this tendency when compared to the boys (Leonardi-Bee, Jere, and Britton 2011), (Kelli Maud Sullivan, Bottorff, and Reid 2011). In our study, it was showed that about 11.5% of the students had someone who smoked every day in their houses for the last week. It was also observed that 29% students witnessed other students smoking in the building. These findings reinforce the predictors of adolescent smoking and in this study, the demographic characteristics showed that in half of the student population (52%), the fathers' education was below university-level, whereas in 60.7% of the cases, the mothers' education was not up to university-level. This could also have a significant effect on adolescent smoking and its roots are to be understood further with future trials.

House-hold smoking bans by family members and bans in public places are to be enforced and the protocol should be strict, so that people with intention to quit head in the right direction. Both the bans should be taken seriously because bans in public places increases the likelihood of household smoking and vice versa (Wong et al. 2010). In our study, it was reported that 76.3% of the students agreed to indoor banning whereas, 67.4% of the students agreed to smoking bans in public places. It can be deduced that the mindset of the students was towards smoking cessation and enforcing these bans may have a positive effect on these students.

In this study, the smoking habit may have been developed through the following medium with more than half of the student population (57.9%) having seen media content with people using tobacco and 9.4% received a free tobacco product from an employee of a tobacco company. It is prudent to note that anti-smoking social messages as well as awareness campaigns should aim to inculcate

means to quit the habit at an early age. This study also observed that 74.3%, a significant proportion of the student population felt that they had no advice towards guiding them in smoking cessation.

Passive smoking poses a significant public health hazard and it poses a greater risk to never-smoking adolescents. A study conducted in China showed that there were increased odds (OR-2.05) of current smoking in adolescents who were exposed to secondhand smoke (Wang et al. 2016). In this study, there was increased awareness among students towards passive smoking with 66.4% of the students agreeing that second smoke could affect them. It is also worth noting that about 80% of the student population did not feel compelled to smoke a cigarette because of peer-pressure. This further reinforces the significant role that an aware non-smoker could play in the life of a smoking adolescent motivating him/her to quit when connected in their social circle.

A correlation test revealed that older adults and higher pocket money per week were significant influencers in adolescent smoking. Also, it was shown from the clinical examination that there were 76.2% untreated cavities in primary teeth and 65.7% in the permanent teeth. Gingival inflammation was observed in 69% and 30.1% with poor oral hygiene. About half of the population required early dental care with 9.2% needing urgent care. A study conducted among Swedish adolescents showed that there was increased risk of caries with tobacco use and the DMFS rates varied between ever and never users (1.8 vs 1.2) (Holmén et al. 2013). It has been shown that cigarette smoking poses a higher risk of periodontal destruction in the younger population (Mullally 2004).

This study provided a brief awareness program at the end of the questionnaire session but a feedback was not received from the students to understand the effectiveness. The other limitations of this study include its cross-sectional design and the multiple predictive factors for adolescent smoking assessed

from this study can be ascertained using future longitudinal cohort studies. Smoking has been associated with significant morbidity and mortality, and younger age group have profound destructive effects. Saudi Arabia has been ranked fourth in the world for cigarette imports and with the faster growing number of adolescent smokers, it is vital to develop awareness programs towards smoking, its implications on health, and smoking cessation.

## CONCLUSION

This study was conducted among male intermediate school students in Saudi Arabia and a prevalence of 33.1% was observed. It was observed that there was a higher proportion of regular smokers and the majority of the student population had an intention to quit the habit. The students were aware that passive smoking can affect them and most of the students were in favor of smoking bans in house-hold as well as public places. Peer-pressure did not influence the students but the media visuals with people smoking had a stronger influence on the students. The correlates for never and ever smokers were older age group and higher pocket money, and the oral health of the students showed higher incidence of caries, gingival inflammation, and some proportion of the student population required urgent dental care. Future studies are warranted towards ascertaining the causal as well as influencing factors deduced from this study and stronger anti-smoking awareness campaigns are the need-of-the-hour for the rising numbers of adolescent smokers in the kingdom of Saudi Arabia.

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