Medical Science

Authors' Affiliation:
[1]Department of Medicine and Surgery, College of Medicine, Umm Alqura University, Makkah, Saudi Arabia
[2]Department of Family Medicine, College of Medicine, Menoufia University, Menoufia, Egypt
[3]Department of Community Medicine and Pilgrims Health Care, College of Medicine, Umm Alqura University, Makkah, Saudi Arabia

ORCID list
Sanad M Alharthi   https://orcid.org/0000-0003-0425-4959
Saad M Alharthi   https://orcid.org/0000-0003-3388-4829
Emad A Baatiyyah   https://orcid.org/0000-0003-1571-4658
Faisal M Alzahrani   https://orcid.org/0000-0002-8401-6047
Alwaleed S Alzahrani   https://orcid.org/0000-0003-0218-8054
Abdulrahman A Baabdullah   https://orcid.org/0000-0003-2051-8811
Mokhtar M Shatla   https://orcid.org/0000-0002-4952-4046

*Correspondence Author
Department of Medicine and Surgery, College of Medicine, Umm Alqura University, Makkah,
Saudi Arabia
Email: sa.alharthi2@gmail.com

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Prevalence and determinants of smoking behavior among general population in Makkah city, Saudi Arabia - An analytic cross-sectional study

Sanad M Alharthi[1], Saad M Alharthi[1*], Emad A Baatiyyah[1], Faisal M Alzahrani[1], Alwaleed S Alzahrani[1], Abdulrahman A Baabdullah[1], Mokhtar M Shatla[2,3]

ABSTRACT

Background: Smoking behavior is a health threat to the world. It has a big influence on many diseases. The aim of this study was to assess the prevalence and determinants of smoking among general population in Makkah city, Saudi Arabia. *Methodology:* A cross sectional study has been conducted in September 2022 by posting an online survey on social media platforms (WhatsApp, Twitter) to collect data on participants' demographics, smoking behaviors and determinants using a validated Arabic version of a subcategory questions from the global adult tobacco survey (GATS). *Results:* A total of 996 participants responded, with the age 16-30 years old predominance (N=647, 65%). The prevalence of smoking was (N=340, 34.1%). There was an increased risk for tobacco smoking among participants with male gender (OR=3.68), low income (OR=2.77), government employee (OR=1.25), who experienced domestic violence or neglect (OR=2.54) and who had smoking friends (OR=2.14). *Conclusion:* A high prevalence of smokers was noticed. Understanding the factors associated with the smoking are crucial to design tobacco prevention and control programs. The health authority should take urgent measures to encounter this major issue.

Keywords: Prevalence, determinants, smoking behavior, general population, Makkah, Saudi Arabia.

1. INTRODUCTION

Smoking is a serious public health hazard. It leads to a huge impact on the morbidity and mortality of many diseases (Jayes et al., 2016; Morris et al., 2015). World Health Organization (WHO) declared that smoking remains the leading worldwide cause of preventable morbidity and mortality (Mahfouz et al., 2013). Deaths were found to be in low and middle income populations and this discrepancy is anticipated to expand further over the next several decades

(Mahfouz et al., 2013). WHO estimated that by 2030 tobacco will kill more than 8 million people globally each year (Mahfouz et al., 2013). In Saudi Arabia 2013, 12.2% of the adult populations were current smokers (Moradi et al., 2013). The Food and Drug Agencyin Saudi performed a study to update tobacco smoking information. They discovered that 21.4% of the citizens were smokers, in comparison to what they found in 2013, showing a rise in a period started between 2013 and 2018 (Algabbani et al., 2018).

Hypothetically, if the number of smokers in the SaudiArabia has expanded, the non smoker probably to be exposed to passive smoking has also risen substantially. The highest motives for smoking were having friends who smoke, family neglect, having smoker parents, family problems, pleasure and having smoker relatives (Alsubaie et al., 2018; Ahmed et al., 2021). To decrease the tobacco use, it is crucial to recognize the causes that drive it. Nevertheless, the trend and Determinants of smoking among general population is largely unknown in Makkah city, Saudi Arabia. This study was aimed to assess the prevalence of tobacco use and the associated determinants of the smokers.

2. METHODOLOGY

A cross sectional study was carried out between June and September 2022 by posting an online survey on social media platforms (WhatsApp, Twitter) to collect data on participants' demographics, smoking behaviors and determinants among general population in the Makkah region, Saudi Arabia, using a validated Arabic version of a subcategory questions from GATS used previously (Almulla et al., 2021). We used the RAO soft sample size program, the sample size of this study was determined to be no less than 385 participants, considering confidence interval as 95% and level of significance (p value) as 5%. Randomly, 996 participants replied in the questionnaire.

Individuals who lived in Makkah city was included, the questionnaire form divided into 2 different parts, the first part gather participants demographic data, then the second part aim to assess prevalence, behavior, determinants of smoking throughout GATS which including questions about the following items: Tobacco smoking prevalence, consumption, exposure to secondhand smoke, cessation, anti-cigarette information, cigarette advertisements, influence and reasons of smoking. SPSS statistics version 21 was utilized to analyze the data.

Statistical significance was described as a P-value of less than 0.05. We presented categorical variables in terms of frequency (percentage). Chi-square test has been performed to explorethe relationships strength between various demographic data and tobacco use and determinants with smoking status for bivariate analyses. The regression Analysis was calculated to measure the association power of each of the categorical variables with the outcome variable (smoking status). Thisresearch was approved by the bioethical committee of Umm Al-Qura University with IRB number: HAPO-02-K-012-2022-04-1064.

3. RESULTS

This survey targets general population in the Makkah regions of Saudi Arabia. Their demography was listed in (Table 1). A total of 996 general populations completed the study questionnaire. Males were (N=537, 53.9%). The age 16-30 years old were predominant, followed by the 31-45 years old age group (65%, 26.9%, respectively). The majority of the respondents were Saudis (N=938, 94.2%) and single (N=577, 57.9%). Educational level (N=645, 64.8%) answered they have Bachelor, followed by others education (N=210, 21.1%). Job description (N=353, 35.4%) are students, followed by government employee (N=232, 23.3%). Furthermore, most people had less than 10 thousand income per month (N=796, 79.9%). Most of the participants sometimes they do exercise (N=500, 50.2%). Regarding chronic diseases among general population, most responders do not have (N=748, 75.1%). In addition, approximately (N=23, 2.3%) of participants had diabetes, (N=31, 3.1%) had hypertension, (N=50, 5%) had asthma and (N=5, 0.5%) had cardiac diseases (Table 1). Furthermore, about (N=923, 92.7%) do not have any history of mental illness, while people who experienced domestic violence or neglect were (N=155, 15.6%). The results showed that (N=340, 34.1%) are smokers.

Table 1 Sociodemographic Characteristics (N=996)

		Frequency	Percent
Age	Less than 15	10	1.0
	From 16 to 30	647	65.0
	From 31 to 45	268	26.9
	More than 46	71	7.1
Gender	Male	537	53.9
	Female	459	46.1

Nationality	Saudi	938	94.2
	Non-Saudi	58	5.8
Marital status	Single	577	57.9
	Married	394	39.6
	Divorced	25	2.5
Educational level	Bachelor	645	64.8
	Master	28	2.8
	Diploma	113	11.3
	Others	210	21.1
Job description over the last 12 months	Government employee	232	23.3
	Private employee	186	18.7
	Student	353	35.4
	Housewife	109	10.9
	Retired	19	1.9
	Unemployed	97	9.7
Income	Less than 10000	796	79.9
	From 10000 to 20000	178	17.9
	More than 20000	22	2.2
Do you exercise regularly	Yes	119	11.9
	Sometimes	500	50.2
	No	377	37.9
Do you have any chronic diseases	Diabetes mellitus	23	2.3
	Hypertension	31	3.1
	Cardiac diseases	5	0.5
	Asthma	50	5.0
	I don't have	748	75.1
	Others	98	9.8
Have you ever been diagnosed with any mental illness	Yes	73	7.3
	NO	923	92.7
Have you ever experienced domestic violence or neglect	Yes	155	15.6
	No	841	84.4
Do you currently smoke tobacco on	Yes	340	34.1
	No	656	65.9

Regarding the participants who smoked tobacco daily in the past were (N=352, 35.3%). Also (N=291, 29.2%) had been smoked on daily basis. Regarding smoking, the highest number of products was more than 15 (N=129, 13%), and the lowest number was from 10-15 (N=76, 7.6%). Almost (N=397, 39.9%) of the participants had someone smoked in their home daily. According to work (N=459, 46.1%) were working outside of their home and (N=405, 40.7%) worked indoors. Related to cravings for nicotine (N=75, 7.5%) smoke with the 5 minutes, on the opposite (N=106, 10.6%) from 6 to 30 minutes after waking up from sleep. (N=225, 22.6%) of participants attempted to quit smoking at some point in the past. The results showed (22.8%) were asked about smoking history when they were visiting healthcare providers, (17%) were advised to quit smoking throughout the previous 12 months.

According to last 30 days, the results showed that (N=510, 51.2%) noticed information about the dangers of smoking or something encourage them to quit smoking from TV and social media and (N=569, 57.1%) noticed healthy warnings on cigarettes packages and (N=135, 13.6%) led to think about quitting after seen warnings labels. The participants who noticed advertisements and promoting signs during past 30 days were (N=109, 10.9%). Cigarettes at sale prices was (3.8%) which was the highest factor for promotion and the lowest were for free samples of cigarettes and coupons for cigarettes (1.8%) for each. According to who influenced you (N=200, 20.1%) said friends, (N=18, 1.8%) said brothers and (N=21, 2.1%) was influenced by their parents. When we

asked why you smoked for the first time (N=180, 18.1%) want to try something new and (N=47, 4.7%) to imitate friends, (N=34, 3.4%) to feel mature, (N=11, 1.1%) said due to peer pressure and (N=21, 2.1%) said family pressure (Table 2).

Table 2 Sociodemographic Characteristics (N=996)

		Frequency	Percent
Have you smoked tobacco daily in the past	Yes	352	35.3
	No	151	15.2
	Not at all	493	49.5
In the past have you smoked tobacco on	Daily	291	29.2
	Less than daily	124	12.4
	Not at all	581	58.3
Number of cigarettes Smoked each Day	Less than 5	94	9.4
	From 5 to 10	100	10.0
	From 10 to 15	76	7,6
	More than 15	129	13.0
	Never smoke	597	59.9
How often does anyone smoke inside your home	Daily	397	39.9
	Weekly	25	2.5
	Monthly	15	1.5
	No one smoke	559	56.1
Do you currently work outside of your home	Yes	459	46.1
	No / do not work	537	53.9
Do you usually work indoors or outdoors	Indoors	405	40.7
	Outdoors	76	7.6
	Both	515	51.7
During the previous 30 days did anyone smoke in indoor areas Where you work	Yes	334	33.5
	No	432	43.4
	Do not know	230	23.1
How soon when you get up do you normally have your first smoke	Within 5 minutes	75	7.5
	6 TO 30 minutes	106	10.6
	31 TO 60 minutes	82	8.2
	More than 60 minutes	74	7.4
	Never smoke	659	66.2
During the pasthave you tried to quit smoking	Yes	225	22.6
	No	127	12.8
	Never smoke	644	64.7
Have you visited a doctor or other health care provider in the previous 12 months	Yes	319	32.0
	No	677	68.0
During any visit to a doctor or health care provider in	Yes	227	22.8

the previous 12 Months were you asked if you smoke tobacco	No	769	77.2
During any visit to a doctor or health care provider in the previous 12 months were you advised to quit smoking tobacco	Yes	169	17.0
	No	827	83.0
In the previous 30 days have you seen information regarding the dangers of smoking or that supports quitting in newspapers or television or social media	Yes	510	51.2
	No	486	48.8
In the previous 30 days did you notice any warnings on tobacco packages	Yes	569	57.1
	No	94	9.4
	Did not see	333	33.4
In the previous 30 days have warning labels on tobacco packages make you to think about quitting	Yes	135	13.6
	No	243	24.4
	Never smoke	618	62.0
In the previous 30 days have you seen any advertisements or signs advertising cigarettes in stores where cigarettes are offered	Yes	109	10.9
	No	470	47.2
	Do not know	417	41.9
In the last 30 days have you seen any of the following types of cigarettesoffers	Free samples of cigarettes	18	1.8
	Cigarettes at sale prices	38	3.8
	Coupons for cigarettes	18	1.8
	Free gifts or special discountoffers on other productswhen buying cigarettes	35	3.5
	didn't notice	887	89.1
Who influenced you to use tobacco	Brother	18	1.8
	Parents	21	2.1
	Friends	200	20.1
	Not influenced by anyone	173	17.4
	Not a smoker	584	58.6
Why did you smoke for the first time	I want to try something	180	18.1

	new		
	To feel mature	34	3.4
	To imitate friends	47	4.7
	Peer pressure	11	1.1
	Family pressure	21	2.1
	Other	132	13.3
	Not a smoker	571	57.3

The bivariate analysis showed that there was a significant association between tobacco smoking and male gender (p<0.001), bachelor's degree (p=0.012), government employee (p<0.001), low income (p=0.002), sometimes doing exercise (p=0.004), not having chronic diseases (p=0.038), not experienced domestic violence or neglect (p<0.001), not seeing advertisements or signs promoting tobacco use (p<0.001), who had smoking friends (p<0.001), want to try something new (p<0.001) and smoked tobacco daily in the past (p < 0.001) (Table 3).There was no significant correlationamong tobacco smoking and age (p=0.353), marital status (p = 0.471) and diagnosed with any mental illness (p = 0.843) (Table 3).

Table 3 The bivariate analysis tobacco smoking

Variables		Do you currently smoke tobacco		
		Yes, n (%)	No, n (%)	p value
Gender	Male	301(56)	236(43.9)	.001
	Female	39(8.5)	420(91.5)	
Age	Less than 15	5(.5)	5(.5)	.353
	From 16 to 30	228(22.9)	419(42.1)	
	From 31 to 45	91(9.1)	177(17.8)	
	More than 46	16(1.6)	55(5.6)	
Marital status	Single	208(36.1)	369(64)	.471
	Married	125(31.7)	269(68.3)	
	Divorced	7(28)	18(72)	
Educational level	Bachelor	196(30.4)	449(69.6)	.012
	Master	10(35.7)	18(64.3)	
	Diploma	45(39.9)	68(60.2)	
	Others	89(42.4)	121(57.6)	
Job description over the last 12 months	Government employee	106(45.7)	126(54.3)	.001
	Private employee	99(53.2)	87(46.8)	
	Student	84(23.8)	269(76.2)	
	Housewife	8(7.4)	101(92.7)	
	Retired	5(26.4)	14(73.7)	
	Unemployed	38(39.2)	59(60.8)	
Income	Less than 10000	284(35.7)	512(64.3)	.002
	From 10000 to 20000	50(28.1)	128(71.9)	
	More than 20000	6(27.2)	16(72.7)	
Do you exercise regularly	Yes	32(26.9)	87(73.1)	.004
	Sometimes	166(33.2)	334(66.8)	
	No	144(37.6)	235(62.3)	
Do you have any chronic	Diabetes	12(56.5)	10(43.5)	.843

diseases	mellitus			
	Hypertension	13(41.9)	18(58.1)	
	Cardiac diseases	0(0)	5(100)	
	Asthma	24(48)	26(52)	
	I don't have	240(32.1)	508(67.9)	
	Others	33(33.7)	65(66.3)	
Have you ever been diagnosed with any mental illness	Yes	27(37)	46(63)	.001
	No	313(33.9)	610(66.1)	
Have you ever experienced domestic violence or neglect	Yes	77(49.7)	78(50.3)	.001
	No	263(31.3)	578(68.7)	
In the last 30 days have you seen any advertisements or signs promoting tobacco use in stores where cigarettes are sold Who influenced you to use tobacco	Yes	60(55.1)	49(45)	.001
	No	251(53.4)	219(46.6)	
	Do not know	29(6.9)	388(93)	
	Brother	12(66.6)	6(33.3)	
	Parents	18(85.7)	3(14.3)	
	Friends	154(77)	46(23)	
	Not influenced by anyone	152(87.9)	21(12.1)	
Why did you smoke for the first time	I want to attempt something new	133(73.9)	47(26.1)	.001
	To feel mature	26(76.4)	8(23.5)	
	To imitate friends	30(63.8)	17(36.2)	
	Peer pressure	9(81.8)	2(18.2)	
	Family pressure	21(100)	0(0)	
	Others	115(87.2)	17(12.9)	
Have you smoked tobacco every day in the past	Yes	284(80.7)	68(19.3)	.001
	No	49(32.5)	102(67.5)	
	Not at all	7(1.4)	486(98.6)	

Logistic regression analysis showed an increased risk for tobacco smoking among participants with male gender, low income, government employee, who experienced domestic violence or neglect, who smoked tobacco every day in the past and who had smoking friends (p<0.05)(Table 4). Participants who smoked tobacco every day in the past had a higher risk for tobacco smoking (OR = 5.104, 95% CI (3.421- 7.617); p = 0.000) followed by male gender (OR = 3.680, 95% CI (1.877 - 7.214); p=0.000), low income (OR = 2.778, 95% CI (1.468 - 5.259); p=0.002), who experienced domestic violence or neglect (OR = 2.540, 95% CI (1.257 – 5.130); p=0.009), who had smoking friends (OR = 2.144, 95% CI (1.533 - 2.998); p=0.000), number of cigarettes Smoked each Day (OR = 1.750, 95% CI (1.462 – 2.095); p=0.000), government employee (OR = 1.250, 95% CI (1.070 - 1.462); p=0.005), while doing regular exercise can decrease risk of tobacco smoking (OR = 0.626, 95% CI (0.431 – 0.909); p=0.014) (Table 4). There was no significant relationship between age, marital status, educational level, diagnosed with any mental illness, why did you smoke for the first time, seen information regarding the dangers of smoking or that supports quitting, cigarette promotions and tobacco smoking (Table 4).

Table 4 Logistic regression for tobacco smoking

Variable	OR	95% C.I.	p-value
Age	0.945	0.544 - 1.643	0.841
Gender	3.680	1.877 - 7.214	0.000
Income	2.778	1.468 - 5.259	0.002
Marital status	0.862	0.476 – 1.561	0.624
Educational level	1.187	0.977 - 1.441	0.084

Job description over the last 12 months	1.250	1.070 - 1.462	0.005
Do you exercise regularly	0.626	0.431 – 0.909	0.014
Have you ever been diagnosed with any mental illness	1.376	0.515 – 3.674	0.524
Have you ever experienced domestic violence or neglect	2.540	1.257 – 5.130	0.009
Have you smoked tobacco every day in the past	5.104	3.421- 7.617	0.000
Number of cigarettes Smoked each Day	1.750	1.462 – 2.095	0.000
Who influenced you to use tobacco	2.144	1.533 - 2.998	0.000
Why did you smoke for the first time	0.959	0.856 – 1.074	0.467
In the previous 30 days have you seen information regarding the dangers of smoking or that supports quitting in newspapers or television or social media	1.073	0.663 - 1.736	0.775
In the previous 30 days have you seen any of the following types of cigarette promotions	1.272	0.935 - 1.729	0.126

Table 4 shows the binary logistic regression for tobacco smoking. Gender, income, Job description, experienced domestic violence or neglect, smoked tobacco every day in the past, number of cigarettes Smoked each day and who influenced you to use tobacco had a higher risk of tobacco smoking ($p < 0.05$).

4. DISCUSSION

A crosssectional survey was done in 2021 and distributed using a social media platform. This study involved the general population in Makkah city, Saudi Arabia. A validated questionnaire was used to estimate the prevalence rates of smoking behavior and to explore the potential associated determinants with different factors. In the present study, the prevalence of tobacco use was 34.1%. Our result is consistent with those of previous studies performed in Saudi Arabia and Egypt. The prevalence was estimated at 45.4% and 27.2%, respectively (Almutairi et al., 2019; Youssef et al., 2002). Nevertheless, it is higher than those previously reported from studies performed in Saudi Arabia (11.6%) and Iraqi (21.8%) (Jarallah et al., 1999; Hussain et al., 2013). This variation could be attributed to the differences in study design, sample size, instruments used.

We found 56% of smokerswere male, while females were only 8.5%. Cigarettes smoking seem to be a gender specific habit with males' predominance. A study conducted in Saudi Arabia has revealed that the highest prevalence of tobacco uses among males (42.3%) (Hassan et al., 2014). On the contrary, one study stated the lowest prevalence among males (15.6%) (Taha et al., 2010). As regard of the female smoking prevalence was 10.3% and 0.9% (Alsaegh et al., 2017; Ansari et al., 2017). The considerable difference among males and females in KSAcould bea scribed to socio cultural differences in smoking behavior.

As for the result of our logistic regression analysis, we found that male was associated with the use of smoking (OR, 3.68). It agrees with the findings of previous published studies which show a significant association between gender typeand smoking (Hussain et al., 2013; Aryal et al., 2010; Mahfouz et al., 2013). In our study, we noticed a significant association between the individual income and smoking habit (OR, 2.77). This finding is congruent with previous published study in Oman. Which they found Adolescents who received more money had higher odds of being current smoker than if they had less money (Allawati et al., 2008). This may imply that receiving more money may have encouraged the individuals to start and maintain their smoking habit.

Our research demonstrated that those individuals who have different job description may influence the person to be a smoker (OR, 1.25). They found that work stress has a significant influence on smoking behavior (Azagba and Sharaf, 2011). This can explain that every job description carries some level of stress which may alter smoking status of people. Also, we discovered that those individuals who have ever experienced domestic violence or neglect were more prone to be smokers (OR, 2.5). A study conducted among male school adolescents in Saudi Arabia reported that (45.5%) of the smokers had family neglect (Alsubaie et al., 2020).

People were two times more expected to use tobacco if at least one family member (parents and brothers) or friends used tobacco than those who had no one using tobacco. Many researchers have reported similar findings with current smoking being associated with having a closer relative who was also a smoker (Hussain et al., 2013; Aryal et al., 2010; Alsubaie et al., 2020; Mutwakel et al., 2013). Lastly, we also found that who have smoked tobacco every day in the past was associated with the current smoking status (OR, 5.1).

Strength and limitations

In spite of the several advantages of a cross sectional study, it shows a limitation linked to design at the data analysis, the snapshot nature could only confirm an association between cause and effect.

5. CONCLUSION

This study reveals a high prevalence of cigarettes smoking amonggeneral population in Makkah, Saudi Arabia, similar to the prevalence rates recorded in other countries. The smoking behaviors were associated with gender, income, Job description, experienced domestic violence or neglect, smoked tobacco every day in the past, number of cigarettes smoked each day and who influenced you to use tobacco. We recommend awareness campaignsto increase the awareness about the smoking hazards. Health education is required for smokers in the primary health care for smoking secession to help them to quit smoking.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

REFERENCES AND NOTES

1. Ahmed RM, Osman H, Faizo NL, Aliazidi R, Eid MW, Elsamani M, Elkhader BA. Factors influencing the initiation of smoking among Taif University students. Medical Science 2021; 25(112):1318-1325

2. Algabbani AM, Almubark R, Althumiri N, Alqahtani A, BinDhim N. The Prevalence of Cigarette Smoking in Saudi Arabia in 2018. J Food Drug Rgul Sci 2018; 1(1):1.

3. Al-Lawati JA, Muula AS, Hilmi SA, Rudatsikira E. Prevalence and Determinants of Waterpipe Tobacco Use among Adolescents in Oman. Sultan Qaboos Univ Med J 2008; 8(1):37–43.

4. Almulla A, Mamtani R, Cheema S, Maisonneuve P, Basuhai JA, Mahmoud G, Kouyoumjian S. Epidemiology of tobacco use in Qatar: Prevalence and its associated factors. Plos one 2021; 16(4):e0250065.

5. AlMutairi H, Aftan A, Alqarni L, Amer F, Alhajji M, AlSaihati R, AlismailN, Alduayji M, Alobaid A. Smoking and related diseases in Saudi Arabia. Int J Med Dev Ctries 2019; 586–91.

6. AL-Saegh SZ, Bakarman M, Habadi MI. Prevalence of smoking and its associated factors among female medical students in King Abdulaziz University, KSA, Jeddah. Int J Res 2017; 3(4):427–36.

7. Alsubaie ASR. Prevalence and determinants of smoking behavior among male school adolescents in Saudi Arabia. Int J Adolesc Med Health 2018; 32(4). doi: 10.1515/ijamh-2017-0180

8. Ansari K, Farooqi FA. Comparison and prevalence of smoking among Saudi females from different Departments of the College of Applied Medical Sciences in Dammam. Int J Health Sci 2017; 11(5):56.

9. Aryal UR, Deuba K, Subedi A, Shrestha R, Bhatta L. Prevalence and Determinants of Cigarette Smoking among the College Students of Kathmandu Valley. Asian J Med Sci 2010; 1(2):53–8.

10. Azagba S, Sharaf MF. The effect of job stress on smoking and alcohol consumption. Health Econ Rev 2011; 1(1):15.

11. Hassan H, Mahmoud S, Katasha M, Isaa L, AbdelWahed A, Kandil S, Abusheisha G, AlSibai M. Tobacco smoking among students of Al-Ghad College for Applied Medical Sciences for Male in Riyadh, Saudi Arabia. Int J Med Sci Public Heal 2014; 3(10):1196.

12. Hussain HY, Abdul Satar BA. Prevalence and determinants of tobacco use among Iraqi adolescents: Iraq GYTS 2012. Tob Induc Dis 2013; 11(1):1–4.

13. Jarallah JS, Al-Rubeaan KA, Al-Nuaim ARA, Al-Ruhaily AA, Kalantan KA. Prevalence and determinants of smoking

in three regions of Saudi Arabia. Tob Control 1999; 8(1):53–6.

14. Jayes L, Haslam PL, Gratziou CG, Powell P, Britton J, Vardavas C, Jimenez-Ruiz C, Leonardi-Bee J, Dautzenberg B, Lundback B, Fletcher M. Smoke Haz: Systematic Reviews and Metaanalyses of the Effects of Smoking on Respiratory Health. Chest 2016; 150(1):164–79.

15. Mahfouz AA, Shatoor AS, Al-Ghamdi BR, Hassanein MA, Nahar S, Farheen A, Gaballah II, Mohamed A, Rabie FM. Tobacco use among health care workers in southwestern Saudi Arabia. Biomed Res Int 2013; 2013:960292. doi: 10.1155/2013/960292

16. Moradi-Lakeh M, El Bcheraoui C, Tuffaha M, Daoud F, Al Saeedi M, Basulaiman M, Memish ZA, AlMazroa MA, Al Rabeeah AA, Mokdad AH. Tobacco consumption in the Kingdom of Saudi Arabia, 2013: Findings from a national survey Health promotion and society. BMC Public Health 2015; 15(1):1–10.

17. Morris PB, Ference BA, Jahangir E, Feldman DN, Ryan JJ, Bahrami H, El-Chami MF, Bhakta S, Winchester DE, Al-Mallah MH, Sanchez Shields M. Cardiovascular Effects of Exposure to Cigarette Smoke and Electronic Cigarettes: Clinical Perspectives from the Prevention of Cardiovascular Disease Section Leadership Council and Early Career Councils of the American College of Cardiology. J Am Coll Cardiol 2015; 66(12):1378–91.

18. Mutwakel A, Alsanosy RM, Mahfouz MS, Gaffar AM. Sociodemographic Factors Associated with Tobacco Smoking Among Intermediate and Secondary School Students in Jazan Region of Saudi Arabia. Subst Abus 2013; 34(4):381–8.

19. Taha AZ, Sabra AA, Al-Mustafa ZZ, Al-Awami HR, Al-Khalaf MA, Al-Momen MM. Water pipe (shisha) smoking among male students of medical colleges in the eastern region of Saudi Arabia. Ann Saudi Med 2010; 30(3):222.

20. Youssef RM, Abou Khatwa SA, Fouad HM. Prevalence of smoking and age of initiation in Alexandria, Egypt. East Mediterr Health J 2002; 8(4-5):626-637.