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Female nursing students' knowledge, attitudes, beliefs and behaviors toward smoking: A cross-sectional study in Saudi Arabia

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ABSTRACT

Background & Aim: Tobacco use is a leading cause or contributor to several chronic health illnesses. Smokers should be encouraged to quit smoking by healthcare providers. Nursing students represent a substantial part of the health delivery workforce in the future. It is crucial to know their knowledge and involvement in tobacco smoking control. We investigate smoking knowledge, attitudes, beliefs, and behaviors toward tobacco smoking among undergraduate nursing program female students.
Methods & Materials: A cross-sectional, descriptive correlational design was used to achieve the study aims. The subjects were 134 female undergraduate nursing students who were recruited in 2016 from a school in a governmental university located in Riyadh, Saudi Arabia. A questionnaire that included the Global Health Professional Student Survey along with additional relevant questions was utilized.
Results: Throughout their lifetime, 80.6% reported not smoking any type of tobacco product (never called smokers), and 19.4% reported smoking either cigarettes or waterpipes (called smokers ever). Female nursing students were less likely to become smokers if they thought that a smoker who quits smoking would 'very likely' or 'likely' avoid or decrease serious health problems [OR: 8.08 (95% CI: 2.00, 32.70), p = < 0.01]. Whereas students who were allowed to smoke at home, or were allowed to smoke in the presence of children, were more likely to become smokers.
Conclusion: Knowledge about the harmful consequences of smoking alone was not enough to motivate smokers to quit. Nursing students should receive training on smoking cessation techniques.

Introduction

Tobacco use is one of the biggest public health concerns as it kills up to half of its long-term users and is accountable for more than 8 million deaths worldwide each year (1, 2). Moreover, tobacco use is considered a leading cause or contributor to several chronic health illnesses, including cancer, cardiovascular problems, respiratory problems, and stroke (3). The prevalence of current tobacco smoking in US was 20% (men, 23.2%, women, 16.7%). In comparison, Saudi Arabia has a lower smoking prevalence of 12.7% (1).

As health experts and promoters, nurses have a paramount role in delivering smoking cessation counseling (4). Given the preventable nature of smoking-related diseases, smokers need to be advised to quit their tobacco smoking by their healthcare providers as part of their responsibility toward health promotion for the community (5).

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The involvement of health professionals in tobacco-use prevention is considered one of the strategies to reduce smoking prevalence and health risks and to improve quality of life (5). Nurses should ask clients about their smoking status and advise them regarding the dangers of exposure to active and passive smoke (6).

Nurses form the largest cohort of healthcare professionals and spend many hours directly with patients. They can contribute to the reduction of tobacco use by assisting in smoking cessation endeavors. Since nurses form their professional roles while studying at a university or a college, it is important to examine their smoking history, behaviors, knowledge, attitudes, and beliefs toward smoking while preparing to become future nurses.

Nurses can perform health promotional activities targeting smoking cessation, report the negative health effects of smoking, and be role models in making smoking seem less attractive or alluring to patients (5). On the other hand, Radsma and Bottorff (8) have shown that nurses who smoke do not assess smoking histories and provide cessation interventions less often to their patients as routinely or in-depth as nurses who do not smoke.

Saudi Arabia participated in the Global Health Professional Student Survey in 2010. A census was conducted on a total of 127 third-year nursing students (9). In that survey, almost half (53.3%) of them had ever smoked cigarettes, and 37.1% had ever used other forms of tobacco products (e.g., waterpipe [also called: hookah, hubble-bubble, shisha, arghila, and narghile]). Moreover, 19.9% and 20.4% were current cigarette and waterpipe smokers, respectively. The majority (87.1%) supported enforcing a ban on smoking in enclosed public places, and 24% stated they received training on smoking cessation.

While many studies worldwide examined tobacco use among college students, similar studies in Saudi Arabia are rather limited (10-12).

According to the literature, nurses who receive training on smoking cessation are more likely to conduct smoking cessation interventions than those who do not receive such training (12-13). In the contents of nursing programs curricula in Saudi Arabia, there is no separate educational module on tobacco assessment and control.

Globally, limited data have been collected previously on tobacco smoking history and patterns among female nursing students. Therefore, research work to shed light on tobacco smoking among female nursing students in Saudi Arabia is needed.

The study focused on female subjects due to limited previously published studies that targeted them. Tobacco smoking among females is still taboo in many cultures and countries, including Saudi Arabia. This study aimed to describe female undergraduate nursing students' knowledge, attitudes, beliefs, and behaviors toward tobacco smoking. Furthermore, the relationships among study variables with smoking status were explored.

Methods

A cross-sectional, descriptive correlational study was conducted in Riyadh, Saudi Arabia. Data collection occurred from March to May 2016.

In this study, subjects were recruited from women's only nursing schools in a governmental university located in Riyadh, the capital of Saudi Arabia. A convenience sampling technique was used. One hundred thirty-four students met the inclusion criteria: (a) being a female undergraduate nursing student and (b) in the third and fourth years of study. All invited students agreed to participate, yielding a response rate of 100%.

A self-administered questionnaire, using questions from the Global Health Professional Student Survey (GHPSS), was utilized. The

GHPSS was developed in 2005 by the WHO, CDC, and the Canadian Public Health Association (14). It asks about knowledge, attitudes, beliefs, and behaviors toward smoking, exposure to second-hand smoking, desire to quit smoking, and training to advise patients on smoking cessation techniques. Several additional questions were added about educational training received in regard to smoking and smoking cessation. Two subject matter experts evaluated the content validity of the study questionnaire.

The study protocol was reviewed and approved by the research ethics committee at the participating research site prior to recruiting the subjects in this study [Approval #: 57/3637/ND]. The students who met the eligibility criteria were approached directly by research team members to explain the objectives and importance of the study and to invite them to participate. The data were collected in an anonymous and voluntary manner. All students provided written informed consent to participate in the study.

Data were analyzed using SPSS 22 software. Before analyzing, the values of entered data were examined for missing data and inconsistencies. Descriptive analyses were performed using percentages and frequencies for categorical variables and minimum, maximum, mean, and standard deviation for quantitative variables. Spearman's correlation coefficient statistics were used to assess the relationships between study variables with smoking status.

In this study, the smoking status of the subject was defined as "never smoker" or "ever smoker." Never smokers are those who did not smoke tobacco products at any time in their entire lifetime. Ever smokers are current or former smokers. Thus, comparisons between the two groups of smokers were carried out using the *t*-test or $\chi 2$ test. Logistic regression analysis, yielding odds ratios [OR] with 95% confidence intervals [CI]), was used to determine the factors associated with smoking status (the outcome variable) among nursing students. A $p \leq 0.05$ was set as the threshold for statistical significance.

Results

The sample ages range from 19 to 25 years, with a mean of 21.5 (±1.2) years. Eighty-three percent were single. About half of the students were in their third (53.7%) and fourth year (46.3%) of their nursing program.

Knowledge about Smoking

All subjects reported that tobacco smoking is harmful to health, and 73.9% (n = 99) believed that smoking causes nicotine addiction. When asked, "Do you believe that waterpipe smoking is less harmful to a smoker than cigarette smoking?" only 12.7% (n = 17) responded, "Yes." Table 1 shows that 90% or more had correct answers to several knowledge questions.

When asked about the position on smoking in Islam, 66.4% (n= 89) reported that smoking is strictly forbidden/sinful (called *haraam* in the Islamic faith). Yet, 14.9% (n= 20) did not know any religious position on smoking. Although around a quarter (24.6%, n= 33) reported that they did not know any religious position on selling tobacco products in Islam, 60.4% (n= 81) and 10.4% (n= 14) stated that selling tobacco products in Islam is strictly forbidden/sinful and discouraged (called *makrouh* in the Islamic faith), respectively.

Statistically significant differences between never smokers and ever smokers were found on "the knowledge on likelihood that an individual will avoid or decrease serious health problems when quitting smoking". Thus, 73.1% of ever smokers compared with 94.4% of never smokers thought that it is 'very likely' or 'likely' that the individual who quits smoking would have lower chances to avoid or decrease serious health problems ($\chi^2 = 10.92$, $df = 1$, $p < 0.01$).

Table 1. Description of responses to knowledge questions

Question	All subjects (N=134) % (n)	Never smokers (N=108) % (n)	Ever smokers (N=26) % (n)	P-value
Do you think that tobacco smoking is harmful to health?				
Yes	100.0 (134)	100.0 (108)	100.0 (26)	1.00
Do you believe smoking causes nicotine addiction?				
No, or Don't know	26.1 (35)	25.9 (28)	26.9 (7)	0.92
Yes	73.9 (99)	74.1 (80)	73.1 (19)	
Do you think that shisha smoking is less harmful to a smoker than cigarette smoking?				
No, or Unsure	87.3 (117)	88.9 (96)	80.8 (21)	0.26
Yes	12.7 (17)	11.1 (12)	19.2 (5)	
To what extent do you think the number of cigarettes a person smokes affects his/her future health?				
Not very much, or I don't know	7.5 (10)	6.5 (7)	11.5 (3)	0.38
Very much, or Much	92.5 (124)	93.5 (101)	88.5 (23)	
To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack (myocardial infarction) or a chest pain (angina)?				
Not very much, or I don't know	8.2 (11)	6.5 (7)	15.4 (4)	0.14
Very much, or Much	91.8 (123)	93.5 (101)	84.6 (22)	
How likely do you think that the heart disease will worsen in a smoker who does not quit smoking?				
Very unlikely, Unlikely, or Uncertain	2.2 (3)	1.9 (2)	3.8 (1)	0.54
Very likely, or Likely	97.8 (131)	98.1 (106)	96.2 (25)	
How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?				
Very unlikely, Unlikely, or Uncertain	9.7 (13)	**5.6 (6)**	**26.9 (7)**	< 0.01
Very likely, or Likely	90.3 (121)	**94.4 (102)**	**73.1 (19)**	
What is the ruling on smoking in Islam?				
There isn't any ruling on smoking	3.7 (5)	2.8 (3)	7.7 (2)	0.39
Smoking is strictly forbidden/sinful	66.4 (89)	67.6 (73)	61.5 (16)	
Smoking is discouraged	11.9 (16)	10.2 (11)	19.2 (5)	
Other ruling	3.0 (4)	3.7 (4)	0.0 (0)	
Don't know	14.9 (20)	15.7 (17)	11.5 (3)	
What is the ruling on selling tobacco products in Islam?				
There isn't any ruling on smoking	1.5 (2)	0.9 (1)	3.8 (1)	0.41
Smoking is strictly forbidden/sinful	60.4 (81)	62.0 (67)	53.8 (14)	
Smoking is discouraged	10.4 (14)	11.1 (12)	7.7 (2)	
Other ruling	3.0 (4)	3.7 (4)	0.0 (0)	
Don't know	24.6 (33)	22.2 (24)	34.6 (9)	

Behaviors of smoking

Around eighty percent (*n*= 108) of subjects, reported not smoking any type of tobacco products in their lifetime (i.e., never smokers) and 19.4% (*n*= 26) smoked either cigarettes or waterpipes in their lifetime (i.e., ever smokers). Among ever smokers, 92.3% (*n*= 24) and 46.2% (*n*= 12) reported smoking cigarettes and waterpipe, respectively. Married subjects constitute 12.0% and 23.1% of never smokers and ever smokers, respectively. Throughout the last 7 days, thirty-one percent of subjects (*n*=41) reported that someone has smoked tobacco in their homes, while only 14.2% (*n* = 19) of them reported that someone smoked outside in front of them. Only 57.5% (*n*= 77) of subjects reported that smoking is never allowed inside their homes. When asked "Inside your home, is smoking allowed in the presence of children?", 79.9% (*n*= 107) responded "No".

Ever smokers reported more often (23.1%) allowance of smoking inside their home compared with never smokers (2.8%) (χ^2= 20.49, *df*= 3, *p* < 0.01). The allowance of

smoking in the presence of children among ever smokers was higher than never smokers (38.5% vs. 15.7%; χ^2= 6.72, *df* = 1, *p* = 0.01).

Attitudes toward Smoking

Table 2 summarizes the findings regarding the students' attitudes toward smoking. Most of the subjects agreed that: tobacco sales to children should be banned (97.8%); a complete ban to advertising of tobacco products should be enforced (95.5%); smoking bans in restaurants (97.8%), in cafes (88.1%), and in enclosed public places (97.8%) should be enforced. Further, 83.6% reported that they are in favor to have increasing taxes on tobacco products.

Table 2. Attitudes toward smoking

Subjects who answered "Yes" to the questions	All Subjects (N=134)	Never Smokers (N=108)	Ever Smokers (N=26)	P-value
	% (n)	% (n)	% (n)	
Should tobacco sales to children (persons younger than 18 years old) be banned/forbidden?	97.8 (131)	98.1 (106)	96.2 (25)	0.54
Should there be a complete ban/forbiddance of the advertising of tobacco products?	95.5 (128)	98.1 (106)	84.6 (22)	< 0.01
Should smoking be banned/forbidden in restaurants?	97.8 (131)	100.0 (108)	88.5 (23)	< 0.01
Should smoking be banned/forbidden in cafes?	88.1 (118)	91.7 (99)	73.1 (19)	0.01
Should smoking in all enclosed public places be banned/forbidden?	97.8 (131)	99.1 (107)	92.3 (24)	0.04
Would you favor increasing taxes on tobacco products?	83.6 (112)	87.0 (94)	69.2 (18)	0.03
Should health professionals get specific training on cessation techniques?	92.5 (124)	90.7 (98)	100.0 (26)	0.11
Do health professionals serve as "role models" for their patients and the public?	88.8 (119)	88.0 (95)	92.3 (24)	0.53
Should health professionals routinely advise their patients who smoke cigarettes to quit smoking?	92.5 (124)	92.6 (100)	92.3 (24)	0.96
Should health professionals routinely advise their patients who use other tobacco products (e.g., shisha and cigar) to quit using these products?	92.5 (124)	92.6 (100)	92.3 (24)	0.96
Do health professionals have a role in giving advice or information about smoking cessation to patients?	98.5 (132)	100.0 (108)	92.3 (24)	< 0.01
Are a patient's chances of quitting smoking increased if a health professional advises him or her to quit?	70.9 (95)	72.2 (78)	65.4 (17)	0.49

Eighty-nine percent indicated that healthcare providers serve as "role models" for their patients and the public. When asked whether health professionals should get specific training on smoking cessation techniques, whether health professionals should routinely advise their patients who smoke tobacco products to quit smoking, and whether health professionals have a role in giving advice or information about smoking cessation to patients, more than 90% responded that they agreed. Nonetheless, about 71% reported that patient's chance of quitting smoking increases if a healthcare professional advises him/her to quit.

Statistically significant differences between never smokers and ever smokers were found in some of the attitudinal statements toward smoking. Almost 85% of ever smokers compared with 98% of never smokers agreed with the statement that there should be a complete ban of adverting of tobacco products (χ^2 = 8.97, *df* = 1, *p* < 0.01).

When compared with never smokers, ever smokers were less likely to agree with implementing measures to ban smoking in

restaurants (88.5 vs. 100%; $\chi^2 = 12.75$, $df = 1$, $p < 0.01$) in cafes (73.1% vs. 91.7%; $\chi^2 = 6.89$, $df = 1$, $p = 0.01$), and in enclosed public places (92.3% vs. 99.1%; $\chi^2 = 4.38$, $df = 1$, $p = 0.04$). Almost 69% of ever smokers vs. 87% of never smokers favored increasing taxes on tobacco products ($\chi^2 = 4.84$, $df = 1$, $p = 0.03$). In addition, 92.3% of ever smokers vs. all (100%) of never smokers endorsed that health professionals have a role in giving advice or information about smoking cessation to patients ($\chi^2 = 8.43$, $df = 1$, $p < 0.01$).

Beliefs toward smoking

Many of the subjects (73.1%, $n = 98$) believed that health professionals who smoke cigarettes are less likely to advise patients to stop smoking vs. 66.4% ($n = 89$) believed that health professionals who smoke waterpipe are less likely to do the same advising. When asked whether they believe that patients would benefit from the advice to stop smoking that are provided by health professionals better than advices provided by friends, relatives, or other people, 77.6% responded "Yes".

Figure 1 illustrates the subjects understanding about available smoking cessation methods. The subjects believed that 'gradually decreasing number of cigarette/waterpipe smoked' is the most helpful method for quitting smoking with 56.0% ($n = 75$) agreeance. A significant statistical difference was shown between never smokers and ever smokers in their beliefs that formal stop-smoking program is a helpful method for smoking cessation (49.1% vs. 23.1%; $\chi^2 = 5.75$, $df = 1$, $p = 0.02$).

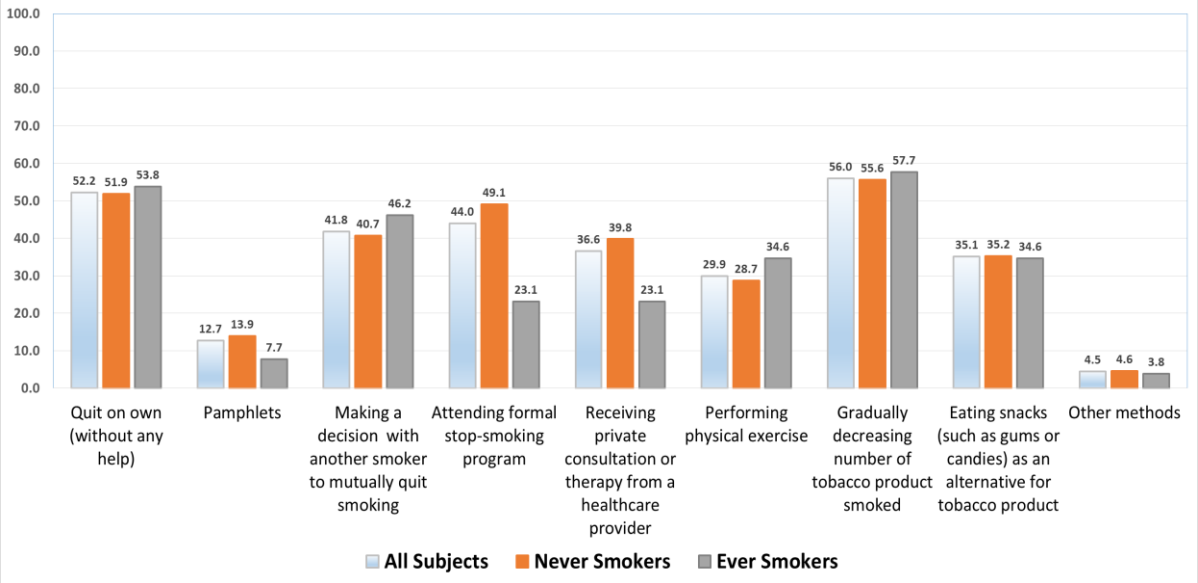

Figure 1. Percentages of positive beliefs toward tobacco smoking cessation methods

Curriculum/Training

When asked, "Were you taught in any of your classes about the dangers of smoking?", 61.2% ($n = 82$) responded "Yes". Ever smokers significantly reported receiving formal training in smoking cessation than never smokers (26.9% vs. 9.3%; $\chi^2 = 5.90$ $df = 1$, $p = 0.02$). Almost half of the subjects (54.5%, $n = 73$) stated that they have ever heard of using nicotine replacement therapies (such as nicotine patch or gum) in tobacco cessation programs, while 25.4% ($n = 34$) stated that they ever heard of using some kind of antidepressants (such as bupropion or Zyban) in tobacco cessation programs.

Relationships between variables and smoking status

The correlation analyses showed that being *never smoker* status was moderately negatively correlated with allowing smoking inside their own homes (rho= 0.30, $p< 0.01$) and weakly negatively correlated with permitting smoking inside their homes while children were present (rho= 0.22, $p= 0.01$). On the other hand, a weak positive statistically significant correlation was observed between being *never smoker* with thinking that smokers will likely avoid serious health problems if they quit smoking (rho= 0.29, $p< 0.01$).

Predictors of smoking status

A multiple logistic regression model shown in Table 3 was statistically significant, χ^2 (5, $N= 134$)= 27.200, $p< 0.001$, indicating that the model was able to estimate those who were *ever smokers*. It explained between 18.4% (Cox and Snell R square) and 29.3% (Negelkerke R squared) of the variance of smoking status and correctly classified 81.3% of the subjects.

Female nursing students were *less likely* to become smokers if they thought that a smoker who quits smoking would 'very likely' or 'likely' avoid or decrease serious health problems [OR: 8.08 (95% CI: 2.00, 32.70), $p< 0.01$] while controlling for all other variables in the model. Whereas students for whom smoking was allowed inside their homes [OR: 3.65 (95% CI: 1.28, 10.43), $p= 0.02$], and who reported that smoking was allowed inside their homes while children were present [OR: 3.34 (95% CI: 1.08, 10.31), $p= 0.04$] were *more likely* to become smokers while controlling for all other variables in the model.

Table 3. Multivariate logistic regression analysis of variables and smoking status as a dependent variable*

Variable	B	S.E.	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
					Lower	Upper
Marital Status [*Married*]	- 1.035	.653	.113	0.36	0.10	1.28
Year of Study [*Fourth*]	- 0.896	.540	.097	0.41	0.14	1.18
Thinks will Avoid or Decrease Serious Health Problems if Quit Smoking [*Very Likely or Likely*]	**2.089**	**.713**	**.003**	**8.08**	**2.00**	**32.70**
Smoking Allowance inside Home [*Never Allowed*]	**1.295**	**.536**	**.016**	**3.65**	**1.28**	**10.43**
Permitting smoking inside home while children are present [*No*]	**1.206**	**.575**	**.036**	**3.34**	**1.08**	**10.31**
Constant	- 1.170	.770	.129	0.31		

* χ^2= 27.200, df= 5. Smoking status was coded as 0= 'Ever Smoker', 1= 'Never Smoker'. Significant differences are in bold. Variables with significant regression scores with p < 0.10 and variables of interest were retained in the model.

Discussion

This study revealed a lower prevalence of female nursing students who ever smoked cigarettes (17.9%) and waterpipe (9.0%) in Saudi Arabia compared to the findings observed in the 2010 census (53.8% for cigarettes and 34.9% for other forms of tobacco products). On the other hand, these findings are near to the findings of Amin et al. (12), who found that the prevalence of tobacco product consumption among nursing students was 14.4%. However, they are much higher than the national average for females. The low prevalence of tobacco smoking in the national statistics is likely an underestimate as tobacco smoking by females is highly considered a social taboo.

While all our study subjects thought that tobacco smoking is harmful to health, some continued smoking behavior. This suggests that knowledge of potential health consequences associated with tobacco smoking may not be enough in and of itself to let smokers quit smoking. Besides, continuing smoking despite such knowledge

might be because they do not know about recommended smoking cessation counseling and behavioral interventions or pharmacological therapies.

In line with published evidence on the harmful effects of smoking waterpipe (13), a majority correctly believed that waterpipe smoking is more harmful to a smoker than cigarette smoking. This awareness is a cornerstone when it comes to the trendy social waterpipe smoking in the Middle East, where some families tend to smoke a waterpipe, forming a backdrop to lively social discussions.

Although all were Muslims, some subjects did not know the Islamic position toward smoking or selling tobacco products. It is crucial for nursing faculty members who develop undergraduate nursing curricula to highlight cultural differences among smokers when educating them about smoking cessation. For instance, Islamic teachings prohibit smoking, distribution, or trading tobacco because of its harmful physical consequences. Increasing awareness of this religious prohibition should be emphasized during smoking cessation programs among Muslims who smoke, as it may help to quit smoking some attendants of such programs.

Only 6.7% of the subjects reported smoking tobacco products inside their own homes. Also, around 20% of subjects reported allowing smoking in front of children. This figure is a very large number in Saudi Arabia because there are still many extended families living in this country. As shown in the regression model, smoking tobacco products inside homes increases the likelihood of smoking, especially while children are present. Likewise, education about the harmful effects of second-hand smoke on others, especially children, could encourage patients and the public who smoke to quit.

Never smokers reported higher positive attitudes against smoking and awareness of the adverse effects of smoking. This shows that continuous and routine assistance in helping with smoking cessation relies on the attitudes of healthcare professionals, including nurses, who play a vital role in promoting tobacco cessation and addiction treatments (15).

Most of our study subjects expressed positive attitudes towards tobacco control regardless of smoking status. However, never-smokers, compared to ever smokers, had a more positive attitude toward banning tobacco product advertising and smoking in restaurants, cafes, and public places. In addition, never smokers were more positive in their attitude toward the favorability of imposing higher taxes on tobacco products. The attitudes of the next generation of nurses toward smoking are of great importance as they play an important role in educating patients about the hazards of tobacco smoking and in providing smoking cessation interventions.

Similar to the one found within the context of our study, de Gravelles and Barone (16) revealed in their study that most nursing students want to receive tobacco control education during nursing school. Accordingly, evidence-based guidelines strongly recommend that smoking behavior evaluation and appropriate education on smoking cessation should take place during each healthcare visit (6, 17).

When compared to never-smokers, this study showed that ever-smokers had lower positive attitudes toward having a role in giving advice or information about smoking cessation to patients. Radsma and Bottorff (2009) also showed that nurses who smoke tobacco products may fail to advise their patients on quitting smoking (8).

The majority of our study subjects did not report receiving formal training in smoking cessation. This was not in line with Martínez et al. (18), who found that students from the last years of schooling had received more training in smoking consumption and smoking cessation during their nursing

education. Nonetheless, more ever-smokers than never-smokers were active in attending smoking cessation training. In Saudi Arabia, undergraduate nursing programs do not provide separate educational modules on tobacco control in the nursing curricula, though they emphasize tobacco's risks to health and smoking prevention and cessation. Similar to Sychareun et al. (19), skills building to provide counseling on quitting smoking to patients should be part of the undergraduate curriculum for nursing students.

Interestingly, ever-smokers, to a lesser degree than never-smokers, believed that formal smoking cessation programs are helpful for smoking quitting. In this regard, we suggest considering further research among those ever-smokers to explore their lived experiences during attending smoking cessation programs in order for them to be improved and strengthened.

Importantly, our findings showed that subjects had limited knowledge regarding available smoking cessation methods. According to this, Matranga et al. (20) emphasized improving undergraduate student nurses' skills, knowledge, and training and equipping them with counseling skills to become more effective in teaching healthy lifestyles to the general population. Smoking cessation interventions provided by healthcare providers are effective in helping smokers quit their smoking behaviors (1). Because of this, a combination of pharmacotherapy and counseling has been recommended to treat tobacco smoking dependence (6, 21). Hence, nursing students urgently need to be trained to successfully provide smoking cessation counseling and support, a positive behavioral change among smokers.

Inadequate previous studies addressed tobacco smoking among healthcare students in Saudi Arabia. Awan et al. (10) studied attitudes toward smoking among dental students; Azhar and Alsayed (11) evaluated knowledge of the risks to health associated with smoking among medical students; and Amin et al. (12) determined the prevalence of tobacco smoking among healthcare students, including nurses, along with environmental exposure and potentially influential factors. They uncovered a knowledge deficit in promoting smoking cessation strategies (such as treatment options, media campaigns, and smoke-free laws) and the need to expand awareness of the addictive nature of tobacco products. Our study evaluated new variables that were not previously addressed, including attitudes and beliefs toward smoking, academic curriculum/training level in undergraduate nursing programs, and predictors of smoking status among female nursing students—especially where tobacco smoking by females is considered taboo in Saudi Arabia.

Conclusion

This study contributes to our knowledge of tobacco use among female nursing students in Saudi Arabia. It showed that the likelihood of becoming a smoker would increase when smoking is a norm and permitted, especially during the presence of children around smokers. Our findings also showed that knowledge about the harmful consequences of smoking alone was not enough to motivate smokers to quit. However, nursing students had positive attitudes against smoking and supported tobacco-banning measures. These attitudes are important as nurses play key roles in educating patients about the hazards of tobacco smoking and in providing smoking cessation interventions.

The majority of our study subjects did not report receiving formal training in smoking cessation. While nurses, as healthcare advisers and behavioral models, should be empowered to provide smoking cessation counseling. Thus, nursing students should receive training on smoking cessation techniques since limited or lack of targeted smoking cessation training had been viewed

as a barrier to implementing effective smoking cessation strategies.

Strengths and Limitations

Our sample was drawn from Riyadh, the capital and largest province in Saudi Arabia. The strengths of this study are: i) a large sample size includes varied geographic distribution of enrolled students in one of the largest governmental universities in Riyadh, ii) this study is the first to our knowledge that investigated and highlighted several important results of smoking among Saudi female nursing students. The limitations are i) the use of self-administered questionnaires that can lead to social desirability bias; ii) the cross-sectional nature of this study that can only provide a snapshot of the situation in our sample; iii) this study does not provide many comparisons between international cultural issues associated with tobacco use (given that a discrepancy might be associated with different cultures).

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. World Health Organization. WHO global report on trends in prevalence of tobacco use 2000-2025. 4 ed. Geneva: Switzerland: World Health Organization; 2021.
2. Organization for Economic Cooperation and Development, World Health Organization. Tobacco. Geneva: Switzerland: Organisation for Economic Cooperation and Development and World Health Organization; 2020.
3. Center for Chronic Disease Prevention. Smoking and tobacco Use: Fast Facts. Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion. 2021 [cited 2022 Oct 22]; Available from: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm.
4. Rice VH, Heath L, Livingstone-Banks J, Hartmann-Boyce J. Nursing interventions for smoking cessation. Cochrane Database of Systematic Reviews. Dec 15;12(12):CD001188.
5. Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. European Heart Journal. 2016;37(29):2315-81.
6. National Institute for Health and Care Excellence. Tobacco: preventing uptake, promoting quitting and treating dependence: NICE guideline. Manchester, UK: National Institute for Health and Care Excellence; 2021.
7. Ganley BJ, Rosario DI. The smoking attitudes, knowledge, intent, and behaviors of adolescents and young adults: Implications for nursing practice. Journal of Nursing Education and Practice. 2013;3(1):40.
8. Radsma J, Bottorff JL. Counteracting ambivalence: nurses who smoke and their health promotion role with patients who smoke. Research in Nursing and Health. 2009;32(4):443-52.
9. Centers for Disease Control and Prevention. *Saudi Arabia - Nursing Students 2010 (3rd Year Students Only) Global Health Professions Student Survey (GHPSS).* [cited 2022 Oct 22]; Available from: https://nccd.cdc.gov/GTSSDataSurveyResources/Ancillary/DownloadAttachment.aspx?ID=1064.
10. Awan KH, Hammam MK, Warnakulasuriya S. Knowledge and attitude of tobacco use and cessation among dental professionals. Saudi Dental Journal. 2015;27(2):99-104.
11. Azhar A, Alsayed N. Prevalence of smoking among female medical students in Saudai Arabia. Asian Pacific Journal of Cancer Prevention. 2012;13(9):4245-8.
12. Amin HS, Alomair AN, Alhammad AH, Altwijri FA, Altaweel AA, Alandejani TA. Tobacco consumption and environmental exposure among healthcare students in King Saud

University in Riyadh. Journal of Family Medicine and Primary Care. 2020;9(2):657-63.
13. Lopez AA, Eissenberg T, Jaafar M, Afifi R. Now is the time to advocate for interventions designed specifically to prevent and control waterpipe tobacco smoking. Addictive Behaviors. 2017;66:41-7.
14. Centers for Disease Control and Prevention. *Global Health Professions Student Survey. 2022* [cited 2022 Oct 22]; Available from: https://nccd.cdc.gov/GTSSDataSurveyResources/Ancillary/DownloadAttachment.aspx?ID=57.
15. Nilan K, McKeever TM, McNeill A, Raw M, Murray RL. Prevalence of tobacco use in healthcare workers: A systematic review and meta-analysis. PloS one. 2019;14(7):e0220168.
16. de Gravelles P, Barone C. Findings of the Global Health Professions Student Survey (GHPSS) of Baccalaureate Nursing Programs in Arkansas. International Journal of Nursing and Health Care Research. 2019;4(2):1-9.
17. Fiore MC, Tobacco Use and Dependence Guideline Panel. Treating tobacco use and dependence:2008 update. 2008 update ed. Rockville, Md.: U.S. Dept. of Health and Human Services, Public Health Service.
18. Martínez C, Castellano Y, Laroussy K, Fu M, Baena A, Margalef M, et al. Knowledge, attitudes, and training in tobacco dependence and cessation treatment among nursing students in Catalonia (ECTEC Study): Cross-sectional study. International Journal of Mental Health and Addiction. 2021; 9:1-16.
19. Sychareun V, Hansana V, Choummanivong M, Nathavong S, Chaleunvong K, Durham J. Cross-sectional survey: Smoking among medical, pharmacy, dental and nursing students, University of Health Sciences, Lao PDR. BMJ Open. 2013;3(8):e003042.
20. Matranga D, Restivo V, Maniscalco L, Bono F, Pizzo G, Lanza G, Gaglio V, Mazzucco W, Miceli S. Lifestyle medicine and psychological well-being toward health promotion: a cross-sectional study on Palermo (Southern Italy) undergraduates. International Journal of Environmental Research and Public Health. 2020 Aug;17(15):5444.
21. Fiore MC, Adsit R. Will Hospitals Finally "Do the Right Thing"?–Providing Evidence-Based Tobacco Dependence Treatments to Hospitalized Patients who Smoke. Joint Commission journal on quality and patient safety/Joint Commission Resources. 2016 May;42(5):207.