*Full Length Research Paper*

# Medical Students' Knowledge of Smoking and Cessation Interventions at King Abdulaziz University

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The purpose of this study was to assess medical students' knowledge of smoking and cessation interventions as well as their preparedness to counsel patients. This was a cross-sectional survey conducted between October 2012 and May 2013 among sixth year medical students at King Abdulaziz University, Jeddah. We administered a self-filled questionnaire that comprised 59 questions that assessed students' characteristics and smoking status, their knowledge of smoking epidemiology, benefits of smoking cessation, smoking risks, and cessation interventions. Data were analyzed using the Statistical Package for the Social Sciences. We recruited 238 students; 22 (9%) were current smokers. Although most students reported being prepared to help their future patients quit, their knowledge of smoking epidemiology in Saudi Arabia was below average with mean score (SD) of 45.8 (16.3). Similarly, students had poor understanding of cessation interventions with mean score (SD) of 29.42 (17.94). Male and female students had a similar level of knowledge of the risks of smoking ($p$=0.409) and pregnancy related hazards ($p$=0.071), but females were more knowledgeable about the risks of second hand smoking ($p$=0.009). Smokers and former smokers were less knowledgeable than never smokers about smoking risks ($p$=0.015). Final year students at King Abdulaziz University have a poor knowledge of the health consequences of tobacco and the current available cessation methods, suggesting that they need further information on smoking and training in cessation techniques.

**Keywords:** Health knowledge; Medical students; Smoking; Tobacco; Cessation Interventions

## INTRODUCTION

Cigarette smoking kills approximately 5.4 million people every year. The World Health Organization estimates that one out of ten adults die due to a smoking-related condition( WHO website, 2013). In Saudi Arabia, recent studies show that the prevalence of smoking ranges from 13% to 20% and 9-11% among male and female university students, respectively (Abdalla et al., 2007; Alturki, 2006; Merdad et al., 2007). However, Bassiony (2009) reported that seven out of ten smokers in Saudi Arabia are willing to quit. In addition, Al-Turki (2006)

stated that 57% of medical students were motivated to quit smoking.

In general, physicians are trusted sources of information as well as recommendations regarding healthy lifestyles and the mitigation of associated health risks. Thus, physicians have the opportunity to provide prevention messages to patients during consultations. It is reported that a patient's chance to quit smoking, for example, is doubled by advice from a physician (Stead et al., 2013). Unfortunately, physician-patient

encounters do not include prevention counseling (Reed and Burns, 2008).

Physician preparedness to counsel patients to quit smoking is affected by their knowledge, training and their own personal habits(Pipe et al., 2009; Yentz et al., 2012). However, most studies conducted in Saudi Arabia focus on the prevalence of smoking among medical students and little is known about the depth of medical students' knowledge regarding smoking, associated risks, and cessation interventions (Alturki 2006; Sreedharan 2010; Azhar and Alsayed 2012; Abdulghani et al., 2013). There is also a paucity of data regarding medical students' preparedness to help their patients quit smoking. However, one report revealed that medical students' knowledge of the hazards of smoking and the relationship between smoking and lung cancer as well as heart disease was good (Wali 2011). Interestingly, non-smoking students were found to be more knowledgeable than smoking students regarding the consequences of smoking (Wali 2011).

Knowledge is one of the factors that influence physicians to counsel their patients about any specific condition. In this paper, we conducted a more comprehensive evaluation that assessed medical students' knowledge of smoking and cessation interventions as well as their preparedness to counsel patients.

## METHODS

*Setting and Study design:*
A cross-sectional survey was conducted between October 2012 and May 2013 among medical students in their final (sixth) academic year at the Faculty of Medicine at King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia.

## Participants and Procedure

All sixth year medical students of the 2012-2013 academic-year were invited to participate in the study. Students of both genders were included provided they consented to participate in the study. Students who declined to participate were excluded. All the participants were requested to fill the questionnaires in the small lecture rooms on campus.

## Ethical considerations

Informed written consent was obtained from all the students prior to recruitment. Participants were assured of the confidentiality of their responses and that all findings would be used solely for research purposes. No incentive was provided for their contribution. Permission

to conduct this study was granted by the Biomedical Ethics Research Committee of King Abdulaziz University.

## Instrument

A previously used questionnaire was modified and administered to all the students enrolled in this study (Springer et al., 2008). The questionnaire consisted of 59 questions divided into four domains: [1] student demographics, smoking habits and quit attempts (9 questions); [2] knowledge about the epidemiology of smoking (11 questions); [3] magnitude of health risks associated with smoking (21 questions), including risks of second hand smoking and risks associated with pregnancy; and [4] knowledge about smoking cessation interventions, benefits, and the physician's role (18 questions).

## Data analysis

The mean score of total correct responses was calculated for each group of items. Scores were classified as follows: > 90, excellent; 80-89, very good; 70-79, good; 60-69, fair; and < 60, poor.

Current smokers were defined as respondents who had smoked ≥ 100 cigarettes in their lifetime and who responded "yes" to the question, "Do you now smoke cigarettes every day or some days?" Ex-smokers were defined as respondents who had previously smoked but responded "no" to the question "Do you now smoke every day or some days?, while non-smokers were those who reported they never smoked in their entire life at the time the survey was conducted.

## Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA), version 20.0. Descriptive statistics was computed for all variables. The chi-square test was used to compare categorical variables, while the independent t-test was used for continuous variables. Differences were considered statistically significant at a $P$-value of < 0.05. Results are expressed as frequency (percent), mean (standard deviation [SD]), and range.

## RESULTS

### Students' characteristics and smoking status

A total of 238 students were recruited; males comprised 52% of the sample (Table 1). The mean (SD) age of the students was 23.4 (0.9) years (range, 22-29 years).

**Table 1.** Demographic and Smoking Characteristics of the Students

| Variable | Frequency* | Percent |
|---|---|---|
| **Gender** | | |
| Male | 124 | 52.1 |
| Female | 114 | 47.9 |
| Total | 238 | 100.0 |
| **Origin** | | |
| Makkah | 187 | 78.9 |
| Madinah | 10 | 4.2 |
| Riyadh | 7 | 3.0 |
| Eastern | 6 | 2.5 |
| Asir | 2 | .8 |
| Others | 25 | 10.5 |
| Total | 237 | 100.0 |
| **Smoking status** | **Male (%)** | **Female (%)** | **Total (%)** |
| Current smoker | 21 (17.8) | 1 (0.9) | 22 (9.7) |
| Exsmoker | 21 (17.8) | 9 (8.3) | 30 (13.2) |
| Never smoker | 76 (64.4) | 99 (90.8) | 175 (77.1) |

*The total varies because of missing responses to some questions.

Twenty two students were current smokers.(9.7%). Of these, about two thirds had attempted to quit smoking in the last year; half of the students (50%) reported that a health care provider had advised them to quit smoking. Sixteen students (72%) were seriously considering stopping smoking within the next 6 months, whereas 6 students (28%) admitted that they had no intention of quitting.

**Students' knowledge of smoking epidemiology**

Students' knowledge of smoking epidemiology in Saudi Arabia was below average with mean score (SD) of 45.8 (16.3). Only, 12 students (5%) correctly estimated the smoking prevalence in Saudi Arabia (within a range of plus or minus 10%). Up to, 222 students (92%) incorrectly estimated the percentage of smokers in Saudi Arabia who want to quit smoking. However, most students knew that more than one third of smokers in Saudi Arabia start smoking before the age of 15 years (Table 2). Over half of the students knew that a patient's chance to quit smoking is doubled after health care provider counseling for smoking cessation. Only 15 students (6%) did not believe that health care providers should ask patients about their smoking status at each visit. Most students recognized that smoking cessation at any age reduces premature death.

There was no significant difference between genders ($p=0.564$) and smoking status ($p=0.192$) regarding knowledge of smoking epidemiology.

**Students' Knowledge of the benefits of smoking cessation**

Twenty-five students (11%) incorrectly responded that after smoking cessation, it took > 15 years for cardiovascular risk to return to normal or the risk was never reduced. Three quarters of the students under- or overestimated the time frame in which lung cancer risk returns to normal after smoking cessation. Few students (14%) accurately estimated the success rate of "cold turkey" to be 5-15%.

**Students' knowledge of smoking risks**

The mean score (SD) of correct responses to the 13 questions on smoking risks was 51.52 (15.2) with a range of 0.0-84.6. Most students recognized that smoking greatly increased the risk of coronary artery disease (95%) and lung cancer (96%). The students' knowledge of the associated risk between smoking and cancers of the colon, bone, and bladder was below average. Only 67% of the students knew that the risk of emphysema was greatly increased by smoking.

Students had a poor understanding of the risks of second hand smoking and risks associated with pregnancy as the mean score (SD) was 33.5 (26.5) with a range of 0.0-100.0. Half of the students correctly responded that second hand smoking greatly increases the risk of developing chronic bronchitis and lung cancer. The mean score (SD) was 47.9 (30.7), with a range of

**Table 2.** Tabulation of the Students' Responses on Epidemiology of Smoking and the Effectiveness of Various Cessation Interventions

| Variable | Frequency* | Percent |
|---|---|---|
| **A patient's chances of quitting smoking are doubled if a health professional advises him or her to quit** | | |
| Correctly | 143 | 60.1 |
| Incorrectly | 55 | 23.1 |
| Don't Know | 40 | 16.8 |
| Total | 238 | 100.0 |
| **Health professionals should ask patients about their use of tobacco products at each visit** | | |
| Correctly | 211 | 89.8 |
| Incorrectly | 15 | 6.4 |
| Don't Know | 9 | 3.8 |
| Total | 235 | 100.0 |
| **Smokers who stop at any age reduce their risk for premature death** | | |
| Correctly | 172 | 72.3 |
| Incorrectly | 27 | 11.3 |
| Don't Know | 39 | 16.4 |
| Total | 238 | 100.0 |
| **In Saudi Arabia, more than one third of current smokers began smoking when they were less than 15 years of age** | | |
| Correctly | 146 | 61.6 |
| Incorrectly | 27 | 11.4 |
| Don't Know | 64 | 27.0 |
| Total | 237 | 100.0 |
| **More than two thirds of current smokers began smoking when they were less than 18 years of age** | | |
| Correctly | 159 | 66.8 |
| Incorrectly | 14 | 5.9 |
| Don't Know | 65 | 27.3 |
| Total | 238 | 100.0 |
| **Counseling** | | |
| Not at all effective | 14 | 6.0 |
| Somewhat effective | 96 | 41.2 |
| Highly effective | 111 | 47.6 |
| Do not know | 12 | 5.2 |
| Total | 233 | 100.0 |
| **Hypnosis** | | |
| Not at all effective | 35 | 15.2 |
| Somewhat effective | 73 | 31.7 |
| Highly effective | 14 | 6.1 |
| Do not know | 108 | 47.0 |
| Total | 230 | 100.0 |
| **Nicotine replacement therapy** | | |
| Not at all effective | 19 | 8.2 |
| Somewhat effective | 106 | 45.7 |
| Highly effective | 83 | 35.8 |
| Do not know | 24 | 10.3 |
| Total | 232 | 100.0 |
| **Fluoxetine** | | |
| Not at all effective | 9 | 3.9 |
| Somewhat effective | 40 | 17.3 |
| Highly effective | 18 | 7.8 |
| Do not know | 164 | 71.0 |
| Total | 231 | 100.0 |

Table 2 continue

| | | |
|---|---|---|
| **Bupropion** | | |
| Not at all effective | 4 | 1.7 |
| Somewhat effective | 23 | 10.0 |
| Highly effective | 26 | 11.4 |
| Do not know | 176 | 76.9 |
| Total | 229 | 100.0 |
| **Varenicline** | | |
| Not at all effective | 2 | .9 |
| Somewhat effective | 22 | 9.8 |
| Highly effective | 13 | 5.8 |
| Do not know | 187 | 83.5 |
| Total | 224 | 100.0 |

*The total varies because of missing responses to some questions.



**Figure 1.** Students' knowledge of smoking risks based on gender

0.0-100.0 for questions that assessed the students' knowledge of the risk of premature birth and sudden infant death due to smoking. Most students knew that smoking increased the risk of premature birth and sudden infant death.

Students of both genders had a similar level of knowledge of the risks of smoking ($p$=0.409) and pregnancy-related hazards ($p$=0.071). However, female students were more knowledgeable than their male peers about the risks of second hand smoking ($p$=0.009; Figure 1). Smokers and ex-smokers were less knowledgeable than non-smokers about smoking risks ($p$=0.015); smoking status had no impact on the level of knowledge on second hand smoking ($p$=0.350) or pregnancy-related risks ($p$=0.949) (Figure 2)

**Students' knowledge of cessation interventions**

Students had a poor level of knowledge regarding available cessation interventions as the mean score (SD) was 29.42 (17.94). Nearly half of the students thought that counseling was highly effective as compared to other cessation interventions (Table 2). Approximately 82% of students knew that nicotine replacement therapy (NRT) was a somewhat or highly effective smoking cessation strategy. However, 20% thought that NRT was contraindicated in patients with cardiovascular disease. Less than one-fifth of the students knew that varenicline was effective for smoking cessation; a smaller proportion of students knew that fluoxoteine was ineffective.
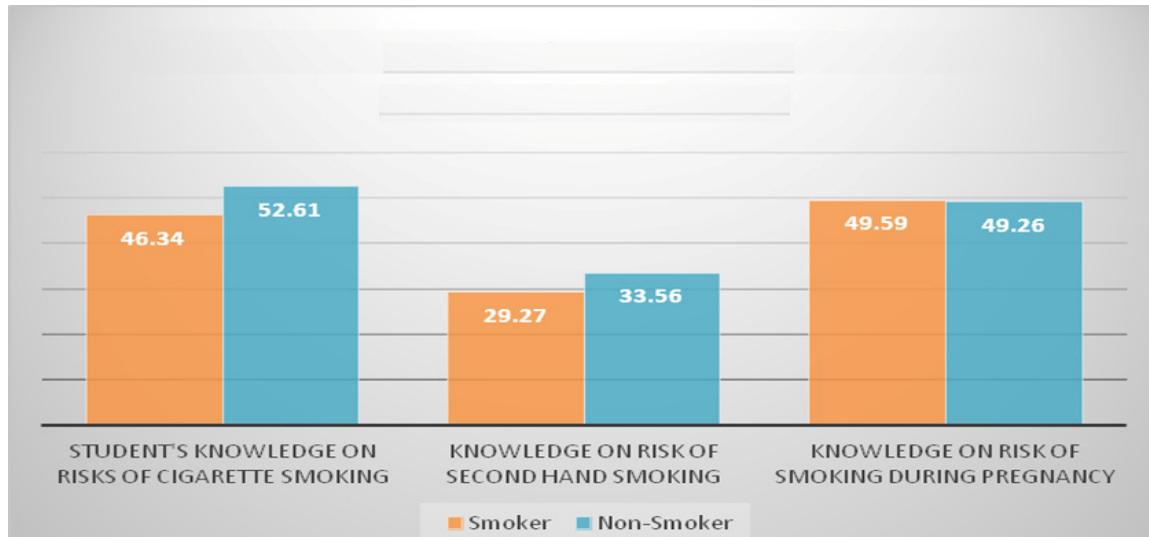
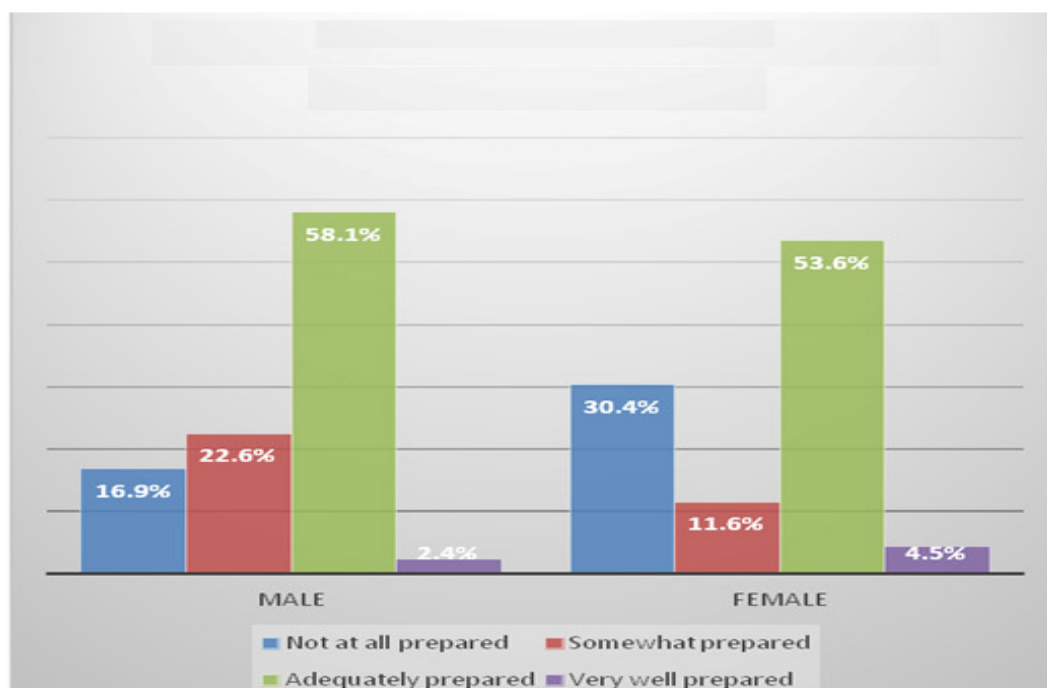**Figure 2.** Students' knowledge of smoking risks based on smoking status



**Figure 3.** Students' preparedness to counsel or advice patients based on gender

Only 15% of the respondents correctly perceived hypnosis to be an ineffective strategy for smoking cessation. Most students (63%) knew that the addictive nature of nicotine was comparable with that of heroin or cocaine.

A total of 134 students (57%) reported that they did not have any training on smoking cessation. Nevertheless, majority of the students (73%) felt they were prepared to advise or counsel patients to quit smoking. Despite their perceived preparedness, only 29 students (13%) reported

they always or most often discuss smoking cessation with each patient. There was no relation ($p=0.182$) between students' smoking status and their preparedness to counsel patients to quit smoking. Furthermore, there was no relation between smoking status and the frequency of counseling to patients ($p=0.246$).

Male students were more likely than their female counterparts to advise patients to quit smoking ($p=0.023$; Figure 3).

**DISCUSSION**

To our knowledge, this is the first comprehensive survey of medical students' knowledge regarding smoking hazards and treatment options. This study showed that participants had a poor knowledge of smoking epidemiology. Similarly, their level of knowledge on the risks associated with smoking and cessation strategies were poor. These results also suggest deficiencies in medical education regarding smoking in students at the Medical College of King Abdulaziz University.

Although most students in our study knew that smoking greatly increased the risk of coronary artery disease and lung cancer, their level of knowledge regarding smoking risks was generally poor. Furthermore, we observed that students had lower scores on questions that assessed knowledge of the risks of second hand smoking and risks associated with pregnancy. A similar study conducted on medical students at King Abdulaziz University revealed that they had a good understanding of the risks of smoking (Wali 2011). However, the discrepancy between the findings of this study and those of the author might be explained by differences in methodology. While the authors used a questionnaire derived from the Global Tobacco Survey, we administered a previously used questionnaire that was modified to specifically address the needs of our students (Springer et al., 2008).    In addition, only sixth year medical students were surveyed in this study, while students from the second to the sixth level were included in the prior study.

Vanderhoek et al., (2013) found no differences in knowledge of smoking risks between smoking and non-smoking students. On the contrary, in this study smokers and ex-smokers demonstrated a lower level of knowledge about smoking risks ($p$=0.015) than non-smokers, which is in line with the results of other studies., indicating that smoking students may become more likely to deny the harmful effects of smoking (Wali 2011; Minhas et al., 2009) . Our analysis showed that female students were more knowledgeable about the risks of second hand smoking. Female medical students were also more knowledgeable than male students about the risk of smoking on lung and bladder cancers as shown in another study (wali 2011). The exact explanation of this finding is unknown.

Similar to the findings of a previous report, most students in this study had little knowledge about the epidemiology of tobacco use and quitting(Springer et al., 2008). This may affect the students' willingness to counsel patients about smoking cessation and, consequently, students may miss opportunities to assess readiness-to-quit in their patients(Springer et al ., 2008). Only 14% of the students accurately estimated that the success for "cold turkey" quit attempts was 5-15%. We believe that the knowledge gaps regarding tobacco epidemiology and cessation may negatively influence physicians' clinical decision-making.

Globally, students feel that they are not adequately prepared during undergraduate education to advise patients about smoking cessation (Vanderhoek et al., 2013). Nevertheless, it is unclear whether medical students' readiness to counsel patients is as a result of deficiencies in education only, but also due to personal factors such as smoking status. In fact, it was shown that non-smoking physicians were more likely to counsel their patients to quit smoking than those who smoke (Frank et al., 2010). In our study, the prevalence of current smoking was 9%, which is within the previous locally reported range (2-52%) (Bassiony 2009). Results of the prevalence rates of current smoking among medical students, however, show wide differences across various regions. In one report from Canada, the prevalence of current smoking among medical students at the University of Alberta was estimated at 3% (Vanderhoek et al., 2013). Recent surveys conducted on medical students in the United States, United Kingdom, and Germany reported smoking rates of 11%, 10%, and 20%, respectively (Springer et al ., 2008; Raupach et al., 2009).  However, rates as high as 22% and 37% have been cited in other reports from South India and Tunisia, respectively (Ganesh et al., 2011; Fakhfakh et al., 1996) .

In this study, students demonstrated a poor level of knowledge regarding available cessation interventions. Furthermore, the lowest levels of knowledge concerned non-pharmacological therapies for smoking cessation. In comparison, some reports state that 99% of general practitioners are familiar with treatment guidelines for hypertension, and 90% of physicians are familiar with the guidelines for the management of angina (Beaulieu et al., 2005; Heneghan et al., 2007).  This discrepancy may reflect the inherited interest of medical schools to focus on common diseases but less so with regard to education about smoking.

According to Vanderhoek et al (2013), medical students differed on their opinion regarding the effectiveness of various intervention methods although they generally agreed on the major risks of smoking. While there is evidence that physician advise doubles the chance of quitting, some studies described physician advise as ineffective (Stead et al., 2013; Minhas and Rahman, 2009; Strobel et al., 2012) . Raupach et al. (2009) reported that medical students in London and Edmonton rated pharmacotherapy to be more effective than physician advice, willpower, or alternative therapy (Raupach et al., 2009). On the contrary, Strobel et al, (2012) in a similar study, reported that German medical students considered "willpower" to be extremely effective. Our study again showed nearly half of the students thought that counseling was highly effective as compared to other intervention methods.

Although over half of the students in this students reported that they did not have any training on smoking cessation, up to 73% felt they were prepared to advise or counsel patients to quit smoking. As future physicians,

who are expected to assume leading roles in managing tobacco addiction, the imbalance between the students' knowledge and the skills and information that they need to treat patients who smoke is one of concern. In order to prevent future weakness or impairment in decision-making in clinical practice, it is necessary to identify knowledge gaps in tobacco intervention and, subsequently, develop effective training methods for tobacco intervention in undergraduate medical education (Spangler et al., 2002).

The findings of our study should be interpreted in the light of its limitations. First, results were based on a self-administered, questionnaire, which has drawbacks such as subjectivity and recollection. Second, the study was limited to one medical school, which is unrepresentative of medical education on tobacco in Saudi medical schools. This did not therefore permit us to make comparative evaluations of knowledge among different medical schools in Saudi Arabia.

## CONCLUSION

Participants have a poor knowledge of the health consequences of tobacco and the current available cessation methods, yet they felt prepared to counsel their future patients who smoke. There is a major concern about the mismatch between students' knowledge about tobacco and their readiness to counsel future patients regarding this very important risk factor for many diseases. The current gaps in the students' knowledge of smoking epidemiology and intervention strategies suggest that they need further information on smoking and training in cessation techniques. The medical school curriculum at the University of King Abdulaziz should incorporate a more focused education on smoking overall.

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