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Knowledge about Tobacco Smoking among Medical Students in Saudi Arabia: Findings from Three Medical Schools

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Abstract

Introduction: Tobacco smoking is the leading cause of preventable death worldwide. Educating and training medical students about tobacco dependence prevention and treatment will prepare them for the task ofhelping smokers quit. In Saudi Arabia, little is known about medical students' knowledge on this topic.

Methods: This study was conducted among 237 medical students from three medical schools (89% Response Rate). Students were asked to complete a 55-item questionnaire about the knowledge of smoking epidemiology, smoking cessation practice and benefits, and treatment of nicotine addiction.

Results: The majority of the students (91.4%) do not have adequate knowledge about the epidemiology of smoking. Students demonstrated a low knowledge of the health risks associated with tobacco use (average score 53%; SD=11.6), a fair (76.3%) understanding of the benefits of smoking cessation, and insufficient information about treatment of nicotine addiction. No more than 20.9% of the respondents thought they were adequately prepared to counsel their patients to quit smoking

Conclusions: Medical students in Saudi Arabia are not well informed and trained in tobacco dependence and treatment. It is necessary to address this deficit by prioritizing these topics in medical education curricula.

Keywords: Pharmacotherapy; Nicotine addiction; Epidemiology

Introduction

Tobacco smoking is the leading cause of preventable death worldwide [1]. Currently, 5.4 million people die from tobacco-related diseases each year and 80% of those deaths occur in developing countries. In Saudi Arabia, the prevalence of smoking is approximately 21% among the general adult population and 25% among university students [2]. Tobacco dependence associated health conditions and quality of life are known to usually improve upon cessation [3-6]. Hence, tobacco dependence treatment and counseling have been recommended to help smokers quit. Physicians can have a critical role in reducing the tobacco burden, as it has been documented that even brief advice to the patient can substantially decrease smoking cessation rates [7,8]. A visit to the clinic can be an opportunity for physicians to counsel their patients about tobacco dependence. Lack of proficiency and training about tobacco dependence and cessation methods, [9-11] lack of confidence and self-efficacy in counseling skills, [9,12] lack of time, [11,12] and a health system that does not support tobacco cessation services [12] are among the reasons why physicians do not intervene with patients that use tobacco. Low level of competence among doctors in tobacco cessation practice has been linked to low level of proficiency among medical students [13]. Investigation of the proficiency of medical students in tobacco dependence and the impact of medical education on their knowledge and attitude about tobacco dependence have demonstrated that medical students as future health care professionals, educators and researchers are in a key position to influence future tobacco cessation and control programs in Saudi Arabia and elsewhere [2,14-16]. There are no published results on treating tobacco dependence in Saudi Arabia and no attention has been paid to the Saudi medical school's core curricula in tobacco education content that is supposed to prepare the students for this task. This study among medical students from three medical schools in Saudi Arabia is intended to partially fill the gap by reporting on the knowledge of the medical students about smoking-related epidemiology, the harmful effects of smoking, and the efficacy of counseling techniques and pharmacotherapy.

Methods

This is a cross-sectional study that was conducted during the 2011-2012 school year among fifth year medical students enrolled at three medical schools in Saudi Arabia. This study was approved by the institutional Review Board at the sponsoring institution.

Study Population

The study was conducted among 237 medical students that constitute the 5th year cohort at three different medical schools from the central (King Saud Bin Abdul-Aziz University), western (King Abdul-Aziz University), and southern (Jazan University) regions of Saudi Arabia. After consenting with the students and explaining the purpose of the study, the questionnaire was completed in about 20 minutes before the start of a class. To be eligible, a medical student had to be in the target year for the medical school and understood the

English language to be able to complete the survey. Medical students in the introductory years were not included in the study because they are still learning the basic sciences and medical students in their sixth year are hard to reach because they are mostly in clinical rotations and rarely in the classic classroom setting. All students that were enrolled in the 3 medical schools and were present on campus during the period of data collection received a copy of the survey and were asked to participate.

Study Instrument

The instrument used in this study mostly contained items that were adopted from previous studies conducted among medicals students for the same purpose [15-17] in addition to newly developed items related to demographics (Questionnaire available upon request). Students completed a 55- item self-administered questionnaire in English about the practice of smoking cessation, knowledge of treatment of nicotine addiction, knowledge of the benefits of smoking cessation, and the knowledge of smoking epidemiology. The questionnaire also assessed the demographic characteristics and the smoking status of the students and was piloted among 20 medical students for validation purpose in terms of clarity and feasibility. Changes related to comprehension and clarity was made based on the pilot results.

Measures

The "demographic characteristics" section of the survey included questions related to age, gender, and marital status of the student, their smoking status, and if they are interested in quitting. Items related to the "Knowledge of smoking-related epidemiology" measures included the health risks associated with smoking and exposure to second hand smoke. Medical students were asked whether cigarette smoking greatly increases, slightly increases, or does not affect smoker's risk for many chronic illnesses such as cardiopulmonary diseases, and cancer. They were also asked about the health risks associated with cigarette smoking during pregnancy and the percentage of adults (over the age of 18) who smoke in Saudi Arabia. Other questions asked about the components in tobacco smoke that are mainly responsible for the increased risk of coronary artery disease and the number of substances that have been identified in tobacco smoke. One question in this section addressed general knowledge related to the harmful effect of Water pipe/Shisha smoking. The "Practice of smoking cessation" measure included items related to receiving any training or information related to smoking cessation, discussing smoking cessation with patients in clinical rotations, and the use of any interventions to help patients quit using tobacco products. The "knowledge of treatment of nicotine addiction" was assessed using 8 questions. Some questions in this section were related to the magnitude of patients' chance of quitting after being counseled by a physician, asking patients about their smoking status, estimating the percent of patients capable of quitting smoking on their own and the percent of smokers expected to successfully quit smoking with brief counseling by a physician. Other questions were about the use of pharmacotherapy, the effectiveness of several interventions in helping smokers quit (counseling, pharmacotherapy, hypnosis), the appropriate level of intervention for a patient who smokes and is not ready to quit, and contraindications for the use of nicotine replacement therapy and other pharmacotherapy. The "knowledge of the benefits of smoking cessation" was measured using 3 items about the reduced risk for premature death, the time it takes for reversing the risk of developing heart disease after quitting smoking, and the time it takes before the chance of developing lung cancer returns to normal. Other questions in the survey asked if the student knew of any tobacco cessation service in the city they reside in, how well they believe they are prepared to advise/counsel their patients to quit smoking, and whether they support a complete smoking ban on their campus. Two additional items addressed the perception of smoking and life-expectancy. Similarly to the surveys by Raupach et al. (2009) [15] and Grassi et al. (2012) [17] the medical students were asked if they knew lifelong smokers and non-smokers (2 questions) that lived to be 90 years old.

Data Analysis

Collected data were entered manually into a database. The questions were grouped by relevance to medical student's practice of smoking cessation, knowledge of treatment of nicotine addiction, knowledge of the benefit of smoking cessation, knowledge of the epidemiology of smoking, demographic characteristics, and all other remaining questions. Acceptable answers to each of the questions were based on published research, reports, and guidelines. Scores were computed based on the correct answers for grouped questions related to the health risks associated with smoking, second hand smoking, and smoking during pregnancy. Similar to other studies [13,17] scores were converted to 100/100 to comply with the convention of academic performance in medical education. A score of 70% to 79% is considered good while a score of less than 60% (average) is considered poor. Percent correct answers for all other questions were tabulated collectively for the three medical schools. Statistical comparisons between groups were performed using two sample t-tests for continuous variables, Chi-square for discrete variables, and analysis of variance (ANOVA) when necessary. A conventional level of $P<0.05$ for alpha was used to establish statistical significance. Data Analysis was performed using Stata 12 (2011).

Results

The survey was administered to 237 fifth year students from 3 medical schools. Of these, 212 responded, for an overall response rate of 89%. No more than 16% of the total sample was females. All female medical students were from one faculty of medicine. Neither one of the other two faculties of medicine had a fifth year cohort of female medical students.

Medical students' demographic characteristics and tobacco use

Results for this section are reported in Table 1. The mean age (SD) for the students was 21.6 (2.1) years. Approximately 19.4% were current smokers of cigarettes (12% of females and 18% of the males) and 14% reported ever smoking during their lifetime. Almost 17% reported currently smoking the water pipe/Shisha. Sixteen of the medical students that are current smokers of any form of tobacco reported a quit attempt in the past twelve months and 12% reported that they wanted to quit but they were not ready to try yet. There was a significant difference in the smoking status of the medical students from the three different medical schools ($\chi2=39.0$; $P<0.001$); the majority of the smokers (46%) were from the central region of Saudi Arabia. Only 5.5% of the students reported that they have been advised by a health professional to stop smoking during the past year.

Characteristic	N	%
Gender(N=205)		
Male	172	83.9
Female	33	16.1
Smoking status		
Cigarette smoking(N=194)	146	75.3
Never smoker	27	14.0
Ever smoker	37	19.4
Current smoker	22	11.3
Former smoker		
Waterpipe/Shisha smoking(N=199)		
Yes	33	16.6
No	146	73.4

Table 1: Gender and smoking status of fifth-year medicalstudentsfrom three medical schools, Saudi Arabia, 2012

Knowledge of smoking-related epidemiology

As can be seen in Table 2, only 8.6% of the students correctly estimated the prevalence of smoking in Saudi Arabia and nearly 16% did not even attempt to give an estimate. About 70% correctly estimated that two thirds of current smokers began smoking before the 18 years of age.

Survey Topic	N	%
Percent of Saudi Arabian adults who smoke(N=208)		
Responses within acceptable range (21%-25%)	18	8.6
More than 2/3 of smokers start before age 18(N=208)		
Correct response (true)	145	69.5
Health risks of cigarette smoking (13 items)(N=205)		
Correct response for 0-7 items	40	19.5
Correct response for 8-10 items	50	24.4
Correct response for more than 11 items	115	50.1
Health risks of secondhand smoke (5 items)(N=205)		
Correct response for 0-3 items	58	28.3
Correct response for 4-5 items	147	71.7
Health risks of cigarette smoking during pregnancy (3 items)(N=205)		
Correct response for 0-1 items	85	41.5
Correct response for 2 items	44	21.5
Correct response for 3 items	76	36.9

Table 2: Tabulation of correct responses to the epidemiology of smoking questions

Few students (16%) responded that carbon monoxide (CO) is the component of tobacco smoke that is mainly responsible for the increased risk for coronary artery disease. Substances mentioned by at least 42% of the medical students were nicotine, tar, or a combination of both substances. Approximately 24% knew that more than 4,000 substances have been identified in tobacco smoke. The average score for "knowledge of health risks" (53%; SD=11.6) associated with cigarette smoking suggested that the surveyed medical students had, in general, a low level of knowledge related to this topic. Almost 75% of the students knew the health risks of second hand smoke; however, the

average score for adequate knowledge of the health risks of smoking during pregnancy (35%; SD=10.7) was poor. There was no significant difference between smokers and non-smokers with regard to" knowledge of the health risks" of cigarette smoking, second hand smoke, or smoking during pregnancy.

Knowledge of the benefit of smoking cessation

No more than 13.6% of the students knew that it will take someone up to 15 years before their chances of developing heart disease returns to normal after quitting tobacco. Approximately 26.7% of the participants thought that the risk for lung cancer after cessation never returns to normal and 12.6% correctly knew that the risk of dying from lung cancer is about half of a person who smokes after 10 years of cessation. The majority of the students (76.3%) answered correctly that stopping smoking at any age reduces risk of premature death. Table 3 shows the percent response per item for this part of the survey.

Survey Item	N	%
Time to return risk of heart disease to normal(N=206)		
Correct response (15 years)	28	13.6
Time to reduce risk of lung cancer by half after smoking cessation (N=206)		
Correct response (10 years))	26	12.6
Stopping smoking at any age reduces risk of premature death(N=206)		
Correct response(true)	157	76.3

Table 3: Tabulation of correct responses about the knowledge of smoking cessation benefits

Knowledge and training in the practice of smoking cessation

With respect to the practice of smoking cessation, surprisingly 79% of the students reported not having any clinical training while in medicals school on smoking cessation, while 50% reported receiving lectures/seminars on the topic. Few students (8%) replied that they usually discuss smoking cessation with patients in clinical rotations or in the hospital; the majority (68%) reported that they never perform such a service. Mostly, the students did not know which interventions are being applied to help patients quit smoking within their health system; however, one fourth of them thought that counseling is the most used intervention, followed by referral to a specialized clinician (19%). Actually, no more than 20.9% of the respondents thought they were adequately prepared to counsel/advise their patients to quit smoking.

Knowledge of treatment of nicotine addiction

Table 4 shows the medical students' response to the knowledge questions associated with the treatment of nicotine addiction. Many students (62.4%) knew that nicotine is as addictive as other drugs such as heroin or cocaine. Nearly 44% of them correctly reported that a patient's chance of quitting doubles if advised by a health professional to do so. Approximately half of the students (52.8%) recognized that a physician should discuss smoking with their patients during every visit and no more than 28.8% correctly estimated the percent of smokers who try to quit on their own successfully. One fourth of the students knew that 20% to 40% of smokers are expected to successfully quit with brief counseling by a physician and the use of pharmacotherapy. Only 18.4% knew that Nicotine Replacement Therapy (NRT) is not contraindicated for people with cardiovascular disease; however, 88% recognized that it is highly or somewhat effective. Almost half of the students (47.8%) answered "Do not know" for the effectiveness of fluoxetine and 63% answered the same way for the effectiveness of bupropion.

Survey Item	N	%
Knowledge of quitting		
Smokers expected to quit on their own (acceptable range 60%-80%)	61	28.7
Knowledge of clinical practice guidelines		
Physicians should ask about smoking status at every visit	112	52.8
Smoker's chance of quitting doubles with provider's help	92	43.8
Nicotine is as addictive as heroin or cocaine	132	62.3
Best interventions to those not ready to quit are personalized advice and self-help material	81	38.2
Knowledge of pharmacotherapy		
Percent smokers who quit with provider counseling and nicotine replacement therapy (NRT) (acceptable range 20%-40%)	52	24.5

NRT is highly or somewhat effective	184	86.7
Fluoxetine is not at all effective	29	13.7
Bupropion is highly or somewhat effective	94	44.3
Knowledge of contraindications		
NRT is contraindicated for cardiovascular disease (False)	39	18.4
Bupropion is not contraindicated for pregnancy	6	2.8
Knowledge of cessation treatment		
Counseling is somewhat effective	101	47.6
Hypnosis is ineffective	16	7.5

Table 4: Tabulation of correct responses about the knowledge of treatment for nicotine addiction (N=212).

General knowledge about tobacco related issues and preparedness for tobacco dependence counseling

Regarding the questions on perception of smoking and life expectancy, most of the students (73.6%) reported not knowing a smoker who lived to be 90 years of age. About 66% of them reported knowing a non-smoker that lived to be the age of 90. There was a significant difference between smokers and non-smokers in replying to knowing a smoker who lived to be the age of 90 years ($\rho<0.001$). There was no significant difference among the two groups for knowing a non-smoker that lived to be that age ($\rho=0.41$). When asked about knowledge of availability of tobacco dependence treatment programs/services in Saudi Arabia, to which a patient willing to quit smoking can be referred to, almost three fourth (74.4%) replied with either "No" or "Don't Know". Unfortunately, many of the medical students (33%) were still reluctant to support a complete ban of smoking on campus.

Discussion

After a thorough review of the literature, we have come to the conclusion that a survey of medical students related to the knowledge of smoking issues and tobacco dependence and treatment has never been conducted in Saudi Arabia. Similar surveys were previously conducted among medical students in the world [9,11,14-19]. This study should add to the literature related to the control of the tobacco epidemic and the involvement of health professionals in this public health initiative. Results showed that Saudi medical students from three distinct medical schools have limited knowledge of the health risks associated with tobacco smoking, and a fair understanding of the benefits of smoking cessation and the practice of cessation. Similar to recent studies conducted in Italy, England, and Germany among a similar cohort of students, [15,17] the knowledge of the epidemiology of smoking was low. A minority of the students correctly estimated the percentage of Saudi adults who smoke. Surprisingly the average score for the knowledge of health risks associated with cigarette smoking and the average score for the knowledge of the health risks of smoking during pregnancy were also considerably low; a suggestion that their medical education may have failed to integrate these topics in the curriculum. This finding is in line with other studies conducted elsewhere, which reported that medical education is lacking in the tobacco dependence [7,11,15-17]. Many of the students showed a positive attitude towards the benefits of smoking cessation since many of them reported that the risk for developing heart disease is reversible and can return to normal after cessation. However, many of them underestimated the period it takes for lung cancer risk to go back to normal. A few thought that the risk persists forever. The level of information among this cohort of medical students from Saudi Arabia is insufficient and rather sporadic in nature. Rarely did medical students reply that they usually discuss smoking cessation with patients in clinical rotations or in the hospital. The entire management of tobacco dependence is unclear for these students; a real concern since the majority of them never performed such a service. A small percentage knew that Nicotine Replacement Therapy (NRT) is not contraindicated for people with cardiovascular disease. Smokers with cardiovascular problems may miss opportunities to overcome tobacco dependence because an uninformed physician, on the topic of smoking cessation, is reluctant to suggest Nicotine Replacement Therapy as a treatment for their addiction. Even though we did not attempt a comparison between medical schools and smokers and non-smokers for many of the response items, there was a significant difference in the smoking status of the medical students from the three different medical schools; we do not know the reason for this difference. Smokers were more likely than non-smokers to overestimate the life expectancy of a smoker, this may be due according to Raupach et al. (2009) [15] to the fact that the student-smoker has emerged from a community with high prevalence of smoking and is more likely to personally knowing a 90-year-old lifelong smoker or possesses the desire to believe that smokers may live to be 90 years of age. In general, the results of this survey are quite striking, as a large number of these students are on the lower end of the proficiency scale in tobacco dependence treatment and practice guidelines compared to published results for other medical students from Europe and the United States [15-17]. Smoking prevalence among the students is somewhat similar to the reported smoking prevalence among the population in the country. Many of them, to our disappointment, still did not want to support a tobacco free campus.

Limitations

This study was conducted among medical students from three different medical schools located in three different regions of Saudi Arabia. The surveyed medical students are not necessarily representative of all medical students in the country and the medical school curriculum from the three medical schools is not necessarily representative of other medical schools' curriculum. Individual examination of medical school curriculum on the inclusion of tobacco dependence and reported student proficiency should be addressed by

further studies. A more important limitation of this study is that these students are in the pre-training year and may have not had the chance to be exposed to the clinical practice guidelines in tobacco dependence. However, this limitation should not compensate for the fact that they demonstrated a low level of knowledge on the topic. A limitation that we had no control over is that most of the surveyed students were males and that the females were only from one of the medical school.

Conclusion

This study showed a lower than expected level of training in tobacco dependence treatment and an apparent deficit in medical education curricula in tobacco dependence among this cohort of medical students from Saudi Arabia. Medical school faculty, public health organizations and the Ministry of Health should promote the inclusion of tobacco dependence treatment education and training for medical students in the undergraduate and post-graduate medical training.

Declaration of Interests

No competing interests to declare.

Contributorship

All authors have contributed to this publication and hold themselves jointly and individually responsible for the content.

Conflict of Interest

None declared.

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