Tobacco Dependence in Medical Education in Countries of the Middle East and North Africa

DISSERTATION

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By

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Abstract

**Background:** Tobacco use is the leading cause of preventable death worldwide and is projected to cause nearly 450 million deaths worldwide during the next 50 year. Health professionals can play a critical role in reducing tobacco use. However, data on the competence of physicians from the Middle East and North Africa to offer tobacco cessation counseling are very scarce. The goal of this research is to determine how well prepared students in the Middle East and North Africa are with respect to providing cigarette and waterpipe smoking cessation advice, and to determine the prevalence of smoking and waterpipe use among Lebanese medical students. **Methods:** We surveyed the administrators who are familiar with the content of the curriculum in accredited medical schools from the Middle East and North African regions. We also surveyed third year medical students from Lebanon. The questionnaires included items about specific curricular content related to tobacco dependence and treatment. Descriptive statistics were reported by country and region and among the medical students in Lebanon. **Results:** There may be major gaps in medical training pertaining to tobacco related issues in medical school’s curriculum in the Middle East and North Africa. The prevalence of tobacco use is high among Lebanese medical students. **Discussion:** Targeting the medical curriculum for improvement in tobacco use and cessation in countries of the Middle East and North Africa will not only help this region, but it will also serve as an international effort to contain a global phenomenon.
This document is dedicated to my daughters Najwa and Yasmeen
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I offer my regards to my committee members who supported me in any respect during the completion of the project.
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Publications


Fields of Study

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Chapter 1: Introduction

Tobacco use is a worldwide epidemic affecting humanity and claiming the life of millions of people every year (1). It is estimated that the tobacco epidemic may kill as many as 10 million in the next 20 to 30 years, with the majority of deaths occurring in developing countries (1). Cigarette smoking accounts for the majority of these deaths, and extensive research is dedicated to studying the determinants and health related effects of cigarette smoking (2). However, there are alternative methods for consuming tobacco such as waterpipe smoking. The World Health Organization (WHO) issued a report in 2005 titled “Waterpipe Tobacco Smoking: Health Effects, Research Needs and Recommended Actions by Regulators” as a wake-up call to the international community about the health concerns stemming from the growing use of waterpipe in the world (1). Waterpipe, also known as argileh, nargileh, and hookah, has been practiced extensively for 400 years in the Middle East, India, and other countries (1). Recently, this smoking behavior has experienced a revival in the Eastern Mediterranean Region and is rapidly expanding to the United States and Europe and the new populations of users include college students (1). The resurgence of waterpipe smoking has been attributed to the perception that it is less dangerous than cigarette smoking, the introduction of flavored
tobacco (Maassel), and the rapid growth in the number of hookah establishments around the world (3). Results from published studies suggest that the smoke produced from a waterpipe contains as much carbon monoxide as cigarette smoke, in addition to other dangerous compounds such as tar, nicotine, arsenic, cobalt, chromium, and lead (1). The health risks linked to waterpipe smoking are no different than cigarette smoking, including several malignancies and cardiovascular diseases, among others (4). Waterpipe smoking is also linked to other unique risks not associated with cigarette smoking. For example, infectious diseases including tuberculosis, herpes, and fungal infections can spread by sharing the waterpipe or through the way the tobacco is prepared (5).

Public health strategies for controlling Tobacco use in general and waterpipe smoking in specific include conducting research on the awareness among the medical community of tobacco control strategies and the emerging epidemic of waterpipe use in areas where this form of smoking behavior is most popular (1, 4). Even though the waterpipe epidemic started to rise in the Middle East, this trend in smoking appears to be spreading rapidly to western nations (1). Gathering preliminary data in the Middle East will give a better understanding of this smoking behavior. This information is important because if patterns of use in the rest of the world follow that of the Eastern Mediterranean region this line of research will have global population health significance.

Specifically, physicians have a critical role in counseling and advising their patients to quit all forms of smoking, including waterpipe (7). A minimal intervention by physicians lasting less than 3 minutes has proved to increase overall tobacco abstinence rates (7). Many clinicians lack knowledge about the importance of identifying patients
who are smokers, which treatments are efficacious, and how such treatments can be delivered (6). Additionally, they may fail to intervene because of inadequate clinic or institutional support for routine assessment and treatment of tobacco use (6). These deficiencies can be addressed by supporting comprehensive tobacco control training programs in medical schools of countries with normative tobacco use and underdeveloped tobacco control programs (6). Medical students are in a key position to influence future tobacco cessation and control programs because of their roles as future educators and researchers, receptivity to innovation and their influence on community practice (6).

The intent of this research was to collect data on demographic characteristics and tobacco use trends of medical students in Lebanon, to examine their attitudes, social norms, and self-efficacy in respect to tobacco dependence and counseling, and examine “tobacco dependence” content in the medical education curriculum of the Middle East and North Africa.

Tobacco is the leading cause of preventable death in Lebanon (1). The smoking epidemic in Lebanon is predicted to kill more people within the next 30 years than the 16 years of civil war (9). The waterpipe in Lebanon is popular among all age groups and among both genders (11). The rate of waterpipe smoking among adults in Lebanon is 14.6% (11). The Lebanese population has adopted a permissive attitude towards waterpipe smoking (11). This form of smoking is perceived as less harmful than cigarette smoking and its adoption may be influenced by perceptions associated with harm and safety (8). Many waterpipe smokers in Lebanon and the rest of the world believe that
smoke produced from the waterpipe is not as dangerous as cigarette smoke because it first passes through water before it is inhaled (10) and the medical community in Lebanon is poorly committed to smoking prevention and awareness policies (12). Waterpipe smoking and cigarette smoking are prevalent among medical students despite their assumed knowledge of the harm associated with it (12). This may very well be due to a medical education that is missing opportunities in tobacco control training.

Examining attitudes, social norms, and self-efficacy in respect to tobacco dependence and intentions to provide counseling among the Lebanese medical students was accomplished by using the TPB (Theory of Planned Behavior) model approach. The model proposes that the best predictor of a given behavior is the behavioral intention to perform it (13,14). Intentions are viewed as a function of attitude toward counseling the patient in tobacco cessation. Attitudes are a function of medical student’s beliefs that certain consequences will occur as result of counseling the patient in tobacco dependence. The social normative component is a measure of what the medical student thinks about the beliefs of influential people toward offering smoking dependence counseling, and their motivation to comply with these people. With physicians in general, it is expected that the social normative belief to be of high impact, due to the importance of normative expectations in health care (15). The perceived behavioral control is a measure of how much control medical students perceive they have over counseling their patients in smoking cessation, how difficult it would be to counsel their patients, and how confident they would be that they can do so. To assess behavioral intention to counsel patients, medical students were asked to assess how often they intend to offer smoking
cessation counseling to people who smoke during their future clinical rotations. The findings of this study will help address the educational challenges of medical students and future physicians on the basis of their individual attitudes, normative beliefs, and their perceived behavioral control.

The WHO repeatedly emphasized the role of health professional in efforts to include tobacco control in the public health agenda and contribute actively to the reduction of tobacco consumption (7). Tobacco control competency is essential to evaluate the risks and to detect tobacco-related problems early in the course of tobacco abuse and dependence. However, are medical students and physicians from the Middle East and North Africa, where tobacco use and waterpipe smoking are highly prevalent, adequately trained in tobacco-related issues to give appropriate advice about tobacco use? Are they trained to ask about alternative tobacco use such as waterpipe smoking where it is highly prevalent? Are they trained to use an office visit to promote health, identify early dependence, intervene, and make recommendations?

To answer to these questions, the curricular content of medical schools in the two regions was examined. This research contains three sections and for each section we have examined the following aims.

Section 1: Smoking Associated Knowledge and Behavior among Medical Students in Lebanon: a Focus on Waterpipe Smoking

1. To estimate the prevalence of tobacco use in general and waterpipe use specifically among medical students in Lebanon and whether smoking behavior is related to gender and socioeconomic status.
2. To compare medical students who are smokers of waterpipe to non-smokers in regard to their knowledge of the harmful effects of waterpipe smoking.

Section 2: Exploring Components of a Behavioral Model Relating to Tobacco Control among Medical Students in Lebanon

To examine the components of the Theory of Planned Behavior (TPB): attitudes, subjective norms, and perceived behavioral control, relating to advising patients in tobacco dependence among medical students in Lebanon.

1. To predict the intentions of medical students to advise their patients in smoking dependence using the components of the Theory of Planned Behavior.

Section 3: Tobacco Dependence Training in Medical Schools of the Middle East and North Africa

1. To examine the curricula in medical schools in countries of the Middle East and North Africa for content related to health risks of tobacco use in general, health risks of cigarette and waterpipe smoking in particular, and tobacco dependence techniques.

2. To examine the placement of the tobacco cessation content within the medical school program.

References


Chapter 2: Background

In the year 2005, an “Advisory Note” titled “Waterpipe Tobacco Smoking: Health Effects, Research Needs and Recommended Actions by Regulators” was issued by the World Health Organization (WHO) Study Group on Tobacco Product Regulation (TobReg) to address the growing concern about the potential health effects of tobacco smoking using waterpipe (1). Waterpipe smoking is now considered a public health challenge for the 21\textsuperscript{st} century because of the recent global expansion of this form of smoking among youth and young adults (1, 2, 3). The WHO report was prepared by a study group “in response to requests made by those Member States whose populations are exposed to this form of tobacco use” (4). The individuals of the study group are mainly from Egypt, Israel, Lebanon, Syria, and the United States (1). The information in this review on the waterpipe origins, prevalence and popularity, constituents of smoke, and health effects will be based mainly on the scientific publications of the members of this study group.

Origins of Waterpipe Smoking

While “waterpipe” is the most popular word used in scientific publications, other terms are used in the world including: hookah, nargileh, argileh, goza, shisha, and hubble-bubble (2, 5, 6). Regardless of the term used to name it, a waterpipe is available in
a variety of designs and colors with common features including: the head that holds and heats the tobacco, the bowl that is filled with water, the tube through which the smoke passes, and the hose and mouthpiece used to inhale the smoke. The tobacco used is moist and often sweetened and flavored (7). Charcoal or an alternative commercially available quick-lighting charcoal briquette is placed on top of the tobacco to sustain its heating (7). Waterpipes can be highly ornamental smoking devices crafted by skilled artists in the Eastern Mediterranean Region (EMR), Iran, India, Pakistan, Egypt, and Turkey (7).

The most ancient traces of waterpipe use were found in Southern or Eastern Africa (8). Chemical evidence from some waterpipe bowls dug out by J.C. Dombrowski in 1971 in the Lalibela cave in Ethiopia, linked the start of the use of the waterpipe to around the year 1320 (8). Historically, it has been documented that the appearance of the waterpipe coincided with the appearance of the coffee-house and the adoption of tobacco in the Middle East near the end of the 16th century and the beginning of the 17th century (9). Also, it is said that waterpipe smoking may have originated in India and then spread to the rest of Asia, Africa, and the Middle East (2,9). Waterpipe smoking is an old method that was highly prevalent among the indigenous peoples of Africa and Asia for at least four centuries (9), but its use declined considerably during the past century and had principally become a behavior among elderly retired men who spent their time in hookah cafés until the latter half of the 20th century and the beginning of the 21st century when it became particularly popular in the Eastern Mediterranean Region (2). The trend in this form of smoking appears to be spreading rapidly in the western nations, and the populations of users include college students in Europe and the U.S. (1).
Prevalence and Popularity of Waterpipe Smoking

Waterpipe smoking has been practiced extensively for 400 years in the Middle East, India, and other countries, but there has been a recent expansion of this smoking behavior, remarkably among youth (2). It has been claimed that more than 100 million people worldwide smoke waterpipe daily (2, 7). A survey estimating the beginning of the waterpipe epidemic in Syria found that the nineties was the starting point (10). According to waterpipe smokers, this recent resurgence of popularity is due to: 1) the introduction of Maassel, a sweet and aromatic tobacco mixture (10); 2) the popularity of international satellite TV and movies heavily featuring waterpipe smoking (1); and 3) the misconception that waterpipe smoking is safer than cigarette smoking because the smoke is passed through water before inhalation (10).

The Waterpipe Epidemic in the Middle East

Waterpipe smoking is a common practice in the Eastern Mediterranean Region and Northern Africa. In some areas, it is even more common than cigarette smoking. The rate of waterpipe smoking among adults in Lebanon is 14.6% (11). A survey of 1964 Beirut University Students in the year 2001 determined that 32% smoked the waterpipe, 23.4% of the smokers were women, and there was no difference between smokers and nonsmokers with respect to socioeconomic status (12). Data from the Global Youth Tobacco Survey in Lebanon (GYTS) indicated that 38.6% of youth reported currently using mainly waterpipe in 2001 (13), which then escalated to 40% in 2005. According to Chaaya, the popularity of waterpipe smoking has risen in Lebanon in the last decade among both genders including women who are pregnant, and among all age groups, with
a permissive attitude to a form of smoking viewed as “healthy” (14). Recently a study conducted by Chaaya to assess the change in the prevalence of cigarette and waterpipe smoking in the last decade among university students in Lebanon noted an alarming increase in waterpipe smoking among adolescents and that the waterpipe is replacing cigarettes (15). In Syria a survey of 587 university students found that 62.6% of men and 29.8% of women have ever smoked the waterpipe and that students smoked in groups in cafés, restaurants, and dormitories (16). A different survey conducted in Syria among 268 university students linked the initiation of waterpipe smoking among this population to the year 1990, regardless of the age of the participants (6). In Kuwait, a survey of 4000 government employees indicated that 57% of men and 69% of women had ever used a waterpipe (17). In Israel, waterpipe smoking is a growing phenomenon among Jewish and Arab youth similarly (18). An Israeli national survey of approximately 6000 middle and high school students found that 37.7% had ever smoked the waterpipe (18). Among those surveyed, 15% reported that their parents smoked the waterpipe and approximately 25% reported smoking with their parents (18).

Health Effects of Waterpipe Smoking

Reports suggest that waterpipe smoking has a carcinogenic role in a number of body systems. The 2005 WHO report documented potential health hazards from waterpipe. The report stated that during a typical waterpipe session that could range from 30 minutes to 2 hours, an individual smoker may take 50 to 200 puffs of smoke, and that each session produces about as much smoke as the amount received from smoking 100 cigarettes (1). Several types of cancer, including bronchogenic carcinoma, lung,
esophageal and gastric, squamous cell carcinoma, and cancer of the lower lip, have been linked to waterpipe smoking (19). Also, non-carcinogenic morbidity has been linked to waterpipe smoking. For example, decreased pulmonary function, cardiovascular diseases, infectious diseases including tuberculosis (infecting the lungs and other parts of the body), pulmonary aspergillosis (a condition caused by a fungus that can affect the lungs), Helicobacter Pylori and herpes infection may be spread by sharing a common mouthpiece or due to the manual preparation of the waterpipe (4). In addition, women using the waterpipe during pregnancy may expose their unborn children to potential health hazards ranging from low birth weight to low apgar scores and respiratory distress (20). Potential harm to children exposed to waterpipe smoking includes ear and upper respiratory tract infections, asthma and sudden infant death syndrome (12).

Medical Schools Curriculum in Tobacco Cessation

Tobacco use is the leading cause of preventable death worldwide and is projected to cause nearly 450 million deaths worldwide during the next 50 years (1, 2). Health professionals can have a critical role in reducing tobacco use; even brief and simple advice from health professionals can substantially increase smoking cessation rates (21). The WHO emphasizes the role of health professional bodies in efforts to include tobacco control in the public health agenda and contribute actively to the reduction of tobacco consumption (21). Many physicians believe that they are ill prepared to offer patient counseling and that their medical school training has not sufficiently prepared them to help patients stop smoking (22) and many underutilize the U.S. Department of Health and Human Services evidence-based approaches to nicotine addiction and treatment (23).
Few studies from the U.S. and the world have assessed medical students’ knowledge in this area.

Reports on Tobacco Cessation Training in Medical Schools’ Curricula around the World. The WHO Framework Convention for Tobacco Control, adopted by the 56th World Health Assembly in May 2003, called for countries to use standard methods and procedures for surveillance of their third year health-profession students for tobacco use, cessation among those who smoke, the extent to which they are being trained to provide tobacco-cessation counseling, and their willingness to use such training to reduce tobacco use among their patients (23). For this purpose, the GHPS (Global Health Professionals Study) Pilot Study was launched in 2005 in 10 countries (Albania, Argentina, Bangladesh, Croatia, Egypt, Federation of Bosnia and Herzegovina, India, the Philippines, the Republic of Serbia, and Uganda) (24). The study indicated that the percentage of third-year students who had received formal training in countries surveyed varied between 3.5% in Argentina and 36.9% in the Philippines. Formal training varied widely between lectures, seminars, and problem based learning opportunities (25).

A recent study from Bahrain conducted among primary care physicians indicated that inadequate education at medical school about tobacco use and interventions was reported by the majority of physicians (26). Only 4% of those surveyed reported receiving training about tobacco cessation (26).

In a study conducted in Brazil, Chatkin attributed the insufficient commitment of some physicians in the fight against tobacco to deficiencies in medical school curriculum,
the rapid changes occurring in this area, and the lack of transdisciplinary vision regarding smoking (27).

Findings from two European medical schools indicated that teaching of smoking cessation methods is not a top priority in most medical curricula and overall knowledge of long-term effectiveness of smoking cessation methods among students was poor (28). In 1999 Ferry et al. reported that 60% of 122 surveyed U.S. medical schools did not include tobacco cessation training in required curriculum (29). A few years later, Geller and Spangler still found limited inclusion of tobacco dependence training across the medical school curriculum and a need for evidence-based skills, cross-cultural understanding, and smokeless tobacco addiction (21). In 2003, the National Cancer Institute launched PACE (Tobacco Prevention and Cessation Education at U.S. Medical Schools), a project to assess and improve medical education in 12 U.S. medical schools (23). The survey showed that more tobacco content is now integrated into medical schools courses (23). Overall, schools reported that 36% of courses had some inclusion of tobacco information and administrators and faculty generally agreed that student’s skills in prevention and cessation counseling were poor to average (23). A recent web-based survey among fourth year medical students in six New York City medical schools indicated that students had a good knowledge of the harms of smoking but needed more information on the benefits of stopping smoking and treatment of nicotine addiction (24).

Reports on Smoking Prevalence among Medical Students in the World

Almerie et al. conducted a study among medical students in Damascus and reported a smoking prevalence of 10.9% for cigarette and 23.5% for waterpipe (65). The
authors claimed that smoking rates among Syrian medical students may be lower than what is reported from Saudi Arabia (29%), Pakistan (14.4%), and Iran (18.5%) which may be an indication of “pro-health” attitude among medical students. However, these students had very high rates of waterpipe smoking and more than two third of them reported that they may not discuss quitting smoking with their patients in the future or may have a hard time doing so (25). The GHPS (Global Health Professionals Study) Pilot Study launched in 2005 in 10 countries (Albania, Argentina, Bangladesh, Croatia, Egypt, Federation of Bosnia and Herzegovina, India, the Philippines, the Republic of Serbia, and Uganda) indicated that the current cigarette smoking rate among third-year health profession students is higher than 20% in seven of the ten countries surveyed (25).

The Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB)

The Theory of Reasoned Action (TRA), first introduced in 1967, was developed to explain behaviors that were under full volitional control or full will power (32). For behaviors that are not under full volitional control, the TRA was expanded to the Theory of Planned Behavior (TPB) with one additional component: the individual’s belief about her or his ability to perform the behavior (32). TRA and TPB rely on the claim that an individual’s behavior can be predicted simply from a person’s intention to perform the behavior. In other words, a person will do what she or he intends to do, and not do what she or he intends not to do (33). Such intentions have been called “behavioral intentions” (32). Both models emphasize two variables that have influence on the strength of intention; the expected value of behavioral performance or attitude and subjective norms (33). The expected values or the attitudes component toward performing a certain
behavior are a function of the individual’s belief that certain advantages and
disadvantages are going to occur as a result of performing the action (34). The subjective
norms or the social normative component is a measure of the individual’s belief or
perception of what others think or would want him or her to do in regard to the behavior,
weighted by the individual’s motivation to comply with the opinions of others (34). The
TPB model adds the measure of self-efficacy or the perceived behavioral control to those
components (32). Perceived behavioral control refers to the person’s perception that she
or he can carry out the behavior and overcome barriers that may hinder it (32). Perceived
behavioral control implies that even when an individual has a positive attitude towards a
behavior, and positive subjective norms, she or he may not perform the behavior if they
are lacking self-efficacy (33). The three components of this behavioral model are
considered to be the primary determinants of intentions (33). Other variables, like
demographic characteristics and environmental influences may influence behavioral
intentions and behavior in this model, only through the three main components discussed
previously (33). It has also been shown that the primacy of importance in the main core
components (attitude, subjective norms, and perceived behavioral control) differ across
populations in their capacity to influence a behavior (32). The TRA and TPB models are
considered of main importance in the field of social science in understanding behavior
(32).

The Use of TRA and TPB and Health Care Provider’s Behavior

Given their cognitive orientation and the importance of decision making in
providing health care, the TRA and the TPB seem to be useful in explaining health care
providers’ behavior. A study by Kinket et al. in 1992 involved the use of TPB to predict intentions of 49 general practitioners to offer clinical services (36). The model indicated that attitudes were the strongest predictors of intentions among this group, explaining 27% of variability (36). Also, attitudes of young physicians were found to be the strongest predictor of intention for use of guidelines for antibiotics by Limbert and Lamb in 2002 (37). The same investigators, utilizing TPB, found that subjective norms were the strongest predictors for the use of an asthma management guideline by physicians (36). Later Gaither et al. demonstrated that social norms were the predominant determinant of use of drug information by physicians in HMO when predicted by the constructs of TPB (38). Other studies of physicians’ behavior reported variations of results with the use of the same model (33). Also the TPB constructs have been used to develop causal models to study the behaviors of nurses, pharmacists, and other health professionals (33). The components of the models and the prediction of intentions varied across groups and on the basis of the behavior being examined (33). Both theories stress the importance of attitudes and normative considerations to predict different intentions (34). With physicians, it is expected for the normative considerations to have a high impact on behavior, due to the importance of medical standards in health care (33). The construct ‘perceived control’ seems to improve the predictability of a physician’s behavior in the literature (33). Since the delivery of health services is highly susceptible to external factors that may be barriers or facilitators, this additional construct of TPB makes the theory most suitable to predict a physician’s behavior (33,34).

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Chapter 3: Methods

Study 1: Smoking Associated Knowledge and Behavior among Medical Students in Lebanon: a Focus on Waterpipe Smoking

This is a cross-sectional study that was conducted during the 2009–2010 school year among third year medical students enrolled at six medical schools in Lebanon. The study received exemption from the Ohio State University Office of Responsible Research and was conducted according to their approved protocol.

Study Population

Medical Schools

A listing of all colleges in Lebanon that offer degrees in medicine was obtained from the WHO 2007 updated list (1). There are currently seven listed medical schools. The American University of Beirut Faculty of Medicine, The Lebanese University School of Medicine, University St. Esprit de Kaslik, The Balamand Faculty of Medicine, The Beirut Arab University, The University St. Joseph Faculty of Medicine, and The Lebanese American University.

The American University of Beirut Faculty of Medicine is located directly on the shores of the Mediterranean in one of the most expensive neighborhoods in the Eastern Mediterranean region. It has been providing services of medical education, training, and
health care to Lebanon and the Middle East, continuously since it was founded in 1867. The Faculty of Medicine programs have been approved by and registered in the State of New York on a continual basis since 1867. In 1957 the Faculty became an institutional member of the Association of American Medical Colleges until 1988, when the new rules of the association did not allow membership of institutions outside the North American continent. Instructions are in English and currently the school has an enrollment of 80 male and female students in their third year of medical education class. The school is tuition based and the fees are comparable to the expenses of medical education in the U.S.

The Lebanese University School of Medicine was established in 1983 and is part of the government provided public higher education institutions in Lebanon. It has an enrollment of 84 male and female students in the 6th year class. Instructions are in English and French. It serves various cultural, religious, and social groups of students and teachers. The school is not tuition based and the fees are limited to registration fees and books.

University St. Esprit de Kaslik is a private university that was established in 2002 in the city of Jounieh, about thirty miles outside of Beirut. The University is a Maronite Catholic higher institute of education founded in 1961 in Kaslik, Lebanon by the Lebanese Maronite Order. The school has a 7 year medical education curriculum. Instructions in the medical school are delivered in English and French. The school has an enrollment of 21 male and female medical students in their sixth year of instructions. Tuition and fees are comparable to medical schools expenses in the U.S.
The Balamand Faculty of Medicine founded in 1988. The school is sponsored by the Antiochian Orthodox and Christian Church. It has a traditional 7 year medical curriculum and a current enrollment of 53 students in the sixth year of medical education. Tuition and fees are comparable to other private universities in the country. The student body consists of both male and female students.

The Beirut Arab University located in the heart of Beirut is a private institution for higher education, founded by the Lebanese El-Bir and Ihsan society in 1960 and supported by Alexandria University in Egypt. The faculty of medicine has a traditional medical education curriculum of 7 years. The languages of instructions are Arabic, French, and English. The medical school was established in 1995 and currently 50 medical students of both genders are enrolled in the sixth year of medical education.

The University St. Joseph Faculty of Medicine located in the city of Beirut is a francophone catholic university established in 1883. The school has strong affiliations with France and has its own establishment in Paris. The curriculum is comparable to the medical school curriculum in the traditional French faculty of medicine. The language of instruction is French and currently there are 63 students of both genders enrolled in the 6th year of medical instructions.

The Lebanese American University, previously Beirut University College (BUC), was approved in 1994 by the Board of Regents in New York to change into the Lebanese American University (LAU). Located in Ras Beirut, a descendent of the American School for Girls (ASG), first edifice built in the Turkish Empire for a girls’ school, and established in Beirut in 1835 by American Presbyterian missionaries. In 2007 LAU
attained accreditation candidacy by the New England Association of Schools and Colleges. In July 2008 the official groundbreaking of the Gilbert and Rose-Marie Chagoury School of Medicine took place. The first M.D. class was admitted in September 2009.

All the above described medical schools were invited to participate in the study by directly contacting the deans of the medical schools. A letter of invitation to participate in the study was e-mailed directly to the dean’s office (copy of the letter is provided in APPENDIX A). A response with permission to conduct the survey was promptly received via e-mail from five medical schools. One medical school replied that they did not have a 6th year cohort of medical students since they had just opened for enrollment in 2007. One school was contacted via a phone call upon arrival to Lebanon and permission to conduct the study was granted. Among the seven medical schools, only the American University of Beirut has a pre-medical training program before admission to medical school. All others follow a traditional seven year medical education curriculum.

Eligibility Criteria for Medical Students

All third year medical students were the target population for the study in programs that have four years of medical school education following an undergraduate degree, and medical students classified as one year before their graduation year from all other programs. To be eligible, a medical student had to be in the target year for the medical school and understand English to be able to complete the survey. Medical students in the introductory years were not targeted because they are still learning the
basic sciences and medical students in their graduating 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 6 medical schools and were in Lebanon during the period of data collection received a copy of the survey and were asked to participate. We attempted to reach 354 medical students from all universities.

**Procedures**

**Questionnaire Development**

The anonymous self-administered questionnaire included the Global Health Professionals Survey (GHPS) core questionnaire (2) and questions developed by Maziak et al. (3). The GHPS was developed by the WHO, the U.S. Centers for Disease Control and Prevention (CDC), the Canadian Public Health Association (CPHA), and the American Cancer Society (ACS) in 2004 to collect information from third year health professions students on the following topics: tobacco use, exposure to second hand smoke, perception of the role of the health professional in treating and counseling smokers, willingness to quit tobacco, consumption, exposure to tobacco cessation training, and opinions on the tobacco consumption ban in Lebanon. The questionnaire also contained the items developed by Maziak et al. (3) that emerged from a recommendation to standardize questions for the assessment of waterpipe tobacco use in epidemiological studies; specifically those related to relation to waterpipe smoking and health perception associated with waterpipe smoking. The instrument also included additional questions on demographics and socioeconomic status, cigarette smoking behavior, and waterpipe smoking behavior. All of the items have been used in the past
and most have been evaluated for reliability, test-retest reliability, and validity. The instrument used is attached to this chapter as APPENDIX B.

Data Collection

The survey was administered in the classroom setting in the schools after a mandatory class to ensure full attendance. Before administration of the survey, full attendance of the group was confirmed by the class delegate. For every medical school the class delegate confirmed that we had reached all medical students from his cohort. All participants were asked to not write their names on the survey and were assured of the anonymity of their identity. All students were encouraged to read the first page before attempting to answer any question, which stated that they reserved their right not to participate if they did not wish to (APPENDIX B). Each survey took approximately 30 minutes to complete. After completion, the students were asked to place the questionnaire in an envelope on a table in the front of the room.

Measures

Current waterpipe smoking status was measured using the question “Which of the following best describes your relation to waterpipe smoking?” Non smokers were those who replied “I do not currently smoke the waterpipe.” Current cigarette smoking status was measured using the two questions “During the past 30 days (one month), on how many days did you smoke cigarettes”; a current non-smoker was defined on the basis of replying “0 days” to the question.

The ages of initiating smoking cigarettes and waterpipe were based on the questions “How old were you when you first smoked cigarettes?” and “How old were
you were you when you first smoked a waterpipe?” These were multiple choice questions with the following possible responses: never smoked, age 10 or younger, age 11-15, age 16-17, age 18-19, age 20-25, and age 25-29.

Socioeconomic status was based on the students’ monthly spending or allowance from all sources, the education level of the father, and the education level of the mother. Students’ allowance response options included: <$200, $200-$400, $400-$600, $600-$800, and >$800. Parental education level response options were: illiterate, primary, intermediate, secondary school and university or higher. The perception of the health effects of waterpipe smoking was based on the response to a question asking for a comparison of the harmful effect of cigarettes smoking to waterpipe smoking (3).

Analysis

The data for this study were analyzed using the statistical package Stata 10 (College Station, Texas). Descriptive statistics for number of participants, age of participants, male and female composition, and measures of socioeconomic status were presented for individual schools and collectively for all medical schools. Means and standard errors were reported for continuous variables and frequencies for categorical variables. Analyses were done separately for waterpipe smoking and cigarette smoking. Waterpipe smokers were compared to nonsmokers and cigarette smokers to nonsmokers using chi-square tests adjusted for clustering. Logistic regression analysis accounting for within school clustering was performed using the XTIMELOGIT command in Stata10 (college Station, Texas) to examine factors associated with waterpipe smoking, including cigarette smoking. Variables with a p-value<0.1 level in a univariate analysis
were entered in the multivariable model. Variables were removed in a stepwise backward elimination process if their p-value was greater than 0.05. Model fit assessment and diagnostics tests were performed for the final model according to the recommendation by West, Welch, and Gatecki (Ref). Adjusted odds ratios (OR) and 95% confidence intervals (95% CI) were reported for any significant correlate of waterpipe smoking. Frequencies were reported for all medical school training variables.

Study 2: Lebanese Medical Students’ Intention to Deliver Tobacco Dependence Advice: Utility of the Theory of Planned Behavior.

This cross-sectional study received exemption from the Ohio State University Office of Responsible Research and was conducted officially according to their protocol. This study had the same study population as study one and the same eligibility criteria.

Procedures

Questionnaire Development

The survey instrument was developed to measure the primary constructs of the TPB. This theory includes the concepts of attitude toward behavior, perceived subjective norms (belief that influential others support the behavior), self-efficacy in performing the behavior, and perceived barriers to the performance of the behavior. The behavior of interest in this analysis is intention to advise patients in tobacco dependence (both cigarette and waterpipe smoking) in clinical rotations. The influential factors that impede or facilitate provision of tobacco dependence advising and the impact of these factors on the intention to provide the advising service by the medical student must be determined in the context of this study (APPENDIX C is a schematic display of the TPB constructs).
To develop the TPB questionnaire according to the recommendations by Ajzen (4) and to determine the influential others and barriers that may affect the intention to provide tobacco dependence advising, semi-structured interviews were conducted with four medical students who were recent graduates of Lebanese medical schools or were in the U.S. for one month of elective courses. Individuals were contacted and interviewed separately. The participants were asked to respond to items from previously developed questionnaires that were designed to predict nurses’ intentions to use clinical guidelines in tobacco dependence counseling (5) and to examine nurses’ attitudes and beliefs toward their role in assisting patients with smoking cessation (6). Specifically, the following were explored in the interviews: 1) attitude toward behavior such as obligation to provide tobacco dependence advice, the clinic visit as an ideal time to provide tobacco dependence advice, and all patients identified as tobacco dependent should be given tobacco dependence advice; 2) behavioral beliefs, or the evaluation of outcomes of providing tobacco dependence advice such as jeopardizing the patient-physician relationship, wasting the physician time, and causing frustration; 3) the social norms of people identified as influential by health professionals such as attending physicians, the hospital or medical school policy, and the patients themselves; and 4) perceived behavioral control, or the possession of the knowledge and resources needed by a health professional to provide tobacco dependence advice such as behavioral skills, knowledge of pharmacological, and the availability of time to provide such a service. Analysis of the content of these interviews was performed to develop the measures for this study. A copy of the instrument is attached to this chapter as APPENDIX D.
Measures

Intention to advise patients in waterpipe smoking or cigarette smoking dependence was defined on the basis of replying on a scale of 1 to 10 to the question: “How often do you intend to provide smoking cessation advice in your clinical rotations to patients who smoke waterpipe/cigarette?”

Attitude toward the behavior of advising (ATB) was measured using 5 statements that measured attitudes toward offering tobacco dependence advice, such as beliefs about the physician’s role in offering advice and the situations that are appropriate or not for giving advice (see APPENDIX D). Items for this variable were measured using a 5-point strongly agree/strongly disagree scale (ranging from 5 to 1 in value for every item). The scale score was determined by summing all items.

Behavioral beliefs (BB) were measured with 4 items related to beliefs about possible outcomes of offering waterpipe/cigarette dependence advice to patients. The outcomes included negative consequences, such as threatening the doctor-patient relationship, wasting the physician’s time, and frustration (see APPENDIX D). Items for this variable were measured on a 5-point scale ranging from strongly disagree (value of 5) to strongly agree (value of 1). The scale score was determined by summing the 4 items.

Social norms (SN) were defined according to influential personnel beliefs (normative beliefs) about offering waterpipe/cigarette dependence advice and the medical student’s motivation to comply with those people. Influential personnel were identified as attending physicians or chief residents, school policy developers such as administrators
and public health advocates, and patients (see APPENDIX D). Items measuring normative beliefs used a 5-point strongly agree/strongly disagree scale (ranging from 2 for strongly agree to -2 for strongly disagree). Items measuring willingness to comply used a 5-point frequently/never scale (ranging from 5 to 1). Every item related to normative belief was multiplied by the corresponding item for motivation. For example, the first item in this scale was about the attending physician or chief resident (influential person) wanting the medical student to give the patient tobacco dependence advice. Medical students who strongly agreed (score of 2) with the belief of the attending physician and were motivated to frequently comply (score of 5) with the attending physician’s beliefs would have a score of 10. A scale score was developed for social norms by summing the products of each item combination.

Perceived behavioral control (PBC) was developed by asking the medical students about their knowledge of different aspects related to tobacco dependence advice, resources available to them that would facilitate or hinder the provision of tobacco dependence advice, and their beliefs about the effect of this knowledge or resources on providing this service to patients (see APPENDIX D). For example, if the student strongly agreed (value of 5 on a 5-point scale) with having adequate knowledge of pharmacological aids for tobacco dependence treatment, and believed that knowledge of pharmacological aids would strongly increase (value of 2 on a 5-point bipolar scale) the likelihood to provide tobacco dependence advice for the patient, then the score for this item would be 10. This score is an indication of positive perceived ability to provide
tobacco dependence advice. The PBC scale contained 6 items. The scores for all products of each item combination were summed in one total score.

The self-rated current skill level (SL) for counseling a patient in smoking cessation was determined as a separate variable in this study according to the participant response to the question: “Please rate your current skill level for advising a patient in cigarette/waterpipe dependence.” Answer option had a numeric value ranging from 1 (not at all skilled) to 4 (very skilled). Calculations performed for individual scale items, total scales scores, and ranges of values are tabulated in APPENDIX E.

Waterpipe smoking status was adopted from the first study instrument and was measured using the question “Which of the following best describes you relation to waterpipe smoking?” Nonsmokers were those who replied “I do not currently smoke the waterpipe.” Cigarette smoking status was measured using the question “During the past 30 days (one month), on how many days did you smoke cigarettes”; a non-smoker was defined on the basis of replying “0 days” to the question.

Data Collection

The survey was administered in the classroom setting in the medical schools at the same time as the survey for study 1. Same rules and procedures applied to this data collection as before. The order of the questions for this part of the instrument was arranged differently in two formats making a version A and Version B of the instrument. The purpose of the two formats was to avoid response bias associated with repetition and false assumptions. The two versions of the instrument were distributed randomly to the participants.
Data Analysis

The data for this study were analyzed using the statistical package Stata 10 (College Station, Texas). Descriptive statistics for number of participants, age of participants, male and female composition, and smoking status were reported for individual schools and collectively for all schools. Means and standard errors were reported for continuous variables and frequencies for categorical variables. Analysis was done separately for waterpipe smoking and cigarette smoking. The mean, SE, range, and intercorrelations were calculated for all scales. Frequencies of responses were calculated for scale items. The internal consistency of each scale was measured with Cronbach’s coefficient alpha. The intention to deliver tobacco dependence advice was treated as a continuous variable since it was reported on a scale of 1 to 10, with 1 being never and 10 being always. Spearman correlation was used to test the association between individual scale items and intention to deliver tobacco dependence advice to patients. All correlations were considered significant at p<0.05. Linear regression was used to specify a predictive model of intention to provide tobacco dependence advice for patients based on the component of the TPB. Regression analysis for mixed models using the XTIMIXED command in Stata 10 (College Station, Texas) was performed because of the clustering of students within universities. All items that had a significant Spearman correlation with intention to deliver tobacco dependence advice were considered for addition to the multivariable model and backward elimination was performed for all insignificant variables (p≥0.05). The assumption that the overall residual distribution of the final linear mixed model is Gaussian was tested, in addition to the assumption of
equal variance for the residuals, linear relation between the predictors and outcome, and
diagnosis of any outliers of the random effects of the model (7). The variance inflation
factor and tolerance were examined for the parameters to determine any multicolinearity
(VIF values more than 2.5 and tolerance levels less than 0.01 were considered indicative
of multicolinearity). Analyses were performed for waterpipe smoking and cigarette
smoking separately.

Study 3: Tobacco Dependence Curricula in Middle Eastern and North African Medical
Education

A cross-sectional survey in the English language was conducted to collect
information on the tobacco education curriculum content in 90 medical schools from 19
countries of the Middle East and North Africa. The 190 medical schools from the two
regions that were listed on the WHO updated directory of medical schools (1) and the
FAIMER (Foundation for Advancement of International Medical Education) directory
(8), were eligible for this study. The Foundation for advancement of International
Medical Education and Research (FAIMER) was used for regional classification of the
medical schools and to access addresses and phone numbers (8). Countries that are listed
as part of the Middle East are: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon,
Oman, Qatar, Saudi Arabia, Syria, UAE, and Yemen. Countries in the North African
region are: Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia.

Procedures

Questionnaire design and Data Collection
A modification of the valid and reliable questionnaire written in the English language previously used by Ferry et al. to assess tobacco dependence curricula in U.S. undergraduate medical education was used (9). The response items were modified to accommodate the purpose of the study in addition to adding questions related to the emerging waterpipe epidemic. The 20 items instrument (APPENDIX F) included questions about the, specific curricular content related to health risks of tobacco use, high risk groups (at increased risk for tobacco addiction), effects of passive smoking, pharmacological agents related to smoking dependence treatment, behavioral tobacco cessation techniques, information about the use of waterpipe and smokeless tobacco, learning experiences in clinical practice, the placement of this content within the medical school curriculum, and the existence of an established tobacco dependence curriculum.

An introductory letter addressed to the administrator of the medical school (dean, associate dean, or dean of academic affairs; depending on available published contact) containing an invitation to participate and an explanation of the purpose of the study was attached to the questionnaire (see APPENDIX G). A list of e-mails, mailing addresses, and phone numbers for all medical schools administrators was accumulated from the WHO directory of medical schools (1), the FAIMER website (8) or the website of the medical school if available. This list was used to dispatch the survey instrument via Zommerang online surveys (MarketTools Company, San Francisco, CA), send individual e-mail with the same request, and mail the questionnaire to the medical schools in the two regions. Reminders were sent to the e-mail addresses after 2, 3 and 4 weeks from the original mailings. Telephone calls were made to the medical schools that did not respond.
to all forms of invitations to participate in the study. The phone calls attempted to reach the administrative office of the medical schools and a verbal request for a key informant who can provide curricular information was placed. The phone calls attempted to reach the administrative office of the medical schools and a verbal request for a key informant who can provide curricular information was placed. The maximum number of telephone attempts was three for every institution. Time required to completing the questionnaire varied between institutions. Responses to the questions were tabulated and information from all respondents was confidential.

Data Analysis

Total response rate and response rate for the two regions were calculated. Statistical analysis involved computations of summary statistics to describe the percentage of survey responses. To preserve confidentiality, all results were reported aggregately and by region because some countries do not have more than one medical school.

References


Introduction

Tobacco is the leading cause of preventable death in Lebanon (1). The smoking epidemic in Lebanon is predicted to kill more people within the next 30 years than the 16 years of civil war (2). A growing trend among young adults in Lebanon is waterpipe smoking. The waterpipe in Lebanon is popular among all age groups and among both genders (3). For many years it was mainly used by retired elderly men in cafés (4). Recently, it has reappeared as a fashionable trend to add to the burden of the tobacco epidemic and its health consequences. Waterpipe smoking is common in the Eastern Mediterranean Region and Northern Africa. The rate of waterpipe smoking among adults in Lebanon is 14.6% (5). A survey of 1,964 Beirut University students in the year 2001 determined that 32% smoked the waterpipe, 23.4% of waterpipe smokers were women, and there was no difference between smokers and nonsmokers with respect to socioeconomic status (6). Data from the Global Youth Tobacco Survey in Lebanon (GYTS) indicated that 38.6% of youth reported currently using mainly waterpipe in 2001 (7), which then increased slightly to 40% in 2005.
The Lebanese population has adopted a permissive attitude towards waterpipe smoking (8). This form of smoking is perceived as less harmful than cigarette smoking and its adoption may be influenced by perceptions associated with harm and safety (8).

Many waterpipe smokers in Lebanon and the rest of the world believe that smoke produced from the waterpipe is not as dangerous as cigarette smoke because it first passes through water before it is inhaled (9). However, researchers have reported a variety of health problems associated with waterpipe smoking, including cancer of the lung, oral cavity, bladder, esophagus, and stomach, cardiovascular diseases, and infectious diseases among many others (10, 11). Waterpipe smoke has been reported to contain as much carbon monoxide as cigarette smoke, in addition to other carcinogens such as high amounts of tar, nicotine, arsenic, cobalt, chromium, and lead (12).

The spread of this smoking behavior requires urgent attention. The 2000 U.S. Surgeon General’s Report on “Reducing Tobacco Use” states that “Minimal clinical interventions are those that can be delivered briefly to smokers by health care professionals during the course of a regular health care encounter. Minimal clinical interventions could have a great influence at a national level on smoking cessation, but they have been underused” (13).

Lebanon currently has seven medical schools (14). The Lebanese medical schools graduate about 354 physicians per year (unpublished data). Lebanese physicians both serve the Lebanese community and migrate in high numbers to other countries like the U.S., Canada, and Australia (15). Approximately 41% of Lebanese medical school graduates in the last 25 years are currently active physicians in the U.S. (16). The medical
community in Lebanon is poorly committed to smoking prevention and awareness policies (5). Training medical students in smoking cessation techniques as part of their curriculum and exposing them to the recent knowledge associated with alternative tobacco use will not only have a local impact, but, may also contribute to the global effort to contain the tobacco epidemic.

The 2005 Global Health Professional Survey (GHPS) was conducted in 6 medical schools in Lebanon and reported that lifetime use among third year medical students in Lebanon was 67.4% for cigarettes and 65.4% for waterpipe and current use was 27.4% for cigarettes and 20.6% for waterpipe (17). These figures represent the seriousness of the problem of tobacco use in general and waterpipe specifically in the country.

Tobacco dependence practices and beliefs about tobacco use in general are acquired early in life (17), which makes it necessary to look at the development of tobacco dependence among medical students in this population and how their medical education may have influenced their beliefs and practices. Waterpipe smoking and cigarette smoking are prevalent among medical students despite their assumed knowledge of the harm associated with it (17). This may very well be due to a medical education that is missing opportunities in tobacco control training and the failure of the medical school education to promote healthy behaviors and attitudes among future physicians.

The first objective of this study was to estimate the current prevalence of waterpipe smoking and cigarettes smoking among medical students in Lebanon, determine whether smoking behavior is related to gender and socioeconomic status, and whether waterpipe smoking is associated with cigarette smoking. The second objective was to compare
medical students who are smokers of waterpipe to non-smokers in regard to their knowledge of the harmful effects of waterpipe smoking. The third objective was to present the student’s reports on the following topics as part of the tobacco education in medical schools of Lebanon: dangers of smoking, reasons people smoke, importance of recording patient’s tobacco history, provision of educational material to support smoking cessation, receiving formal training in tobacco dependence, knowledge of nicotine replacement therapy, and knowledge of antidepressants for tobacco dependence.

This study reports on the prevalence of tobacco use among the 6th year medical students five years after the GHPS. It specifically examines beliefs and trends of use related to waterpipe for the first time in this population and whether waterpipe smoking behavior in this cohort of medical students is related to cigarette smoking. This study will provide new information by looking at gender and socioeconomic differences by smoking status. In addition, the self-reported information on training and knowledge associated with tobacco education will assess the extent of training of this cohort of future physicians and whether this training has impacted their tobacco related behavior.

Methods

This is a cross-sectional study that was conducted during the 2009–2010 school year among third medical students enrolled at six medical schools in Lebanon. The study received exemption from the Ohio State University Office of Responsible Research and was conducted according to their approved protocol.

Study Population

Medical Schools
A listing of all colleges in Lebanon that offer degrees in medicine was obtained from the WHO 2007 updated list (14). There are currently seven listed medical schools. They were all invited to participate in the study by directly contacting the deans of the medical schools. A letter of invitation to participate in the study was e-mailed directly to the dean’s office. A response with permission to conduct the survey was promptly received via e-mail from five medical schools. One medical school replied that they did not have a 6th year cohort of medical students since they had just opened for enrollment in 2007. One school was contacted via a phone call upon arrival to Lebanon and permission to conduct the study was granted. Among the seven medical schools, only the American University of Beirut has a pre-medical training program before admission to medical school. All others follow a traditional seven year medical education curriculum.

Eligibility Criteria for Medical Students

All third year medical students were the target population for the study in programs that have four years of medical school education following an undergraduate degree, and medical students classified as one year before their graduation year from all other programs. To be eligible, a medical student had to be in the target year for the medical school and understand English to be able to complete the survey. Medical students in the introductory years were not targeted because they are still learning the basic sciences and medical students in their graduating 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 6 medical schools and were in Lebanon during the
period of data collection received a copy of the survey and were asked to participate. We attempted to reach 354 medical students from all universities.

Procedures

Questionnaire Development

The anonymous self-administered questionnaire included the Global Health Professionals Survey (GHPS) core questionnaire (17) and questions developed by Maziak et al. (18). The GHPS was developed by the WHO, the U.S. Centers for Disease Control and Prevention (CDC), the Canadian Public Health Association (CPHA), and the American Cancer Society (ACS) in 2004 to collect information from third year health professions students on the following topics: tobacco use, exposure to second hand smoke, perception of the role of the health professional in treating and counseling smokers, willingness to quit tobacco, consumption, exposure to tobacco cessation training, and opinions on the tobacco consumption ban in Lebanon. The questionnaire also contained the items developed by Maziak et al. (18) that emerged from a recommendation to standardize questions for the assessment of waterpipe tobacco use in epidemiological studies; specifically those related to relation to waterpipe smoking and health perception associated with waterpipe smoking. The instrument also included additional questions on demographics and socioeconomic status, cigarette smoking behavior, and waterpipe smoking behavior. All of the items have been used in the past and most have been evaluated for reliability, test-retest reliability, and validity.

Data Collection
The survey was administered in the classroom setting in the schools after a mandatory class to ensure full attendance. Before administration of the survey, full attendance of the group was confirmed by the class delegate. For every medical school the class delegate confirmed that we had reached all medical students from his cohort. All participants were asked to not write their names on the survey and were assured of the anonymity of their identity. All students were encouraged to read the first page before attempting to answer any question, which stated that they reserved their right not to participate if they did not wish to. Each survey took approximately 30 minutes to complete. After completion, the students were asked to place the questionnaire in an envelope on a table in the front of the room.

Measures

Current waterpipe smoking status was measured using the question “Which of the following best describes your relation to waterpipe smoking?” Non smokers were those who replied “I do not currently smoke the waterpipe.” Current cigarette smoking status was measured using the two questions “During the past 30 days (one month), on how many days did you smoke cigarettes”; a current non-smoker was defined on the basis of replying “0 days” to the question.

The ages of initiating smoking cigarettes and waterpipe were based on the questions “How old were you when you first smoked cigarettes?” and “How old were you when you first smoked a waterpipe?” These were multiple choice questions with the following possible responses: never smoked, age 10 or younger, age 11-15, age 16-17, age 18-19, age 20-25, and age 25-29.
Socioeconomic status was based on the students’ monthly spending or allowance from all sources, the education level of the father, and the education level of the mother. Students’ allowance response options included: <$200, $200-$400, $400-$600, $600-$800, and >$800. Parental education level response options were: illiterate, primary, intermediate, secondary school and university or higher.

The perception of the health effects of waterpipe smoking was based on the response to a question asking for a comparison of the harmful effect of cigarettes smoking to waterpipe smoking (18).

Analysis

The data for this study were analyzed using the statistical package Stata 10 (College Station, Texas). Descriptive statistics for number of participants, age of participants, male and female composition, and measures of socioeconomic status were presented for individual schools and collectively for all medical schools. Means and standard errors were reported for continuous variables and frequencies for categorical variables. Analyses were done separately for waterpipe smoking and cigarette smoking. Waterpipe smokers were compared to nonsmokers and cigarette smokers to nonsmokers using chi-square tests adjusted for clustering. Logistic regression analysis accounting for within school clustering was performed to examine factors associated with waterpipe smoking, including cigarette smoking. Variables with a p-value<0.1 level in a univariate analysis were entered in the multivariable model. Variables were removed in a stepwise backward elimination process if their p-value was greater than 0.05. Model fit assessment and diagnostics tests were performed for the final model. Adjusted odds ratios (OR) and
95% confidence intervals (95% CI) were reported for any significant correlate of waterpipe smoking. Frequencies were reported for all medical school training variables.

Results

Participation

The study included 191 enrolled students from 6 medical schools. Of the 191 participants, 25.6% were from the American University of Beirut, 20.9% from the Lebanese University, 12% from the Beirut Arab University, 15.7% from the University St. Joseph, 14.7% from Balamand University, and 11% from University St. Esprit de Kaslik. The response rate was 54.3% from all medical schools. Response rates and descriptive statistics are presented in Table 4.1

Social and Demographic Background of Participants

The average age of medical students who participated in the study was 23.6 ± 1.0 years with a minimum age of 21 and a maximum age of 26. With respect to gender, 44.5% were female participants and 55.5% were males. The majority of students reported fathers and mothers with a university or higher education. When asked about monthly spending or allowance from all sources, almost half of the medical students reported a monthly spending of $200-$400.

Objective 1: To estimate the current prevalence of waterpipe smoking and cigarettes smoking among medical students in Lebanon, determine whether smoking behavior is related to gender and socioeconomic status, and examine any association between waterpipe smoking and cigarette smoking.

Waterpipe Smoking
Tables 4.1 and 4.2 provide the descriptive statistics for waterpipe smoking. Ever smoking a waterpipe was 41.9% among all students. The prevalence of current waterpipe smoking was 29.5% (67.9% of smokers were males, 32.2% were females). Waterpipe smoking by gender exhibited a significant value ($\chi^2 = 4.69, p = 0.03$). Males were two times more likely to smoke the waterpipe than females (Table 4.3).

When asked about their age when they first tried a waterpipe, the highest percentage (30.4%) was reported for the “16 to 17” age interval. Waterpipe smoking was an occasional practice for more than half of the waterpipe smokers, 53.6% of the waterpipe smokers reported smoking monthly (at least once a month but less than weekly). In response to the intention to quit waterpipe smoking question, 50% of the smokers reported that they intend to quit in the future.

Cigarette Smoking

A total of 67.9% have reported ever trying or experimenting with cigarettes; the highest percentage (31.7%) reported trying their first cigarettes between the ages of 18 and 19. The current prevalence of cigarette smoking was 26.3% (32% of smokers were females, 68% were males). There was no significant association between gender of the student and currently smoking cigarettes ($\chi^2=2.57, p = 0.11$). Approximately 24% of smokers reported smoking every day in the last 30 days. Regarding intention to quit smoking, 38% of the cigarette smokers intended to quit smoking in the future.

Association between waterpipe smoking and cigarette smoking

Logistic regression model results for current waterpipe smoking are reported in Table 4.3. The association between waterpipe smoking and cigarette smoking was
significant. Medical students who were cigarette smokers were 13.4 times more likely to
be waterpipe smokers than non-cigarette smokers (OR=13.5, 95%CI=5.81-30.9). Other
potential factors, such as socioeconomic status and harm perception, were not
significantly associated with waterpipe smoking in the univariate logistic models. Gender
was significant in the univariate analysis but not significant in the final model.

Objective 2: To compare medical students who are smokers of waterpipe to non-smokers
in regard to their knowledge of the harmful effects of waterpipe smoking.

When asked about risks associated with smoking, 42.8% of waterpipe smokers
replied that waterpipe smoking was more harmful than cigarettes. Nearly 46% of
cigarette smokers replied that waterpipe smoking was more harmful than cigarette
smoking. (Results for this section are presented in Table 4.2)

Objective 3: to present the student’s reports on the following topics as part of the tobacco
education in medical schools of Lebanon: dangers of smoking, reasons people smoke,
importance of recording patient’s tobacco history, provision of educational material to
support smoking cessation, receiving formal training in tobacco dependence, knowledge
of nicotine replacement therapy, and knowledge of antidepressants for tobacco
dependence..

Table 4.4 contains a summary of reported medical school training in tobacco
control. Nearly 28.3% of this cohort of medical students reported ever receiving any
formal training in smoking cessation approaches to use with patients; 94.2% reported
being taught in any of the classes about the dangers of smoking. A high percentage
(94.8%) had heard of using nicotine replacement therapy in tobacco cessation programs,
and surprisingly only 57.6% had heard of using antidepressants in tobacco cessation programs.

Discussion

This study about waterpipe smoking behavior of medical students and tobacco related behavior and knowledge in 6 medical schools in Lebanon presents new findings about a cohort of future medical physicians in the country. The data indicated that almost one third of this population smokes either waterpipe or cigarettes, with the majority using the waterpipe and no gender differences for cigarette smoking. Recent publications by Saade et al. (17), reporting on the 2005 results of the GHPS, showed a similar rate for cigarette smoking and a lower rate for waterpipe smoking (27.4% for cigarettes and 20.6% for waterpipe). The rise in waterpipe smoking may be due, as previously reported for youth in general, to an increase in its popularity and the fact that it is replacing cigarette smoking in Lebanon (19). This cohort of students appears to have been affected by the waterpipe epidemic among the youth of the Eastern Mediterranean region and the rest of the world (21). More than 31% of the participants in this study started smoking the waterpipe between the ages of 16 and 17, which coincides with the rise of the waterpipe epidemic in the region ten years ago (21).

Surprisingly, the majority of the medical students reported that waterpipe smoking was more harmful than cigarettes, which is an indication that their behavior is not affected by any false beliefs. Some populations have the misperception that waterpipe smoking is safer than cigarette smoking because the smoke passes through water before inhalation (20).
This study showed no significant difference between the male and female cigarette smoking rates but a significant difference in waterpipe smoking, a suggestion that in Lebanon, smoking among females does not carry a major social stigma. Women in Lebanon smoke openly like men, contrary to the neighboring Arab countries that have less tolerant attitudes toward this behavior among women. (4).

Socioeconomic status in this study had no significant influence on the smoking behavior, similar to the findings in 2001 among University students in Lebanon (5). This may be an indication that the study may have failed to capture a valid measure of socioeconomic status in this society, we may be facing a socially and economically homogeneous group, or this behavior does not discriminate among socioeconomic levels in Lebanon.

Less than 30% of the students who participated in this study reported they had received any formal training in tobacco dependence treatment during their medical school years; however, more than 91% reported that a physician should receive specific training in these therapies. These results are consistent with previous reports from the GHPS. This indicates a persistent gap in medical school education in Lebanon.

Despite the limitations of cross-sectional surveys, the results from this study can be considered representative of the 6th year medical student body because the response rate was near 55% and respondents were from all schools with a 6th year cohort of students. Students who participated in this study were similar demographically to students that participated in the previous GHPS. Approximately 45% of the participants in this study were female, similar to female participation in the GHPS (44.5%) (17). Also,
75.5% of the medical students who participated in the GHPS were aged 19-24 (17), and this cohort’s mean age is within this age interval (23.6). A higher response rate may have been attained if there were more specialized research offices in the universities to facilitate communication. In Lebanon there is a lack of set protocols for research in many universities which made data collection difficult even though it was approved by the deans of the institutions. Conclusion

This study provides important information about the smoking practices in general and waterpipe smoking in specific of the 6th year medical students in Lebanon. When compared to previous results from GHPS (17), it revealed a shift from cigarette smoking to waterpipe smoking consistent with reports on populations within the same geographical area (19). In addition, this study showed a lower than expected level of training in tobacco dependence treatment and an apparent deficit in medical education curricula to promote healthy behavior among this cohort of medical students. Medical school faculty, public health organizations and the Ministry of Health should promote efforts to discourage tobacco use among medical students and health professionals in general. These efforts should include tobacco dependence treatment training programs for medical students in the undergraduate and post-graduate medical training with an emphasis on waterpipe smoking. Tobacco dependence treatment clinics should be initiated in medical schools and students should be encouraged to use their services. The results of this study can be used as a basis for enhancing the capacity to develop and implement tobacco dependence related programs for medical students in Lebanon.

References


12. Shihadeh A. Investigation of mainstream smoke aerosol of the argileh waterpipe. Food and Chemical Toxicology, 2003; 41: 143-152.


Descriptive Tables for Demographic and Tobacco Use Related characteristics of
6\textsuperscript{th} Year Medical Students in Lebanon, 2010
## Medical School

<table>
<thead>
<tr>
<th>Descriptive Measure</th>
<th>AUB</th>
<th>BU</th>
<th>BAU</th>
<th>LU</th>
<th>USEK</th>
<th>USJ</th>
<th>All Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Rate (n)</td>
<td>59.7 (49)</td>
<td>53.8 (28)</td>
<td>44.2 (23)</td>
<td>47.6 (40)</td>
<td>100 (21)</td>
<td>47.6 (30)</td>
<td>54.3 (191)</td>
</tr>
<tr>
<td>Mean Age (SE)</td>
<td>24 (0.25)</td>
<td>23.6 (0.10)</td>
<td>23.6 (0)</td>
<td>23.1 (0.53)</td>
<td>23.9 (0)</td>
<td>23.8 (0.01)</td>
<td>23.6 (0.14)</td>
</tr>
<tr>
<td>Ever Smokers of Waterpipe % (n)</td>
<td>44.9 (22)</td>
<td>57.1 (16)</td>
<td>39.1 (9)</td>
<td>32.5 (13)</td>
<td>42.9 (9)</td>
<td>36.7 (11)</td>
<td>41.9 (80)</td>
</tr>
<tr>
<td>Current Smokers of Waterpipe % (n)</td>
<td>38.8 (19)</td>
<td>35.7 (10)</td>
<td>26.1 (6)</td>
<td>22.5 (9)</td>
<td>23.8 (5)</td>
<td>24.1 (9)</td>
<td>29.5 (56)</td>
</tr>
<tr>
<td>Ever Smokers of Cigarette % (n)</td>
<td>67.3 (33)</td>
<td>78.6 (22)</td>
<td>65.2 (15)</td>
<td>70 (28)</td>
<td>61.9 (13)</td>
<td>60 (18)</td>
<td>67.9 (129)</td>
</tr>
<tr>
<td>Current Smokers of Cigarette % (n)</td>
<td>22.4 (11)</td>
<td>28.6 (8)</td>
<td>30.4 (7)</td>
<td>30 (12)</td>
<td>42.9 (9)</td>
<td>10.4 (3)</td>
<td>26.3 (50)</td>
</tr>
<tr>
<td>Males % (n)</td>
<td>48.9 (24)</td>
<td>85.7 (24)</td>
<td>47.8 (11)</td>
<td>52.5 (21)</td>
<td>47.6 (10)</td>
<td>53.3 (16)</td>
<td>55.5 (106)</td>
</tr>
<tr>
<td>Fathers With University Education % (n)</td>
<td>63.3 (31)</td>
<td>89.2 (25)</td>
<td>60.9 (14)</td>
<td>45 (18)</td>
<td>76.2 (16)</td>
<td>70 (21)</td>
<td>65.4 (125)</td>
</tr>
<tr>
<td>Mothers With University Education % (n)</td>
<td>59.2 (29)</td>
<td>85.7 (24)</td>
<td>69.6 (16)</td>
<td>40 (16)</td>
<td>71.4 (15)</td>
<td>63.3 (19)</td>
<td>62.3 (119)</td>
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<td>Allowance % (n)</td>
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<td></td>
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<td>&lt;$200</td>
<td>10.2 (5)</td>
<td>8.7 (2)</td>
<td>20 (8)</td>
<td>4.8 (1)</td>
<td>23.3 (7)</td>
<td>12.7 (23)</td>
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<td>32.6 (16)</td>
<td>35.7 (10)</td>
<td>60.9 (14)</td>
<td>55 (22)</td>
<td>66.7 (14)</td>
<td>23.3 (7)</td>
<td>45.9 (83)</td>
</tr>
<tr>
<td>$400-$600</td>
<td>32.6 (16)</td>
<td>35.7 (10)</td>
<td>26.1 (6)</td>
<td>17.5 (7)</td>
<td>14.3 (3)</td>
<td>36.7 (11)</td>
<td>29.3 (53)</td>
</tr>
<tr>
<td>&gt;$600</td>
<td>4.1 (2)</td>
<td>28.6 (8)</td>
<td>4.3 (1)</td>
<td>7.5 (3)</td>
<td>14.3 (3)</td>
<td>16.7 (5)</td>
<td>12.1 (22)</td>
</tr>
</tbody>
</table>

*AUB=American University of Beirut, UB=University Balamand, BAU=Beirut Arab University, LU=Lebanese University, USEK=University St. Esprit de Kaslik, USJ=University St. Joseph.

Table 4.1 Response rate for medical schools and demographic characteristics of medical students.
<table>
<thead>
<tr>
<th></th>
<th>Waterpipe Smokers</th>
<th>Non-smokers</th>
<th>χ²</th>
<th>p-value</th>
<th>Cigarette Smokers</th>
<th>Non-smokers</th>
<th>χ²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender % (n)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>67.8 (38)</td>
<td>50.7 (68)</td>
<td>4.69</td>
<td>0.03</td>
<td>68.0 (34)</td>
<td>51.1 (72)</td>
<td>2.57</td>
<td>0.11</td>
</tr>
<tr>
<td>Female</td>
<td>32.1 (18)</td>
<td>49.2 (66)</td>
<td></td>
<td></td>
<td>32 (16)</td>
<td>48.2 (68)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Father university education % (n)</strong></td>
<td>67.8(38)</td>
<td>63.7 (86)</td>
<td>0.42</td>
<td>0.52</td>
<td>70.0 (35)</td>
<td>63.1 (89)</td>
<td>0.37</td>
<td>0.54</td>
</tr>
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<td><strong>Mother university education % (n)</strong></td>
<td>62.5 (35)</td>
<td>60.7 (82)</td>
<td>0.06</td>
<td>0.8</td>
<td>68.0 (34)</td>
<td>58.9 (83)</td>
<td>1.07</td>
<td>0.3</td>
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<tr>
<td><strong>Waterpipe smoking more harmful % (n)</strong></td>
<td>42.8 (24)</td>
<td>54.8 (74)</td>
<td>2.07</td>
<td>0.15</td>
<td>46.0 (23)</td>
<td>53.2 (75)</td>
<td>0.11</td>
<td>0.74</td>
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<tr>
<td><strong>Allowance % (n)</strong></td>
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<td>&lt; $200</td>
<td>7.1 (4)</td>
<td>14.1 (19)</td>
<td>3.22</td>
<td>0.36</td>
<td>10.0 (5)</td>
<td>12.7 (18)</td>
<td>1.68</td>
<td>0.64</td>
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<tr>
<td>$200 - $400</td>
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<td>39.2 (53)</td>
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<td>40.0 (20)</td>
<td>43.9 (62)</td>
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<td>$400 - $600</td>
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<td>24.0 (12)</td>
<td>29.0 (41)</td>
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<tr>
<td>&gt; $600</td>
<td>12.5 (7)</td>
<td>11.1 (15)</td>
<td></td>
<td></td>
<td>16.0 (8)</td>
<td>9.9 (14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smoking behavior % (n)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily users</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Weekly user</td>
<td>10.8 (4)</td>
<td></td>
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<td></td>
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<tr>
<td>Monthly users</td>
<td>81.1 (30)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age at Initiation % (n)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 or younger</td>
<td>1.8 (1)</td>
<td></td>
<td></td>
<td></td>
<td>0.0 (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 to 15</td>
<td>7.1 (4)</td>
<td></td>
<td></td>
<td></td>
<td>24.0 (12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 to 17</td>
<td>30.4 (17)</td>
<td></td>
<td></td>
<td></td>
<td>26.8 (12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 to 19</td>
<td>25.0 (14)</td>
<td></td>
<td></td>
<td></td>
<td>31.7 (18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 to 25</td>
<td>26.8 (15)</td>
<td></td>
<td></td>
<td></td>
<td>13.8 (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intention to quit % (n)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.0 (28)</td>
<td>38.0 (19)</td>
<td></td>
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<td></td>
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</table>

Table 4.2 Characteristics of medical students according to smoking behavior
<table>
<thead>
<tr>
<th>Covariates*</th>
<th>Univariate Analysis</th>
<th>Multivariable Analysis</th>
<th>Final Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male)</td>
<td>2.05 (1.06-3.97)</td>
<td>1.54 (0.71-3.37)</td>
<td>13.4 (5.81-30.81)</td>
</tr>
<tr>
<td>Cigarette smoking (Current)</td>
<td>13.4 (5.81-30.81)</td>
<td>12.9 (5.52-30.34)</td>
<td>13.4 (5.81-30.81)</td>
</tr>
<tr>
<td><strong>Health Effects of Waterpipe Smoking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterpipe is more harmful than cigarettes (_Ihews_2)</td>
<td>0.43 (0.15-1.23)</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>Waterpipe is equally harmful to cigarettes (_Ihews_3)</td>
<td>0.32 (0.11-0.91)</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td><strong>Socioeconomic Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father with university education and more</td>
<td>0.46 (0.18-1.17)</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Mother with university education and more</td>
<td>0.86 (0.34-2.13)</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>Allowance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$200-$400 (_Iallow_2)</td>
<td>2.6 (0.81-8.4)</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>$400-$600 (_Iallow_3)</td>
<td>1.7 (0.49-5.90)</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>&gt;$600 (_Iallow_4)</td>
<td>2.2 (0.54-9.010)</td>
<td>0.27</td>
<td></td>
</tr>
</tbody>
</table>

*Variables: Gender (reference category female); Current cigarette smoking (reference category non-smokers); Health Effects of Waterpipe Smoking (3 categories variable with waterpipe being less harmful as a reference category); Socioeconomic status defined with 3 variables: Father with university education and more (reference category is father with less than university education), Mother with university education and more (reference is mother with less than university education) and allowance (reference category <$200)

Table 4.3 Results of Logistic Regression analysis for predictors of waterpipe use among 6th year medical students
<table>
<thead>
<tr>
<th></th>
<th>Agreement % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taught in any of the classes about the dangers of smoking</td>
<td>94.2 (180)</td>
</tr>
<tr>
<td>Discussed in any of the classes the reasons people smoke</td>
<td>58.1 (111)</td>
</tr>
<tr>
<td>Learned the importance of recording tobacco history as part of patient's medical history</td>
<td>94.8 (181)</td>
</tr>
<tr>
<td>Learned the importance of providing educational material to support smoking cessation</td>
<td>71.7 (137)</td>
</tr>
<tr>
<td>Ever received any formal training in smoking cessation approaches</td>
<td>28.3 (54)</td>
</tr>
<tr>
<td>Ever heard of nicotine replacement therapy in tobacco cessation</td>
<td>94.8 (181)</td>
</tr>
<tr>
<td>Ever heard of antidepressants in tobacco cessation</td>
<td>57.6 (110)</td>
</tr>
</tbody>
</table>

*Percent agreement is based on N=191

Table 4.4 Reported medical school training
Introduction

Tobacco use is a worldwide epidemic that claims millions of lives every year (1). It is estimated that the tobacco epidemic may kill as many as 10 million in the next 20 to 30 years, with the majority of deaths occurring in developing countries (1).

Approximately 70% of smokers report that they visit a healthcare provider at least once a year (2). The U.S. Public Health Service’s Clinical Practice Guideline *Treating Tobacco Dependence* reports that physicians have a critical role in counseling and advising their patients to quit smoking (3). Even brief and simple advice from health professionals can increase tobacco cessation rates substantially (3). A minimal intervention by physicians lasting less than 3 minutes has proven to increase overall tobacco abstinence rates (3). Minimal clinical intervention consists of brief cessation advice from health care providers. Brief advice typically involves asking patients about their current smoking, advising them to stop, offering assistance either by providing further advice, a referral to a specialist service, or recommendation of, or a prescription for, pharmacotherapy, and
arranging follow up if needed (3). The identification of smoking status and the provision of brief advice increase cessation rate compared to no intervention and should be part of
each contact with health professionals during routine consultations whether or not they are seeking help with smoking dependence (3). Therefore, one important strategy to reduce tobacco related diseases, disabilities, and death is to encourage the involvement of physicians to prevent and control tobacco usages (3).

Given the disease burden associated with tobacco use and recommendations to increase the competency of physicians in tobacco dependence interventions, training in tobacco dependence treatment should be an essential component of medical schools’ curricula worldwide. To address the educational challenges of medical students and future physicians in Lebanon, our study examined the intention of medical students to advise their patients about tobacco dependence in future clinical rotations. The Theory of Planned Behavior (TBP) guided the development of this study. The TPB has been successfully used to predict a wide range of social behaviors, including health behaviors (4) and particularly a physician’s delivery of preventive services (5,6,8).

The TPB assists to characterize beliefs, attitudes, social norms, and the perceived behavioral control issues relating to tobacco dependence advice delivery by Lebanese medical students. The model proposes that the best predictor of a given behavior is the behavioral intention to perform it (5-7). Intentions are viewed as a function of attitude toward advising the tobacco dependent patient, the subjective norms or perceived social pressure to perform the advising behavior or not, and the perceived behavioral control or perception of personal and situational barriers to perform this behavior (7). Attitudes are a function of a medical student’s beliefs that certain consequences will occur as a result of advising the patient. The social normative component is a measure of what the medical
student thinks about the beliefs of influential people toward offering smoking dependence advice and their motivation to model their beliefs with these people. With physicians in general, it is expected that the social normative belief will be important, due to the importance of normative expectations in health care (4). Perceived behavioral control is measures of how much control medical students perceive they have over advising patients who try to quit smoking, how difficult it would be to advise the patients, and how confident they would be that they can in fact intervene.

Using the TPB, intention to provide advice in tobacco dependence (both waterpipe and cigarette) is a function of the medical student’s attitude toward tobacco dependence advice, perceptions that influential others value this behavior, perceptions that barriers to perform tobacco dependence advising are minimal, and belief that one possesses capacity and confidence to perform such behavior for the two forms of smoking. Intentions have previously shown in other studies among health professionals to be influenced by how participants rated their skills in providing healthcare services in addition to the constructs of the TPB (9). Also, personal behavior accounted for the variance in intention in other studies (4). The first objective of this study was to examine these components of the TPB and a second objective was to determine how they predict behavioral intention for waterpipe and cigarette dependence advising. This will allow the behavioral interventionist to examine the factors influencing intentions to provide tobacco dependence advice and the educational challenges of medical school curricula in a country plagued by tobacco.

Methods
This is a cross-sectional study that was conducted during 2009–2010 school year among third year medical students enrolled at six medical schools in Lebanon. The study was approved by the Ohio State University IRB.

Study Population

Medical Schools Recruitment

A listing of all colleges in Lebanon that offer degrees in medicine was obtained from the WHO 2007 updated list (10). There are currently seven listed medical schools. They were all asked to participate in the study through an invitation to the deans of the medical schools. A response with permission to conduct the survey was promptly received via e-mail from five medical schools. One medical school replied that they do not have a 6th year cohort of medical students since they have opened for enrollment in 2007. One school was contacted via a phone call upon arrival to Lebanon and permission to conduct the study was granted. Among the seven medical schools, only the American University of Beirut has a pre-medical training program before admission to medical school. All others follow a traditional seven year medical education curriculum.

Medical Students Eligibility

All third year medical students were the target population for the study in programs that have four years of medical school education following an undergraduate degree, and medical students classified as one year before their graduation year from all other programs. The study attempted to reach 354 medical students from all universities. To be eligible, a medical student had to be in the target year for the medical school and understand English to be able to complete the survey. Medical students in the
introductory years were not targeted because they are still learning the basic sciences and medical students in their graduating year are hard to reach because they are mostly in clinical rotations and rarely in the classic classroom setting. All participants were told to not write their names on the survey and were assured of the anonymity of their responses. All students were encouraged to read the first page before attempting to answer any question and reserve their right not to participate if they do not wish to.

The cross-sectional surveys from the 6 schools were filled over a period of several visits because students were in groups and in different rotations. All students with no exception that were enrolled in the 6 medical schools and were in Lebanon during the period of collection received a copy of the survey and were asked to participate.

Survey Questionnaire

Questionnaire Development

The survey instrument was developed to measure the primary constructs of the TPB. This theory includes the concepts of attitude toward behavior, perceived subjective norms (belief that influential others support the behavior), self-efficacy in performing the behavior, and perceived barriers to the performance of the behavior. The behavior of interest in this analysis is intention to advise patients in tobacco dependence (both cigarette and waterpipe smoking) in clinical rotations. The influential factors that impede or facilitate provision of tobacco dependence advising and the impact of these factors on the intention to provide the advising service by the medical student must be determined in the context of this study.
To develop the TPB questionnaire according to the recommendations by Ajzen (7) and to determine the influential others and barriers that may affect the intention to provide tobacco dependence advising, semi-structured interviews were conducted with four medical students who were recent graduates of Lebanese medical schools or were in the U.S. for one month of elective courses. Individuals were contacted and interviewed separately. The participants were asked to respond to items from previously developed questionnaires that were designed to predict nurses’ intentions to use clinical guidelines in tobacco dependence counseling (11) and to examine nurses’ attitudes and beliefs toward their role in assisting patients with smoking cessation (12). Specifically, the following were explored in the interviews: 1) attitude toward behavior such as obligation to provide tobacco dependence advice, the clinic visit as an ideal time to provide tobacco dependence advice, and all patients identified as tobacco dependent should be given tobacco dependence advice; 2) behavioral beliefs, or the evaluation of outcomes of providing tobacco dependence advice such as jeopardizing the patient-physician relationship, wasting the physician time, and causing frustration; 3) the social norms of people identified as influential by health professionals such as attending physicians, the hospital or medical school policy, and the patients themselves; and 4) perceived behavioral control, or the possession of the knowledge and resources needed by a health professional to provide tobacco dependence advice such as behavioral skills, knowledge of pharmacological, and the availability of time to provide such a service. Analysis of the content of these interviews was performed to develop the measures for this study.

Measures
Intention to advise patients in waterpipe smoking or cigarette smoking dependence was defined on the basis of replying on a scale of 1 to 10 to the question: “How often do you intend to provide smoking cessation advice in your clinical rotations to patients who smoke waterpipe/cigarette?”

Attitude toward the behavior of advising (ATB) was measured using 5 statements that measured attitudes toward offering tobacco dependence advice, such as beliefs about the physician’s role in offering advice and the situations that are appropriate or not for giving advice (see Table 5.3). Items for this variable were measured using a 5-point strongly agree/strongly disagree scale (ranging from 5 to 1 in value for every item). The scale score was determined by summing all items.

Behavioral beliefs (BB) were measured with 4 items related to beliefs about possible outcomes of offering waterpipe/cigarette dependence advice to patients. The outcomes included negative consequences, such as threatening the doctor-patient relationship, wasting the physician’s time, and frustration (see Table 5.3). Items for this variable were measured on a 5-point scale ranging from strongly disagree (value of 5) to strongly agree (value of 1). The scale score was determined by summing the 4 items.

Social norms (SN) were defined according to influential personnel beliefs (normative beliefs) about offering waterpipe/cigarette dependence advice and the medical student’s motivation to comply with those people. Influential personnel were identified as attending physicians or chief residents, school policy developers such as administrators and public health advocates, and patients (see Table 5.3). Items measuring normative beliefs used a 5-point strongly agree/strongly disagree scale (ranging from 2 for strongly
agree to -2 for strongly disagree). Items measuring willingness to comply used a 5-point frequently/never scale (ranging from 5 to 1). Every item related to normative belief was multiplied by the corresponding item for motivation. For example, the first item in this scale was about the attending physician or chief resident (influential person) wanting the medical student to give the patient tobacco dependence advice. Medical students who strongly agreed (score of 2) with the belief of the attending physician and were motivated to frequently comply (score of 5) with the attending physician’s beliefs would have a score of 10. A scale score was developed for social norms by summing the products of each item combination.

Perceived behavioral control (PBC) was developed by asking the medical students about their knowledge of different aspects related to tobacco dependence advice, resources available to them that would facilitate or hinder the provision of tobacco dependence advice, and their beliefs about the effect of this knowledge or resources on providing this service to patients (see Table 5.3). For example, if the student strongly agreed (value of 5 on a 5-point scale) with having adequate knowledge of pharmacological aids for tobacco dependence treatment, and believed that knowledge of pharmacological aids would strongly increase (value of 2 on a 5-point bipolar scale) the likelihood to provide tobacco dependence advice for the patient, then the score for this item would be 10. This score is an indication of positive perceived ability to provide tobacco dependence advice. The PBC scale contained 6 items. The scores for all products of each item combination were summed in one total score.
The self-rated current skill level (SL) for counseling a patient in smoking cessation was determined as a separate variable in this study according to the participant response to the question: “Please rate your current skill level for advising a patient in cigarette/waterpipe dependence.” Answer option had a numeric value ranging from 1 (not at all skilled) to 4 (very skilled).

Waterpipe smoking status was measured using the question “Which of the following best describes you relation to waterpipe smoking?” Non smokers were those who replied “I do not currently smoke the waterpipe.” Cigarette smoking status was measured using the question “During the past 30 days (one month), on how many days did you smoke cigarettes”; a non-smoker was defined on the basis of replying “0 days” to the question.

Data Collection and Data Analysis

Data Collection

The survey was administered in the classroom setting in the schools after a mandatory class to ensure full attendance. Before the administration of the survey, full attendance of the group was confirmed by the class delegate. For every medical school the class delegate confirmed that we have reached all medical students from his cohort. The survey took approximately 30 minutes to complete. After completion, the students were asked to place the questionnaire in an envelope on a table in the front of the room.

Data Analysis

The data for this study were analyzed using the statistical package Stata 10 (College Station, Texas). Descriptive statistics for number of participants, age of
participants, male and female composition, and smoking status were reported for individual schools and collectively for all schools. Means and standard errors were reported for continuous variables and frequencies for categorical variables. Analysis was done separately for waterpipe smoking and cigarette smoking. The mean, SE, range, and intercorrelations were calculated for all scales. Frequencies of responses were calculated for scale items. The internal consistency of each scale was measured with Cronbach’s coefficient alpha.

The intention to deliver tobacco dependence advice was treated as a continuous variable since it was reported on a scale of 1 to 10, with 1 being never and 10 being always. Spearman correlation was used to test the association between individual scale items and intention to deliver tobacco dependence advice to patients. All correlations were considered significant at p<0.05. Linear regression was used to specify a predictive model of intention to provide tobacco dependence advice for patients based on the component of the TPB. Regression analysis for mixed models was performed because of the clustering of students within universities. All items that had a significant Spearman correlation with intention to deliver tobacco dependence advice were considered for addition to the multivariable model and backward elimination was performed for all insignificant variables (p≥0.05). The assumption that the overall residual distribution of the final linear mixed model is Gaussian was tested, in addition to the assumption of equal variance for the residuals, linear relation between the predictors and outcome, and diagnosis of any outliers of the random effects of the model. The variance inflation factor and tolerance were examined for the parameters to determine any multicolinearity (VIF
values more than 2.5 and tolerance levels less than 0.01 were considered indicative of multicolinearity). Analyses were performed for waterpipe smoking and cigarette smoking separately.

Results

Response rates to the survey and descriptive statistics of the sample are presented in Table 5.1. The study included 191 enrolled students from 6 medical schools. The response rate was 54.3% from all medical schools. Of the 191 participants, 25.6% were from the American University of Beirut, 20.9% from the Lebanese University, 12% from the Beirut Arab University, 15.7% from the University St. Joseph, 14.7% from Balamand University, and 11% from University St. Esprit de Kaslik. The average age of medical students who participated in the study was 23.6 ± 1.0 years with a minimum age of 21 and a maximum age of 26. With respect to gender, 44.5% were female participants and 55.5% were males. The prevalence of current smoking was 29.5% for waterpipe and 26.3% for cigarette.

Objective 1 Findings

The first objective of the study was to examine the components of the TPB Self-reported intentions to advise patients in waterpipe dependence and cigarette dependence are described in Table 5.2. Respondents in general had a positive but not very high intention toward tobacco dependence advice for waterpipe and cigarette smoking. The mean for the intention scale for waterpipe was 6.5 and 6.9 for cigarette smoking on a 10-point scale, indicating an above average intention.
Table 5.3 contains the means, standard errors and Spearman correlations with intention to advise patients in waterpipe dependence and cigarette dependence for the 4 TPB scales and items in each scale. All four scales for waterpipe dependence advice and cigarette dependence advice exhibited acceptable internal consistency as measured by Cronbach’s coefficient alpha. For waterpipe advice: ATB = 0.67, BB = 0.81, SN = 0.74, PBC = 0.88. For cigarette advice: ATB=0.75, BB=0.80, SN=0.61, PBC=0.87 (Table 5.4).

In general, the medical students reported a positive attitude toward advising patients in waterpipe dependence and cigarette dependence and a moderate Spearman correlation with intention to counsel patient in tobacco dependence for the two forms of smoking (0.50 for waterpipe dependence and 0.46 for cigarette dependence). Of the five attitudinal items, the most important were that the medical students felt that a physician has an obligation to advise patients to quit smoking (85% for waterpipe and 89% for cigarette) and that patients with non-smoking related illnesses should be given tobacco dependence advice (86% for waterpipe and 90.4% for cigarette)

The behavioral belief scale had a theoretical range from 4 to 20, and the overall mean was 14.7 for waterpipe dependence and 14.4 for cigarette dependence, indicating the strong beliefs in the physician’s obligations in tobacco dependence advising. The behavioral belief scale for waterpipe smoking dependence correlated strongly (Spearman correlation=0.78) with intention to advise patients in quitting this behavior.

The social norm scale had an overall positive mean for waterpipe smoking and cigarette smoking (4.9 and 5.9, respectively with possible theoretical range of -30 to +30), indicating a possible social influence on decisions to provide tobacco dependence
advice in clinical rotations by the medical students. However, Spearman correlation of
the scale with intention to provide advice for the two smoking behaviors was weak and
non-significant for some of the scale items for cigarette dependence (medical school
policy requirement and patients’ demands).

Self-efficacy for the ability to provide tobacco dependence advice in clinical
rotations and perceived control over barriers to provide this service were positive (total
mean scores for waterpipe dependence and cigarette dependence scales were 24.6 and
24.3, respectively on a -60 to +60 theoretically possible range of values). Respondents
tended to disagree (60%) that they have adequate knowledge of pharmacological aids to
provide tobacco dependence advice and tended to agree (86%) that they do not have
adequate time to discuss the topic with a patient.

The four TPB variables (ATB, SN, BB, and PBC) for waterpipe dependence and
cigarettes dependence showed either weak or no intercorrelations (Table 5.4), indicating
that those with the most positive attitudes toward tobacco dependence advice did not
strongly feel that social influence was somewhat important in their decision to adopt this
behavior, confident in performing this behavior, and able to overcome barriers such as
finding the time and acquiring knowledge of the pharmacological aids for treating
tobacco dependence.

Objective 2 Findings

The second objective of this study was to determine how the TPB constructs
predict behavioral intention for waterpipe and cigarette dependence advice. Table 5.5
reports the results of the final linear mixed model for predicting intention of medical
students to advise patients in waterpipe dependence treatment and cigarette dependence treatment. Analysis for the two forms of smoking was done separately. For waterpipe smoking, the four variables were positively and significantly correlated with the intention variable as measured by Spearman correlation and were entered in the multivariable model. Other potential variables that were not significant in the univariate analyses were a single item self-reported skill level that was not in any scale and being a waterpipe smoker. The final model contained the attitude toward behavior scale, the behavioral belief scale, and the social norms scale. This is indicative that intention to provide waterpipe dependence advice by the medical student in future clinical rotations is dependent on a student’s attitudes toward this behavior, beliefs and social influences associated with this behavior, but not necessarily dependent on control over personal or external barriers against providing this service.

For cigarette smoking, the four scales attitude toward behavior, behavioral belief, and social norms, and perceived behavioral control were also significantly correlated with intention to counsel patients in cigarette dependence as measured by Spearman correlation and considered for the multivariable model. Self-rated skill level and cigarette smoking status were not significant and were omitted from the analysis. The final model contained the attitude toward behavior scale as the only variable that yielded a significant prediction for intention to advise patients in cigarette dependence, indicating the importance of positive attitudes toward cigarette dependence advice to be able to implement this behavior.
An investigation of the conditional residuals revealed that the distribution deviated mildly from normality for the final models (waterpipe and cigarette) and the assumption of constant variance for the residuals deviated mildly from being constant. Given the mild violations of these two assumptions, no transformations of the variables were applied. An examination of the random effects for both models (waterpipe and cigarettes) did not reveal any extremely unusual observations. There was no violation of the linearity assumption between the response variables and predictors for the two fitted models, and the VIF and tolerance were acceptable.

Discussion

The objective of this study was to examine the current state of intentions to advice for tobacco dependence among the 6th year Lebanese medical students. According to the TPB (7), attitudes, social influences, and control over personal and external barriers must be strong for an individual to be able to have an intention to provide tobacco dependence advice.

The results of this study revealed that attitudes, behavioral beliefs and social norms were the significant determinants of intention to provide waterpipe dependence advice and only attitude was a significant predictor of intention to provide cigarette dependence advice. Perceived behavioral control was not related to this behavioral intention for the two forms of smoking. This suggested that medical students being confident in their own ability to provide tobacco dependence advice did not influence their intention to provide such a service. Medical students who believed they had the knowledge to provide the advising behavior, and who perceived the behavior would be
easier to perform, did not differ in intention from those who thought otherwise. Perceived behavioral control also might be more influential if there were controversies about the medical students’ reports on this behavior in this population. An examination of the responses to the perceived behavioral control constructs revealed that the majority of the medical students reported lack of time to provide tobacco dependence advice, insufficient knowledge of pharmacological aids, and the lack of openness of the patient to receive tobacco dependence intervention.

There is evidence that the students are receiving some kind of training in tobacco control education from their reported positive self-efficacy and ability to provide tobacco dependence counseling in their clinical rotations. The medical students have reported strong agreement that it is an obligation of the physician to provide tobacco dependence treatment to all patients identified as tobacco users. Because students must be clinically competent in providing this service, it is worrisome that the reported level of knowledge in this field is low. Based on the results of this study, there is a need to expand the level of tobacco dependence education, actual training in the clinical competency to provide treatment to complicated tobacco dependency in all forms, increase intentions, and possibly future behavior in providing tobacco dependence treatment. Interventions targeted to this group may focus on improving attitudes toward tobacco dependence counseling, stressing the role of the physician in increasing the chances of a patient to overcome tobacco dependence, strengthening institutional requirements to provide this service to patients, and providing solutions to reported barriers such as lack of time to provide counseling or lack of knowledge of pharmacological aids. Qualitative research is
recommended to understand the social context of the two smoking behaviors and why is intention to provide waterpipe dependence counseling is perceived differently than intention to provide cigarette dependence counseling.

This study revealed that the constructs of the TPB were not strong enough in this population to have a high level of intention to provide tobacco dependence counseling. Despite this, the findings add to the growing body of knowledge that the construct of Attitude toward the behavior in TPB may be of value in understanding and predicting medical students’ behavior regarding tobacco dependence counseling.

The TPB has previously been used successfully to investigate the behavior of a range of health professionals (4,6,8,11,12); similar to our findings, previous studies focusing on explaining the variance in health professionals’ behavioral intentions have found promising results consistent with the importance of attitude as predictor of intention (4,6,11,12). Our results support the TPB as an important addition to understanding intention. However, our results were inconsistent with a number of studies of other behavioral domains that had found that perceived behavioral control significantly increased the prediction of intention (6, 11,12).

It is important to find ways to increase intention to provide tobacco dependence counseling among the Lebanese medical students. One way of achieving this is to include additional variables to the predictive model of intention. It has been previously recommended to include variables related to personal norms, moral norms, and social identity in addition to the constructs of TPB (9). These additional variables have previously shown to increase the variance in intention and health-related behavior (9).
Further studies are recommended to better understand the variables that will have the highest impact on the intentions to provide tobacco dependence counseling and actual provision of this service by this group of health professionals.

Limitations

This study followed recommended methodological approach to the theory of planned behavior (7). The theory proposes that the best predictor of a given behavior is the behavioral intention to perform it (7). As a result, the study was limited to the intention of providing tobacco dependence counseling by medical students in future clinical rotations rather than the actual behavior of providing the counseling service. These findings of intentions may not actually translate into action for this population and there may be other factors that need to be taken into consideration when predicting the performance of a behavior such as tobacco dependence counseling. However, the results of this study add to the growing evidence that the TPB is useful in predicting medical students’ and other health professionals’ intentions and their subsequent behavior.

Similar to our study, previous studies aiming at predicting health professionals’ behavioral intentions were successful (8,11). Other studies showed promising results in explaining variance in real behavior from intentions and other constructs of TPB (6).

This study has other limitations. First, our findings rely on self-reported data and medical students may have misreported their intentions, beliefs, social norms, and level of knowledge. Second, medical students who did not participate in the survey may have had different beliefs or intentions than students who participated. However, due to the response rate and the participation of all medical schools in the country that have a 6th
year medical students’ cohort, the sample was representative and sufficient to predict tobacco dependence counseling intentions.

Conclusion

The findings from this study have several important implications for controlling the tobacco epidemic and in specific waterpipe smoking in Lebanon. Interventionists, educators, and medical schools administrators, should concentrate their efforts on the outcomes of TPB constructs to bring medical education to the current tobacco dependence practices and methods. Information about pharmacotherapy and the effectiveness of these methods should be included in regular updates and presented to all physicians, trainees, and students. Educating the medical community about the importance of their role in decreasing the tobacco dependence rates in the country is major step. Further research is recommended using this useful theory to find the reasons that affected intentions in this group and recognize the resources that will improve the ability to reduce the tobacco burden in the country.

References


Tables of

Description of the TPB Constructs

And

Behavioral Intention Description and Prediction
<table>
<thead>
<tr>
<th>Medical School</th>
<th>Descriptive Measure</th>
<th>AUB</th>
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<th>LU</th>
<th>USEK</th>
<th>USJ</th>
<th>All Schools</th>
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<td></td>
<td>Response Rate (n)</td>
<td>59.7</td>
<td>53.8</td>
<td>44.2</td>
<td>47.6</td>
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<td>Ever Smokers of Waterpipe % (n)</td>
<td>44.9</td>
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<td>Ever Smokers of Cigarette % (n)</td>
<td>67.3</td>
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<td>61.9</td>
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<td>Current Smokers of Waterpipe % (n)</td>
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<td>35.7</td>
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<td>22.5</td>
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<td>Current Smokers of Cigarette % (n)</td>
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<td>14.3</td>
<td>16.7</td>
<td>12.1</td>
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*AUB=American University of Beirut, UB=University Balamand, BAU=Beirut Arab University, LU=Lebanese University, USEK=University St. Esprit de Kaslik, USJ=University St. Joseph.*

Table 5.1 Response rate for medical schools and demographic characteristics of medical students.
<table>
<thead>
<tr>
<th>Intention Score</th>
<th>Waterpipe Dependence Advice 1= Never, 10=Always % Reported</th>
<th>Cigarette Dependence Advice 1= Never, 10=Always % Reported</th>
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<tr>
<td>1</td>
<td>7</td>
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<tr>
<td>2</td>
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<td>6.8</td>
</tr>
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<td>10</td>
<td>18.8</td>
<td>26.2</td>
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</table>

Mean Score ± SD

<table>
<thead>
<tr>
<th>Waterpipe</th>
<th>6.5±0.2</th>
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<tr>
<td>Cigarette</td>
<td>6.9±0.3</td>
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</table>

Median Score

<table>
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<tbody>
<tr>
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MIN Score

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<tbody>
<tr>
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MAX Score

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<td>Cigarette</td>
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Table 5.2 Self reported intentions to advise patients in waterpipe dependence and cigarette dependence. Reported percentage based on N=191.
<table>
<thead>
<tr>
<th>Scales</th>
<th>Mean</th>
<th>SE</th>
<th>Correlation with intention to counsel patients* *</th>
<th>p-value</th>
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<tr>
<td><strong>Attitude Toward Behavior (ATB)</strong></td>
<td></td>
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<tr>
<td><em>Total Score for Waterpipe Smoking Cessation</em></td>
<td>19.7</td>
<td>0.21</td>
<td>0.5</td>
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<tr>
<td>Physician has an obligation to advise patient to quit</td>
<td>4.2</td>
<td>0.1</td>
<td>0.36</td>
<td>&lt;0.001</td>
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<td>A doctor's visit is an ideal time to try to quit</td>
<td>3.9</td>
<td>0.09</td>
<td>0.32</td>
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<tr>
<td>All patients who smoke should be given cessation advice by physician</td>
<td>4.1</td>
<td>0.05</td>
<td>0.24</td>
<td>&lt;0.001</td>
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<tr>
<td>Only patients who are ready to quit should be given cessation advice</td>
<td>3.2</td>
<td>0.11</td>
<td>0.16</td>
<td>0.03</td>
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<tr>
<td>Patients with non-smoking related illness should be advised to quit</td>
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<td>0.05</td>
<td>0.2</td>
<td>&lt;0.005</td>
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<tr>
<td><em>Total Score for Cigarette Smoking Cessation</em></td>
<td>20.5</td>
<td>0.17</td>
<td>0.46</td>
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<td>Physician has an obligation to advise patient to quit</td>
<td>4.4</td>
<td>0.04</td>
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<td>&lt;0.001</td>
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<tr>
<td>A doctor's visit is an ideal time to try to quit</td>
<td>3.9</td>
<td>0.05</td>
<td>0.37</td>
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<td>All patients who smoke should be given cessation advice by physician</td>
<td>4.3</td>
<td>0.06</td>
<td>0.37</td>
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<td>Only patients who are ready to quit should be given cessation advice</td>
<td>3.8</td>
<td>0.03</td>
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<td>Patients with non-smoking related illness should be advised to quit</td>
<td>4.1</td>
<td>0.04</td>
<td>0.35</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Behavioral Belief Scale (BB)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Total Score for Waterpipe Smoking</em></td>
<td>14.7</td>
<td>0.22</td>
<td>0.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Offering cessation advice will threaten physician-patient relationship</td>
<td>3.5</td>
<td>0.08</td>
<td>0.27</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Offering cessation advice is a waste of the physician time</td>
<td>3.8</td>
<td>0.09</td>
<td>0.28</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Offering cessation advice will leave little time to do other patient care</td>
<td>3.6</td>
<td>0.03</td>
<td>0.22</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Offering cessation advice will cause frustration</td>
<td>3.7</td>
<td>0.10</td>
<td>0.14</td>
<td>0.05*</td>
</tr>
<tr>
<td><em>Total Score for Waterpipe Smoking Cessation</em></td>
<td>14.4</td>
<td>0.22</td>
<td>0.19</td>
<td>0.01</td>
</tr>
<tr>
<td>Offering cessation advice will threaten physician-patient relationship</td>
<td>3.4</td>
<td>0.11</td>
<td>0.1</td>
<td>0.18*</td>
</tr>
<tr>
<td>Offering cessation advice is a waste of the physician time</td>
<td>3.8</td>
<td>0.09</td>
<td>0.13</td>
<td>0.03</td>
</tr>
<tr>
<td>Offering cessation advice will leave little time to do other patient care</td>
<td>3.5</td>
<td>0.08</td>
<td>0.16</td>
<td>0.03</td>
</tr>
<tr>
<td>Offering cessation advice will cause frustration</td>
<td>3.7</td>
<td>0.07</td>
<td>0.14</td>
<td>0.06*</td>
</tr>
</tbody>
</table>
### Social Norm Scale (SN)

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Median</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Score for Waterpipe Smoking Cessation</strong></td>
<td>4.9</td>
<td>0.76</td>
<td>0.33</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Attending Physician would like patient to receive cessation advice</td>
<td>2.2</td>
<td>0.23</td>
<td>0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Medical school policy dictates that patient receives cessation advice</td>
<td>1.8</td>
<td>0.34</td>
<td>0.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patients who smoke would like physician to offer cessation advice</td>
<td>0.8</td>
<td>0.30</td>
<td>0.25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Total Score for Cigarettes Smoking Cessation</strong></td>
<td>5.9</td>
<td>0.68</td>
<td>0.23</td>
<td>0.001</td>
</tr>
<tr>
<td>Attending Physician would like patient to receive cessation advice</td>
<td>2.5</td>
<td>0.17</td>
<td>0.28</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Medical school policy dictates that patient receives cessation advice</td>
<td>2.03</td>
<td>0.43</td>
<td>0.134</td>
<td>0.07*</td>
</tr>
<tr>
<td>Patients who smoke would like physician to offer cessation advice</td>
<td>1.25</td>
<td>0.33</td>
<td>0.06</td>
<td>0.42*</td>
</tr>
</tbody>
</table>

### Perceived Behavioral Control Scale (PBC)

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Median</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Score for Waterpipe Smoking Cessation</strong></td>
<td>24.6</td>
<td>1.67</td>
<td>0.35</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Knowledge of behavioral skills and techniques for cessation</td>
<td>4.8</td>
<td>0.42</td>
<td>0.24</td>
<td>0.001</td>
</tr>
<tr>
<td>Knowledge of pharmacological aids for cessation</td>
<td>3.8</td>
<td>0.26</td>
<td>0.26</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Knowledge of positive effects of cessation</td>
<td>4.7</td>
<td>0.31</td>
<td>0.19</td>
<td>0.01</td>
</tr>
<tr>
<td>Comfortable discussing cessation</td>
<td>4.2</td>
<td>0.29</td>
<td>0.39</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Adequate time to discuss cessation</td>
<td>4.1</td>
<td>0.31</td>
<td>0.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patient open to receive cessation advice</td>
<td>3.1</td>
<td>0.17</td>
<td>0.22</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td><strong>Total Score for Cigarette Smoking Cessation</strong></td>
<td>24.3</td>
<td>1.82</td>
<td>0.23</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Knowledge of behavioral skills and techniques for cessation</td>
<td>4.7</td>
<td>0.41</td>
<td>0.13</td>
<td>0.82*</td>
</tr>
<tr>
<td>Knowledge of pharmacological aids for cessation</td>
<td>3.7</td>
<td>0.32</td>
<td>0.12</td>
<td>0.12*</td>
</tr>
<tr>
<td>Knowledge of positive effects of cessation</td>
<td>4.5</td>
<td>0.27</td>
<td>0.19</td>
<td>0.01</td>
</tr>
<tr>
<td>Comfortable discussing cessation</td>
<td>4.3</td>
<td>0.37</td>
<td>0.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Adequate time to discuss cessation</td>
<td>4.1</td>
<td>0.28</td>
<td>0.28</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patient open to receive cessation advice</td>
<td>3.0</td>
<td>0.16</td>
<td>0.16</td>
<td>0.03</td>
</tr>
</tbody>
</table>

*Insignificant correlation at p-value<0.05

**Spearman correlation: Waterpipe dependence total scales and scale items and cigarette dependence total scales and scale items were correlated with intention to advise patients in waterpipe dependence and cigarette dependence.

Table 5.3 Descriptive Statistics of Scales, Scale Items, and Correlation with Medical Students’ Intention to Advise Patients in Smoking Dependence.
<table>
<thead>
<tr>
<th>Variable</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterpipe Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Attitude</td>
<td>(0.67)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Behavioral</td>
<td>0.28</td>
<td>(0.81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Social Norms</td>
<td>0.11</td>
<td>-0.27</td>
<td>(0.74)</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Perceived</td>
<td>0.38</td>
<td>0.07</td>
<td>0.4</td>
<td>(0.88)</td>
</tr>
<tr>
<td>Behavioral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Attitude</td>
<td>(0.75)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Behavioral</td>
<td>0.2</td>
<td>(0.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Social Norms</td>
<td>0.37</td>
<td>-0.35</td>
<td>(0.61)</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Perceived</td>
<td>0.67</td>
<td>0.038</td>
<td>0.45</td>
<td>(0.87)</td>
</tr>
<tr>
<td>Behavioral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cronbach’s alpha are presented in the diagonal
Table 5.4 Internal consistencies, and intercorrelations among the TPB variables
<table>
<thead>
<tr>
<th>Construct*</th>
<th>Waterpipe</th>
<th></th>
<th>Cigarette</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attitude toward Behavior (ATB)</td>
<td>0.22</td>
<td>0.002</td>
<td>0.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>2. Behavioral Belief (BB)</td>
<td>0.22</td>
<td>&lt;0.001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Social Norms (SN)</td>
<td>0.11</td>
<td>&lt;0.001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Perceived Behavioral Control (PBC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Constructs of the Theory of Planned Behavior: ATB (Attitude Toward behavior), BB (Behavioral Belief), SN (Social Norms), and PBCS (Perceived Behavioral Control; not included for non-significance in the model)

Table 5.5 Mixed model linear regression results of the prediction of medical students’ behavioral intentions in waterpipe and cigarette dependence counseling by the constructs of the theory of planned behavior (TPB)
Chapter 6: Tobacco Dependence Curricula in Middle Eastern and North African Medical Education

Introduction

Tobacco use is the leading cause of preventable death and is projected to cause nearly 450 million deaths worldwide during the next 50 years (1, 2). Currently 5.4 million people die from tobacco-related diseases each year; 80% of those deaths occur in less developed countries (3). According to the World Health Organization (WHO), low-to-middle income countries are facing major social and financial penalties due to an increase in tobacco consumption (4). It is estimated by the WHO that nearly 63% of men and 10% of women use tobacco in Middle Eastern countries (5). Also, the Middle East and North Africa face the challenges of the rising youth smoking rates, particularly among girls, and the prevailing acceptance of waterpipe smoking (5). It is reported that between 1999 and 2007 waterpipe usage in the Middle East rose 200% among women and 60% among men (5). The tobacco epidemic is the cause of health crises in many countries and a major risk factor for the leading causes of death in the world (4).

Due to public health efforts and involvement of medical and health personnel that are capable of delivering tobacco dependence interventions, smoking rates have fallen in
some developed countries (6). Interventions by health professionals targeting tobacco dependence lead to improvements in health and are cost effective (6). The WHO emphasizes the role of health professional bodies in efforts to include tobacco control in the public health agenda and contribute actively to the reduction of tobacco consumption (7). Physicians can have a critical role in reducing the tobacco burden, as even brief advice from health professionals can substantially increase smoking cessation rates (8). Unfortunately, many physicians believe that they are ill prepared to offer patient counseling and that their medical school training has not sufficiently prepared them to help patients stop smoking (9).

Implementing effective interventions in tobacco dependence in the general practice requires training medical students about tobacco dependence treatment techniques. Including tobacco education in the medical curricula will strengthen the possibility that future physicians will deliver information about the health effects of smoking and counsel tobacco users to quit (10).

Due to the economic and health burden of tobacco use in the Middle East and North Africa and the emerging ways to consume tobacco, such as waterpipe smoking, a physician’s competency in tobacco-related issues must be increased. However, it is not clear if medical students and physicians from the area are sufficiently trained to deliver tobacco dependence treatment, including dependence on the waterpipe. Research carried out in some medical schools in the MENA (Middle East and North Africa) countries has looked at smoking prevalence among medical students and briefly investigated student-reported tobacco control teaching (11). In this paper we present
original data collected from medical school administrators in MENA countries about the extent of tobacco teaching in their curriculum.

The first objective of this study was to examine the curricula in medical schools in countries of the Middle East and North Africa for content related to: 1) health risks of tobacco dependence in general; 2) tobacco dependence among special population like women and children; 3) health effects of passive smoking; 4) use of pharmacological agents for treatment; 5) tobacco dependence treatment techniques; and 6) the inclusion of information regarding health risks of waterpipe use and smokeless tobacco. A second objective was to examine the extent of coverage of the tobacco dependence treatment content within the medical school program, and an examination of any clinical experience setting.

An examination of the current curriculum content will highlight what is being taught, how it is presented to the future medical community, and what interventions are needed for improvements. Improvements in tobacco dependence and cessation education in countries of the Middle East and North Africa will not only help these regions, but it will also serve as an international effort to contain a global phenomenon that is spreading with no geographic boundaries.

Methods

A cross-sectional survey in the English language was administered to collect information on the tobacco education curriculum content in 90 medical schools from 19 countries of the Middle East and North Africa. The 190 medical schools from the two regions that were listed on the WHO (2007) updated directory of medical schools (12) and the Foundation for Advancement of International Medical Education (FAIMER)
directory (13), were eligible for this study. The FAIMER was used for regional classification of the medical schools and to access addresses and phone numbers (13). Countries that are listed as part of the Middle East are: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, UAE, and Yemen. Countries in the North African region are: Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia.

**Questionnaire design and Measures**

A modification of the valid and reliable questionnaire written in the English language previously used by Ferry et al. to assess tobacco dependence curricula in U.S. medical education was used (14). To address the study objectives, some of the Ferry et al. survey response options were modified and questions were added to address the emerging waterpipe epidemic. The 19-item instrument included questions about the specific content related to health risks of tobacco use, content related to tobacco dependence among special populations such as adolescents and pregnant women, effects of passive smoking, pharmacological agents related to smoking dependence treatment, behavioral tobacco dependence treatment techniques, information about the use of waterpipe and smokeless tobacco, learning experiences in clinical practice, the placement of this content within the medical school curriculum, and the existence of an established tobacco dependence curriculum.

**Data Collection and Data Analysis**

Data Collection

An introductory letter addressed to the administrator of the medical school (dean, associate dean, or dean of academic affairs; depending on available published contact) invited the administrator to participate, explained the purpose of the study, and contained
the questionnaire. A list of e-mails, mailing addresses, and phone numbers for all medical school administrators was accumulated from the WHO directory of medical schools (12), the FAIMER website (13) or the website of the medical school if available. This information was used to dispatch the survey instrument via Zoomerang online surveys (Market Tools Company, San Francisco, CA), send individual e-mail with the same request, and mail the questionnaire to the medical schools in the two regions. Reminders were sent to the e-mail addresses after 2, 3 and 4 weeks from the original mailings. Telephone calls were made to the medical schools that did not respond to all forms of invitations to participate in the study. The phone calls attempted to reach the administrative office of the medical schools and a verbal request for a key informant who can provide curricular information was placed. The maximum number of telephone attempts was three for every institution. Time required to completing the questionnaire varied between institutions. Responses to the questions were tabulated and information from all respondents was confidential.

Data Analysis

Overall and regional response rates were calculated. The statistical analysis involved computations of summary statistics to describe the percentage of responses for survey items. To preserve confidentiality, all results were reported aggregatedly and by region because some countries have only one medical school.

Results

Response Rate

Forty nine e-mails and 190 mailing addresses and phone numbers were identified from different sources (13,14) and different medical schools’ websites. Responses to the
questionnaire were received from 90 medical schools (a response rate of 47.4%) and from 19 countries. The response rate for the medical schools of North Africa was 61.8% and the response rate for the medical schools of the Middle East was 37.7% (Table 6.1). Responses were received from 43 medical schools in the Middle Eastern countries and from 47 medical schools in North Africa. One school responded to the survey dispatched via Zommerang.com (Market Tool Company, San Francisco, California), 16 schools responded by e-mail (4 responded to the original e-mail), 3 schools responded via air-mail, 5 responses were collected by visiting the medical schools, and 65 were collected via phone calls.

**Objective 1 Findings**

**Tobacco Education Content in Curriculum**

Table 6.2 contains information about tobacco education content in medical school curriculum plans. Approximately 82.4% of the surveyed schools reported inclusion of the health effects of tobacco-related diseases as part of a required course or a course dedicated to tobacco related diseases, 33% reported the inclusion of high risk groups for smoking as part of a required course and the same percentage was reported for this topic as a required course dedicated to tobacco related diseases. Almost half of the medical schools (48.4%) reported including content on the health effects of passive smoking as part of these courses. Only 41.7% reported that the topic of pharmacological agents for tobacco dependence treatment was part of any required courses. With respect to the Clinical Practice Guideline *Treating Tobacco Dependence* topics (5As, relapse prevention, reduction of automatic smoking), the highest percentage was reported for “not offered” (40%) and 21.1% included these topics in required courses. Approximately
66.7% of the medical schools reported the inclusion of the topic of waterpipe smoking in their curriculum as part of a required course or as a required course dedicated to tobacco related diseases. Information about smokeless tobacco was covered by 57.8% of the programs in medical schools of the regions.

**Objective 2 Findings**

**Extent of Coverage of Tobacco Cessation in Curriculum**

The results for this section are presented in Table 6.3. Clinical interventions for tobacco cessation were mostly covered briefly in the surveyed countries (67.8%). Fewer than 16% of all countries reported a detailed coverage of nicotine replacement therapy in their curriculum and only 34% reported detailed coverage for antidepressants therapy for tobacco dependence treatment. The use of Varenicline for tobacco dependence treatment was not covered in more than half of the programs (53.3%). Almost half of the schools reported a brief discussion of the Transtheoretical model and stage of change construct or motivational interviewing. Approximately 44% reported no content focused on tobacco dependence treatment interventions.

**Clinical Training**

Responses for this section are displayed in Table 6.4. Over half (55.5%) of the programs offered a clinical rotation in addiction medicine that included tobacco dependence treatment training for their students in the two regions; medical schools of the Middle East tend to offer such a rotation at higher rate than medical schools of North Africa (62.8% vs. 49%). The response to the provision of a clinical setting in which students are taught tobacco cessation techniques to use with patients was approximately equally divided between the 4 response options: “not provided,” “provided in artificial
setting,” “provided in clinical setting with actual patients,” “provided in clinical setting with actual patients and students are evaluated on performance.” If a curriculum in which students are trained in tobacco dependence treatment existed, 48.9% of the respondents reported that they evaluated the performance of the students via one on one discussion, followed by 39.8% who reported chart review in addition to one-on-one discussion. As displayed in Table 4, 47.6% of the medical schools who replied to this question (82 schools), reported that they do not have established tobacco dependence education. Among the schools who replied positively to this question (43 schools), 24.4% reported that the tobacco dependence curriculum was established between the years 1989 and 1990. When asked about the medical school year the students are taught tobacco dependence treatment techniques, the highest percentage (34.5%) reported the third year. Medical schools of the Middle East were more likely to cover this topic in the third year of instructions (37.2%) while medical schools of North Africa were more likely to include it in their fourth year of instructions (35.6%).

Discussion

Responses to the questionnaire were received from 90 medical schools from the MENA region. The oldest medical school in the area is the American University of Beirut (1868) followed by the University of Cairo (1927) and University of Baghdad (1927). Medical schools that responded to the survey did not differ in date of establishment from schools that did not respond for all countries in the MENA region. Comparison between responding schools and non-responding schools based on number of enrolled students was not possible because of the unavailability of this information for most of the medical schools.
This is the first study to examine current tobacco teaching in medical schools of the Middle East and North Africa. In this study we attempted to estimate the extent to which schools in these regions teach students about tobacco and tobacco dependence treatment techniques, identify formats in which teaching is undertaken, and assess the inclusion of any topics relevant to emerging alternative tobacco use like the waterpipe.

The findings of this study revealed that tobacco related information is poorly integrated in the required curriculum and clinical experience, and some topics are absent from many required courses. Medical students from the MENA countries are not adequately trained to help reduce the tobacco burden in the two regions, the most costly and preventable healthcare problem in the world. The WHO has recommended the use of medication for the treatment of tobacco dependence (15) and the Clinical Practice Guideline *Treating Tobacco Use and Dependence* recommends that all physicians use the tobacco dependence treatment techniques like the 5As (ask, advise, assess, assist, and arrange follow-up) to identify tobacco users and provide treatment and brief tobacco cessation intervention to every patient (15). Approximately 60% of the schools reported no required courses that integrate pharmacological therapy for tobacco dependence and nearly 80% reported no integration of clinical tobacco dependence treatment techniques. Also, behavioral intervention instructions for tobacco dependence treatment were briefly discussed in about half of the surveyed medical schools (50% for the stage of change construct and 56.7% for motivational interviewing); however, they were completely omitted from 23.3% of the schools. These findings are suggestive of a need to improve teaching that involves treatment strategies, effective communication strategies with
patients, and counseling skills that will increase the competence of the physician in reducing tobacco related diseases.

The Middle East and North Africa face the challenges of the rising youth smoking rates, particularly among girls, and the prevailing acceptance of waterpipe smoking (5). The findings of this study suggest that the inclusion of tobacco dependence of these populations is not addressed in the curriculum of the surveyed medical schools and waterpipe smoking is discussed in only 66.7% of the medical school’s curriculum.

Medical students who lack applied clinical skills may be less likely to intervene with their patients and make tobacco dependence treatment referrals. Despite the fact that 55.5% of medical schools reported having a clinical setting in which students is taught tobacco dependence treatment techniques, the method of clinical skill training varied greatly between the schools. These various methods should be further investigated to determine the best teaching approach in the clinical setting.

Similarly to studies performed by Ferry at al. in 1999 (14) that surveyed 122 associate deans of U.S. medical schools, medical schools from the MENA countries included more basic science related to tobacco dependence like the health effects of tobacco dependence (82.2%) in required courses of their curricula than clinical sciences (28.1%). Approximately 60% of the surveyed schools by Ferry et al. did not require tobacco cessation training and 54.8% reported that they included basic sciences related to tobacco dependence in their curriculum (14). The majority (98.3%) reported that the basic sciences content was part of a required course (14). Also in the same study, only 4.4% of the U.S. medical schools reported the inclusion of clinical sciences like the 5A’s and smoking cessation techniques in clinical settings with patients (14). However,
findings by Powers et al. in 2004 differed from earlier reports for the U.S. medical schools (9) and more inclusion of tobacco dependence material across the curriculum of 12 medical schools was reported (9). Contrary to the findings from our study more behavioral interventions were integrated into the curriculum as reported by Powers et al. in addition to communication skills associated with patients’ interventions (9). The change in curricular content in medical schools of the U.S. may be attributed to the efforts to increase attention to the topic from 1996 to 2003 (16). Including the basic sciences related to tobacco dependence does not seem to be the problem for medical schools in the U.S. or the MENA countries; however to meet the challenges associated with the impact of tobacco dependence, medical schools need to build components in tobacco dependence in their required curriculum to increase Physicians’ effectiveness in this topic in addition to increasing skills in behavioral interventions related to tobacco dependence in the required clinical training.

This study had a number of limitations. First, the response rate from some countries is low even if the overall response rate is considered acceptable for this study. The results may not be generalizable to all medical schools in the countries because of this low response. Communication strategies were a challenge in some countries like Iran and Israel because of language barriers and strict regulations on dissemination of information. Second, all information was self-reported and there is no ability to assess its accuracy and whether the informant is familiar with the curricular content as initially claimed. Third, the bias associated with social desirability may be high in this study. Medical schools from geographical areas that are unfamiliar with survey methodology may have reported higher than usual positive responses to the inclusion of tobacco
dependence curriculum and teaching strategies. Because the original instrument was designed for medical schools in the U.S., some medical schools may have faced the challenge of comprehension of unfamiliar wording or concepts. Future studies should compare student’s reports to medical schools reports for accuracy, attempt more qualitative assessment of tobacco education teaching, and conduct validation studies consisting of visits to medical schools of the regions.

Conclusion

There is no reference to any medical schools’ curriculum investigation from the MENA regions that can be used to compare the current results; hence, it is not feasible to determine any increase in the medical schools that teach about tobacco and tobacco dependence treatment techniques. Although it seems that many medical schools integrate tobacco information in their required courses, elective courses, and clinical experiences. The results of this study revealed that the next generations of physicians from the two targeted geographical regions are ill prepared to combat the tobacco epidemic and much remains to be accomplished in this domain. In this part of the world there is a lack of human resources, financial resources, and organizational capacity to implement programs that will help reduce the burden of tobacco and diseases associated with it. Including the tobacco education in curriculum is going to require high uptake and commitment from medical schools in the area. This mission against tobacco dependence is possible and requires tobacco control leaders that are culturally competent with the environment they are working in and skilled in selecting suitable medical education resources. Tobacco control competency is essential to evaluate the risks and to detect tobacco-related
problems early in the course of tobacco abuse and dependence, and physicians should acquire this competency during medical education and retain it in future practice.

References


Descriptive tables of response rate and inclusion of tobacco education in the curriculum of medical schools of the Middle East and North Africa Countries
<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Medical Schools (n)</th>
<th>Survey Participants (n)</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East</td>
<td>114</td>
<td>43</td>
<td>37.7</td>
</tr>
<tr>
<td>Bahrain</td>
<td>2</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td>Iran</td>
<td>48</td>
<td>5</td>
<td>10.4</td>
</tr>
<tr>
<td>Iraq</td>
<td>14</td>
<td>7</td>
<td>50.0</td>
</tr>
<tr>
<td>Israel</td>
<td>6</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>Jordan</td>
<td>3</td>
<td>3</td>
<td>100.0</td>
</tr>
<tr>
<td>Kuwait</td>
<td>1</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Lebanon</td>
<td>7</td>
<td>5</td>
<td>71.4</td>
</tr>
<tr>
<td>Oman</td>
<td>2</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td>Qatar</td>
<td>1</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>14</td>
<td>7</td>
<td>50.0</td>
</tr>
<tr>
<td>Syria</td>
<td>6</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>5</td>
<td>3</td>
<td>60.0</td>
</tr>
<tr>
<td>Yemen</td>
<td>5</td>
<td>2</td>
<td>40.0</td>
</tr>
<tr>
<td>North Africa</td>
<td>76</td>
<td>47</td>
<td>61.8</td>
</tr>
<tr>
<td>Algeria</td>
<td>12</td>
<td>11</td>
<td>91.7</td>
</tr>
<tr>
<td>Egypt</td>
<td>21</td>
<td>8</td>
<td>38.1</td>
</tr>
<tr>
<td>Libya</td>
<td>10</td>
<td>6</td>
<td>60.0</td>
</tr>
<tr>
<td>Morocco</td>
<td>4</td>
<td>4</td>
<td>100.0</td>
</tr>
<tr>
<td>Sudan</td>
<td>25</td>
<td>14</td>
<td>56.0</td>
</tr>
<tr>
<td>Tunisia</td>
<td>4</td>
<td>4</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>190</strong></td>
<td><strong>90</strong></td>
<td><strong>47.4</strong></td>
</tr>
</tbody>
</table>

Table 6.1 Medical schools programs and response rate in the Middle East and North Africa, 2010
<table>
<thead>
<tr>
<th>Topic</th>
<th>Total</th>
<th>Middle East</th>
<th>North Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health effects of tobacco related diseases</td>
<td>82.4</td>
<td>88.6</td>
<td>76.6</td>
</tr>
<tr>
<td>High risk groups for cigarettes and waterpipe smoking</td>
<td>33.0</td>
<td>35.9</td>
<td>27.2</td>
</tr>
<tr>
<td>Effects of passive smoking</td>
<td>48.4</td>
<td>65.9</td>
<td>29.8</td>
</tr>
<tr>
<td>Pharmacological treatments (nicotine replacement therapy, drugs for tobacco dependence)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41.7</td>
<td>56.8</td>
<td>27.7</td>
</tr>
<tr>
<td>Clinical smoking cessation techniques (5As, relapse prevention, reduction of automatic smoking)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.1</td>
<td>25.6</td>
<td>14.9</td>
</tr>
<tr>
<td>Waterpipe smoking</td>
<td>66.7</td>
<td>60.5</td>
<td>72.3</td>
</tr>
<tr>
<td>Smokeless tobacco</td>
<td>57.8</td>
<td>53.5</td>
<td>61.7</td>
</tr>
</tbody>
</table>

Table 6.2 Inclusion of tobacco related content in required courses of medical schools in the Middle East and North Africa, 2010
<table>
<thead>
<tr>
<th>Topic</th>
<th>Total</th>
<th>Middle East</th>
<th>North Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion of clinical intervention for tobacco dependence treatment techniques</td>
<td>21.1/67.8</td>
<td>11.6/79.1</td>
<td>27.7/59.6</td>
</tr>
<tr>
<td>5 A’s (Ask, Advise, Assess, Assist, Arrange), relapse prevention, reduction of automatic smoking</td>
<td>28.1/28.1</td>
<td>47.6/21.4</td>
<td>10.6/34.0</td>
</tr>
<tr>
<td>Stages of change (Transtheoretical Model)</td>
<td>11.1/50.0</td>
<td>16.3/53.5</td>
<td>6.4/46.8</td>
</tr>
<tr>
<td>Motivational interviewing</td>
<td>20.0/56.7</td>
<td>23.3/48.8</td>
<td>17.0/63.8</td>
</tr>
<tr>
<td>Nicotine replacement therapy</td>
<td>15.7/73.0</td>
<td>14.3/71.4</td>
<td>17.0/74.5</td>
</tr>
<tr>
<td>Antidepressants therapy</td>
<td>34.4/48.9</td>
<td>23.3/60.5</td>
<td>38.3/44.7</td>
</tr>
<tr>
<td>Varenicline for tobacco cessation</td>
<td>11.1/34.4</td>
<td>11.6/25.6</td>
<td>10.6/42.5</td>
</tr>
</tbody>
</table>

Table 6.3 Topical areas of tobacco dependence treatment curriculum in medical schools in the Middle East and North Africa, 2010
<table>
<thead>
<tr>
<th>Topic</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Clinical rotation in addiction medicine that includes tobacco</td>
<td>55.5</td>
</tr>
<tr>
<td>dependence treatment training</td>
<td></td>
</tr>
<tr>
<td>Existence of an established tobacco dependence and education</td>
<td>52.4</td>
</tr>
<tr>
<td>curriculum</td>
<td></td>
</tr>
<tr>
<td>Clinical setting in which students are taught tobacco cessation</td>
<td>78.9</td>
</tr>
<tr>
<td>techniques</td>
<td></td>
</tr>
<tr>
<td>Provided in artificial setting</td>
<td>24.4</td>
</tr>
<tr>
<td>Provided in clinical setting with actual patients</td>
<td>25.6</td>
</tr>
<tr>
<td>Provided in clinical setting with actual patients and students are</td>
<td>27.8</td>
</tr>
<tr>
<td>evaluated</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.1</td>
</tr>
<tr>
<td>Evaluation of medical students' performance in tobacco dependence</td>
<td>85.6</td>
</tr>
<tr>
<td>treatment*</td>
<td></td>
</tr>
<tr>
<td>One on one discussion</td>
<td>48.9</td>
</tr>
<tr>
<td>Chart review</td>
<td>39.8</td>
</tr>
<tr>
<td>Videotape</td>
<td>17.8</td>
</tr>
<tr>
<td>Other</td>
<td>8.0</td>
</tr>
</tbody>
</table>

* More than one response option was allowed for this question.

Table 6.4 Clinical learning experiences in tobacco dependence treatment
Chapter 7: Discussion and Conclusion

Discussion

Smoking is recognized as the greatest preventable cause of disease and death in the world (1). In Western countries tobacco use has been declining since 1970 and governments have been sponsoring firm tobacco control efforts and cessation programs (2). In France, where smoking is part of the life of the French citizen like red wine and coffee, a ban on smoking was established in 2007 that has earned acceptance and is well enforced (2). In the U.S., home of many tobacco companies, adult smoking rates have fallen from 37% to 20% in the last 40 years due to public health efforts, tax increase, bans, and awareness campaigns among many others (2). However, in the developing world efforts to control the tobacco problem are just starting. Currently 5.4 million people die from tobacco-related diseases each year; 80% of those deaths occur in less developed countries (1). According to the WHO, the number of smokers in the developing world increased by 30% between 1970 and 2005 (1).

This research focused mainly on a portion of the developing world – Middle Eastern and North African (MENA) countries. The Middle East and North Africa face the challenges of the rising youth smoking rates, particularly among girls, and the prevailing
acceptance of waterpipe smoking (3). It is reported that between 1999 and 2007 waterpipe usage in the Middle East rose 200% among women and 60% among men (3). Based on large-scale population surveys it has been estimated that nearly 63% of men and 10% of women currently use tobacco in Middle Eastern countries (1). Specifically in Lebanon, the prevalence of smoking is relatively high at 29% for men and 6.9% for women, the highest in the Middle East after Jordan (1). Also, in Lebanon two-thirds of boys and more than one half of the girls between the ages of 13 and 15 years smoke some type of tobacco, including the waterpipe, and the numbers are rising (3). For Lebanon, a country that just emerged from a major civil war and is crippled by political and economic crisis, the tobacco burden will only add to its human and financial loss. Anti-tobacco groups in the country are in need of evidence-based strategies on what can be done to contain the tobacco epidemic and even more evidence to support the efforts against the spread of the socially acceptable waterpipe.

There is documented evidence that physicians play an important role in the comprehensive effort to control tobacco use and nicotine addiction. This made it necessary to look at the tobacco use and tobacco dependence knowledge among medical students in Lebanon and how their medical education may have influenced their tobacco use, beliefs, practices, and predict their intentions to deliver tobacco advice to smokers in their future clinical rotations using a behavioral model approach. Also, waterpipe smoking and cigarette smoking are prevalent among medical students despite their assumed knowledge of the harm associated with it (5). This may very well be due to a medical education that is missing opportunities in tobacco control training and the failure
of the medical school education to promote healthy behaviors and attitudes among future physicians. This research into the curricula in medical schools of Lebanon, the rest of the Middle East, and North Africa for content related to tobacco teaching helped determine whether medical students are offered training in tobacco dependence treatment, including dependence on the waterpipe.

The results of this research revealed three basic findings: 1) One third of Lebanese medical students smokes either waterpipe or cigarettes, with the majority using the waterpipe and no gender differences for cigarette smoking. 2) The constructs of the Theory of Planned Behavior were not strong predictors of medical students’ intentions to provide tobacco dependence advice for cigarettes and waterpipe smokers and intentions levels to provide such a service were not high enough among this population. 3) Tobacco related information is poorly integrated in the required curriculum and clinical experiences of the medical schools in the Middle East and North Africa, and some topics are absent from many required courses.

**Important Findings from Lebanese Medical Students Survey**

Current smoking rates among the 2010 cohort of 6th year Lebanese medical students was 29.5% for waterpipe and 26.3% for cigarettes. These rates are higher for waterpipe smoking than the rates reported from the GHPS (20.6% for waterpipe and 27.4% for cigarettes) (4) and similar to those reported for the general adult population in the country (29.1%) (6). Also, these rates are higher than those reported among medical students in neighboring Syria (10.9% for cigarettes and 23.6% for waterpipe) (7), higher than the rates reported for medical students in Pakistan (14.4%) (8) and Iran (18.8%) (9),
and similar to the rates among medical students in Saudi Arabia (29%) (10). Medical students in Lebanon like the rest of the population need to obtain interventions for smoking cessation due their increased smoking rates.

This study showed no significant difference between the male and female cigarette smoking rates but a significant 2-fold increase in waterpipe smoking among males. This is a suggestion that in Lebanon, smoking among females does not carry a major social stigma. Women in Lebanon smoke openly like men and have no problem associating with the Western cigarettes, contrary to the neighboring Arab countries that have less tolerant attitudes toward this behavior among women (3).

The medical student survey results also revealed a particularly discouraging finding: less than 30% of the students who participated in this study reported that they had received any formal training in tobacco dependence treatment during their medical school years. These results are consistent with previous reports from the GHPS and reports from medical students within the same geographical area (11). This indicates a persistent gap in medical school education in Lebanon and the neighboring countries that will make it difficult for the future physician to counsel patients in tobacco dependence. Although the majority of the students agreed that they should receive training in tobacco dependence, there is no evidence in the literature that this issue is addressed during medical education in the country and there are no interventions to address tobacco dependence among medical students. Waterpipe smoking among the students did not seem to result from inadequacy of information concerning the hazards associated with it or any misconceptions associated with harm and safety; however, there seems to be a
cultural factor associated with this form of smoking that overcomes all reasons. This emerging form of smoking like all forms of tobacco use is dangerous and needs to be addressed early in medical education.

*Important Findings from Predicting Intentions to Provide Tobacco Dependence Advice*

The intent of this study was to examine the current state of attitudes and practices with regard to providing tobacco dependence treatment by the medical students in future clinical rotations. The Theory of Planned Behavior (TPB) guided the development of this study. The TPB has been successfully used to predict a wide range of social behaviors, including health behaviors (12) and particularly a physician’s delivery of preventive services (12, 13, 14). This study examined the components of the TPB as they related to the delivery of tobacco dependence advice in future clinical rotations by the medical students and determined how they predicted their intentions to provide such a behavior. According to the TPB (15), attitudes, behavioral beliefs, social influences, and control over personal and external barriers must be strong for an individual to form an intention to provide tobacco dependence advice.

Attitudes and behavioral beliefs toward providing tobacco dependence advice were quite strong, indicating the strong beliefs in the medical student’s obligations in tobacco dependence advising. However, social influences, self-efficacy, and perception of control over external barriers to providing this service were only weak to moderate. Only attitude was a significant predictor of intention to provide cigarette and waterpipe dependence advice. In addition to attitude, behavioral beliefs and social norms were significant determinants of intention to provide waterpipe dependence advice but not
cigarette dependence advice. This is an indication that, except for attitude, these constructs of the TPB were not strong driving intention to provide cigarette dependence advice. Also, this indicates that there is may be a social identity associated with waterpipe smoking and not necessarily with cigarette smoking in this population rendering the social norms and the behavioral beliefs more significant predictors of intentions to provide advice for dependence on this form of smoking. Similar to our findings, previous studies focusing on explaining the variance in health professionals’ behavioral intentions have found promising results consistent with the importance of attitude as predictor of intention (16). These results indicate that interventions targeted to this group may focus primarily on improving attitudes toward tobacco dependence counseling in general. In addition, focusing on behavioral beliefs and social norms associated with providing waterpipe dependence advice may improve the outcome of intentions to provide such a service.

*Important Findings from MENA Medical Schools Survey*

In this study we attempted to estimate the extent to which schools in these regions teach students about tobacco and tobacco dependence treatment techniques, identify formats in which teaching is undertaken, and assess the inclusion of any topics relevant to emerging alternative tobacco use like the waterpipe. This is the first study to examine current tobacco teaching in medical schools of the Middle East and North Africa by directly contacting the school administration. Nearly 48% of the medical schools responded to the questionnaire. The findings of this study revealed that tobacco-related information is poorly integrated in the required curriculum and clinical experiences, and
some topics are absent from many required courses. The most common tobacco content taught in the medical schools curricula were the health effects of tobacco dependence (82.2%) and only 66.7% of the medical schools reported the inclusion of the topic of emerging waterpipe smoking in their curriculum as part of a required course or as a required course dedicated to tobacco related diseases. According to our results, medical students from the MENA countries are not adequately trained to help reduce the tobacco burden in the two regions, the most costly and preventable healthcare problem in the world. The WHO has recommended the use of medication for the treatment of tobacco dependence (17) and the Clinical Practice Guideline *Treating Tobacco Use and Dependence* recommends that all physicians use the tobacco dependence treatment techniques like the 5As (ask, advise, assess, assist, and arrange follow-up) to identify tobacco users and provide treatment and brief tobacco cessation intervention to every patient (17). Approximately 60% of the schools reported no required courses that integrate pharmacological therapy for tobacco dependence and nearly 80% reported no integration of clinical tobacco dependence treatment techniques. Also, behavioral intervention instructions for tobacco dependence treatment were briefly discussed in about half of the surveyed medical schools (50% for the stages of change construct and 56.7% for motivational interviewing); however, they were completely omitted from 23.3% of the schools. These findings are suggestive of a need to improve teaching that involves treatment strategies, effective communication strategies with patients, and counseling skills that will increase the competence of the future physician in reducing tobacco related diseases.
Medical students who lack applied clinical skills may be less likely to intervene with their patients and make tobacco dependence treatment referrals. Despite the fact that 78.9% of medical schools reported having a clinical setting in which students are taught tobacco dependence treatment techniques, the method of clinical skill training varied greatly between the schools. These various methods should be further investigated to determine the best teaching approach in the clinical setting. These findings may reflect the possibility that some programs have an established curriculum in tobacco control and have integrated some aspects of tobacco control into their course and/or clinical instruction. Unfortunately, the results also suggest that tobacco control has not been well integrated into most programs in the area.

Conclusion

There is evidence that health care providers can have a profound impact on the long-term success of patients trying to quit tobacco use. The U.S. Public Health Service’s gold standard, *Treating Tobacco Use and Dependence: Clinical Guideline* reported a strong relationship between clinician tobacco interventions and successful quitting (17). Many researchers in recent years have been investigating the importance of training health professionals in tobacco dependence and it has been recommended to train current providers through continuing education, and to train future providers in their educational settings (18). Given the disease burden of tobacco use in countries of the Middle East and North Africa, the emerging epidemic of the waterpipe and dangers associated with it, and current recommendations, a tobacco control curriculum should be an essential component of medical schools programs in the region as well as worldwide. Medical educators have
a unique opportunity to shape and guide future generations of medical students early in their medical education years. The barriers to providing comprehensive tobacco control education are possible to overcome and require planning and searching for suitable and culturally competent guidelines for every country by the medical schools and tobacco control groups.

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APPENDIX A: LETTER TO THE DEANS OF MEDICAL SCHOOL
Dear Dean of Medical School,

We are a team of researchers committed to control the worldwide tobacco epidemic. Part of our research interest is focused on the prevention of tobacco abuse and tobacco-related diseases. We recognize that this topic is posing a current challenge to medicine in all countries. However, interventions delivered by clinicians are known to have a great impact on smoking rates in a nation. For this reason, we think of smoking status of the physician and her/his competency in cessation methods as top priorities.

In an attempt to help reduce the tobacco burden, we are asking to kindly allow the collection of data on the prevalence of smoking among the third year medical students (If your institution follows the American system) or among students “one year before graduation” from all other systems of education, in addition to other information related to knowledge, attitude and perceptions towards tobacco use. The collected information will be used as dissertation material to fulfill the requirements for a doctorate degree in Public Health Epidemiology at The Ohio State University. Also, the collected data will be analyzed and used in scientific publications. The information will be collected in a survey format that will not take more than 20 minutes from your medical students. All surveys will be anonymous and all data collected will be reported aggregately without any indication to a specific medical school.

Your efforts in making this research possible are greatly appreciated. We will gladly share the results of this survey with you upon request. Please let us know if it will be possible to collect data at your medical school. We hope to meet with your student body very soon.
Sincerely,
Dear Student,

You have been asked to voluntarily participate in this survey. This is a national survey and is anonymous (you do not need to provide your name or any kind of identification). All questions are related to tobacco control and tobacco education and will be used for research purpose. We appreciate your cooperation in completing this questionnaire and your support for academic research. We value your commitment to high quality medical education. By filling this survey you agree to participate in this research project.

THANK YOU
Name of your school:

_______________________________________________________

Medical school year (Rank):

What is your Gender?

a. Male
b. Female

How old are you?

Education of father/man that raised you:

1. Illiterate
2. Primary
3. Intermediate
4. Secondary school
5. University and more

Education of mother:

1. Illiterate
2. Primary
3. Intermediate
4. Secondary school
5. University and more

Occupation of father:
Occupation of mother:

How much money do you get for your monthly spending (allowance) from all sources?

1. <$200
2. $200-$400
3. $400-$600
4. $600-$800
5. >$800

I. Tobacco Use and Prevalence among Medical Students

1. Have you ever tried or experimented with cigarette smoking, even one or two puffs?
   a. Yes
   b. No

2. How old were you when you first tried a cigarette?
   a. I have never smoked cigarettes
   b. Age 10 or younger
   c. Age 11-15
   d. Age 16-17
   e. Age 18-19
   f. Age 20-25
   g. Age 25-29
   h. Age 30 or older

3. During the past 30 days (one month), on how many days did you smoke cigarettes?

4. How soon after you awake do you smoke your first cigarette
5. Do you want to stop smoking cigarettes now?
   a. I have never smoked cigarettes
   b. Yes
   c. No

6. How long ago did you stop smoking cigarettes?
   a. I have never smoked cigarette
   b. I have not stopped smoking cigarettes
   c. Less than 1 month
   d. 1-5 month
   e. 6-11 month
   f. One year
   g. 2 years
   h. 3 years or longer

7. Have you ever smoked cigarettes in University buildings during the past year?
   a. I have never smoked cigarettes
   b. Yes
   c. No

8. Have you ever smoked a waterpipe?
   a. Yes
   b. No

9. How old were you when you first tried a waterpipe?
   a. I have never smoked waterpipe
   b. Age 10 or younger
c. Age 11-15

d. Age 16-17

e. Age 18-19

f. Age 20-25
g. Age 25-29

h. Age 30 or older

10. Which of the following choices best describes your relation to waterpipe smoking?

a. I have never smoked waterpipe

b. I have smoked waterpipe in the past (smoked it for at least 3 months but stopped)

c. I smoke waterpipe monthly (at least once a month but less than weekly)

d. I smoke waterpipe weekly (at least once a week but less than daily)

e. I smoke waterpipe daily (at least once a day, or on most days of the month)

11. Do you intend to quit waterpipe smoking?

a. I have never used waterpipe

b. Not at all

c. In the next month

d. In the next 6 months

e. In the future

12. During the past 7 days, on how many days have people smoked (cigarettes, waterpipe) where you live, in your presence?

a. 0 days

b. 1 to 2 days

c. 3 to 4 days

d. 5 to 6 days

e. All 7 days

13. During the past 7 days, on how many days have people smoked in your presence, in places other than where you live?
a. 0 days
b. 1 to 2 days
c. 3 to 4 days
d. 5 to 6 days
e. All 7 days

14. Does your school have an official policy banning smoking in school buildings and clinics?

   a. Yes, for school buildings only
   b. Yes, for clinics only
   c. Yes, for both school buildings and clinics
   d. No official policy

III. Attitudes/knowledge

15. Should tobacco sales (cigarettes and waterpipe) for adolescents (persons younger than 18 years old) be banned?

   a. Yes
   b. No

16. Should there be a complete ban of the advertising of tobacco products?

   a. Yes
   b. No

17. Should smoking be banned in restaurants?

   a. Yes
   b. No

18. Should smoking be banned in discos/bars/pubs?

   a. Yes
   b. No
19. Should smoking in all enclosed public places be banned?
   a. Yes
   b. No

20. Should physicians get specific training on cessation techniques?
   a. Yes
   b. No

21. Do physicians serve as “role models” for their patients and the public?
   a. Yes
   b. No

22. Should physicians routinely advise their patients who smoke cigarettes to quit smoking?
   a. Yes
   b. No

23. Should physicians routinely advise their patients who smoke waterpipe to quit smoking?
   a. Yes
   b. No

24. Are a patient’s chances of quitting smoking increased if a physician advises him or her to quit?
   a. Yes
   b. No

25. Are physicians who use tobacco less likely to advise patients to stop smoking?
   a. Yes
   b. No
26. Are physicians who smoke waterpipe or other tobacco products less likely to advise their patients to stop smoking?
   a. Yes
   b. No

27. What in your opinion are the health hazards of waterpipe smoking?

28. Which of the following in your opinion is true about cigarettes?
   a. Cigarettes are more harmful than waterpipe
   b. Cigarettes are equally harmful to waterpipe
   c. Waterpipe is more harmful than cigarettes

29. Which of the following in your opinion is true about waterpipe?
   a. Waterpipe is more addictive than cigarettes
   b. Waterpipe is equally addictive to cigarettes
   c. Cigarettes are more addictive than waterpipe

IV. Training

30. During your medical school training, were you taught in any of your classes about dangers of smoking?
   a. Yes
   b. No

29. During your medical school training did you discuss in any of your classes the reasons people smoke?
   a. Yes
   b. No

30. During your medical school training did you learn that it is important to record tobacco use history as a part of a patient’s general medical history?
31. During your medical school training did you learn that it is important to provide educational materials to support smoking cessation to patients who want to quit smoking?

a. Yes  
b. No

32. During your medical school training did you ever received any formal training in tobacco dependence approaches to use with patients

a. Yes  
b. No

33. Have you ever heard of using nicotine replacement therapy in tobacco dependence programs (such as nicotine patch or gum)?

a. Yes  
b. No

34. Have you ever heard of using antidepressants in tobacco dependence program (such as bupropion, clonidine, or Zybam)?

a. Yes  
b. No

35. Have you ever heard of using Varenicline in tobacco dependence?

a. Yes  
b. No
APPENDIX C: SCHEMATIC DISPLAY OF THE THEORY OF PLANNED BEHAVIOR CONSTRUCTS
Figure 1. The Theory of Planned Behavior
Within each medical school class, half the class will randomly get the waterpipe version of this part of the survey first and half will get the cigarette version first.

30. How often do you intend to provide smoking dependence advice in your clinical rotations to patients who smoke cigarettes/waterpipe? (Please circle one)

1. Never
2. Almost never
3. Very rarely
4. Rarely
5. Sometimes
6. About half the time
7. Frequently
8. Very frequently
9. Almost always
10. Always

31. A physician has an obligation to advise a patient to quit smoking cigarettes/waterpipe

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

32. A doctor’s visit is an ideal time for the patient to try to quit smoking cigarettes/waterpipe

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

33. All patients who smoke cigarettes/waterpipe should be given smoking dependence advice by a physician

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

34. Only patient who are ready to quit smoking cigarettes/waterpipe should be given smoking dependence advice by their physician

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

35. Patients with a non-smoking related illness should be advised to quit smoking cigarettes/waterpipe

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree
36. Offering a *cigarettes/waterpipe smoking dependence advice* will threaten the relationship between the physician and the patient

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

37. Offering *cigarettes/waterpipe smoking dependence advice* is a waste of the physician’s time

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

38. Offering *cigarette/waterpipe smoking dependence advice to patients would leave me with little time to do other patient care*

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

39. Offering *cigarettes/waterpipe smoking dependence advice* will would make me feel frustrated

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

40. My attending physician (chief resident) would want me to give the patient *cigarette/waterpipe smoking dependence advice* (Please circle one answer)

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

41. I would like to do what my attending physician thinks I should do when it comes to *cigarette/waterpipe smoking dependence advice* (Please circle one answer)

<table>
<thead>
<tr>
<th>Frequently</th>
<th>Often</th>
<th>Sometimes</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
</table>

42. My medical school policy dictates that I should give the patient *cigarette/waterpipe smoking dependence advice* (Please circle one answer)

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

43. I would like to follow my medical school’s policy when it comes to offering *cigarette/waterpipe smoking dependence advice* to a patient (Please circle one answer)

<table>
<thead>
<tr>
<th>Frequently</th>
<th>Often</th>
<th>Sometimes</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
</table>

44. Patients who smoke *cigarettes/waterpipe* would like their physician to *offer smoking dependence advice* (Please circle one answer)
45. I would like to do what my patient thinks when it comes to cigarette/waterpipe smoking dependence advice (Please circle one answer)

Frequently Often Sometimes Seldom Never

46. Knowledge of techniques and behavioral skills that are useful to provide cigarette/waterpipe smoking dependence advice to a patient

Strongly Approve Approve Neutral Disapprove Strongly Disapprove

47. Does knowledge of techniques and behavioral skills increase the likelihood that you provide cigarette/waterpipe smoking dependence advice

Strongly Increase Increase No Effect Decrease Strongly Decrease

48. I have adequate knowledge of pharmacological aids for cigarette/waterpipe smoking cessation

Strongly Approve Approve Neutral Disapprove Strongly Disapprove

49. Knowledge of pharmacological aids increase the likelihood to provide cigarette/waterpipe smoking dependence advice for my patients

Strongly Increase Increase No Effect Decrease Strongly Decrease

50. I am familiar with the positive effects of cigarette/waterpipe smoking dependence advice on my patient’s health

Strongly Approve Approve Neutral Disapprove Strongly Disapprove

51. Knowing the positive effects of cigarette/waterpipe smoking dependence advice on my patient’s health increases the likelihood of providing smoking dependence advice

Strongly Increase Increase No Effect Decrease Strongly Decrease

52. I am comfortable discussing cigarette/waterpipe smoking dependence with my patient

Strongly Approve Approve Neutral Disapprove Strongly Disapprove
53. Being comfortable with discussing \textit{cigarette/waterpipe smoking dependence with my patient} ------the likelihood of providing smoking cessation help

- Strongly Increase
- Increase
- No Effect
- Decrease
- Strongly Decrease

54. I have adequate time to discuss \textit{cigarette/waterpipe smoking dependence with my patient during a visit}

- Strongly Approve
- Approve
- Neutral
- Disapprove
- Strongly Disapprove

55. Having adequate time to discuss \textit{cigarette/waterpipe smoking dependence} with my patient----------the likelihood of providing smoking dependence advice

- Strongly Increase
- Increase
- No Effect
- Decrease
- Strongly Decrease

56. Most patients who smoke \textit{cigarettes/waterpipe} are open to receive smoking \textit{dependence advice}

- Strongly Approve
- Approve
- Neutral
- Disapprove
- Strongly Disapprove

57. For a patient to be open about \textit{cigarette/waterpipe smoking cessation counseling}------the likelihood of being able to \textit{provide smoking dependence advice}

- Strongly Increase
- Increase
- No Effect
- Decrease
- Strongly Decrease

58. Please rate your current skill level for advising a patient in cigarette/waterpipe smoking dependence

- Not at all Skilled
- Somewhat Skilled
- Moderately Skilled
- Very Skilled

END
APPENDIX E: TOTAL SCALES SCORES
<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of items in Scale</th>
<th>Mean</th>
<th>SE</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude Toward Behavior</strong></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterpipe Smoking</td>
<td></td>
<td>19.7</td>
<td>0.2</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Cigarette Smoking</td>
<td></td>
<td>20.5</td>
<td>0.2</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td><strong>Behavioral Belief</strong></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterpipe Smoking</td>
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<td>14.7</td>
<td>0.2</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Cigarette Smoking</td>
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<td>14.4</td>
<td>0.3</td>
<td>4</td>
<td>20</td>
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<tr>
<td><strong>Subjective Norm</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterpipe Smoking</td>
<td></td>
<td>4.9</td>
<td>0.8</td>
<td>-22</td>
<td>30</td>
</tr>
<tr>
<td>Cigarette Smoking</td>
<td></td>
<td>5.9</td>
<td>0.7</td>
<td>-9</td>
<td>30</td>
</tr>
<tr>
<td><strong>Perceived Behavioral Control</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterpipe Smoking</td>
<td></td>
<td>24.6</td>
<td>1.7</td>
<td>-15</td>
<td>60</td>
</tr>
<tr>
<td>Cigarette Smoking</td>
<td></td>
<td>24.3</td>
<td>1.8</td>
<td>-15</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 3.1 Calculations for Individual Scale Items, Total Scales Scores, and Ranges of Values
A Survey of Tobacco Dependence Treatment Curricula in Middle Eastern and North African Medical Schools

Question 1 - Open Ended
Please indicate the name of your medical school (the results of this survey will be used anonymously, the name of your school is needed only to avoid multiple responses and for regional classification)

For questions 2-5, please indicate which of the following topics are included in your school's tobacco cessation curriculum plan as a part of a required course, required as: 1) part of a required course, 2) a required course dedicated to tobacco related diseases, or 3) an elective course. Please mark "Not Offered" for any topic that does not apply to your curriculum. Some topics may be taught in several classes. Check all that apply.

Question 2 - Choice - Multiple Answers (Bullets)
Health effects of tobacco related diseases

☐ a. Part of a required course
☐ b. Required course dedicated to tobacco related diseases
☐ c. Elective course
☐ d. Not offered

Question 3 - Choice - Multiple Answers (Bullets)
High risk groups/groups with most difficulty quitting or increased risk to start cigarette or waterpipe smoking: for example adolescents, young adults, women, adolescent pregnant women, drug/alcohol dependent patients, and patients with psychiatric disorder.

☐ a. Part of a required course
☐ b. Required course dedicated to tobacco related diseases
☐ c. Elective course
☐ d. Not offered

Question 4 - Choice - Multiple Answers (Bullets)
Effects of passive smoking

☐ a. Part of a required course
☐ b. Required course dedicated to tobacco related diseases
☐ c. Elective course
☐ d. Not offered

Question 5 - Choice - Multiple Answers (Bullets)
Pharmacological agents: refers to nicotine replacement therapy and other drugs for smoking dependence treatment.
- a. Part of a required course
- b. Required course dedicated to tobacco related diseases
- c. Elective course
- d. Not offered

Question 6 - Choice - One Answer (Bullets)
Clinical smoking cessation techniques: Refers to the five A's (Ask, Advise, Assess, Assist, Arrange), relapse prevention, and reduction of automatic smoking.
- a. Part of a required course
- b. Required course dedicated to tobacco related diseases
- c. Elective course
- d. Not offered

Question 7 - Choice - One Answer (Bullets)
How much discussion of clinical intervention for tobacco cessation techniques is covered in your curriculum? (Mark only one)
- a. Not covered
- b. Covered briefly
- c. Covered in detail

Question 8 - Choice - Multiple Answers (Bullets)
In reference to the five A's: Ask, Advise, Assess, Assist, and Arrange; relapse prevention; reduction of automatic smoking.
How much is covered in your tobacco cessation curriculum? (Mark only one)
- a. Not covered
- b. Covered briefly
- c. Covered in detail

Question 9 - Choice - One Answer (Bullets)
Do you discuss the Transtheoretical Model (stages of change) theory by Prochaska and Di Clemente in your curriculum? (Mark only one)
- a. Not discussed
- b. Discussed briefly
- c. Discussed in detail

Question 10 - Choice - One Answer (Bullets)
How much discussion of motivational interviewing is covered in your curriculum? (Mark only one)
- a. Not covered
- b. Covered briefly
- c. Covered in detail

Question 11 - Yes or No
Does your curriculum provide information regarding the use of waterpipe (hookah, shisha, argileh) for smoking?
- Yes
- No

Question 12 - Yes or No
Does your curriculum provide any information regarding the use of smokeless tobacco?
- Yes
- No

Question 13 - Yes or No
Does your program offer a clinical rotation in addiction medicine that includes tobacco dependence treatment training?
- Yes
- No

Question 14 - Choice - Multiple Answers (Bullets)
How much does your curriculum cover nicotine replacement therapy for use in tobacco cessation settings?
- a. Not covered
- b. Covered briefly
- c. Covered in detail

Question 15 - Choice - Multiple Answers (Bullets)
How much does your curriculum cover antidepressant therapy (bupropion) for use in tobacco cessation settings?
- a. Not covered
- b. Covered briefly
- c. Covered in detail

Question 16 - Choice - Multiple Answers (Bullets)
How much does your curriculum cover Varenicline for use in tobacco cessation settings?

☐ a. Not covered
☐ b. Covered briefly
☐ c. Covered in detail

Question 17 - Choice - Multiple Answers (Bullets)
Does your curriculum provide a setting in which students are taught tobacco cessation techniques to use with patients in a clinical setting? (Mark only one)

☐ a. Not provided
☐ b. Provided in artificial setting (no actual setting)
☐ c. Provided in clinical setting with actual patients
☐ d. Provided in clinical setting with actual patients and students are evaluated on performance in the practice setting
☐ e. Other, please specify in the space below

Question 18 - Choice - Multiple Answers (Bullets)
If your school provides a curriculum in which students are trained in tobacco dependence, how do you evaluate their performance? (Check all that apply)

☐ a. One on one discussion
☐ b. Chart review
☐ c. Videotaped
☐ d. Other, please indicate in the space below

Question 19 - Yes or No
Does your school have an established tobacco dependence and education curriculum in place?

☐ Yes
☐ No
☐ If yes, please indicate in the space below in which year was the curriculum established?

Question 20 - Open Ended - One Line
Please indicate in the space below in which medical school year your students are taught tobacco cessation techniques.

END OF SURVEY — Thank you for completing this survey. We greatly appreciate your time.
APPENDIX G: LETTER TO THE ADMINISTRATOR OF THE MEDICAL SCHOOL
Dear Administrator of Medical School,

We are a team of researchers committed to control the worldwide tobacco epidemic. Part of our research interest is focused on the prevention of tobacco abuse and tobacco-related diseases. We recognize that this topic is posing a current challenge to medicine in all countries. However, interventions delivered by clinicians are known to have a great impact on smoking rates in a nation. For this reason, we think of smoking status of the physician and her/his competency in cessation methods as top priorities.

In an attempt to help reduce the tobacco burden, we are asking you to kindly participate in a survey about the tobacco education content of the curriculum of your medical school. The collected information will be used as dissertation material to fulfill the requirements for a doctorate degree in Public Health Epidemiology at The Ohio State University. Also, the collected data will be analyzed and used in scientific publications. The survey will not take more than 20 minutes from your time. All surveys will be anonymous (there will be no mentioning of your name or the name of your medical school) and all data collected will be reported aggregately without any indication to a specific medical school. This research has the potential to greatly impact the global public health efforts against the tobacco epidemic and advance education in tobacco related issues.

Your efforts in making this research possible and your contribution in advancing academic collaboration are greatly appreciated. We will gladly share the results of this survey with you upon request.