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Prevalence, Knowledge, Beliefs, and Attitude of Hookah (Waterpipe) Smoking among Health Care Students at a Southeastern Urban Research University

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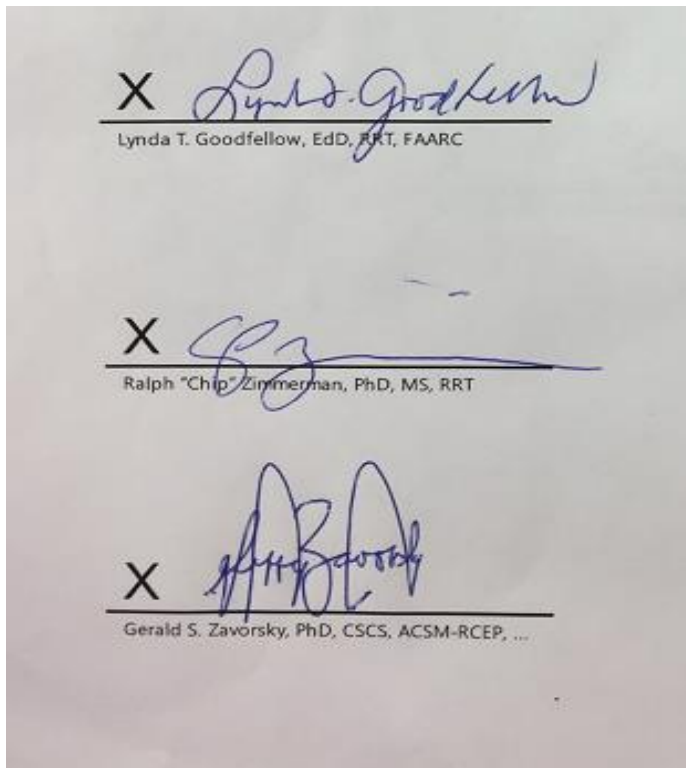
PREVALENCE, KNOWLEDGE, BELIEFS, AND ATTITUDE OF HOOKAH (WATERPIPE)
SMOKING AMONG HEALTH CARE STUDENTS AT A SOUTHEASTERN URBAN
RESEARCH UNIVERSITY

By

Mohammed Mesfer Alqahtani

Acceptance

This thesis, PREVALENCE, KNOWLEDGE, BELIEFS, AND ATTITUDE OF HOOKAH WATERPIPE) SMOKING AMONG CARE STUDENTS AT A SOUTHEASTERN URBAN RESEARCH UNIVERSITY, by Mohammed Mesfer Alqahtani, BS, was prepared under the direction of the Master's Thesis Advisory Committee of the Respiratory Therapy department at Georgia State University. It is accepted by the committee in partial fulfillment of requirements for the Master's of Science degree in Respiratory Therapy at Byrdine F. Lewis School of Nursing and Health Professions, Georgia State University. The Master's Thesis Advisory Committee, as representative of the faculty, certifies that this thesis has met all standards of excellence and scholarship as determined by the faculty.



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PREVALENCE, KNOWLEDGE, BELIEFS, AND ATTITUDE OF HOOKAH (WATERPIPE)
SMOKING AMONG HEALTH CARE STUDENTS AT A SOUTHEASTERN URBAN
RESEARCH UNIVERSITY

A thesis submitted By

Mohammed Mesfer Alqahtani

Presented in Partial Fulfilment of Requirements for the degree of

Master of Science degree

in

Health Sciences

with a

Concentration in Respiratory Therapy

Under the supervision of Dr. Lynda T. Goodfellow

in the

Byrdine F. Lewis School of Nursing and Health Professions

Georgia State University,

Atlanta, Georgia

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MOHAMMED MESFER ALQAHTANI, BS

(Under the Direction of Dr. Lynda T. Goodfellow)

ABSTRACT

Background: Waterpipe (hookah) smoking is gaining in popularity as a form of smoking tobacco. There is a noticeable increase in hookah smoking worldwide, among young adults. There is a growing body of literature that indicates that college students may not be as knowledgeable as should be in making decisions about smoking waterpipes.

Purpose: This study was performed to evaluate the prevalence, knowledge, attitudes and beliefs regarding hookah (waterpipe) use among college-based health care students.

Methods: Participants in this study were chosen based on their readiness and willingness to participate. The questionnaire was distributed by the researcher to graduate students through a link for a web-based survey. A paper copy was distributed in class to undergraduate students only. There were 319 college-based health care students who participated in this study from the following specialties: nursing, physical therapy, respiratory therapy, occupational therapy and nutrition. Data were analyzed using descriptive statistics.

Results: Respondents have used or tried hookah (waterpipe) smoking before (n=156, 49%), while the majority of students who have not tried or used the hookah smoking (n=163, 51%). Students were able to identify health hazards that might result from hookah smoking, for example cancer (n=258, 80.9%), respiratory problems (n=308, 97%), cardiovascular impairments (n=202, 63%), hematological impairments (n= 98, 31%), harm during pregnancy (n=214, 67%), and diarrhea (n=37, 11.6%) as potential health hazard. This study showed that 187 students (58.6%) believed that cigarette smoking is more harmful than water pipe smoking due to the false beliefs that they have. There was also general disagreement regarding students' attitudes and opinions about waterpipe smoking. Finally, this study showed the reasons why students engage in hookah smoking; for example, (241, 75.5%)of the students reported that the reason for water pipe smoking is an increased opportunity to smoke a water pipe in cafes, etc. Also, students said other reasons like flavor/aroma of Hookah itself (219, 68.7%), and utility of water pipe in leisure & pleasure activities (217, 68%).

Conclusion: This study showed that the prevalence of hookah (waterpipe) smoking is common among students in health care especially in young adults. Further studies are needed to ask more students and at different institutions. Finally, we recommended conducting educational campaigns to increase students' knowledge and awareness and to correct the wrongs beliefs and attitudes.

Signature Thesis

KEY WORDS: Waterpipe, Hookah, Smoking, Knowledge, Beliefs, Attitudes, Students, College Students, Health Care

DEDICATION

I will start off by thanking my god for all the blessing in my entire life, I could not have done this without my god's guidance. I am also grateful to my parents who supported me. My father I have accepted and realized your death, but I want to say "you are still alive in my brain and my heart, I will not forget all of moral principles that you taught us with my brothers and sisters. My mother "if I used all good words and if I gather all the books to impress my gratitude and my gratefulness, I am sure that all of these books will not satisfy my inner desire to thank you, you have been sick for two years, but you cannot imagine the hard time that I am suffering since I am away, I know that you want me to succeed and achieve my dreams and my success is your success, mom your picture exist in my mind everywhere , every time in my dreams and I would love if I sacrifice my health , and everything that is precious to me to return all of what you have done to me. I love you mother, and I am grateful for teaching me how to respect, dream, love, and trust.

My brothers, thank you so much for your enormous support. I am very proud of you and I am sure that my success is your success and I will do all impossible means to make you happy and proud. My old brother Hussain, I thank you for your tremendous help, support, and thank you for your empowerment, and encouragements to make my dreams come true. Also, I would thank your wife and your daughters and son (Taif, Fajr, Hammod) for their sincere support since I was doing undergraduate study.

Lastly, I would like thank all my sisters from bottom of my heart for their ultimate support and inspirations. I have had rough time and you were the first supporter and advocates. You were rescuers during my tough time and I appreciate every single second that you spent advocating me.

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CHAPTER I

Introduction

Tobacco smoking is one of the most atrocious problems in the world today. It accounted for 100 million deaths in the 20th century, and this outweighs the deaths from World War I and II together (Eriksen, MacKay, & Schluger, 2015). Waterpipes are the first new tobacco product of the 21st century. It originated in the Middle East and it is currently spreading throughout Europe and the United States (TREND, 2007). Waterpipe smoking is considered a threat to human health, and it is known by three primary names: hookah, narghile, and shisha (Chaouachi, 2006).

The use of a waterpipe is emerging on one of the most common methods for smoking tobacco both in the United States and internationally (Cobb, Ward, Maziak, Shihadeh, & Eissenberg, 2010). For example, researchers surveyed 105,000 US university students and found that 30.5% of them had tried smoking tobacco through a waterpipe (Primack et al., 2013). In Lebanon, waterpipe smoking varied from 21% to 45% among students (Saade, Warren, Jones, & Mokdad, 2009); and another study conducted in Jordan surveyed 1,845 students which showed that between 30% to 56% had smoked tobacco through a waterpipe (Khabour et al., 2012). Moreover, another study conducted in the United Kingdom showed 66% of students at six universities had tried waterpipe tobacco smoking (Jawad et al., 2016). Also, another study conducted in Australia in 2004 reviewed 1102 Arabic speaking adults, and found that 11.4% of the sample were waterpipe smokers (Maziak et al., 2015).

Smoking a waterpipe has negative impacts on our health. For example, smoking waterpipe can dramatically increase the level of carbon monoxide poisoning (Lim, Lim, & Seow, 2009). Waterpipe smoking also decreases the forced expiratory volume in the one second (FEV1) by 4 % and decreases the forced vital capacity (FVC) by one percent (Raad et al., 2011).

Moreover, waterpipe smoking has been linked to lung cancer, respiratory diseases, low birth weight, periodontal disease, bladder cancer, nasopharyngeal cancer, esophageal cancer, oral dysplasia, infertility, and hepatitis C infection (Akl et al., 2010). Most smokers believe that using a waterpipe is less dangerous than cigarette smoking because the water filter and hose eliminate the harmful products that can be found in the waterpipe (Berg et al., 2015). Health care professional programs lack some of the essential health promotion sessions of tobacco use and cessation, for instance in the US more than 90% of respiratory therapy programs don't teach or educate their students about tobacco use and cessation, and more than 40% of the programs do not assess their students' capability to deliver smoking cessation advice to patients (Jordan, Khubchandani, Wiblishauser, Glassman, & Thompson, 2011). Health care students should have the knowledge, attitudes, and beliefs of the harmful properties of Waterpipe smoking. For this reason, a good foundation about the impact of waterpipe smoking, through education must be provided in schools before students enter the clinical profession and have direct contact with patients who use waterpipe. This should have a direct and positive impact in preventing students from trying tobacco smoking through the waterpipe.

Constituents of Waterpipe Smoke

Waterpipe smokers inhale the smoke from shisha—a semi-solid mixture of molasses and tobacco, often infused with other flavors—which is burned by using charcoal (see figure 1). When they inhale through the mouth piece, the air goes through the waterpipe mixture, and this air is heated by charcoal to yield smoke. As a result, this smoke encompasses products from both the tobacco mixture and the charcoal, which could include polycyclic aromatic hydrocarbons (PAH), volatile aldehydes, CO, nitric oxide (NO), nicotine, furans, and nanoparticles (Kadhun, Sweidan, Jaffery, Al-Saadi, & Madden, 2015). Moreover, both tobacco and tobacco-free

molasses have high levels of PAH which can cause cancer (Sepetdjian, Saliba, & Shihadeh, 2010).

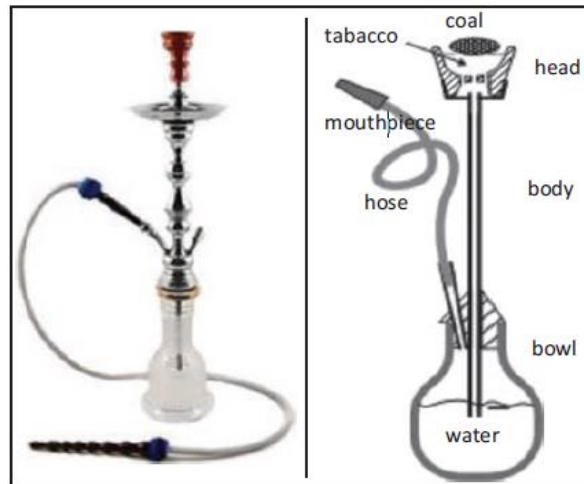


Figure 1. The hookah (Waterpipe) apparatus (left) and a labeled schematic of the main parts (right) (Kadhum et al., 2015).

Tobacco Cessation Education in Health Care Programs

Health care students are aspiring health care professionals who may encounter patients who have cardiopulmonary as a result of tobacco smoking. Many don't have sufficient knowledge to educate and explain to patients the negative effects of tobacco products, such as smoking a waterpipe. Health care programs should incorporate tobacco cessation education programs into their curriculum to enable their graduates to attain the necessary knowledge and skills to treat and advocate people who use and depend on tobacco.

Statement of Problem

The increasing practice of waterpipe smoking use among young adults indicates the importance of performing research on this population. Waterpipe smoking is increasing among adults and this increase should be addressed. The prevalence, knowledge, attitudes and beliefs,

and the reasons for waterpipe smoking among college-based health care students are unknown and more research is needed.

Purpose of Study

The purpose of this study was to evaluate the prevalence, knowledge, beliefs, and attitudes/opinions regarding waterpipe use among college-based health care students. The research questions addressed were:

1. What was the prevalence of hookah (waterpipe) smoking among college - based health care students at a Southeastern Urban Research University?
2. What was known about hookah (waterpipe) smoking among college - based health care students at a Southeastern Urban Research University?
3. What were the beliefs of hookah (waterpipe) smoking among college- based health care students at a Southeastern Urban Research University?
4. What were their attitudes/opinions about hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?

Significance of Study

Health care students play an important role in health care. This study is significant because health care students can promote better health by providing educational sessions about the negative effects of waterpipe smoking. These sessions can be done in the hospital with patients who have health issues due to waterpipe smoking or at a college/university with students who are in non-health care majors. College-based health care students should have adequate knowledge, appropriate attitudes, and beliefs to help current waterpipe smokers to quit and to prevent the students from initiating waterpipe smoking. They should also be aware of the

harmful effects of this type of smoking and be able to educate people in an effective and scientific manner about the detrimental effects of water pipe smoking. Health care students should have more knowledge about waterpipe smoking than students in other specialties. Also, this study is needed because students have little awareness and education about the harmful effect of smoking waterpipe. This will show the importance of education about waterpipe smoking being included in the curriculum and at conferences. This study is very significant and its significant lies in its ability to provide information regarding prevalence of waterpipe smoking among the college-based health care students and their knowledge, beliefs, attitudes, and reasons of waterpipe smoking.

Summary

Smoking waterpipe is a popular way to smoke tobacco these days. There is a noticeable increase of waterpipe smokers worldwide especially among young adults. Some of college - based health care students are susceptible to waterpipe smoking because they lack the knowledge and have misinformed attitudes and beliefs. Health care based students are the future clinicians who will treat people who have health problems as a result of waterpipe smoking. Furthermore, health care program should prepare their students to be alert to the negative impact of tobacco water pipe smoking. It is important that these students obtain the appropriate knowledge, attitudes, and beliefs through their involvement in educational programs.

Defenition of Terms

CO: Carbon Monoxide

NO: Nitric Oxide

PAH: Polycyclic aromatic hydrocarbons

FEV1: Forced expiratory volume in the first one second

FVC: Forced vital capacity

CHAPTER II

REVIEW OF THE LITERATURE

The literature review was performed by searching in PUBMED, Cochrane, CINAHL, and EBSCO databases using the terms “Perception” or “Attitudes to Health” or “Health Knowledge, Attitudes, Practice” and “Universities” or “Schools” or “Schools, Health Occupations” or “Schools, nursing” and “Smoking” and “Hookah” or “Water Pipe” or “Shisa” or “Water pipe” or “Narghile,” and there were approximately 45 articles spread over the last 10 years. However, when the term “Respiratory Therapy”, ‘Nursing “,” Physical Therapy “,” Nutrition”, “Occupational Therapy “were used with the aforementioned keywords, the results revealed no publications in PUBMED and no publications in CINAHL. Moreover, when the same keywords were used with “Tobacco Products/Adverse Effects,” the search found 1557 publications. Most of the articles that were reviewed did not mention the study specialties involved in the study; however, some articles mentioned some of the perceptions and knowledge about waterpipe smoking in other health care areas such as dentistry, nursing, physical therapy, and medical school. This chapter reviews health issues with waterpipe smoking and the literature related to the following questions:

1. What was the prevalence of hookah (waterpipe) smoking among health care students at a Southeastern Urban Research University?
2. What was known about hookah (waterpipe) smoking among college - based health care students at a Southeastern Urban Research University?
3. What were the beliefs of hookah (waterpipe) smoking among college- based health care students at a Southeastern Urban Research University?

4. What were their attitudes/opinions about hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?

Health Issues with Water-Pipe Smoking

One of the preventable causes of deaths is tobacco smoking. It can cause approximately 443,000 deaths per year and approximately \$96.8 billion losses in productivity per year (Adhikari, Kahende, Malrcher, & Asman, 2009). Conventional cigarettes (CC) or non-cigarette tobacco (NCT) products like e-cigarettes and water pipe tobacco are presently becoming popular in many different parts of the world (Warren et al., 2008). Waterpipe smoking is widely known to approximately a billion people around the world. It is estimated that there are 100 million waterpipe smokers throughout the world (Wolfram, Chehne, Oguogho, & Sinzinger, 2003). Smoking can jeopardize human health due to carrying risks of various diseases such as lung cancer, respiratory diseases, and heart disease (Akl et al., 2010).

Waterpipe smoking has similar effects to cigarette smoking. It can increase heart rate and blood pressure (Eissenberg & Shihadeh, 2009) It is known to increase heart rate and blood pressure after waterpipe tobacco smoking (WTS) sessions similar to conventional smoking (Kim, Kabir, & Jahan, 2016). Tobacco products can have negative effects on the heart, increasing the incidence of acute myocardial infraction (Teo et al., 2006). Waterpipe smoking (WPS) can alter vascular function by increasing vascular resistance and decreasing blood flow (Alomari, Khabour, Alzoubi, Shqair, & Stoner, 2015). Length of exposure to waterpipe smoking is associated with the incidence of acute coronary disease. One study conducted at the American University of Beirut showed that lifetime exposure exceeding 40 WP-years was linked to a triple increase in the odds of developing severe coronary artery stenosis—more than 70% compared to nonsmokers (Sibai et al., 2014). Researchers conducted another study in vitro explaining the

impact of waterpipe smoking on the endothelial cell function: waterpipe smoking induces endothelial dysfunction by applying oxidative stress and inflammation while impairing the endothelial vasodilatory function of repair mechanisms, thereby leading to vascular diseases (Rammah, Dandachi, Salman, Shihadeh, & El-Sabban, 2013). The exposure time of waterpipe smoking is about 9 times longer than cigarette smoking (45 minutes versus 5 minutes), and it can lead to 1.7 times the nicotine exposure time of cigarette smoking (Eissenberg & Shihadeh, 2009).

Waterpipe smoking can have a negative effect on the respiratory system. It can lead to increased respiratory rate, alter the normal functioning of the lungs, lead to chronic obstructive lung disease (COPD), and cause acute exacerbation of asthmatic patients (El-Zaatari, Chami, & Zaatari, 2015). Waterpipe smoking can have a negative effect on the normal spirometry of lungs. One study conducted by Ben-Saad et al. (2009) in Sousse, Tunisia included 110 subjects who smoke hookah and found that 36% of subjects had static hyperinflation, 14% had small obstructive ventilatory defects, and 6% had large obstructive ventilatory defects. Moreover, El-Zaatari et al. (2015) noted that exposure to waterpipe smoking increased dyspnea, as measured by the Borg scale at mid to peak exercise. Waterpipe smoking can increase carboxyhemoglobin levels more than cigarette smoking, and it can produce polycythemia (El-Zaatari et al., 2015). Furthermore, different studies performed in Syria, UAE, China, and Lebanon showed an association between waterpipe smoking and COPD (El-Zaatari et al., 2015). It can increase airway resistance, lung inflammation, and oxidative stress (El-Zaatari et al., 2015).

One systemic review of six trials showed that water pipe smoking can double the risk of lung cancer (OR = 2.12, 95% CI 1.32-3.42) (Fakhreddine, Kanj, & Kanj, 2014). Another study performed in Kashmir found that waterpipe smoking was correlated with a six-fold higher risk of compared to nonsmokers (Koul et al., 2011). Al-Amad, Awad and Nimri (2014) found that regular waterpipe smoking was correlated with an average decrease in age of diagnosis of 16.44

years compared with nonsmokers (95% CI, -26.33 to -6.55). Likewise, occasional waterpipe smokers were diagnosed on average 11.79 years younger than nonsmokers (95% CI, -23.29 to -0.27). Another cohort study, conducted in Iran, supported a correlation between waterpipe smoking and gastric cancer (OR=3.4, 95% CI 1.7 to 7.1) (El-Zaatari et al., 2015).

Waterpipe smoking carries with it the risk of transmitting infectious diseases, including hepatitis, herpes, and tuberculosis, because smokers share the mouthpiece and smoke as a group (Kadhun et al., 2015). One study found that sharing a marijuana waterpipe was associated with the transmission of tuberculosis among a group of young Caucasian males in Queensland, Australia (OR 2.22, 95 % CI 0.96-5.17) (Munckhof, Konstantinos, Wamsley, Mortlock, & Gilpin, 2003). Poor cleanliness, inadequate cleaning of the water pipe, lack of awareness among the public, and that fact that some hookah bars are not mandated to change the mouthpiece are other issues that can contribute to the transmission of respiratory diseases (Daniels & Roman, 2013).

Waterpipe smoking can have harmful effects on pregnant women. The fetus may be susceptible to intrauterine fetal growth reduction, resulting in low weight, a low Apgar score, and respiratory failure due to the mother's exposure to carbon monoxide during pregnancy (Blachman-Braun, Del Mazo-Rodríguez, López-Sámamo, & Buendía-Roldán, 2014). Waterpipe smoking can also affect the markers used for diagnosing Down's syndrome during the first trimester of pregnancy (El-Zaatari et al., 2015).

The addictive properties of waterpipe smoking have been less examined. Waterpipe smokers have a higher probability of addiction for several reasons including; chemical characteristic of smoke, frequency of smoking, length of smoking, tobacco type, and amount of smoke being inhaled (Blachman-Braun et al., 2014). There was one meta-analysis completed by Neergaard, Singh, Job, and Montgomery (2007) which showed a 24-hr urinary nicotine level of

0.785 µg/ml (95% CI = 0.578–0.991 µg/ml), which is a nicotine absorption rate equal to smoking 10 cigarettes/day (95% CI = 7–13 cigarettes/day). Moreover, there are one study performed to evaluate daily nicotine and carcinogen exposure for thirteen people who experienced cigarette smoking and waterpipe. Those samples experienced three waterpipe sessions and smoking 11 cigarettes per day, the results of this study showed that waterpipe smoking was related to a significantly lower intake of nicotine, a different pattern of carcinogen exposure in comparison to cigarette smoking, and greater exposure to carbon monoxide (CO) (Jacob Iii et al., 2013).

Prevalence, knowledge, attitude, and beliefs of WPS among College Students

Waterpipe use is increasing dramatically today. Some smokers use the waterpipe for two reasons: first, some smokers believe that waterpipe is safer than cigarettes; and secondly; some prefer to smoke waterpipe because it contains “ma’assel” which adds a sweetened flavor to tobacco, and that’s why the waterpipe smoker enjoys smoking. Moreover, there are different types of flavor that can be used with waterpipe smoking like strawberry, vanilla, and tutti-frutti (Braun, Glassman, Wohlwend, Whewell, & Reindl, 2012). Also, Blachman-Braun et al. (2014) mentioned that some teenagers believe that smoking water pipe will make them more mature and have sense of belonging. Smokers often smoke with friends and family for socializing purposes and they share the same waterpipe. There are several reasons why waterpipe smoking is prevalent among college students. For instance, they use it for its socialization aspect, its flavor, and for relaxation (Holtzman, Babinski, & Merlo, 2013). Another reason for water pipe smoking is glorified social media and on the Internet. Some of programmes have included social activities with waterpipe smoking and are widely dispersed. The evolution of the internet facilitated the online searching for the water pipe products for home use and facilitated searching for water pipe

café and lounges as well. The inadequacy of waterpipe specific regulations and control has led to the spread of waterpipe smoking globally (Maziak et al., 2015).

Waterpipe smokers are mostly young adults from age of 18-24 years old (King, Dube, & Tynan, 2012). College students are more likely to smoke waterpipe than cigarettes among a random sample in 5 cities in the United States (Lee, Bahreinifar, & Ling, 2014). College students have an incorrect perception regarding waterpipe smoking side effects. Some students display wrong attitudes, perceptions, lack of awareness, incorrect beliefs and knowledge about waterpipe smoking. For example, one study that surveyed 744 undergraduate students indicated that 20% of them had engaged in water pipe smoking (Eissenberg, Ward, Smith-Simone, & Maziak, 2008). Another study, looked at 3,770 undergraduate students from eight universities and found that 40% of them had smoked a waterpipe and 17% of them had smoked one in the last 30 days (Sutfin et al., 2011). Another study involved 943 students: 98.7% of them were undergraduates and 1.3% were graduate students. These researchers found that 42.9% of the students had smoked waterpipe and that many of them considered that smoking waterpipe was less harmful to their health and less addictive in comparison to cigarette smoking (Holtzman et al., 2013). Moreover, in another study including 143 students in an undergraduate introductory psychology class discovered that 48% of the students had smoked a waterpipe at least once in their lives, and 22% of the students had smoked a waterpipe in the past 30 days. It was also noted that most of the students believed that smoking waterpipe had less harmful effects than cigarettes demonstrated by the fact that 85 participants (60.7%) said that switching from cigarette to waterpipe smoking would lessen the negative health effects associated with hookah smoking (Heinz et al., 2013). A University of Michigan study using undergraduate and graduate students (N = 241) found that 60% of the students believed that waterpipe smoking was less addictive than cigarette smoking, and that 30% of the students believed that water pipe smoking was less

harmful than cigarette smoking (Noonan & Patrick, 2013). In a study in 2012, researchers included 478 students to assess the students' knowledge and perceptions about waterpipe smoking. They found that 74.6% of students considered the waterpipe harmful to health, 12.6% considered the waterpipe not harmful, and 12.8% were unsure about its negative effects. In addition 50.6% of the students thought that cigarette smoking was more risky than waterpipe smoking (Rahman, Chang, Hadgu, Salinas-Miranda, & Corvin, 2013). In a study performed with 316 college students, researchers examined the students' knowledge of facts and perceptions related to smoking waterpipe, including its risks, associated harm, and addiction. For a factual question about the amount of toxins a 45-minute waterpipe tobacco session delivered or produced compared to a 5-minute cigarette smoking session, only 37% of the participants gave the correct answers (Lipkus, Eissenberg, Schwartz-Bloom, Prokhorov, & Levy, 2014). In another study researcher randomly selected 852 students and found that 39% of the participants had smoked waterpipe tobacco at least once, 14% were current waterpipe tobacco smokers, and 28% of them had smoked in the past year. Furthermore, the researchers asked these participants five factual knowledge items to assess their knowledge about the harmful effects of waterpipe and the associated toxins and found that 475 (55.8%) of the students gave incorrect answers, implying that the students lacked knowledge about the harmful effect of smoking waterpipe (Nuzzo et al., 2013).

Parents must also be aware of the negative impacts of waterpipe smoking. In one study focusing on the parents of college students, researchers performed 44 telephone interviews and found that parents lacked awareness and knowledge about the harmful effects of waterpipe smoking. Meanwhile, parents are considered a trusted source of information, and they should be aware of the harmful effects of waterpipe smoking (Calvanese, Bingham, Martinasek, & Friesen, 2015). Martinasek, Gibson-Young, and Forrest (2014) studied 36,578 high school students in

2012. They looked at the common misconception and perception that smoking waterpipe is less harmful than cigarette smoking—especially focusing on asthmatic students who smoked waterpipe, and also there was association between students who have ever smoked waterpipe and life time asthma a ($\chi^2 = 19.45, p < .01$). Another study by Abughosh, Wu, Rajan, Peters, and Essien (2012) emphasized how adequate knowledge and perceptions gave the students who were waterpipe smokers the motivation and intention to quit smoking. This study surveyed 276 students and it found that 83% (227) of them were not planning to quit smoking, whereas 5.1% of the students were planning to quit because they were more knowledgeable about the harmful effects of waterpipe smoking.

Summary

Waterpipe tobacco smoking is increasing in prevalence globally. In the United States for example ,research demonstrates that 10–20% of the young adult are recent waterpipe users(Cobb et al., 2010). It has been estimated that there was one student among five American students who have a history of waterpipe smoking in the past year. Also, there were many studies which showed that most college students believe waterpipe smoking is less harmful and more acceptable by society than cigarette use (Grekin & Ayna, 2012). Knowledge about the harmful and addictive effects of waterpipe smoking plays an important role in waterpipe smoking prevention and intervention. Also, health warnings, limitations to young adult access, prohibition of advertisements, and waterpipe flavoring, implementation of tobacco taxation, and strict clean indoor environment can help to regulate and control waterpipes which can result in limiting waterpipe smoking’s spread (Maziak et al., 2015).

Defenition of Terms

COPD:Chronic Obstructive Lung Disease

UAE:United Arabi Emirates

US: United States

WP:Waterpipe

WPS:Water pipe smoking

WTS: Waterpipe tobacco smoking

CHAPTER III

Methods

This chapter will discuss the methods used to answer the following research questions:

1. What was the prevalence of hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?
2. What was known about hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?
3. What were the beliefs of hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?
4. What were their attitudes/opinions about hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?

Instrumentation

The instrument used in this study was established from two surveys; one from Holtzman (2013) to evaluate the student knowledge and attitudes toward waterpipe usage among university students, and the second survey was developed by Jawaid (2008) to study the awareness, perceptions, and practice of university students with regard to waterpipe smoking. Permission from both survey investigators was obtained to modify and use each survey in this study (Appendix A). After a review of many surveys, these two surveys were found to be appropriate to use with college-based health care students. Part of Holtzman's survey was used to evaluate the prevalence of use and characteristics of waterpipe smokers. Also, part of Jawaid's survey was used to assess the knowledge, beliefs, and attitudes/opinions of health care students. There were two sections to the survey instrument; first section contained questions that assessed four subsets: the prevalence of use, knowledge, beliefs, and attitudes /opinions. The second part of the

survey contained questions related to demographic characteristics like age, gender, education status (first year, second year), profession, ethnicity, and religion (Appendix B).

Sample and Research Design

The sample for this study was a convenience sample. The participants were chosen based on their readiness and willingness to participate. The inclusion criteria included the following undergraduate and graduate students: respiratory therapy, physical therapy, nursing, occupational therapy, and nutrition. The exclusion criteria excluded the students who were in PhD programs, students who were bridging from associate to bachelor programs, and part time students.

This study was a descriptive, exploratory study. This represents a cross sectional study that represented the population through collecting the students' data at one time-point during the spring semester for each class with a self-reporting questionnaire.

Data Collection

The questionnaire was distributed to the participants by the researcher. There was a web-based survey and it was sent to graduate students and there was a paper copy distributed in class to the undergraduate students. The questionnaires were distributed at the end of a pre-arranged class and the researcher requested from the professor take leave before distribution of the surveys to avoid any bias. The researcher sent an invitation email to the class introducing the study at least one week before the researcher distributed the questionnaire, and he sent an invitation email to the graduate students at least one week before sending the online form of the questionnaire (Appendix C). Regarding the data collection, the researcher clarified to the students the goals of his research and

stressed that their participation is not mandatory. They were informed that they have the right to refuse to participate and withdraw from this study at any time. The questionnaire packets contained an informed consent and the instrument questionnaire. The surveys were distributed by the researcher to all participants. All students' data were confidential and anonymous after participants finished the surveys.

Protection of Human subject

The research proposal was approved by the Georgia State University Institutional Review Board. The study ensured that all the students' rights were protected and reserved. There were no names obtained in this study. Also, there were no risks that resulted from participation in this study. The researcher maximized confidentiality within the data from the students.

Invitation Letter

An invitation letter was sent to ask the students to participate in the study. The invitation letter was emailed to all the assigned sample at least one week before the data collection. After the researcher read several invitation letters, the invitation letter was written(Appendix C).

Informed Consent

Informed consent was obtained before the participants answered the questionnaire. Also, the same invitation letter was sent to the students at one week before conducting the study. Before the participants started answering the questionnaire, they were asked to agree to participate in answering it, and that allowed them to proceed to answer the questionnaire once they marked the agree sign, and those who refused to participate in this study, they turned in the questionnaire without answering any question

from these questionnaires. Moreover, those who received the online version of these questionnaires and did not want to participate in this study pressed “I don’t agree” sign without completion of the survey(Appendix D).

Data Analysis:

Once all data was collected, statistical program Statistical Package for the Social Sciences (SPSS) version 22 was used for the data analysis. Descriptive statistics like the mean, standard deviation, frequency, and the percentage of respondents were calculated to obtain the prevalence of use among college based -health students, knowledge, attitudes and beliefs of hookah smoking. The chi-squared test χ^2 was used to compare the difference in the prevalence of waterpipe smoking based on different demographic factors like age, gender, different educational levels, ethnicities, and religions. The significance for this test were based on a p value of < 0.05 .

Summary

This chapter summarizes the major points about the sample, the method for data collection, and the analyze the data. The goal of this study was primarily to measure the prevalence of use, knowledge, attitude, and beliefs toward hookah smoking among college -based health care students who were taking their undergraduate or graduate study. This study involved the first and the second year of college based health students, and the graduate students who were seeking their degree in the following specialties including; respiratory therapy, occupational therapy, nursing, physical therapy, and nutrition.

Chapter IV

RESULTS

The primary aim of this chapter was to demonstrate the prevalence, knowledge, beliefs, and attitude of waterpipe smoking among college -based health care students. Undergraduate and graduate students were included in this study, and their demographic data were statistically analyzed and presented in this chapter. The following research questions were answered in this study:

1. What was the prevalence of hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?
2. What was known about hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?
3. What were the beliefs of hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?
4. What were their attitudes/opinions about hookah (waterpipe) smoking among college-based health care students at a Southeastern Urban Research University?

Description of Sample:

This study was performed in a southeastern urban research university, the researcher included students who agreed to participate in this study from four different specialties in the college of nursing and health professions including the graduate and undergraduate students. The total number of respondents in this study was 319. The undergraduate students were (n=185, 58) vs graduate students (n=134, 42%). Most of the respondents in this study were nursing students (n=105, 32.9%), and they were followed by respiratory therapy students (n=79, 24.8%), physical therapy (n=66, 20.7%), nutrition (n=48, 15.0%) and occupational therapy (n=21, 6.6%). There

were (n=76, 23.8%) male and (n=243, 76.2) female (See Table 1).

TABLE (1): DEMOGRAPHICS CHARACTERISTICS OF THE SAMPLE POPULATION

Age	N (%)
▪ 18- 25	201 (63%)
▪ 26-30	60 (18.8%)
▪ 31-39	39 (12.2)
▪ 40	19 (6.0)
Gender	N (%)
▪ Male	76 (23.8%)
▪ Female	243 (76.2%)
Education Status	N (%)
➤ First Year in The Program Under Graduate Student (Junior)	96 (30.1%)
➤ Second Year in The Program Under Graduate Student (Senior)	89 (27.9%)
➤ First Year Graduate Student	83 (26.0%)
➤ Second Year Graduate Student	51 (16.0%)
Educational Profession	N (%)
➤ Nursing	105 (32.9%)
➤ Nutrition	48 (15.0%)
➤ Occupational Therapy	21 (6.6%)
➤ Physical Therapy	66 (20.7%)
➤ Respiratory Therapy	79 (24.8%)
Ethnicity	N (%)
➤ Asian	46 (14.4%)
➤ African American	86 (27.0%)
➤ Hispanic or Latino	20 (6.3%)
➤ Native Hawaiian or Other Pacific Islander	1 (.3%)
➤ White	153 (48%)
➤ American Indian	1 (.3%)
➤ Middle Eastern	12 (3.8%)
Religion Affiliations	N (%)

▪ Christian	211 (66.1%)
➤ Jewish	4 (1.3%)
➤ Muslim	22 (6.9%)
➤ Buddhist	7 (2.2%)
➤ Atheist	20 (6.3%)
➤ Prefer not to Answer	40 (12.5%)
➤ Others	15 (4.7%)
N=319	

The Prevalence of Hookah (Waterpipe) Smoking

The first question of this study was aiming to identify the prevalence of waterpipe smoking using among college of health profession students. This study showed that (n=156, 49%) of the respondents have used or tried the waterpipe smoking before, while there are (n=163, 51%) respondents who have not tried or used the waterpipe smoking before. This part of this survey described characteristics of those who used or tried the hookah before; for instance, (n=94, 60.3%) respondents out of 156 smokers less than once a year. Furthermore, most of the respondents who smoked waterpipe were 19-21 years old (n=51 out of 156, 33%) when they first used waterpipe to smoke tobacco. Finally, this study showed that approximately two third of respondents were in a café or restaurant (n=101, 64.7%) when they first used waterpipe to smoke tobacco (See Table 2).

TABLE (2): CHARACTERISTICS OF WATER PIPE USERS

How often you smoke tobacco using a water pipe	N (%)
▪ At less than once a year	94 (60.3%)
▪ At least once a year, but not monthly	50 (32.1%)
▪ At least once a month, but not weekly	9 (5.8%)
▪ At least once a week, but not daily	1 (.6%)
▪ At least once a day, or most days each month	2 (1.3%)
How old when you first used a water pipe to smoke tobacco	N (%)

➤ 13-15	6 (3.8%)
➤ 16-18	51 (32.7%)
➤ 19-21	67 (42.9%)
➤ 22-24	19 (12.2%)
➤ 25-29	7 (4.5%)
➤ 30 years old or older	6 (3.8%)

Who were you with when you FIRST used a water pipe to smoke tobacco	N (%)
▪ No one, I was alone	1 (.6%)
▪ With one friend	21 (13.5%)
▪ With more than one friend	121 (77.6%)
▪ With a family member	8 (5.1%)
▪ With more than one family member	5 (3.2%)

Where were you when you FIRST used a water pipe to smoke tobacco?	N (%)
▪ In a cafe or restaurant	101 (64.7%)
▪ In my own home (apartment, condo, house)	4 (2.6%)
▪ In my own dorm room	3 (1.9%)
▪ At a family member's home	2 (1.3%)
▪ At a fraternity/sorority house	2 (1.3%)
▪ At a friend's or acquaintance's home	42 (26.9%)
▪ In someone else's dorm room	2 (1.3%)

n=156. Table 2 Characteristic of students who have tried a water pipe smoking

Knowledge of Students about Hookah (Waterpipe) Smoking

Respondents identified the health hazards that might results from waterpipe smoking.

Respondents recognized following diseases; cancer (n=258, 80.9%), respiratory problems (n=308, 96.6%), cardiovascular impairments (n=202, 63.3%), hematological impairments (n=98, 30.7%), pregnancy hazards (n=214, 67.1%), and diarrhea (n=37, 11.6%) (See Table 3).

Table (3): Participants' Knowledge toward the important hazards of Hookah (waterpipe) smoking: (in rank order)

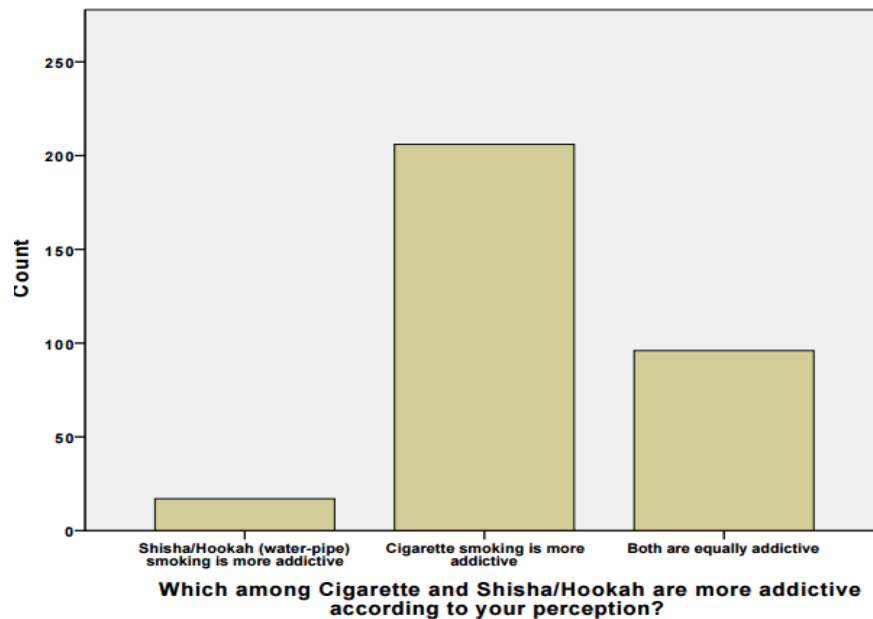
	Frequency: N (%)	
	Yes	NO
Respiratory problems	308 (96.6%)	11 (3.4%)
Cancer	258 (80.9%)	61 (19.1%)
Pregnancy	214 (67.1%)	105 (32.9%)
Cardiovascular Impairments	202 (63.3%)	117 (36.7%)

Hematological impairments	98 (30.7%)	221 (69.3%)
Diarrhea	37 (11.6%)	282 (88.4%)

(N=319)

Respondents were also asked about their perception and knowledge regarding cigarettes and waterpipe addiction. Seventeen of the respondents (5.3%) indicated that waterpipe smoking is more addictive than cigarette smoking, however, 206 respondents (64.6%) indicated that cigarette smoking is more addictive. Lastly, 96 respondents reported that a water pipe smoking and cigarette smoking are both equally addictive (See Figure 2).

Figure 2: Comparisons Regarding the Addictive Potential of Waterpipe and Cigarette Smoking



Respondents were also asked additional question regarding their knowledge and perception about the harmfulness of water pipe smoking. 187 respondents (58.6%) indicated that cigarette smoking is more harmful than water pipe smoking, Additionally, 19 of the respondents (6.0%) reported that water pipe smoking is more harmful, and finally, 113 students stated that both are cigarette smoking and water pipe smoking are equal in terms of health risks.

Beliefs of the Students Regarding the Harmfulness

Cigarette smoking is more harmful than waterpipe smoking (n=187). When asked why they consider cigarette smoking to be more harmful than waterpipe smoking, respondents reported the amount of nicotine is lesser in water-pipe smoke(n=98). While 89 respondents believed the amount of cancerous substances is lesser in waterpipe smoke, and 15 of the respondents believed the fruit flavor in water-pipe detoxifies the smoke (See Table 4 for further Details Regarding Respondents' Beliefs).

Table (4): Participants' Beliefs Toward the Reasons Why Hookah (Waterpipe) Smoking Is Less Hazardous Than Habitual Cigarette smoking: (in rank order)

	Frequency: N (%)	
	Yes	NO
The amount of nicotine is lesser in waterpipe smoke	98 (30.7%)	221 (69.3%)
The amount of cancerous substances is lesser in waterpipe smoke	89 (27.9%)	230 (72.1%)
Chain smokers consume more than 20 cigarettes per day but even habitual	75 (23.5%)	244 (76.5%)
Waterpipe smoking is less irritating and thus less toxic to the respiratory tract	58 (18.2%)	261 (81.8%)
Waterpipe smokers practice it not more than once daily	46 (14.4%)	274 (85.6%)
Waterpipes have an efficient filtration mechanism	43 (13.5%)	276 (86.5%)
The fruit flavor in water-pipe detoxifies the smoke	15 (4.7%)	304 (95.3%)

(N=319)

Attitudes /Opinions of Waterpipe Smoking

This part of study explores some students' attitudes and opinions regarding the waterpipe smoking. Students were asked about their agreement and disagreement in this part, each question in this part were consisted of I do not agree at all', 'I somewhat agree', 'I agree' 'I strongly agree. Respondents' attitudes vary toward waterpipe smoking for example; 68.5 responded that waterpipe smoking is more acceptable than cigarettes, 38.9% agreed that the

waterpipe smoking is a good stress-coping strategy, and, 42.3% of the respondents agreed that water pipe smoking makes one look relaxed. On the contrary 89% of the respondents disagreed that females cannot smoke cigarettes but can smoke waterpipe, also, there were 86.8% who opposed that waterpipe smoking is sign of high social status, lastly, there were 85.0% of the responded who contradicted that water pipe smoking makes one look attractive (See Tables 5).

Table (5): Participants’ Attitudes/Opinion toward Hookah (waterpipe) Smoking (in rank order)

	Frequency: N (%)		Mean (SD)*
	Agreement	Disagreement	
It is more acceptable than cigarettes	210 (68.5%)	109 (34.2%)	2.09 (.974)
Makes one look relaxed	135 (42.3%)	184 (57.7%)	1.95 (.783)
It is a good stress-coping strategy	124 (38.9%)	195 (61.1%)	1.52 (.747)
Shows the person is adventurous	103 (32.3%)	216 (67.7%)	1.42 (.678)
Adds intimacy among persons from opposite sex	73 (22.9%)	246 (77.1%)	1.27 (.540)
It is a safe habit	62 (19.40%)	257 (80.6%)	1.23 (.509)
Makes one look attractive	48 (15%)	271 (85.0%)	1.20 (.524)
Sign of high social status	42 (13.2%)	277 (86.8%)	1.18 (0.517)
Females cannot smoke cigarettes but can smoke Shisha	35 (11%)	284 (89%)	1.16 (.498)

*Means are based on a scale of 1-4 where 1= I do not agree at all, 2= I somewhat agree, 3=I agree, 4= I strongly agree. (N=319)

Opinions, Reasons for Hookah (Waterpipe) Smoking

Regarding the reasons for waterpipe smoking, there were 11 causes and participants were allowed to chooses more than one choice for this questions. Students reported the following reasons for water pipe smoking; its utility in leisure and pleasure activities (n=217, 86%) Also, respondents reported that increased availability to smoke a water pipe in cafes etc. (n=241,

75.5%) as another reason for water pipe smoking. Furthermore, other respondents who reported that the flavor/aroma of Shisha/Hookah itself (n=219, 68.7%) is another reason for water pipe smoking. Additionally, 202 respondents (63.3%) stated that the peer pressure is the reason for smoking a waterpipe smoking. On the other hand, there were respondents who stated that lack of other entertainment sources as another reason for waterpipe smoking (n=62, 19.4%). Finally, few respondents who referred the reasons behind the waterpipe smoking as influence of immigrants (n=56, 17.6%) (See Table 6).

Table (6): Reasons Why Hookah (Waterpipe) Smoking is Popular in US: (in rank order)

	Frequency: N(%)	
	Yes	No
Increased availability (cafes etc.)	241 (75.5%)	78 (24.5%)
Flavor/aroma of Hookah (waterpipe) itself	219 (68.7%)	100 (31.3%)
Utility of Hookah (waterpipe) in leisure & pleasure activities	217 (68%)	102 (32%)
Peer pressure	202 (63,3%)	117 (36.7%)
Boredom in youth	136 (42.6%)	183 (57.4%)
Stressful life and need for relaxation	132 (41.4%)	187 (58.6%)
Ignorance	121 (37.9%)	198 (62.1%)
Availability of free time to the youth	116 (36.4%)	203 (63.6%)
Existing high prevalence of cigarette smoking	73 (22.9%)	246 (77.1%)
Lack of other entertainment sources	62 (19.4%)	257 (80.6%)
Influence of immigrants	56 (17.6%)	263 (82.4%)

(N=319)

Demographic Differences in the Prevalence of Waterpipe Smoking

What effect did demographic factors contribute to the prevalence of waterpipe smoking was explored. The chi-squared test χ^2 was used to compare the difference in the prevalence of

waterpipe smoking. There was a significant difference in the prevalence of waterpipe smoking among different age group ($p= 0.03$), waterpipe smoking was common among the following age groups; 18-25 years old (52.2%), and 26-30 years old (53.3%). There was no significant difference in the prevalence of waterpipe smoking between male ($n=76, .53 \pm .503$) and female ($n= 243, .51 \pm .501$) regarding those who have smoked waterpipe ($p=0.76$). Furthermore, there was no difference in the prevalence of waterpipe smoking among 4 different groups of educational status ($p=0.65$). There was a significant difference in the prevalence of waterpipe smoking among five different health profession categories for example; the respiratory therapy students (38%), nutrition students (69%), nursing students (48%), occupational therapy (38%) and physical therapy (53%). Finally, there was no differences in the prevalence of waterpipe smoking among 8 different group ethnicities ($p=.19$), religions ($p=0.64$), and graduate and undergraduate students ($p=0.57$) (See Table 7).

Table (7): Findings Related to Demographic Differences in the Prevalence of Waterpipe Smoking

	<i>p-value</i>
Is there a difference in the prevalence of waterpipe smoking among 4 different age groups?	0.03*
Is there a difference in the prevalence of waterpipe smoking among males vs. females?	0.76
Is there a difference in the prevalence of waterpipe smoking among 4 different groups of educational status?	0.65
Is there a difference in the prevalence of waterpipe smoking among 5 different health profession categories?	0.01*
Is there a difference in the prevalence of waterpipe smoking among 8 different group ethnicities?	0.19
Is there a difference in the prevalence of waterpipe smoking among different group religions?	0.64
Is there a difference in the prevalence of waterpipe smoking among Graduate VS Undergraduate?	0.57

(*) Significant difference (P value <0.05)

Summary

There are large numbers of students who have used waterpipe smoking before, and most of students who tried their first water pipe to smoke tobacco were between age 26-30 years old. Most of respondents identified the respiratory problems as health hazards that might results from waterpipe smoking. The majority of the respondents indicated that cigarette smoking is more addictive and harmful than waterpipe smoking. Respondents' attitudes and opinions were in general disagreement regarding what were stated about waterpipe smoking. Finally, respondents reported different reasons behind the current surge of water pipe in US like increase waterpipe availability in café or restaurant, waterpipe flavors, and utilities of waterpipe in leisure and pleasure activities

Chapter V

Discussion

This chapter demonstrated the interpretations of the findings which were discussed in Chapter IV. This chapter also included implications for practice, study limitations, recommendations for future research, and conclusions. The research questions that were explored in the discussion were:

1. What was the prevalence of hookah (waterpipe) smoking among health care students at a Southeastern Urban Research University?
2. What was known about hookah (waterpipe) smoking among health care students at a Southeastern Urban Research University?
3. What were the beliefs of hookah (waterpipe) smoking among health care students at a Southeastern Urban Research University?
4. What were their attitudes/opinions about hookah (waterpipe) smoking among health care students at a Southeastern Urban Research University?

Finding related to Question 1

The first research question considered the prevalence of waterpipe smoking. The result showed a higher number of students who have smoked waterpipe smoking (n=156, 48.9%). This finding is consistent with (Holtzman et al., 2013) when they found that 43% of students reported ever smoking waterpipe. This finding is also similar to Martinasek, Haddad, Wheldon, and Barnett (2017), who found that 64% of students reported having smoked a waterpipe. Moreover, the result of this study explored characteristics of waterpipe users. It has been recognized that those who use waterpipe tobacco smoked at rate of “at least less than once a year” (60.3%), but

Holtzman et al. (2013) reported that 41.0% of students smoked tobacco “at rate of at least once a year, but not monthly”. The results also showed that many students (42.9%) were 19-21 years old when they first used a water pipe to smoke tobacco. In contrast, Holtzman et al. (2013) indicated that 57.1% of students were 16-18 years old when they first used a water pipe to smoke tobacco. Moreover, the result demonstrated that students who have smoked waterpipes self-reported that they “were with more than one friend” (77.6%), and they were “in a cafe or restaurant” (64.7%) when they first used a waterpipe to smoke tobacco. These findings are consistent to a study conducted by Holtzman et al. (2013) which demonstrated that 85% of students self-reported that they were “with more than one friends” and they were “in a café or restaurant” (46%) when they first used a water pipe to smoke tobacco.

Finding Related to Question 2

The second research question examined the college- based health care students’ knowledge regarding their perception of health hazards that might results from water pipe smoking. Students were able to identify different diseases that habitual waterpipe smoking can cause; such as respiratory problems, cancer, hazardous during pregnancy, cardiovascular impairments, hematological impairments, and diarrhea. These findings are consistent with (Jawaid et al., 2008) where students were able to identify the following health hazards that might result from water pipe smoking; respiratory problems (n=327,72.7%), cancer (n=240,53.3%), hazardous during pregnancy (n=131,29.1%), cardiovascular impairments (n=165,36.7%), hematological impairments (n=49,10.9%). The results of this study were also similar to another study whereby students identified the top three health hazards that might results from waterpipe smoking: respiratory problems (n=45, 92%), cardiovascular effects (n=34, 69%), and cancer (n=34, 69%) (Braun et al., 2012).

The results showed that the vast majority of students (65%) indicated that cigarette smoking is more addictive than waterpipe smoking. Also, most perceived that that cigarette smoking is more harmful than waterpipe smoking. The results are consistent with Jawaid et al. (2008) when many students (71.1%) indicated that cigarette smoking is more addictive than water pipe smoking. In addition, there were 60% indicated that cigarette smoking is more harmful than waterpipe smoking. Furthermore, the findings of this study are similar to Noonan and Patrick (2013), whereby 60% of students indicated that waterpipe smoking is less addictive than cigarette smoking, and 32% indicated that water pipe smoking is less harmful than cigarette smoking. Finally, the finding of this study showed large portion of students who have misperceptions about waterpipe smoking, some perceive that cigarettes smoking is more addictive and harmful than waterpipe smoking, these misperceptions might lead to increase students' willingness to try waterpipe smoking, and these misperceptions might lead to decrease the number of smokers who think about discontinuing waterpipe smoking. All of the aforementioned examples necessitate the importance of tobacco educational programs to increase the students' awareness about tobacco alternative product.

Finding Related to Question 3

Students' beliefs and myths regarding the waterpipe smoking show that 59% perceive cigarette smoking is more harmful than water pipe smoking. Further questions regarding their perception that cigarette smoking is more harmful than water pipe smoking showed that students believe that the amount of nicotine is less in waterpipe smoke. It is also showed that students believe that the amount of cancerous substances is less in waterpipes when compared to cigarettes. 25% of students believe that chain smokers who consume more than 20 cigarettes per day but even habitual waterpipe smokers practice it not more than once daily (n=75, 23.5%). Also some students believe that water-pipe smoking is less irritating and thus less toxic to the

respiratory tract, and who believe that water pipe smokers who smoke less than once daily, there were also respondents who believe that water-pipes have an efficient filtration mechanism. Finally, there were respondents who believed that the fruit flavor in water-pipe detoxifies the smoke. These findings are similar to Jawaid et al. (2008), there were students who believe that waterpipe has an efficient filtration mechanism, less frequency of use limits the side effects of waterpipe smoking, less nicotine than cigarettes, and fewer carcinogens than cigarettes.

Finding related to Question 4

The fourth research question was related to students' attitudes/opinions regarding the water pipe smoking, also, students were asked questions related to their opinion about the reasons behind popularity of water pipe smoking in the United States. The finding of the study showed general disagreement regarding water pipe smoking except only one statement where most of the students (210, 68.5%) agreed that water pipe smoking is more acceptable than cigarettes (2.09 ± 0.974). In contrast, Jawaid et al. (2008) stated that students agreed that water pipe smoking is more acceptable than cigarettes with a mean score of ($M=2.6$) and standard deviation of ($SD=1.2$).

Students were also reported the common reasons behind water pipe smoking popularity in US, the top four reasons that were identified by students were increased availability (cafes etc.) ($n=241, 75.5\%$), utility of Shisha/Hookah in leisure & pleasure activities ($n=217, 86\%$), flavor/aroma of Shisha/Hookah itself ($n=219, 68.7\%$), and peer pressure ($n=202, 63.3\%$), those findings were different than Jawaid et al. (2008), their findings presented the top four reasons that were identified by students as the following; boredom in youth ($n=296, 65.8\%$), utility of water pipe in leisure activities ($n=240, 53.3\%$), peer pressure ($n=231, 51.3\%$), and increased availability ($n=229, 50.9\%$).

Implication for Practice

The findings of this study shed the light on the prevalence, knowledge, beliefs, and attitudes/opinions of water pipe smoking among college -based health care students. There are many different aspects about the water pipe smoking among college- based health care professions. This study adds to the literature by providing common perceptions and misconceptions of waterpipe smoking among college -based health care professions. This study also contains information regarding usage patterns of waterpipe smoking and characteristics of those who have used water pipe before, and common reasons behind waterpipe smoking.

College-based health care students will deal with patients in the future, and that necessitates the importance of addressing the waterpipe tobacco smoking in health care programs. Students should also receive some tobacco prevention and cessation programs to limit the number of tobacco use especially among the young adults, in addition, these programs will increase the awareness level of alternative tobacco products such as waterpipe among health profession students. Those programs will influence students positively by increasing their information regarding the hazards of alternative tobacco products and they will be more confident when they involve in tobacco educational campaigns in hospital or in the university.

Limitations

There were some limitations in this study. The respondents were from one educational institution and from one college. The small sample size n=319 was another limitation and that's why we cannot generalize our findings to non-health care students. Also, most of the participants in this study were female (n=243,76.2%), and most of the participants were nursing students (105 ,32.9%) and that's why we cannot analyze the data separately.

Recommendation for Future Studies

We should ensure the reproducibility of our study by doing more research among different colleges of health professions with larger sample size. It is also recommended to involve non- health care students, clinicians, and the educators in health field in order to have complete image about prevalence, knowledge, attitudes towards waterpipe smoking among different groups. This study necessitates the importance of addressing the water pipe tobacco smoking in health care programs and curricula. Students should also receive some tobacco prevention and cessation programs to limit the number of tobacco use especially among the young adults. Finally, educational Tobacco campaigns should be performed in the universities and in the hospitals to increase students' and patients' awareness.

Conclusion

This study showed the prevalence of waterpipe smoking, common perceptions and misperceptions among health care students. Waterpipe smoking was noticeably highly among young adult. Moreover, the top four health hazards that were identified by students were respiratory problems, cancer, hazard during pregnancy and cardiovascular impairment. Furthermore, the study expressed that many of students indicated that cigarette smoking is more addictive and harmful than water pipe. Lastly, the top three reasons of water pipe smoking that were reported by students were increased the availability, flavor and leisure and relaxation.

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Appendix A: Permission



 **Greene, Lisa Merlo** <imerlo@ufl.edu>
Wed 10/26/2016 1:57 AM
To:  Mohammed Mesfer M Alqahtani

Inbox

You forwarded this message on 10/30/2016 4:50 PM

 **Hookah Survey FINAL.pdf**
232 KB

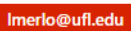
Download Save to OneDrive - Georgia State University


 Action Items 

Hi Mohammed,


Please find a copy of our research questionnaire attached. We did not calculate Cronbach's alpha or other measures of reliability/validity because this is not a specific scale. Rather, it is a collection of items that are related but not expected to measure the exact same construct. Good luck with your thesis!

Best,
Dr. M



 1 of 2

 **Ali Jawaid** <alijawaid84@gmail.com>
Tue 11/8/2016, 1:15 AM
Mohammed Mesfer M Alqahtani

Inbox

 **Questionnaire KAP on S...**
56 KB


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 Action Items 

No problem Mohammed,

Here is the survey. Please do acknowledge that you used our survey in your thesis/paper.

Best,



Appendix B: Instrument Survey and Demographics

Part 1: The survey instrument

Waterpipe Use History and Prevalence:

This section will ask you about water pipe use (also called hookah, shisha, narghile, or the hubbly bubbly) experiences. Please only tell us about your water pipe experiences using TOBACCO and not any other non-tobacco products like marijuana.

1. Have you EVER used a waterpipe to smoke tobacco (even one or two puffs)?

- No (please skip to question #6)
- Yes (please continue to question 2)

2. Which of the following choices best describes how often you smoke tobacco using a water pipe?

- Less than once a year
- At least once a year, but not monthly
- At least once a month, but not weekly
- At least once a week, but not daily
- At least once a day, or most days each month

3. How old were you when you FIRST used a water pipe to smoke tobacco?

- Younger than 9 years' old
- 10-12 years old
- 13-15 years old
- 16-18 years old
- 19-21 years old
- 22-24 years old
- 25-29 years old
- 30 years old or older

4. Who were you with when you FIRST used a waterpipe to smoke tobacco? (check all that apply)?

- No one, I was alone
- With one friend
- With more than one friend
- With a family member
- With more than one family member
- With a new acquaintance

5. Where were you when you FIRST used a water pipe to smoke tobacco?

- In a cafe or restaurant
- In my own home (apartment, condo, house)
- In my own dorm room
- At a family member's home
- At a fraternity/sorority house
- At a friend's or acquaintance's home
- In someone else's dorm room

AWESOME!! thanks for sticking with us! Keep going

Knowledge of a water pipe smoking among College Based Health professional students:

This section will ask about your knowledge about water pipe smoking:

6. **Which among these do you identify as important health hazards of *Shisha/Hookah* (water-pipe) smoking?** (You may choose more than one response if applicable)

- Cancer
- Respiratory problems
- Cardiovascular impairments
- Hematologic Impairments
- Pregnancy Hazards
- Diarrhea

7. **Which among Cigarette and *Shisha/Hookah* are more addictive according to your perception?**

- Shisha/Hookah* (water-pipe) smoking is more addictive
- Cigarette smoking is more addictive
- Both are equally addictive

8. **Where do you rate the health hazards of habitual *Shisha/Hookah* (water-pipe) smoking in comparison to those of cigarette smoking?** (If you choose 1, please answer question 9, and If you choose 2 or 3, please skip question 9 continue to attitude section)

- 1. Cigarette smoking is more harmful
- 2. Water-pipe smoking is more harmful
- 3. Both are equal in terms of health risks

Beliefs of hookah smoking among College Based Health professional students:

9. **Why do you think habitual *Shisha/Hookah* (water-pipe) smoking is less hazardous than habitual cigarette smoking?** (You can choose more than one answer)

- Water-pipes have an efficient filtration mechanism
- The fruit flavor in water-pipe detoxifies the smoke
- The amount of cancerous substances is lesser in water-pipe smoke
- The amount of Nicotine is lesser in water-pipe smoke
- Chain smokers consume more than 20 cigarettes per day but even habitual hookah (*Shisha*) smokers practice it not more than once daily
- Water-pipe smoking is less irritating and thus less toxic to the respiratory tract.

Attitudes of hookah smoking among College Based Health professional students:

This section will ask about your attitudes and opinions regarding water pipe smoking:

10. For each statement given under please indicate where do you place *Shisha/Hookah* (water-pipe) smoking using the scale below:

	I do not agree at all	I somewhat agree	I agree	I strongly agree
It is a safe habit				
It is a good stress-coping strategy				
Makes one look attractive				
Makes one look relaxed				
Sign of high social status				
Shows the person is adventurous				
Adds intimacy among persons from opposite sex				
It is more acceptable than cigarettes				
Females cannot smoke cigarettes but can smoke hookah				

11. In Your opinion, what are the main reason/s behind the current surge of *Shisha/Hookah* popularity in US? (You may choose more than one response if applicable)

- Boredom in youth
- Availability of free time to the youth
- Lack of other entertainment sources
- Existing high prevalence of cigarette smoking
- Utility of *Shisha/Hookah* in leisure & pleasure activities
- Flavor/aroma of *Shisha/Hookah* itself
- Influence of immigrants
- Stressful life and need for relaxation
- Increased availability (cafes etc.)
- Ignorance
- Peer pressure

Part 2: Demographic Questionnaire

Please Mark the suitable number or fill in where requested:

1. How old are you?

- | | |
|--|--|
| <input type="checkbox"/> 18-25 years old | <input type="checkbox"/> 31-39 years old |
| <input type="checkbox"/> 26-30 years old | <input type="checkbox"/> >40 years old |

2. What is your gender?

- Male
- Female

3. Which of the following best describes your education status?

- | | |
|---|---|
| <input type="checkbox"/> First Year in the program
undergraduate students
(Junior) | <input type="checkbox"/> First year graduate students |
| <input type="checkbox"/> Second year in the program
undergraduate students
(Senior) | <input type="checkbox"/> Second year graduate
students |

4. Educational profession:

- | | |
|---|--|
| <input type="checkbox"/> Nursing | <input type="checkbox"/> Physical Therapy |
| <input type="checkbox"/> Nutrition | <input type="checkbox"/> Respiratory Therapy |
| <input type="checkbox"/> Occupational Therapy | |

5. Which of these groups best describes you? (Choose only ONE answer)

- | | |
|---|--|
| <input type="checkbox"/> Alaska Native | <input type="checkbox"/> Native Hawaiian or Other Pa
cific Islander |
| <input type="checkbox"/> Asian | <input type="checkbox"/> White |
| <input type="checkbox"/> African American | <input type="checkbox"/> American Indian |
| <input type="checkbox"/> Hispanic or Latino | <input type="checkbox"/> Middle Eastern |

6. Religions affiliations:

- | | |
|------------------------------------|---|
| <input type="checkbox"/> Christian | <input type="checkbox"/> Atheist |
| <input type="checkbox"/> Jewish | <input type="checkbox"/> Prefer not to answer |
| <input type="checkbox"/> Muslim | <input type="checkbox"/> Others |
| <input type="checkbox"/> Buddhist | |

Appendix C: Invitation Letter

Invitation Letter

Dear graduate and undergraduate students.

I am inviting you to participate in my research study “THE PREVALENCE OF USE, KNOWLEDGE, BELIEFS, AND ATTITUDES OF HOOKAH (WATERPIPE) SMOKING AMONG HEALTH CARE STUDENTS AT A SOUTHEASTERN URBAN RESEARCH UNIVERSITY”. The purpose of this study is to evaluate students’ use, knowledge, beliefs, and attitudes of hookah smoking. If you volunteer to participate, you will be asked to answer 22 questions related to prevalence of use, knowledge, beliefs, and attitudes about hookah smoking. These questions take approximately 15 minutes of your time to answer. The student investigator, Mohammed alqahtani shall give these surveys to you during your class time if you are undergraduate students, and he will send a web-based survey to your emails if you are graduate students.

Your participation is strictly voluntary and you can refuse to participate or stop taking the survey at any time without penalty. Your answers will be confidential. In order to protect your confidentiality, no names or codes will be used to identify you or your survey. The findings will be summarized and reported in a group form. Your completion and submission of the survey indicates your consent to participate in the study. We hope that you will submit a completed survey. Although your participation in this study may not benefit you personally, we hope to gain information about the prevalence of use, knowledge, beliefs, and attitudes of hookah smoking among the students at the college of nursing and health profession.

If you have any question about this research study, please contact my advisor, Dr. Lynda Good fellow at LTGoodfellow@gsu.edu or 404.413.1100.

Warmest regards

Mohammed Alqahtani

Graduate student

Georgia State University

Byrdine F. Lewis School of Nursing and Health Profession

Division of Respiratory Therapy

Appendix D: Informed Consent

Informed Consent

Georgia State University

Department of Respiratory Therapy

Informed Consent

Title: THE PREVALENCE OF USE, KNOWLEDGE, BELIEFS, AND ATTITUDES OF HOOKAH SMOKING AMONG COLLEGE BASED HEALTH CARE STUDENTS AT A SOUTHEASTERN URBAN RESEARCH UNIVERSITY”

Principle Investigator: Lynda T Goodfellow, Ed.D, RRT AE-C

Student PI: Mohammed AlQahtani, BS

Dear Student:

You are invited to participate in a research study. The purpose of this study is to address the prevalence of use, knowledge and beliefs and attitudes of hookah smoking among health care students. you are invited to participated because you are a health care student in the college of nursing and health professions. All undergraduate and graduate students who are currently enrolled in respiratory therapy, nursing, physiotherapy, occupational therapy and nutrition will be recruited for this study. If you decide to participate, you will be asked to complete the following survey that should take approximately 15 minutes or less of your time.

The following survey is about the prevalence of use, knowledge and beliefs and attitudes of hookah smoking among health care students. This survey will need to be completed only one time.

Please note that you will receive no direct benefit for participation in this study. However, the information gained from this study may be beneficial in distinguishing the specific knowledge needed about hookah. Also, it will be helpful to provide information regarding your perception on the use of hookah. This survey will not require you to interact with other participants.

Please note that your participation in this study is voluntary. You can refuse to participate, and you can stop taking the survey at any time without any penalty or loss of benefits to which you are otherwise entitled. Your response will be used for research purposes and will be strictly confidential. In order to ensure confidentiality, no names or codes will be used to identify you or your survey. Survey will be destroyed after all surveys have been collected.

The information gained from this study may be use and shared in other study with the approval of GSU institutional Review board (IRB) and the office of Human Protection (OHRP). Dr. Lynda Goodfellow (PI)and Mohammed Alqahtani (student PI) will have access to the information you provided. The information you provided will be stored on a password-protected computer. The information you provided may be published in journals or presented at

professional meetings. However, no identifiable information or other facts that might point to you will appear when we present this study or publish its results. The findings will be presented and summarized in group form.

Please note that there are no known risks associated with participation in this study. We don't foresee that this study will cause any harm or discomfort. However, if you are uncomfortable about completing the survey, you may withdraw at any time or simply submit a blank survey.

If you have any questions or concerns about this study, please contact Dr. Lynda Goodfellow at LtGoodfellow@gsu.edu or 404-413-1223. You may also Call Susan Vogtner in the Georgia State University Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu if you want to talk to someone who is not part of the study team. You can talk about questions, concerns, offer input, obtain information, or suggestions about the study. You can also call Susan Vogtner if you have questions or concerns about your rights in this study.

Your completion and submission of the survey implies that you agree to participate in this research. Please note that you may withdraw at any time by not completing or submitting a blank survey.

Thank you in advance for your cooperation

Sincerely,

Lynda T. Goodfellow, EdD, RRT, AE-C

Mohammed AlQahtani, BS

Please note: If you agree to participate in this research, please continue with the survey. You can print a copy of the form for your records.

- I Agree
- I Disagree