

**An-Najah National University**  
**Faculty of Graduate Studies**

**Water-Pipe Smoking and Associated  
Factors among An-Najah National  
University Students**

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## **Dedication**

To my parents who made a lot of sacrifices for me to have the best opportunity in having this master degree. To my parents who taught me that the best kind of knowledge to have is that which is learned for its own sake, they taught and encouraged me to face all challenges that I faced during this difficult trip, by offering me unconditional love, guidance and support and provided me with the unlimited confidence in myself. Thank you my parents for everything you did and are still doing!

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Finally, this thesis is dedicated to all public health department team in An-Najah National University in specific, and all students and teachers of this great university.

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## الإقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان :

## Water-Pipe Smoking and Associated Factors among An-Najah National University Students

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### Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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**List of Acronyms**

<b>Abbreviation</b>	<b>Explanation</b>
WPS	Water-pipe Smoking
WHO	World Health Organization
GYTS	Global Youth Tobacco Survey
EM	Eastern Mediterranean
PCBS	Palestinian Central Bureau of Statistics
ANU	An-Najah National University

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**Abstract**

**Rationale and objectives:**

Lately, in many Middle Eastern countries, water-pipe smoking has become widely used especially among university and high school students of both genders. Reports show that the prevalence of water-pipe smoking among Palestinian youth (school students) is increasing dramatically in the last years, whereas data that focuses on the prevalence and pattern of water-pipe smoking alone among Palestinian university students is missed. The aim of this study was to determine the factors affecting water-pipe smoking among students at An-Najah National University.

**Methods:**

After evaluation for the reliability and validity of a self-administered questionnaire; it was administered to a representative sample of An-Najah National University (all disciplines, males and females, all classes). The questionnaire included items addressing demographics, water-pipe use patterns, motives, beliefs and knowledge; as well as psychological and social determinants of water-pipe smoking. Data was analyzed using descriptive methods and relationships applying univariate analysis and logistic regression were used.

**Results:** Overall 22.8% of the study sample was current water-pipe smokers, and this rate was higher among males than females (35.5% versus 11.5%). In logistic regression analysis, sex (male), type of college (humanities), older age and negative social norms and negative beliefs toward water-pipe smoking contribute to this behavior. Low level of knowledge regarding adverse health effects of water-pipe use were predictors of current smoking status. Enjoying the taste of water-pipe and the relaxation feeling coming from its use were the main motives that drive students to smoke.

**Conclusion:** Water-pipe smoking is common among An-Najah National University students and should be of great concern. Therefore, future efforts are needed toward struggling water-pipe.

# Chapter One

## Introduction

### 1.1 Background

Tobacco use continues to grow in developing countries due to steady population growth along with aggressive tobacco industry marketing efforts <sup>(1)</sup>. Its use is declining in the developed but increasing in some developing countries. It is estimated that about 80% of the world's smokers are from developing countries <sup>(2)</sup>. More than one billion people worldwide currently smoke tobacco (about one quarter of adults) despite the fact that it is associated with high mortality because it is considered as a risk factor for six of the eight leading causes of death in the world; which make it the single greatest preventable cause of death in the world today <sup>(1)</sup>.

The high mortality associated with tobacco use is not the only public burden that can affect societies, as also of the major burdens of smoking is that it increases the burden of poverty <sup>(2)</sup>; as its' usage causes economic harm to families and countries due to lost wages, reduced productivity and increased health-care costs <sup>(1)</sup>; for example; in 2004, tobacco costed the United State nation more than \$96 billion per year in direct medical expenses and more than \$97 billion annually in lost productivity <sup>(3)</sup>.

Smoking can be in different ways like cigarette tobacco smoking; smokeless tobacco and water pipe tobacco smoking (WPS). Research tends to focus on methods of smoking other than WPS as it is not prevalent in the developed countries as much as in the developing countries <sup>(4)</sup>.

WPS is a customary and cultural method of consumption of tobacco products in the Middle Eastern countries Southeastern Asia, and North Africa. It was originated in India by a Physician in the second half of the 15<sup>th</sup> century, and was introduced as a less harmful method of tobacco use, as he suggested that” tobacco smoke should firstly passed through a small receptacle of water so that it would be rendered harmless”; thus; the widespread of the misperception of that WPS is less harmful than cigarette which is held by many smokers today is as old as the WP itself <sup>(5)</sup>; although early WP has been used to smoke opium or hashish, but after the advent of tobacco in the region, new products were developed by mixing shredded tobacco leaf and honey, molasses or dried fruit <sup>(6)</sup>.

The use of WP has spread through the Middle East and Asia, as it was widely used in Turkey, Iran, Lebanon, Syria, Jordan, Palestine, Egypt, Saudi Arabia and Pakistan during the Ottoman Empire in the 15<sup>th</sup> century. And by the late 19<sup>th</sup> century Turkish women of high society had used WP as status symbol. After that in the late 20<sup>th</sup> century sweeter additives and more flavors were developed in Egypt in an effort to attract more female consumers; and then as people immigrated to Europe from the Middle East and south eastern of Asia, WP began appearing in Europe, to find now that WP cafes and bars are popular all over Europe and United States <sup>(6, 7, 8, 9)</sup>.

## **1.2 Significance of the study**

WPS is an arising public health problem worldwide especially in the Middle Eastern region. It is one of the several forms of tobacco smoking which is responsible for 4.9 million deaths annually worldwide, and within

the next 20 years it is expected to increase to 10 million. In 2005, ‘the World Health Organization (WHO) issued an advisory note calling for a better understanding of national and global trends of water-pipe tobacco smoking. The American Lung Association in 2007 labelled water-pipe smoking as an ‘emerging deadly trend’, and called for more research on the patterns of use of water-pipe amongst various populations and to investigate its use as part of the national surveys on youth and adult tobacco use’<sup>(10)</sup>.

The prevalence of WPS among Palestinian population seems to be high despite the deficiency in data that focuses on water-pipe smoking pattern alone. In a study done in 2010 among An-Najah National University students the prevalence of tobacco smoking (both cigarette and water-pipe) was 34.7%<sup>(11)</sup>, while in Abu Shomar’s et al. (2014) study 36% of four university students in Gaza Strip were strictly WP smokers<sup>(12)</sup>. These two rates of Palestinian university students can be considered as high when compared with the rates of university students of other neighboring countries, and were found to be higher than the Palestinian Central Bureau of Statistics estimates of the proportion of smokers in the general Palestinian population in 2009 which was 19.8%; indicating that the prevalence of tobacco smoking is increasing by time<sup>(11)</sup>. Also the 2009 West Bank Global Youth Tobacco Survey (GYTS) Report showed an increase in the prevalence of students using water-pipe among 13-15 year olds (27-43%) compared to the year 2000 results (11.2-17.4%)<sup>(13)</sup>; this indicates that Palestinian youth are exposed to an emerging hazard that is



threatening their health; and more data is needed to know in depth the extent and pattern of such hazard among Palestinian population either youth or adults.

Studying the prevalence of and the factors associated with water-pipe smoking among the university students has a major importance; as studies of unhealthy behaviors among university students are important not only because they serve as role models for other young adults, but mainly because the majority of such behavior is established in young adulthood<sup>(14)</sup>. Although extensive research has been performed on cigarette use among school and university students, studies on WPS in Palestine in this population are limited; as to the best of our knowledge, there is no such study conducted in the universities of the West Bank/Palestine.

### **1.3 Aim and Objectives**

#### **1.4.1 Aim**

The aim of this study is to investigate the burden of and factors behind Water-pipe smoking among students at An-Najah National University (ANU), which will help in planning and implementing a comprehensive and effective health promotion programs to prevent and control WP smoking for the sake of family and community.

#### **1.4.2 Specific Objectives**

1. To assess behaviors of water-pipe tobacco smokers.
2. To assess the motives behind WPS among smokers.

3. To determine the possible social and cultural factors affecting WPS behavior.
4. To assess student's beliefs about WPS.
5. To assess student's perceived risk of using WPS.
6. To assess the student's knowledge regarding adverse health effects of WPS.

## Chapter Two

### Literature Review

#### 2.2 Chemical contents of WP and associated adverse health risks

WP and cigarette smoke contain many of the same toxins including carbon monoxide, polyhydrocarbons, formaldehyde, nitrogen, nitric acid, nicotine and other toxicants such as arsenic, chromium, lead and volatile aldehydes<sup>(15)</sup>, with some evidences support that relative to cigarettes, WP can deliver the same or even significantly greater amount of nicotine and carbon monoxide<sup>(16)</sup>. This was supported by the results of one study which had investigated the dose of nicotine and cotinine (a chemical marker of nicotine exposure) in blood stream of a group of WP smokers to find out high amounts of both chemicals after one session of WPS (lasting 40 to 45 minutes) when compared with levels before smoking, as the level of nicotine increased up to 250 percent and the cotinine level increased up to 120 percent<sup>(6)</sup>. In another study, analyses of urinary cotinine levels among daily users suggested that one WP session may equate to ten cigarettes' worth of nicotine; which may lie above the "addiction threshold" and subject users to dependency and failed quit attempts<sup>(17)</sup>. Other studies had found that white blood cells collected from WP tobacco smokers demonstrate higher levels of chromatinex change than white blood cells collected from cigarette smokers, suggesting increased carcinogenic activity<sup>(18)</sup>.

So, it should be kept in mind that one session of WP involves inhalation of 50–100 times the smoke volume inhaled from a single cigarette <sup>(6)</sup>, which in other words means that one complete session of smoking WP (45 minutes) may equals smoking 100 cigarettes <sup>(8)</sup>, which can be associated with smokers exposure to about 3-9 times the carbon-monoxide, 2 times the nicotine, 40times the tar, and 20 times the carcinogenic polycyclic aromatic hydrocarbons of a single cigarette <sup>(16, 19)</sup>.

Undoubtedly, these chemicals have serious adverse health effects including dependence; as regular hookah smokers suffer from similar withdrawal and craving symptoms as cigarette smokers <sup>(16)</sup>; acute respiratory diseases including the spread of infectious diseases, such as tuberculosis, due to sharing of WP mouth piece among smokers <sup>(20)</sup>; and reduced lung function capacity which might end with chronic obstructive pulmonary disease <sup>(4)</sup>.

Other more serious negative health outcomes include increased risk of developing cancers like bronchogenic carcinoma, as well as lung, oral, and bladder cancers. This is in addition to increased risk of other chronic diseases such as cardiovascular diseases <sup>(4, 21, 22)</sup>; as it was found that water-pipe use is associated with markers of atherosclerosis and with coronary heart disease <sup>(4)</sup>.

Smoking WP during pregnancy, can lead to low fetal birth weight, as it was reported in one study investigated the association between WPS and low birth weight and other pregnancy outcomes that smoking one or more WP a day during pregnancy is associated with at least a 100-g reduction in the adjusted mean birth weight, and those who smoke in the first trimester have

triple the risk of having babies with low birth weight than who do not smoke. This is in addition to other ill pregnancy outcomes such as low Apgar scores and respiratory distress <sup>(4, 22, 23)</sup>.

It is well established in literature that tobacco consumption might lead to hypoxia, which has significant influence on brain, loss of consciousness, abnormal motor function, reduced speed and precision in finger tapping, this is in addition to its effect on cognitive functions like typical performance decrement, difficulty in concentrating and faulty judgments. All of these adverse effects of hypoxia had been proved to be associated with WPS. A recent study (2012) have been done to investigate the relation between WPS and the risk of a motor vehicle crashes and to carry out a test of the effects of WPS on the concentration of oxygen and carbon monoxide (CO) in the blood; this study had found that WPS has a significant impact on driving behavior and on the risk of being involved in road accidents and causing driving to become riskier and less careful and stable; this was supported by findings of other studies from Spain and United States which had shown smokers to have a 50% higher risk of road crashes than nonsmokers <sup>(24)</sup>.

Despite all previously mentioned health effects that are attributed to WPS; it is becoming more and more prevalent; its' prevalence in the Middle Eastern countries has been estimated to range between 9-25% among school students and 6-33% among university students; whereas among adults the prevalence was between 6-15% <sup>(10)</sup>; with an evidence of an increase in these percentages <sup>(7)</sup>; this may be a result of several social,

cultural, perception and economic factors that if were understood properly this will help in developing tailored prevention, cessation, as well as policy interventions <sup>(25, 26)</sup>.

## **2.1 Prevalence of WPS**

The prevalence of WPS in the Middle Eastern region is increasing especially among youth if compared with cigarette smoking. Global Youth Tobacco Survey (GYTS) evaluated the trends of tobacco use among 13-15 years old between 1999 and 2008 in all countries of the Arab region to indicate that the use of tobacco products other than cigarettes (most likely water-pipe) was more common than use of cigarettes <sup>(26)</sup>. In Lebanon, GYTS in 2005; has reported that 59.8% of 13-15 years old school students smoked other forms of tobacco (most likely water-pipe) at least once in the past month as opposed to 10% cigarettes; and after comparing that with what was reported in 2001, cigarette use was shown to be decreased among 13-15 years old; while use of other tobacco products has increased <sup>(25)</sup>. In a systematic review done in 2011 to investigate the prevalence of WPS among different populations; the highest prevalence of current water-pipe smoking was among school students across countries: the United States, especially among Arab Americans (12%-15%), the Arabic Gulf region (9%-16%) and Lebanon (25%) <sup>(10)</sup>.

Among university students the prevalence of current water-pipe smoking was high in Pakistan (33%), Lebanon (28%), Syria (15%), the United States (10%), the United Kingdom (8%) and the Arabic Gulf region (6%) <sup>(10)</sup>.

In a cross sectional study done in 3 universities in Jordan in 2008; 25% of students were water-pipe smokers, where 53% of females who were smokers preferred to smoke water-pipe alone <sup>(21)</sup>. But in another more recent Jordanian study (2012) that was conducted in 4 universities the prevalence was higher (30.0%) <sup>(27)</sup>.

Among Iranian university students, 11.5% of females and 28.7% of males have been reported to smoke water-pipes, compared to 2.5% of females and 18.3% of males who smoke cigarettes <sup>(9)</sup>.

The prevalence of current water-pipe smoking among adults was found in literature to be clearly lower than that of school and university students; as some of reported prevalence were as the following: Lebanon (15%), Arabic Gulf region (4%-12%), Syria (9%-12%), Australia (11% in Arab speaking adults) and Pakistan (6%). In Lebanon, 5%-6% of pregnant women reported smoking water-pipe during pregnancy <sup>(10)</sup>.

Regarding water-pipe use in the West Bank; the only obtained data that describe WPS separated from cigarette smoking were those results of the Global Youth Tobacco Survey (2009); which showed an increase in the prevalence of students use of water-pipe among 13-15 Year olds (27 -43%) compared to the year 2000 results (11.2-17.4%) <sup>(13)</sup>, in addition to the study that was conducted in four universities in Gaza Strip in 2014 which showed that 36% of students were strictly WP smokers <sup>(12)</sup>.

## **2.2 Factors affecting WPS**

### **2.2.1 Social norms and peer influence**

Social norms and cultures were suggested to be an important factors behind the huge spread of water-pipe use in the Middle Eastern region <sup>(8, 9, 21, 27)</sup>, the negative social norm against cigarette smoking is not applied to water-pipe; and this maybe because of its' more recent trend and use <sup>(8, 11, 28)</sup>. As in one Pakistani study that had been conducted in four different universities of Karachi; 78.5% of students reported that their parents approve this practice <sup>(29)</sup>. Also, this can be obvious by watching the increasing numbers of females who smoke WP in relative to those who smoke cigarettes <sup>(21, 28, 30)</sup>, and in the finding of a Syrian study where female WP smokers were more likely to have started smoking and to share WP with family members than male WP smokers <sup>(28)</sup>.

Nowadays WPS is practiced during social activities whereby family members and friends smoke together, as number of studies showed that smoking in the house, smoking in the family and smoking among friends are associated with water-pipe smoking among school students and university students <sup>(10, 21, 31)</sup>. For example, Jordanian university students in 2009 stated that “sharing water-pipe provides a means of demonstrating the hospitality and generosity characteristic of an adult Arab male” <sup>(21)</sup>.

WPS status of Jordanian university students was strongly associated with smoking parents, where as in other Lebanese study WPS status was related to parental education, suggesting the influence of social factors (socioeconomic status) on the smoking behavior of youth <sup>(21)</sup>.



Also peer influence was found to be an equally important, or even a more important determinant of the smoking habits of university students, where a friend was most often the introducer, motivator, and companion for smoking <sup>(16, 21, 28, 31)</sup>.

### **2.2.2 Beliefs and perceived risks**

Misperceptions toward WPS that are held by substantial proportion of smokers were proved in a lot of studies to play an important role in increasing the prevalence of such unhealthy practice. One of these misperceptions is that WPS is perceived as being less harmful than cigarette smoking by the majority of its users <sup>(8, 9, 16, 21, 25, 28, 29, 32)</sup>. In one Israeli study, 90% of Israeli schoolchildren agreed that water-pipe use is not healthy, though 50% agreed that it was less harmful than cigarettes. Among university students in Syria, 30% of those sampled thought water-pipes are less harmful than cigarettes <sup>(4)</sup>, and in Jordan the percentage was much higher (89%) <sup>(21)</sup>. Also in one American study, some of the university students did not believe that the tobacco used in WP contained nicotine and some students did not believe that the product smoked was related to tobacco<sup>(32)</sup>.

On the other hand, in Egypt, 21% of adult male WP users reported that they preferred WPS over cigarette smoking because it is less harmful; although 81–92% of these Egyptian users reported that they knew that water-pipe use might be associated with lung cancer, asthma, heart disease, and infection transmission; and this may suggest the uncertainty regarding the relation between perceived health effects and water-pipe use <sup>(4)</sup>.

### **2.2.3 Motives**

Several factors were reported by university students all over the world as being motives behind smoking WP, including: curiosity, boredom and pleasure seeking, peer pressure, stress relieving <sup>(25, 29, 30, 31, 32)</sup>, part of social gathering <sup>(25, 31, 32)</sup>, dealing with anger or depression <sup>(30)</sup>, seeking for popularity; the sense of “fitting in” and the feeling of maturity, in addition to viewing it a good way to make new friends <sup>(32)</sup>. A Syrian study investigated the motives of smokers behind smoking WP to find that quarter of participating students (smokers and non-smokers) find the smell and taste of WP as the chief attributing factors for its use <sup>(28)</sup>.

Regarding Palestinian school students; the survey that was done by GYTS in 2010 revealed that students perceived that smokers are more likely to perceive other smokers more positively and they are more likely to have acquaintances <sup>(17)</sup>.

### **2.2.4 Other factors**

Other factors had been suggested in the literature and may be attributed to the rising pattern of WP use. In a Lebanese study done in 2007; 25 focus groups and 9 in-depth interviews were held with adults to understand these factors; findings indicated that factors encouraging WPS are similar to those that have been successful in enticing people to smoke cigarettes. They indicated that availability of the water-pipe in the public sphere (café and restaurants) and tobacco affordability (price) have the strongest influences on tobacco consumption. This is in addition to the WP ornamented hoses and other innovations in flavoring and the sensory

characteristics as taste and smell of the Maasel which were important factors that attract smokers and hook them to WP. Also; media promotion of water-pipe was stated by participants as attracting and enticing individuals to smoke, and the lack of policy framework for the control over tobacco and water-pipe use which was seen to be a participating factor in rising water-pipe smoking <sup>(25)</sup>.

### **2.3 Knowledge of adverse health effects of WPS**

Several studies in different countries had investigated the level of knowledge regarding the adverse health effects that can be related to WPS to report different levels of knowledge among university students; but most of them concluded that smokers were aware of some of the adverse health effects mainly: cardiovascular diseases, respiratory diseases and cancers. For example; in one American study, 92% of participants believed it can cause respiratory problems, 69% believed it has cardiovascular effects, and 69% felt it can cause cancer <sup>(33)</sup>, and In Karachi, Pakistan, 56% of university students believed that WP contains significant amounts of tobacco, 53% believed that it can cause cancer, and 73% believed it can cause respiratory problems <sup>(29)</sup>. In Egypt, 84% of students believed WP to be hazardous <sup>(33)</sup>, while in Jordan; university students reported lower level of knowledge as 37% believed it causes respiratory disease, 35% cancer, 20% cardiovascular disease, and 6% mouth disease <sup>(21)</sup>.

## **2.4 Tobacco smoking among ANU students**

Regarding Palestinian university students, data is limited as only one study has addressed smoking prevalence (either cigarette or water-pipe or both) and factors associated with initiating and maintaining such behavior among ANU students in 2010. The results of this study revealed that 34.7% (52.7% among males and 16.4% among females) of the overall study sample are smokers. These figures are higher than the Palestinian Central Bureau of Statistics (PCBS) estimates of the proportion of smokers in the general Palestinian population which was 19.8% (37.0% among males and 2.2% among females). This rate was also higher than other rates reported in university students of neighboring Arab countries, as among Jordanian and Saudi students smoking rate was (28.6%, 17.5% respectively); but lower than that among Lebanese students (40%) <sup>(11)</sup>.

A significantly higher risk of smoking among students was found in the arts and humanities field (57.1%) compared with students enrolled in the sciences (35.9%) or in health care (7.0%); indicating a strong effect of the education about the health risks of smoking in avoiding such bad habit <sup>(11)</sup>.

The negative effects of smoking seemed to be perceived by all students; however, more smokers and male students perceived positive effects compared with non-smokers and females <sup>(11)</sup>.

Recreation and proving manhood were the main reasons for smoking according to most of the current smoker students, also non-smokers believed that their peers smoked mainly to prove their manhood and popularity <sup>(11)</sup>.

Regarding smokers attitude toward smoking; they were more tolerant toward smoking at home than non-smokers; and would be less likely to put pressure on their children not to smoke. Also smokers had more negative attitudes to banning smoking in public areas on campus and to education about the harmful effects of smoking <sup>(11)</sup>.

## **Chapter Three**

### **Materials and Methods**

#### **3.1 Study design**

A cross – sectional study design was used to achieve the study objectives. It was thought to be suitable as it is the preferred design to assess prevalence of health related events and their determinants.

#### **3.2 Study setting**

This study was conducted on the students of ANU (old and new campuses). It is considered one of the largest universities in Palestine. The number of students attending ANU was about 21327 in 2012-213 academic year (among them 19891 are bachelor students); based on the last report of Ministry of Education and Higher Education (2012/2013) <sup>(34)</sup>. These attending students are coming from all different West Bank governorates and represents different social classes.

#### **3.3 Study population**

The study was conducted on the bachelor degree students of ANU from all faculties; all students have been included except those who didn't speak Arabic.

#### **3.4 Sample size and sampling technique**

To achieve confidence interval of 95% and standard error of 5%, the following equation was used to calculate the sample size <sup>(20)</sup>:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Where

$n =$  *sample size*

$Z =$  *Z statistic for a level of confidence, = 1.96*

$P =$  *Expected proportion (in proportion of one), and*

$d =$  *Precision (in proportion of one). = 0.05*

Based on expected proportion of 30% with water-pipe smoking (P) <sup>(4, 7, 8)</sup>, the sample size according to the previous equation was calculated to be 336. We added more 20% to the calculated sample size to compensate for incomplete answers, and the total number came out to be 386. To be able to compare between the water-pipe smokers and non-smokers, the calculated sample size was multiplied by 2 to obtain the sample size of 810 students <sup>(35)</sup>.

A systematic random sampling technique was implemented to select the participating students from the obligatory courses which include students from all faculties and all levels at a time. There are 12 university obligatory courses with a total number of 253 classes that were opened in the second semester of 2013-2014 academic years. A list of the names of these courses and the names of students attending them were obtained from university administration. English Language 100 and introduction to computer science were excluded as they may be by passed by many students through the preparation exams before starting the university study, and so not all students will take them, and English 102 was excluded as it is specific for every faculty. Also, we excluded "Community service" course because it is

practical and not inside the university campuses. The final courses list included Arabic language, Islamic culture, Palestinian studies, Leadership and communication skills, and English language 101 course.

The total number of the classes of these 5 courses was 123 (after exclusion of other courses); with total number of students equals 5665. In each class the total number of students that were attending was around 55; so in order to obtain the 810 students in a systematic way (every 3<sup>rd</sup> student) a total number of 29 classes was needed to be visited. But, in order to compensate for any inaccuracy or students absence another 6 classes were added to end with final number of 35 classes that were selected randomly to be visited to select students from them.

While visiting each class; permission was taken first from the lecturer and before disseminating the questionnaire a brief description about the study and its objectives was given to the participants; then students were selected randomly by starting with the student sitting on the first desk and then every 3<sup>rd</sup> student was selected. Those who reported to be registered in 2 courses and had filled the questionnaire were asked not to participate again. Finally, the total number of the students (810 students) who participated in the study was obtained after visiting the 35 different classes (15 classes of English language course (101), 8 classes of Islamic culture course, 4 classes of Arabic language course, 4 classes of Palestinian studies course and 4 classes of Leadership and communication skills course.



### 3.5 Study Variables (Measures)

**Dependent variable:** the main outcome variable for this study was the “water pipe use profile”. It was operational zed based on the number of times a participant smokes water-pipe as follows:

Current water-pipe smoker: this was the primary outcome of the study and was defined as anyone who indicated on his survey that he has shared in complete session of water-pipe smoking one time or more in the past 30 days. The frequency of water-pipe smoking was described as daily, weekly (smoke water-pipe at least once a week but not daily), or monthly (smoke water-pipe at least once a month but not weekly) <sup>(4)</sup>.

In the analysis, the non-current WP smoker variable was created and included those who had never smoked or tried WP, and those who were ever water-pipe smokers (anyone who had ever tried water-pipe just for curiosity but did not share in complete session of water-pipe smoking ever, or anyone who was x-smoker and had quitted) <sup>(4)</sup>.

**Independent variables:**

- Age: was collected as a continuous variable
- Sex: was as male or female; categorical variable,
- Faculty of study: nominal variable, for the purpose of analysis all types of faculties were classified into 4 main categories: faculty of medicine and health sciences, faculty of engineering and Information technology, faculty of science, and faculty of Humanities and social sciences which included the following branches: Agriculture and Veterinary Medicine, Economic and Social Studies, Educational

Sciences and Teachers' Training, Fine Arts, Humanities, Islamic Law, and faculty of law <sup>(36)</sup>.

- Place of residence: a categorical variable that was assessed by following responses: city, village and camp.
- Average monthly spending on water-pipe smoking: continuous variable.
- Monthly family income: categorical variable that was assessed by using the following responses (less than 1000 NIS, 1000 to 2000 NIS, more than 2000 NIS) <sup>(11)</sup>.
- Marital status: categorical variable, single or married.
- Behavior of water-pipe smoking among the current WPS was evaluated by responding to questions in section 2 in the questionnaire such as: “what is your water-pipe smoking status?, where you most often smoke water-pipe?, do you intend to quit water-pipe smoking?”
- Motivation behind smoking water-pipe among the current WPS: a categorical variable that was assessed by responding to statements that identify the main reasons that drive students to smoke water-pipe by either agree or disagree such as: “it is a good way to socialize with family and friends, it helps me to feel relaxed, I enjoy the taste, it helps me not smoke cigarettes.”
- Beliefs of students regarding water-pipe use and their perceived risk and severity of water-pipe smoking, this was assessed by 14 statements like: “I think, society accept water-pipe smoking more than cigarette smoking, I think, using water-pipe is less harmful than

smoking cigarettes. I think young people who use water-pipe have more friends.” For each term, Likert-type responses included agree, disagree and I don’t know.

For the purpose of analysis a new variable was extracted from these items and named social norms variable which included the following three items: society approves water-pipe smoking, society approves water-pipe smoking more than cigarette smoking, and my family accept smoking water-pipe.

- Knowledge of possible adverse health effects of water-pipe use, was assessed by reading a list of eleven health effects and diseases that may or may not be caused by water-pipe smoking and responding to them by either agree, disagree or I don’t know based on their knowledge.

### **3.6 Data collection tool**

A Self-administered questionnaire was used to collect data. It was constructed and developed from a literature review and questions adapted from previously published water-pipe smoking studies <sup>(2, 4, 16, 17, 18, 19, 20)</sup>. The questionnaire was reviewed by three experts in the field before being translated into Arabic and pretested before being disseminated to students. The final draft of the constructed questionnaire was piloted on a group of 40 University students before starting the study. It aimed to assess the easy flow and understandability of the questions and time needed to complete the questionnaire. Also to assess the internal consistency of the

questionnaire through computing the Chronbach alpha with results ranged from 0.77 to 0.79 which is considered as very good.

The questionnaire contained a brief introduction about the study and its objectives. It included total of 55 questions, divided into 5 sections.

- Section I: this was about demographic data of the participants, and composed of 9 items to obtain background and personal information: age, gender, faculty of study, place of original residence, place of residence during university study, marital status, monthly average income, and average monthly spending on water-pipe smoking.
- Section II: this was about water-pipe smoking behavior. It asks about cigarette smoking status, water-pipe smoking status, and examining current level of water pipe-use and situational characteristics of water pipe use. In addition, the last four questions measure the participants intention to quit water-pipe smoking and if they have tried it or not. Only those who reported to be current WPS completed the questions of this section;
- Section III: This part was composed of statements that aimed to identify the main motives behind water-pipe smoking among students, they asked about whether smokers smoke water-pipe because: they find it a good way to socialize with family and friends, it helps them to feel less stressed and to relax, to spend leisure time, to enjoy taste and smell and other suggested reasons.
- Section IV: This part contained statements that aimed to assess students' believe regarding water-pipe use and their perceived risk and

severity of water-pipe smoking. The Chronbach alpha was calculated for this section using the pilot study and was found to be 0.77.

- Section V: This part aimed to measure the level of knowledge of student regarding adverse health effects of water-pipe smoking. It included items on the chemical contents of water pipe tobacco and the adverse health effects that could be associated with WP smoking. The Chronbach alpha was calculated for this section also using the pilot study and was found to be 0.79.

### **3.7 Data Analysis**

The data entry and statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 17. P-value  $\leq 0.05$  was set as a criterion of statistical significance. Data was then analyzed using descriptive methods then relationships were tested by applying univariate analysis and multivariate logistic regression.

- Descriptive statistics: frequencies and proportions were calculated for categorical variables. Mean and standard deviation were calculated for continuous variables.
- Inferential statistics: statistical significant relation between the study outcomes and the independent variables was assessed using the chi-squared test and *t*-test as appropriate.
- For analysis purposes belief and knowledge scores has been created. Each individual's response was counted as good belief if he or she indicated agree on statements with good belief, or indicate with disagrees on statements with bad belief. A belief score equal to the

number of agree or disagree responses according to the meaning of the statement individual had out of eleven statements that describes the belief was given to each student as a new variable.

- A knowledge score has been given for each participant according to the number of correct answers that he or she had out of eleven statements (as the answer was considered correct if the response was agree, and incorrect if the response was disagree or don't know).
- The multivariate logistic regression model has been performed in order to control for the confounding factors that might be associated with current WP use. The model included all variables that have been found to be significantly related to WPS in the univariate analysis.

### **3.8 Ethical consideration**

- IRB approval and appropriate permissions was taken from the University administration before conducting the study.
- Approval of the graduate studies scientific board council was taken.
- A brief summary about the study and its objectives was provided to students before their permission was requested to fill the questionnaire and filling the questionnaire and returning it was considered agreement to participate.
- Anonymity of the participants and confidentiality of the collected data were assured.

## **Chapter Four**

### **Results**

Data was analyzed to find out frequencies that describe the demographic characteristics of the participants and their WPS pattern; prevalence, behavior, motivation, beliefs and level of knowledge regarding adverse health effects. Relations were also explored between WP smoking status and demographic characteristics, social norms, beliefs and perceived risks, and the level of knowledge regarding adverse health effects of smoking WP. Also relations between gender and motives and social norms have been studied.

In this study the total sample size was 810 students; among them a total of 750 students completed and returned the questionnaire with a response rate of 92.5%.

#### **4.1 Demographic characteristics of the study participants**

Table1 shows the demographic characteristics of the study participants. Almost half of the study group was females and the mean age of students was 19.7 years. All of the study participants were bachelor students; among them 59.9% were in the Humanities and social sciences faculties. Almost half of the participants (52.7%) resided in a village before enrolled at the university and 82.3% of them were residing with their families.

**Table 1: Demographic characteristics of the study participants (n=750)**

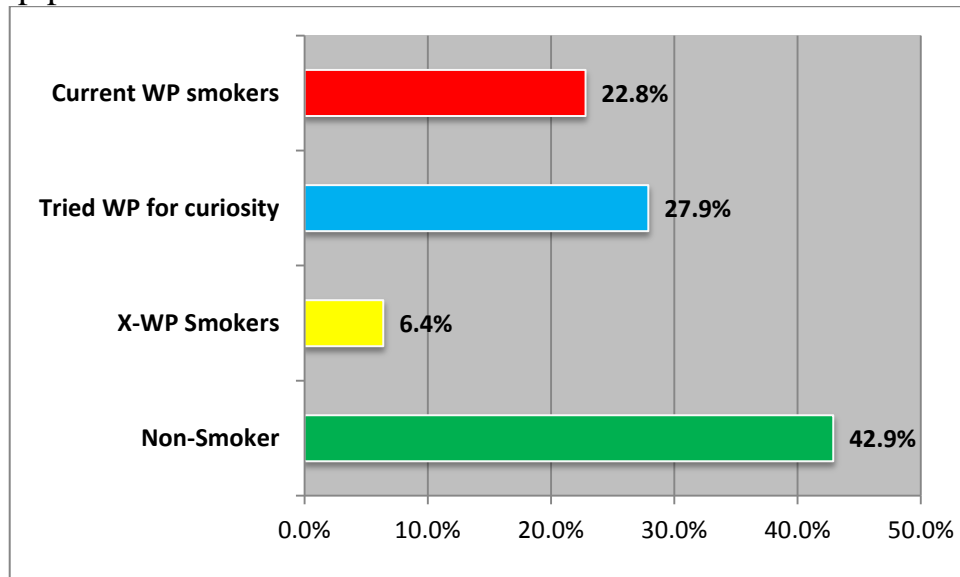
<b>Characteristic</b>	<b>Frequency (%)</b>
<b>Age</b>	Mean age 19.7 years (SD 1.4)
<b>Gender:</b> Male Female	351 (46.8%) 399 (53.2%)
<b>Faculty:</b> Humanities and social sciences Engineering and information Technology Medicine and health sciences Natural sciences	449 (59.9%) 131 (17.5%) 088 (11.7%) 082 (10.9%)
<b>Place of residence:</b> Village City Camp	395 (52.7%) 326 (43.4%) 029 (03.9%)
<b>Place of residence during studying:</b> In family home With friend in rented apartment Alone in rented apartment	617 (82.3%) 110 (14.7%) 023 (03.1%)
<b>Monthly income level of the family:</b> More than 2000 1000-2000 NIS Less than 1000NIS	497 (66.3%) 209 (27.9%) 44 (5.9%)
<b>Marital status:</b> Single Married	714 (95.2%) 36 (04.8%)

#### **4.2 Prevalence of Tobacco use**

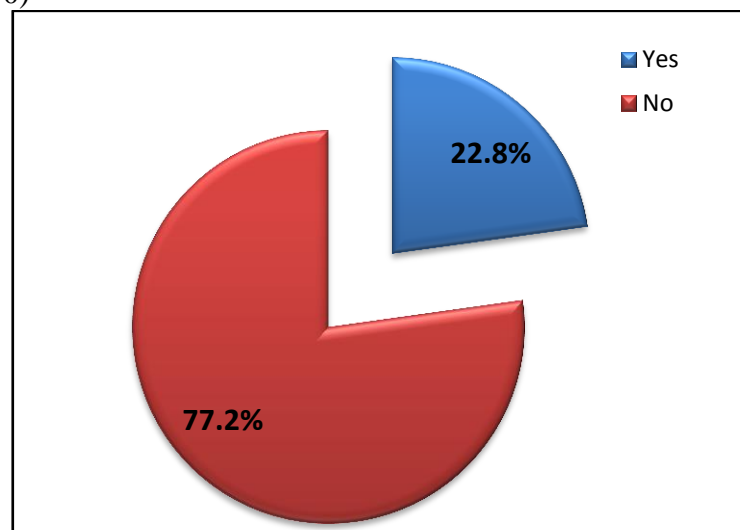
Around one third of the university students (34.3%) reported to have ever used water-pipe tobacco (6.4% were X-smokers of WP and 27.9% of them tried WP for curiosity) (Figure 1), and 22.8% of the study group was current WP smokers (Figures 1 and 2). On the other hand, 16.1% of the



study group was current cigarette smoker; among them 9.4% are current water-pipe smokers also.



**Figure 1:** Distribution of the Water-pipe smoking status among the university students (n=750)



**Figure 2:** Prevalence of current water-pipe smoking among the University students (n=750)

### **4.3 Water-pipe status by respondent characteristics**

The difference between current water-pipe smokers and non-current smokers regarding their demographic characteristics is shown in table 2. The difference between males and females regarding the prevalence of current water-pipe smoking was statistically significant (P-value= <0.001) as 35.5% of males were current water-pipe smokers while only 11.5% of females were current smokers.

Regarding the collages, again the difference was found to be statistically significant (P-value= 0.033); humanities and social sciences faculty reported the highest prevalence of water-pipe smoking among its students (25.4%) while medicine students reported the lowest prevalence of water-pipe smoking (12.5%).

The WPS status didn't show difference in relation to residency (city village or camp) (P-value= 0.057). Slightly less than one-third of those who live with their friends during studying (30.9%) were current WP smokers and this percentage is higher than that of those who live with their families or alone in rented house (P-value=0.09).

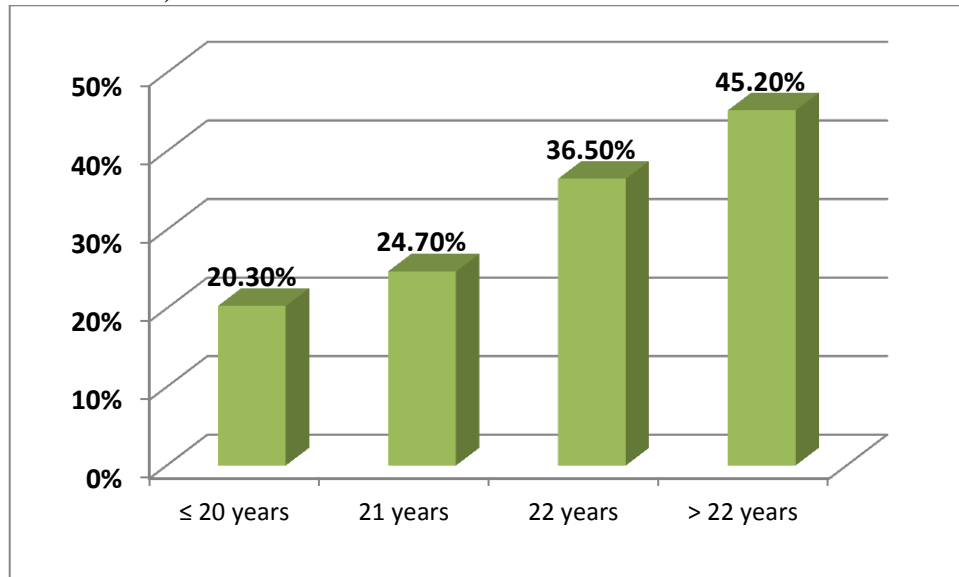
Although married students reported higher prevalence of WPS (30.6%) than single students (22.3%) the difference between both groups was not significant (P-value= 0.34). Also the monthly income level was not found to be a significant factor in the prevalence of smoking water-pipe (P-value=0.468), as around 20.0% of those in low and middle income level were WP smokers, and 24.1 of those whose their monthly income is more than 2000 NIS were WP smokers.

**Table 2: Water-pipe status by respondent characteristics (n=750)**

<b>Characteristic</b>	<b>Total (%)</b>	<b>Current WP smokers n=171(%)</b>	<b>Non-current WP smokers n=579 (%)</b>	<b>P-value<sup>^</sup></b>
<b>Gender:</b> Male Female	351 (46.8%) 399 (53.3%)	124 (35.5%) 47 (11.8%)	226 (64.6%) 353 (88.5%)	< 0.001
<b>Faculty:</b> Humanities and social sciences Engineering and IT Natural sciences Medicine	449 (59.9%) 131 (17.5%) 82 (11.7%) 88 (10.9%)	114 (25.4%) 32 (24.4%) 14 (17.1%) 11 (12.5%)	335 (74.6%) 99 (75.6%) 68 (82.9%) 77 (87.5%)	0.033
<b>Place of residence:</b> City Village Camp	326 (43.5%) 395 (52.7%) 29 (3.9%)	83 (25.3%) 78 (19.7%) 10 (34.5%)	242 (74.5%) 317 (80.3%) 19 (65.5%)	0.057
<b>Place of residence during studying:</b> Family house With friends in rented house Alone in rented house	617 (82.3%) 110 (14.7%) 23 (3.1%)	132 (21.4%) 34 (30.9%) 5 (21.7%)	485 (78.6%) 76 (69.1%) 18 (78.3%)	0.09
<b>Marital status:</b> Single Married	714 (94.9%) 36 (4.8%)	160 (22.3%) 11 (30.6%)	554 (77.7%) 25 (69.4%)	0.34
<b>Monthly income level:</b> Less than 1000 NIS 1000-2000 NIS More than 2000 NIS	44 (5.9%) 209 (27.9%) 497 (66.3%)	9 (20.5%) 42 (20.1%) 120 (24.1%)	35 (79.5%) 167 (79.9%) 377 (75.9%)	0.468

<sup>^</sup> *Pearson Chi-Square Test*

The prevalence of WPS was studied in relation to age, and it was noticed that it increases as the age increase. The prevalence of WPS was 20.3% among the  $\leq 20$  years age group compared to 45.2% among  $\geq 20$  years. This increase in the prevalence in WPS was found to be statistically significant (P-value= 0.005).



**Figure 3:** Prevalence of water-pipe smoking by age groups

The relation between cigarette smoking and water-pipe smoking status was tested. It showed that there is a significant relation between both behaviors (P-value=  $< 0.001$ ); as 41.5% of current water-pipe smokers were also cigarette smokers, whereas only 8.7% of non-current WP smokers were cigarette smokers (Figure 4).

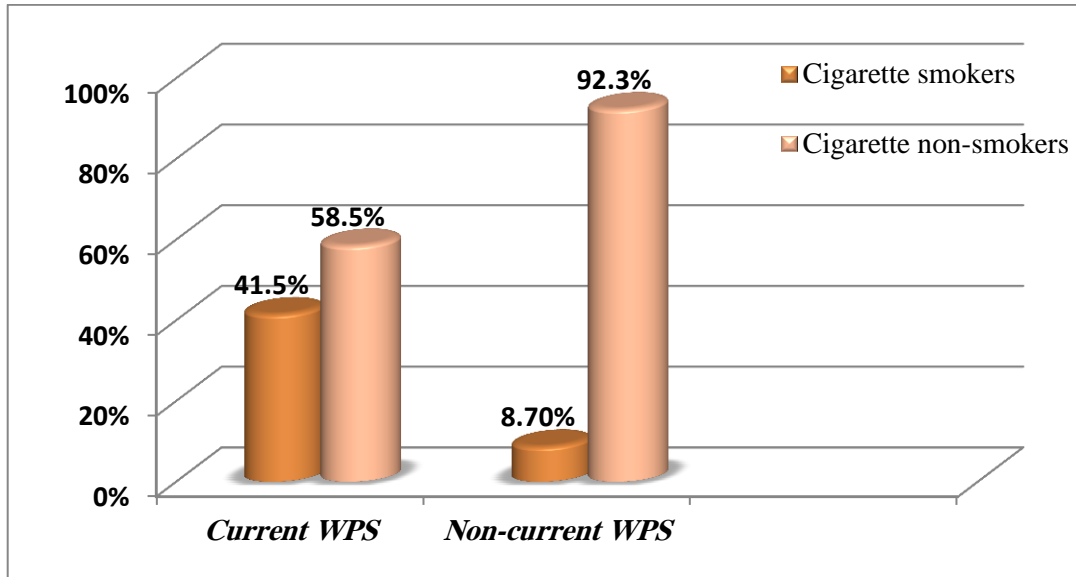


Figure 4: Frequency of water-pipe smoking by cigarette smoking

\*P value <0.001

#### 4.4 Behavior of water-pipe use

Table 3 shows some characteristics related to water-pipe first use. The mean age of starting WPS was 16.6 years for males and 17.6 years for females and the difference between both groups was found to be statistically significant ( $t(168): -3.050, P < 0.003$ ). About two thirds (57.9%) of smokers' first use was in company with their friends and café and/or restaurants where the most common places for students to start WP smoking (38.0%) followed by own homes (31%).

**Table 3: characteristics of water-pipe first use**

<b>Characteristic</b>	<b>Frequency n=171 (%)</b>
<b>Age of starting WPS (<i>mean ±SD</i>) :</b>	
Male	16.6 years ±1.9
Female	17.6 years ±1.7
<b>First use company:</b>	
With friends	99 (57.9%)
With family	31 (18.1%)
Group of family and friends	29 (17.0%)
Alone	12 (7.0%)
<b>Place of first use:</b>	
Cafe or restaurant	65 (38.0%)
At home	53 (31.0%)
At friend home	28 (16.4%)
Other places	25 (14.6%)

Table 4 describes the general behaviors and patterns of WPS among the current WP smokers. Around 40% of current WP smokers smoke it daily whereas 45.0% smoke it weekly. The majority of students (81.3%) smoke WP usually with their friends, and more than half of them (59.1%) has at least four or more of their closest friends who agree their smoking water-pipe.

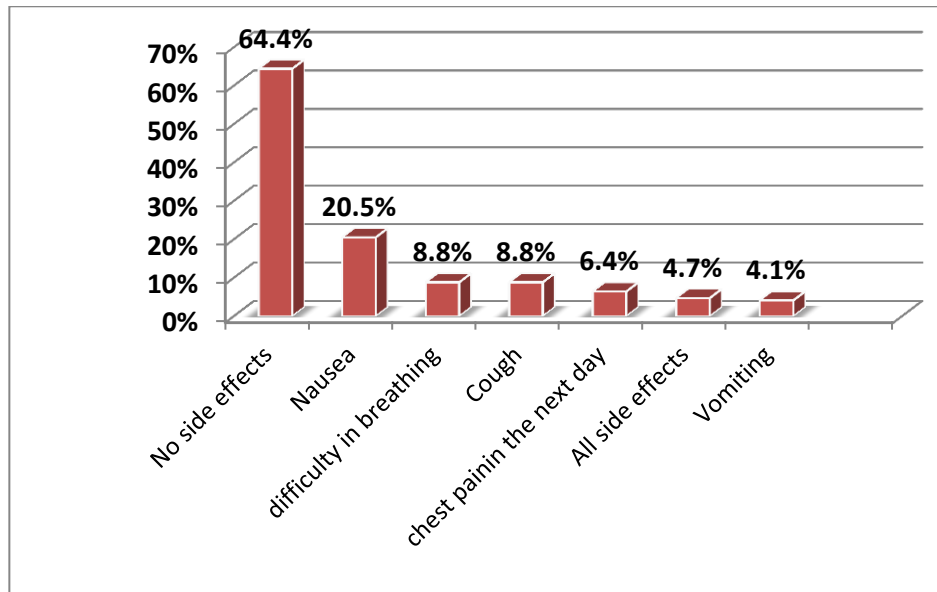
Regarding smoking behavior; 97.7% of the smokers prefer to smoke Maasel and the average duration of the smoking session of 62.5% of the smokers is around half an hour to one hour; while 8.8% of them smoke it

for more than 3 hours. Surprisingly, 45.6% of the smokers share the same mouth piece with others all or most of the times.

**Table 4: Behavior of water-pipe use among current water-pipe smokers of ANU (n=171)**

<b>Behavior</b>	<b>Frequency n=171 (%)</b>
<b>Average use of WP:</b>	
Weekly	77 (45.0%)
Daily	70 (40.9%)
Monthly	24 (14.0%)
<b>Place of smoking WP most often:</b>	
In a cafe	78 (45.6%)
At my home	76 (44.4%)
At friends home	17 (9.9%)
<b>Company of WP smoking most often (more than one response was allowed):</b>	
With friends	139 (81.3%)
With family members	70 (40.9%)
Alone	46 (26.9%)
<b>Average duration of WP smoking session:</b>	
Less or equal half an hour to 1 hour	107 (62.5%)
More than 1 hour to 2 hours	49 (28.7%)
More than 3 hours	15 (8.8%)
<b>Frequency of sharing the same mouth piece of WP:</b>	
All or most of the times	78 (45.6%)
Few times	65 (38.0%)
Never	28 (16.4%)
<b>Number of closest friends who agree on WP smoking:</b>	
One to three friends	70 (40.9%)
More than three friends	101 (59.1%)
<b>Favorite flavor:</b>	
Whole mixed fruit (Maasel)	167 (97.7%)
Tobacco (Agame)	4 (2.3%)

Regarding the side effects after smoking water-pipe; the highest percentage of the smokers (64.9%) reported that they experience nothing of the mentioned side effects after the smoking session, while (20.5%) reported nausea as the most common side effect after smoking session (figure 5).



**Figure 5:** Distribution of participants' answer on side effects after smoking water-pipe

#### 4.5 Motives

Table 5 presents the current smokers' responses regarding motives for WP smoking. The main reason that drives the students to smoke WP is that they enjoy its taste (70.8%). As well, majority of them reported that it helps them to feel more relaxed (57.3%), and 48.0% of smokers find WP as something to do when they are bored. Additional motives included enjoying the smell, socializing with families and friends, peer influence, control weight, etc.

The motives for WP smoking were studied in relation to gender. Both male and females agreed on enjoying the taste as the main motivators, however,



65.3% of male smokers feel relaxed when they smoke water-pipe, while only 17.0% of females really do (P-value= 0.001). As well; 34.7% of male smokers reported that smoking water-pipe helps them not to smoke cigarette compared to 13.0% of females (P-value= 0.006).

**Table 5: Reasons that drive ANU students to smoke water-pipe (n=171)**

<b>Motivation behind smoking WP</b>	<b>Total n=171 (%)</b>	<b>Male n=124 (%)</b>	<b>Female n=45(%)</b>	<b>P- value<sup>^</sup></b>
Enjoying the taste	121 (70.8%)	93 (74.3%)	28 (60.9%)	0.09
It helps me to feel relaxed	98 (57.3%)	81 (65.3%)	17 (37.0%)	0.001
Enjoying the smell	97 (56.7%)	73 (58.9%)	24 (50.1%)	0.30
It's something to do when I feel bored	82 (48.0%)	42 (34.6%)	40 (30.5%)	0.062
It helps me not smoke cigarettes	49 (28.7%)	43 (34.7%)	6 (13.0%)	0.006
Good way to socialize with family and friends	45 (26.3%)	34 (27.4%)	11 (23.9%)	0.645
Influence of friends and/or family	39 (22.8%)	25 (20.2%)	14 (30.4%)	0.157
It helps control my weight	15 (8.8%)	13 (10.5%)	2 (4.3%)	0.210
Not to feel different when being in a company with water-pipe smokers	15 (8.8%)	10 (8.1%)	5 (10.9%)	0.567

<sup>^</sup> *Pearson Chi-Square Test*

#### **4.6 Social norms, beliefs, perceived risk and severity of water-pipe smoking**

Society and family attitudes about water pipe smoking have been studied among all study groups and their results are shown in table 6. Interestingly, 52.5% of the students agreed that the society approves water-pipe smoking

more than cigarette smoking and this percentage was significantly higher among the current smokers group ( $P\text{-value}\leq 0.001$ ).

Regarding family acceptance toward water-pipe smoking, significantly higher percentage of the current smokers families accept their students' water-pipe smoking (53.2%) compared to 14.9% of non-current smokers' families ( $P\text{-value}\leq 0.001$ )

The difference between males and females regarding social and family acceptance of WPS was also significant ( $P\text{-value}\leq 0.001$ ), as 67.4% of males agreed that society accept WPS and 43.0% of females did; and 30.0% of male students reported that their families accept their smoking water-pipe, whereas 18.0% of females did.

**Table 6: Social norms toward water-pipe smoking (Agreed data)**

Social norms	Total n= 750 (%)	WPS status			Gender		P-value <sup>^</sup>
		Current smokers n=171(%)	Non-current smokers n=579 (%)	P-value	Male n=351 (%)	Female n=399 (%)	
Society approves water-pipe smoking*	408 (54.4%)	114 (66.7%)	294 (55.85%)	<0.001	236 (67.4%)	172 (43.0%)	<0.001
Society approves water-pipe smoking more than cigarette smoking*	393 (52.4%)	113 (66.1%)	280 (48.4%)	<0.001	193 (54.9%)	200 (50.1%)	<0.001
My family accept smoking water-pipe*	177 (23.6%)	91 (53.2%)	86 (14.9%)	<0.001	104 (30.0%)	73 (18.1%)	<0.001

<sup>^</sup>Chi-Square Test

\* Frequency of students who responded with agree on this social norm

Results on students' negative beliefs about water-pipe smoking are shown in table 7. Generally, current water pipe smokers have significantly higher percentages of wrong beliefs on water pipe compared to the non-current smokers. It was found that 91.5% of non-current smokers' belief that youth harm themselves if they use water-pipe, while 69.0% of current smokers actually did; and the difference between both groups was statistically significant ( $P\text{-value} \leq 0.001$ ).

Interestingly, 62.6% of the current smokers perceive water-pipe smoking as not bad habit, compared to 27.8% of the non-current smokers, and this difference was found to be statistically significant ( $P\text{-value} \leq 0.001$ ).

As expected, there is a significant difference ( $P\text{ value} \leq 0.001$ ) between smokers and non-current smokers in the belief that smoking water-pipe is less harmful than smoking cigarettes (42.1% and 19.9% respectively).

Surprisingly, more than half of current smokers (57.9%) don't feel worried regarding bad health effects of water-pipe use whereas most of students of non-current smokers (77.9%) do really feel worried regarding the adverse health effects of WPS.

**Table 7: Distribution of Students negative perceptions and perceived risk regarding water-pipe smoking (n=750)**

<b>Negative beliefs and perceived risk</b>	<b>Total n= 750 (%)</b>	<b>Current smokers n=171(%)</b>	<b>Non-current smokers n=579 (%)</b>	<b>P-value<sup>^</sup></b>
I think youth harm themselves if they use water-pipe *	102 (13.6%)	53 (30.9%)	49 (8.5%)	< 0.001
I think if water-pipe use is stopped earlier the health risks will reverse *	304 (40.5%)	70 (40.9%)	234 (40.4%)	0.903
I think water-pipe smoking is not a bad habit**	268 (35.7%)	107 (62.6%)	161 (27.8%)	< 0.001
I think smoking water-pipe make people look cool and fit in**	254 (33.9%)	92 (53.8%)	162 (28.0%)	< 0.001
I think young people who use water-pipe have more friends **	306 (40.8%)	81 (47.4%)	225 (38.9%)	0.047
I think smoking water-pipe is less harmful than smoking cigarettes **	187 (25.0%)	72(42.1%)	115(19.9%)	< 0.001
I don't feel worried regarding bad health effects of water-pipe use **	227(30.3%)	99 (57.9%)	128 (22.1%)	< 0.001
I think that the medical evidence that water-pipe smoking is harmful is exaggerated **	304(40.5%)	113 (66.1%)	191(33.0%)	< 0.001

<sup>^</sup> **Chi-Square Test**

\*Frequency of students who responded with either disagree or don't know

\*\*Frequency of students who responded with either agree or don't know

#### **4.7 Intention and perceived ability to quit**

Almost half of the smokers (49.7%) reported that they have never tried to quit WP smoking; and around one quarter of them (24.0%) had no plans to quit at any time; despite that 89 of them (52.0%) feel that they can quit

water-pipe smoking at any time they want, whereas 67 smoker (39.2%) consider themselves “hooked” on smoking tobacco with water-pipe (table 8).

**Table 8: Current water-pipe smokers intention for quitting WP smoking and their perceived control over themselves regarding water-pipe smoking behavior n= 171**

	<b>Frequency (%)</b>
<b>Intention for quitting WPS:</b>	
Yes	66 (38.6%)
No	41 (24.0%)
Don't know	64 (37.4%)
<b>Previous trial of quitting WPS:</b>	
Never	85 (49.7%)
Several times	44 (25.7%)
Once	42 (24.6%)
I consider myself “hooked” on smoking tobacco with water-pipe	67 (39.2%)
I feel it is difficult to quit water-pipe smoking	64 (37.4%)
I feel I can quit water-pipe smoking at any time if I want	89 (52.0%)

#### **4.8 Knowledge of health effects associated with water-pipe use**

Level of knowledge regarding health effects of water-pipe smoking was tested and results are shown in table 9. Majority of the students (84.1%) agreed that smoke inhaled from water pipes contains harmful chemicals; and this was significantly lower among the current water pipe users (70.8) compared to 88.0% of the non-current smokers (P value= <0.001). Less than half of students have the knowledge that water-pipe smoke has more tar and nicotine (47.5%), and more carcinogens and heavy metals than cigarette smoke (43.2%); and also here the differences between smokers

and non-current smokers were found to be statistically significant; as more non-current smoker students agreed on that.

For addictiveness, 77.7% of non-current smokers agreed that water-pipe smoking can be addictive compared to only 57.9% of the current smokers and this difference was statistically significant (P value= <0.001).

Regarding adverse health effects of WPS; around 80.0% and even more of non-current smokers agreed that water-pipe smoking can lead to different types of cancers, heart disease and harm to unborn babies; whereas around 60.0% of smokers did; and again the difference between both groups was statistically significant (P value= <0.001).

**Table 9: Knowledge of health effects associated with water-pipe use among An-Najah National University students**

<b>Health effect of water-pipe smoking</b>	<b>Total n= 750 (%)</b>	<b>Current smokers n=171(%)</b>	<b>Non-current smokers n=579 (%)</b>	<b>P-value<sup>^</sup></b>
Smoke inhaled from water pipes contains harmful chemicals.	631 (84.1%)	121 (70.8%)	510 (88.0%)	< 0.001
Water-pipe smoking can lead to different types of cancers; such as lung cancer, mouth & throat cancer, and other cancers.	619 (82.5%)	106 (62.0%)	513 (88.8%)	< 0.001
Water-pipe smoking can lead to heart diseases.	574 (76.5%)	108 (63.2%)	466 (80.5%)	< 0.001
Water-pipe smoking can harm unborn babies.	568 (75.7%)	104 (60.8%)	464 (80.1%)	< 0.001
Water-pipe smoking is addictive.	549 (73.2%)	99 (57.9%)	450 (77.7%)	< 0.001
Water-pipe smoking can be harmful to those exposed to second hand smoke.	546(72.8%)	105 (61.4%)	441 (76.2%)	< 0.001

Water-pipe tobacco has more tar than cigarettes.	357 (47.6%)	69 (40.4%)	288 (49.8%)	0.029
Water-pipe tobacco has more nicotine.	356 (47.5%)	68 (39.8%)	288 (49.7%)	0.022
Water-pipe tobacco has more carcinogens.	324(43.2%)	68(39.8%)	332 (57.3%)	< 0.001
Water-pipe tobacco has more heavy metals.	324 (43.2%)	58 (33.9%)	266 (46.0%)	0.005
Water-pipe smoking can lead to infertility in male smokers.	318 (42.4%)	57 (33.3%)	261 (45.1%)	0.006

^ **Chi-Square Test**

#### **4.9 Multivariate analysis of factors associated with WP use**

The multivariate logistic regression model has been performed to assess the variables associated with WP use and to control for the confounding factors (table 10). The model included all variables that have been found to be significantly related to WPS in the univariate analysis; age, gender, place of residence, place of residence during studying, type of faculty, and cigarette smoking status, in addition to social norms, belief score and knowledge score.

Controlling for all these variables, Logistic-Regression Model identified that individual factors most strongly associated with higher odds of current WPS were male gender (OR:2.6; 95% CI: 1.6-4.1) and living in rented house with friends during studying (OR:4.3; 95% CI: 1.0-18.4).Also, two faculties (Humanities and social sciences, and Engineering and IT) were associated with higher odds of current WPS than Faculty of Medicine and health sciences (OR: 2.4; 95% CI: 1.2-4.6, and OR: 2.3: 95% CI: 1.07-4.7 respectively)

Cigarette smoking was found to be significantly associated with current WPS (P value: <0.001), where current cigarette smokers had higher probability (OR: 3.3, 95% CI: 2.0-5.5) to be WP smokers compared to non-cigarette smokers.

Social norms were also significantly associated with smoking water-pipe, as those who agreed on that society approves water-pipe smoking more than cigarette smoking have 1.8 times greater tendency to use water-pipe than those who disagreed on that (95% CI: 1.1-2.8). Family acceptance for WPS was also found as a significant factor that could be associated with WP use, and students showed that those whose families accept their smoking WP are at 4.6 times at greater risk of smoking WP than those whose families don't accept (95% CI: 2.9-7.2).

Interestingly, students' belief was also found as a significant factor of current WPS. The results showed that when belief score is increased the tendency to WPS decreased (OR: 0.8, 95% CI: 0.8-0.9). This relation was also found between knowledge score of each student and current WP use, as also whenever knowledge score is decreased the risk of using water-pipe increase (OR: 0.9, 95% CI: 0.8-0.9).



**Table 10: Multivariable Analysis of Factors Associated with WP Use**

Variables	P value	OR <sup>∞</sup>	95% CI <sup>a</sup>	
			lower	upper
<b>Age</b>				
≤20 years	0.613	0.9	0.5	1.4
> 20 years <sup>#</sup>				
<b>Gender</b>				
Female <sup>#</sup>	< 0.001	2.6	1.6	4.1
Male				
<b>Faculty</b>				
Medicine <sup>#</sup>	0.038			
Humanities and social sciences	0.011	2.4	1.2	4.6
Engineering and IT	0.032	2.3	1.07	4.7
Natural sciences	0.402	1.5	0.6	3.3
<b>Place of residence:</b>				
Village <sup>#</sup>	0.467			
Camp	0.485	1.4	0.5	4.0
City	0.254	1.3	0.8	2.0
<b>Place of residence during studying:</b>				
Alone in rented house	0.111			
With friends	0.049	4.3	1.0	18.4
With family	0.123	3.0	0.7	11.8
<b>Cigarette smoking status</b>				
No <sup>#</sup>	<0.001	3.3	2.0	5.5
Yes				
<b>Social norms</b>				
<b>Society approves WPS:</b>				
Disagree <sup>#</sup>	0.840	1.0	0.6	1.7
Agree				
<b>Society approves WPS more than cigarette smoking:</b>				
Disagree <sup>#</sup>	0.012	1.8	1.1	2.8
Agree				
<b>Family accept WPS</b>				
Disagree <sup>#</sup>	<0.001	4.6	2.9	7.2
Agree				
<b>Belief score</b>	0.001	0.8	0.8	0.9
<b>Knowledge score</b>	< 0.001	0.9	0.8	0.9

<sup>∞</sup>Odds Ratio, <sup>a</sup>Confidence Interval, <sup>#</sup>Reference group

## **Chapter Five**

### **Discussion**

The hazards of WP smoking were first identified by Nafae et al. in 1973. Over the next three decades, compelling evidence regarding the hazards of WPS accumulated in literature <sup>(29)</sup>, and unfortunately; questions on WPS are not generally included in routine surveillance on tobacco; resulting in very little population level data being available in most countries, which led WHO in 2005 to recommend hardly to improve understanding of the epidemiology of and factors associated with WPS among different populations <sup>(17)</sup>.

This study investigated WP use prevalence, behavior, motives, beliefs and perceived risks of its use on health, in addition to the level of knowledge regarding adverse health effects of WP use among ANU students in 2014. Given the dearth of epidemiological data describing different aspects of this potentially major public health problem in East Mediterranean region (EM), this study provides the first insights into and a detailed description of the spread and characteristics of WPS among students of one of the biggest universities in Palestine.

#### **5.1 Study sample**

This study was a cross sectional survey. The sample was collected from the obligatory courses of the university. The total number of students who participated in this study was 810, which is considered large enough to reflect the WP smoking pattern of the university students in ANU. This

sample size was higher than that of several studies among university students in other countries <sup>(16, 28, 29, 31, 36)</sup>.

The study population was fairly distributed in regard to gender as 53.2% of them were females, and this was comparable to the general university population which has almost equal proportions of male and female students <sup>(11)</sup>. 59.9% of students were in Humanities and social sciences faculty; this could be a result of classes selection method

## **5.2 Prevalence of tobacco use**

Around one third of the university students (34.3%) reported to have ever used water-pipe tobacco in their life time. This was found to be comparable to what was reported in some studies done in western universities such as Birmingham University in London (34.8%) <sup>(37)</sup>, but lower than that reported in a lot of similar studies done in neighboring countries (42.5% in Iran <sup>(30)</sup>, 48.0% in Syria <sup>(28)</sup>, 53.0% in Pakistan <sup>(29)</sup> and 56.0% in Jordan <sup>(27)</sup>. This lower rate could be a result of possible differences in the definition of ever WP smoker, or could be under reporting of the prevalence which could be a result of self-reporting method of data collection.

The prevalence of current WPS among our study participants was 22.8%, this was consistent with what was reported in other studies done in EM region such as Syria (22.0%) <sup>(28)</sup>, and one study done in three public Jordanian universities (25.0%) <sup>(21)</sup>, but higher than other western rates (8.0% in United Kingdom <sup>(37)</sup> and 6-14.0% in USA) <sup>(31, 36)</sup>. On the other hand, the prevalence of current WPS in our study was found to be lower than that of university students in Gaza strip (36% smoke WP only) <sup>(12)</sup>, and

universities of other EM region; as students of four Karachi universities in Pakistan had reported much higher prevalence (61.8%)<sup>(29)</sup>, in addition to the Jordanian students (30.0%)<sup>(27)</sup> and Lebanese students (28.0%)<sup>(10)</sup>. All these findings indicate that EM region is one of the highest areas that are exposed to such hazard; indicating a massive need for active and effective interventions to limit the spread of this hazard.

The prevalence of cigarette smoking in this study was (16.1%) which is much lower than the prevalence of WPS (22.8%); and 58.5% of current WPS were not cigarette smokers; indicating that WPS phenomena is becoming more and more accepted and widely spread than cigarette smoking in our culture and among our families, and that social attitudes are becoming more lax especially regarding females. This can be obviously noted when comparing the WPS with cigarette smoking among females (11.5% and 3.8% respectively). These findings are consistent with those of universities of Gaza<sup>(12)</sup> and the neighboring countries such as Jordan, Lebanon<sup>(21)</sup>, Syria and Iran<sup>(30)</sup>. This change in the social attitude and acceptance toward WPS can also be emphasized by the proportion of students who see that society approves WPS more than cigarette smoking (52.5% of participants). This belief had a significant negative influence on the behavior of students; as those who agreed on the statement that society approves WPS more than cigarette smoking had 1.7 times greater tendency to use water-pipe than those who disagreed on it; as well, students whose families accept their smoking WP were 4.6 times at greater risk of smoking WP than those whose families don't accept.

The prevalence of WPS and cigarette smoking collectively (38.9%) among the ANU students in the present study was found to be higher than findings of a previous study done in 2010 in ANU. This study investigated the prevalence of tobacco use (cigarette and WP) among students which had been 34.7%, and both these results were higher than the Palestinian Central Bureau of statistics estimates (2009) of the proportion of smokers in the general Palestinian population which was 19.8% (37.0% among males and 2.2% among females) <sup>(11)</sup>. This emphasizes the fact that tobacco consumption trends are increasing among our population especially among youth.

Regarding the association between smoking WP and cigarette; it was found that current cigarette smokers are at 3.3 times at greater risk of smoking WP than non-cigarette smokers; as 41.5% of current water-pipe smokers were also cigarette smokers, whereas only 8.7% of non-current WP smokers were cigarette smoke. Among Syrian university students cigarette smokers were about four times more likely to be WP smoker than non-cigarette smoker <sup>(28)</sup>, whereas in US study this was reported to be as much as 10.4 times more likely <sup>(30)</sup>. This might indicates that one of this two behavior may be a gateway to the other; suggesting that it may be appropriate to target water-pipe smokers as part of efforts to reduce cigarette use in some settings.

Male gender was significantly associated with smoking WP with higher odds by 2.6 times than female gender. This was consistent with findings of most similar studies conducted in the EM region <sup>(14, 21, 27, 28)</sup>. But, when

comparing the difference in the prevalence of WPS in male and female students it was lower than previously shown in a similar study on the prevalence of both cigarette and WP smoking among ANU students which was done in 2010 <sup>(11)</sup>; indicating that females are accepting smoking especially WP more and more by time. On the other hand, in studies conducted in United States such differences were minimal <sup>(25)</sup>, and this may be related to the fact that even our societies are becoming more lax toward female smoking; there is still some restrictions among females.

Interestingly, although wasn't significant, the prevalence of WPS in this study increased with age. This is similar to what has been found in other studies <sup>(27, 30, 37)</sup>. In a Jordanian study current and ever use of tobacco peaked among undergraduates who had spent more than four years in their institution and aged 23 years <sup>(27)</sup>; suggesting that as students grow older they are exposed to more risk factors for WPS such as peer pressure, indicating that WPS is propagated through student culture. In another American study it was shown that most smokers were over 20 years, and the reason that was suggested for such finding was the reduction of the family pressure against their kids' smoking during adolescence; as once students get older and acquire more freedom family pressure lessens <sup>(16)</sup>.

Living in a rented house with friends during studying was also associated with higher odds (by 4.3 times) for WPS than living alone or with the family. This is consistent with western data which generally showed increased use of WP among students who live away from their parents; which emphasizes the important influence of peer pressure on increasing

the prevalence of WPS. On the other hand, in the study which was conducted in four Jordanian universities <sup>(27)</sup>; students living on their own had lower odds of smoking a WP than those living with their parents; this was explained by that “students who still living with their families may therefore have support systems facilitating WPS, such as increased access to and familiarity with water-pipes, and other paraphernalia that they do not have to pay for with their own money.”

The type of faculty was found to be a risk factor for using WP; as students in humanities and social sciences faculty and Engineering and Information Technology faculty were associated with higher odds for WP use (2.3 and 2.4 respectively) than medicine students. This was exactly similar to the results of the previous study that had been conducted in ANU in 2010 to investigate the prevalence of tobacco consumption among students, and the lower risk of smoking by health sciences students was related probably to the strong effect of education about the health risks of smoking <sup>(11)</sup>. However, sample selection bias might have an effect here which showed higher representation of participants from the art colleges.

### **5.3 Behavior of water-pipe use**

Strikingly, this study revealed that our students started WPS at early age (mean age of starting WPS was 16.6 years for males and 17.6 years for females); and this was found to be much earlier than what was reported in other countries such as Jordan and Pakistan (18.1 years) <sup>(29, 30)</sup>, Syria (19.6 years <sup>(28)</sup>, and 21.7 <sup>(31)</sup> years in two different studies). This indicates again that our society and families are becoming more and more lax toward

tobacco smoking especially by WP which is accepted more than cigarette smoking. This may be related to the ease in accessibility and availability of the WP in cafes and restaurants which do not have any restrictions toward these young ages, and this is obvious in the results of our students which show that more than one third of smokers had their first use of WP at cafes or restaurants.

Although most of smokers (57.9%) started the habit in company with their friends, a substantial proportion (35.1%) was in company with their family members or a group of their friends and family, which stresses the role of family in formulating unwanted social habits like WPS, and this is comparable with results of Jordanian study <sup>(21)</sup>.

Disappointingly; the majority of WP smokers in this study reported high average use of WP (40.9% daily and 45.0% weekly). This was again much higher than other populations, when compared to Iranian students (only 4.4 of students were daily smokers) <sup>(30)</sup>, Syrian male students <sup>(30)</sup> (only 7.0% were daily smokers), and Jordanian students who reported 19.7% of them as daily smokers <sup>(30)</sup>. This suggests that our students may becoming more and more hooked with WPS and this was assured by students as large proportion of smokers (39.2%) of them admitted that they are hooked to this bad habit. Around one quarter of the smokers had no intention to quit WPS which necessitate an immediate intervention to change their behavior and attitude in order to control such hazard.

The high average use of WP among our students was not the only risky behavior associated with WPS, but also around half of them (45.6%) share



the same mouth piece with others all or most of the times, and this was exactly similar to the Jordanian universities students behavior <sup>(17)</sup>; which can be considered as an alarming sign because this could be a substantial source of cross infections.

#### **5.4 Motives**

The main reason that drives our students to smoke WP was that they enjoy its taste (70.8%), and this was assured by their response on the question which asked about the preferred flavor of smoking material; where 97.7% of students preferred Maasel than Agami. “Maasel” is a relatively new form of tobacco material composed of dried fruits with different types of flavors which are considered as the most attractive and enjoyable factor in smoking WP. This was also found among Syrian students who said that the smell and taste of WP smoke was its chief positive attribute <sup>(28)</sup>. This put the responsibility of increasing the prevalence of this bad habit to some extent on the tobacco manufacturing companies which are doing their best in producing new innovations of smoking materials just to attract children, youth and adults to WPS and make it more and more enjoyable, and this is one of the most important areas that public health initiatives must struggle against to limit the widespread of this public health hazard.

Also, the majority of students find WPS a way to feel more relaxed and stress-free way to pass the time and to seek pleasure; this was comparable to students of neighboring and western countries <sup>(29, 32)</sup>. This was explained by a study done in USA in 2011 aimed to understand the psychosocial aspects of WPS among college students that they try to escape from the

daily pressure of university or work through WPS, and this form of escapism may be related to depression, which might need further investigation<sup>(32)</sup>. The fact that students find WPS as something gives them fun when they are bored could be related to the lack of other healthy activities in our societies that can be practiced in leisure times and provide the social atmosphere that is sought through smoking WP.

In our study, over one quarter of smokers find WP as a good way to socialize with others, this was also reported by students of other studies<sup>(31, 32)</sup>, this feeling was explained by the American study which investigated the psychosocial aspects of WPS among college students that students may seek meeting expectations (through WPS) related to bringing family and friends together and reinforce their culture along with staying focused. In this American study students also viewed WPS as a way that enable them to make new friends<sup>(32)</sup>. This was quite similar to what has been reported by some students of our study as they smoke WP just not to feel different when they are in company with smokers.

One of the most important factors that could be a motivator factor for WPS is peer pressure. It had been reported by several studies<sup>(21, 29, 30, 31)</sup> and was clearly obvious in the responses of the study participants; as up to one quarter (22.8%) of smokers admitted that they smoke WP under the influence of their families or friends. This is in addition to that the friend was most often the introducer or companion in the first use (59.9%), and the companion of most WPS sessions (81.3%), and more than half of smokers (59.1%) has more than three (either four or five) of their closest

friends who smoke WP and agree their smoking water-pipe. This can explain the high percentage of WP users (45.6%) who practice this habit at cafes; as definitely youth especially females prefer to enjoy smoking with their friends without much (if any) parental opposition. Unfortunately this is served a lot by the large and increasing number of cafes and restaurants that provide WP with pleasant social atmosphere for smokers without any restrictions<sup>(21)</sup>.

### **5.5 Social norms**

Societal approval for WPS was perceived by substantial proportion of students (54.4%), and analysis showed that this perception serves as encouraging factor for using WP without any feeling of social stigma. As those who perceive that society approves water-pipe smoking more than cigarette smoking had 1.7 times greater tendency to use WP than who did not have such perception. This is in addition to the interesting finding where families' acceptance for WPS was found to be a significant risk factor for increasing tendency to smoke WP by 4.6 times. It is obvious from these results that the negative social norms against cigarette smoking is not applied to WPS in our society; which may be related to its more recent trend and use; and this may play an important role in the wide and dramatic spread of this type of tobacco use.

These important results indicate the seriousness of the role of societal and family attitude in forming either good or bad habits among individuals, and should be a direct target of any future interventions toward struggling this bad and unhealthy habit and clean the society from it. These observed

associations were consistent with previous studies<sup>(16, 29, 32)</sup>, and was given an explanation based on the theory of reasoned action, whereby intention and subsequent behaviors are predicted by attitudes and normative beliefs about the behavior<sup>(16)</sup>. Our findings of increased peer engagement and approval of WP use among smokers bolster the notion that the social aspects of the practice promote its use.

Results showed a statistically significant difference in family acceptance for WPS between males and females, indicating that there is still some taboo toward female smoking in some cultures. But on the other hand; the percentage of families who accept their daughters smoking was greater than the current prevalence of WPS among females, suggesting that the prevalence among females may increase more and more in the future without any parental oppositions.

Further evidence of families' lax attitude toward females' use of WP have been shown in previous Syrian study, where most of female WP smokers had started smoking and sharing WP with family members than male WP smokers. This finding has been viewed by the author as being the first evidence in the EM region of greater permissiveness of any type of tobacco use for females than males<sup>(28)</sup>.

### **5.6 Beliefs, perceived risk and severity of WPS**

Analyzing the belief score of each student revealed that students' negative beliefs about WPS were significant risk factors for using WP; and those with low belief score had greater tendency to be WP smokers; as 62.6% of the current smokers perceived water-pipe smoking as not bad habit,

compared to 27.8% of the non-current smokers, and 91.5% of non-current smokers' belief that youth harm themselves if they use water-pipe, while 69.0% of current smokers actually did. Also, a large proportion (42.1%) of smokers believe that smoking water-pipe is less harmful than smoking cigarettes compared to 19.9% of non-current smokers, this is in addition to the surprising result that more than half of the smokers don't feel worried regarding bad health effects of water-pipe use.

“Switching from cigarettes to water-pipe would reduce the health risks” was a misconception perceived by undergraduate introductory psychology class at an urban Midwestern university in USA <sup>(16)</sup>, and this was quite similar to the misconception that was reported by 34.7% of our WP smokers “it can help me not to smoke”, which means that WP is viewed as harm reduction method or substitute for cigarettes following cessation.

The misconception of that WPS is less harmful than cigarette smoking was found among university students of several western and EM countries such as America <sup>(16, 31, 32)</sup>, Canada United Kingdom, Australia <sup>(33)</sup>, Syria <sup>(28)</sup>, Jordan <sup>(21)</sup> and others. There are several reasons for this misconception; as students believe that water-pipe contain less nicotine and other chemicals than cigarettes, and that the water has filtering properties for the smoke which reduces its harmful chemical contents <sup>(33, 38)</sup>, as some WP users had reported that WP smoke is less irritating than that of cigarette; noting it has a smooth texture that allows them to smoke it for hours; although it is well known that passing air bubbles through water does not change their contents and since the volatile carcinogens for tobacco smoke and other

particles will stay within the air bubble during its passage through the water, the water will not filter the smoke in the bubbles <sup>(38)</sup>. Another suggested reason was the lack of media campaigns about WPS which indicated that it is safer than cigarettes <sup>(33)</sup>.

All these findings emphasize that our students have a lot of misconceptions and bad beliefs toward WPS in addition to the low level of perceived severity of WPS; and this can be viewed as being consistent with the concept of health belief model (perceived severity), which suggest that one's opinion of how serious a condition or a behavior and its health consequences are; is contributing factor in either performing or avoiding it. This indicates the importance of taking actions in this direction such as increasing awareness of students and the society in general regarding the real nature of the harm associated with WPS, and about how serious are the consequences of such bad habit.

### **5.7 Knowledge of health effects associated with water-pipe use**

This part of the study had investigated the level of knowledge among students regarding the difference between WP smoke and cigarette smoke in regard to their chemical contents; in addition to their level of knowledge regarding the adverse health effects of WP. The results showed that more than half of the students (WP smokers and non-current smokers) did not know that WP smoke has tar, nicotine, heavy metals and other carcinogens more than cigarettes which support the previous findings of the misconception that WP is less harmful than cigarettes due to the lower contents of chemicals or due to the filtering effect of water.

Regarding the adverse health effects of WP more than 60% of smokers had the knowledge that WP can lead to different types of cancer (lung, mouth, throat and others), heart diseases, and harm the unborn babies; and despite that they continue to smoke; either because they do not want to stop, or they cannot give up the practice due to social pressure; or more seriously due to addiction of such bad habit. While searching the literature a systematic review done in 2013 to summarize the literature regarding motives, beliefs and attitudes towards water-pipe tobacco smoking, showed that most of studies in the literature which studied the level of knowledge among university students had reported that students were aware of the adverse health effects of smoking WP and despite that a large proportion of them continue smoking <sup>(33)</sup>.

Although, this study showed that students had moderate level of knowledge regarding adverse health effects of WP, there were statistically significant disparities between current WP smokers and non-current WP smokers; whenever knowledge score is decreased the risk of using water-pipe increase. This was consistent with an American study done in Florida on university students to find out significant association between a 'don't know' response to various individual knowledge items and both current hookah tobacco use and susceptibility to hookah tobacco use <sup>(36)</sup>; which assure the importance of raising the level of knowledge regarding the adverse health effects of smoking in general and WPS in particular among students as one of the interventions to fight this public health hazard.

**Limitations of the study**

This study has a cross-sectional design; so temporal relationships and causality cannot be determined; but it was selected because it is usually considered as the best design for evaluating the prevalence.

The prevalence of current WPS that have been obtained in this study could be underestimated because of the self-reporting method used in data collection. Also, this study assessed only students of ANU which is one of the largest universities in Palestine and includes students from all different West Bank governorates and represents different social classes; including one university in the study could limit generalizing its findings on other university students or more widely on all young people in Palestine.

**Conclusion**

It is clear from the findings of our study that WPS is common among ANU students to be of concern and to be included in future efforts toward struggling WP.

Results regarding individual and social factors associated with WPS suggest that these efforts should primarily target not only the students' perception; attitude and adverse health effects knowledge of WP use; but also those of all society members (who are students' family, teachers and friends) who play a significant role in increasing its' spread by accepting this bad habit.



## **Recommendations**

Based on the study findings, the followings are recommended

1. Scientific evidences supports that WPS is associated with serious adverse health effects; which highlight the need for development, implementation and evaluation of interventions specifically adapted to control WPS, including education and awareness programs against WP.
2. University students' perception and attitude regarding WP use need to be addressed immediately, as this dangerous practice is viewed as harmless social activity.
3. The prevalence rates of WP use and the accumulating evidence that its' use is associated with nicotine addiction and other serious health effects suggest that it may be valuable to address this problem from a policy perspective; as when such polices remain absent from the public sphere it may be interpreted to signal "acceptance and safety" of WP use which may unintentionally promote its' spread.
4. Policy measures are mandatory to fight WPS and its recent widespread; as policy changes had been shown to be effective in reducing cigarette use in some countries; but unfortunately in Palestine WP tobacco smoking establishments are generally not affected by policy regulations (such as taxation, labeling, and clean air laws). Thus, a valuable first step in this area will be to perform a descriptive assessment of current tobacco related policy measures and how they do or do not pertain to WP tobacco smoking.

5. Health care providers, quit lines and university administrators should also consider offering culturally appropriate cessation products and services to help water-pipe smokers attempt to quit.

### **Further research**

- In future, it would be useful to repeat this survey to other Palestinian universities to ensure findings are reproducible across the general population.
- Further research is needed to characterize the factors that increase or decrease the likelihood of initiating WPS in order to develop guided prevention strategies.
- It may be useful to follow longitudinally the change in the trends of motives, beliefs, and level of knowledge regarding adverse health effects of WPS; in order to assess and guide public health interventions.
- It is important to held studies that can quantify the harmfulness of WPS by determining pulmonary, cardiovascular and other vital functions among users; in addition to researches that can characterize tobacco dependence in WP users to guide cessation interventions.

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## Annex (I)

### Questionnaire.

استبيان حول انتشار تدخين النارجيلة، ومعرفة الآراء، المواقف والمعتقدات السائدة حول تدخين النارجيلة، ومستوى ادراك خطورة تدخينها

أعزائي طلاب جامعة النجاح الوطنية (مدخنين للنارجيلة و غير مدخنين)

أنامي أبو الحلاوة طالبة ماجستير في قسم الصحة العامة بجامعة النجاح الوطنية، أقوم بعمل دراسة تهدف إلى جمع معلومات لمعرفة اذا ما كنت مدخن للنارجيلة أم لا و ما هو موقفك و رأيك تجاه تدخين النارجيلة. هذا الاستبيان يعنى بتدخين النارجيلة فقط و ليس تدخين السجائر. بمشاركتك بهذه الدراسة ستساعدني على فهم بعض الأسباب التي تدفع طلاب الجامعة الى تدخين النارجيلة أو عدم تدخينها بصورة أعمق.

مشاركتك بهذه الدراسة اختياري، و يمكنك الانسحاب بحرية بأي وقت تشاء، و تأكد بأن المعلومات التي سيتم جمعها ستبقى سرية و ستستخدم لأغراض البحث العلمي فقط.

استبيان حول انتشار تدخين النارجيلة، و معرفة الآراء، المواقف و المعتقدات السائدة حول

تدخين النارجيلة، و مستوى ادراك خطورة تدخينها

القسم الأول: معلومات عامة

1. العمر:-----

2. الكلية:..... القسم:.....

3. الجنس:  ذكر  أنثى

4. المستوى العلمي  طالب بكالوريوس  طالب ماجستير  طالب دكتوراه

5. مكان الإقامة الأصلي  مدينة  قرية  مخيم

6. مكان الإقامة أثناء  في منزل العائلة  لوحدي في  مع زملاء في

الدراسة  سكن طلاب  سكن طلاب

7. الدخل الشهري للعائلة  أقل من 1000 شيقل  1000-2000  أكثر من

2000 شيقل  شيقل

8. الحالة الاجتماعية  أعزب  متزوج

9. معدل الصرف الشهري على استخدام النارجيلة..... شيقل

## القسم الثاني: سلوكيات و أنماط استخدام النارجيلة

1. ماهو وضعك بالنسبة لتدخين السجائر؟

- مدخن حالي  مدخن سابق  غير مدخن

2. ماهو وضعك بالنسبة لتدخين النارجيلة ؟ (الرجاء قراءة كل الخيارات و من بعدها

الاجابة)

أنا مدخن حالي للنارجيلة (شاركت بجلسة تدخين كاملة مرة أو أكثر خلال الثلاثين يوم الماضية)  
(أكمل أسئلة القسم الثاني)

جربت النارجيلة مرات قليلة فقط من باب الفضول لكن لم أشارك بجلسات تدخين كاملة في حياتي (انتقل الى القسم الرابع)

لا أدخن النارجيلة الان لكن في السابق كنت أدخنها (انتقل الى القسم الرابع)

لم أدخن أو أجرب النارجيلة أبدا في حياتي (انتقل الى القسم الرابع)

3. اذاكنت مدخن حالي للنارجيلة فكيف تصف معدل تدخينك لها؟

أدخن النارجيلة يوميا

أدخن النارجيلة أسبوعيا (على الأقل مرة بالأسبوع لكن ليس يوميا)

أدخن النارجيلة شهريا (على الأقل مرة بالشهر لكن ليس أسبوعيا)

4. منذ متى و أنت تدخن النارجيلة بهذا المعدل؟

أقل من 6 شهور  أكثر من 6 شهور الى سنة  أكثر من سنة الى سنتين

أكثر من سنتين الى 3 سنوات  أكثر من 3 سنوات الى 4 سنوات

أكثر من 4 سنوات

5. في أي عمر بدأت تدخين النارجيلة؟ .....

6. أول استخدام للنارجيلة كان برفقة :

لوحدي  مع صديق  مع أكثر من صديق  مع العائلة

مجموعة من العائلة و الأصدقاء

7. مكان أول استخدام للنارجيلة:

في البيت  كافية أو مطعم  في منزل صديق

أماكن أخرى

8. هل لديك نارجيلة في البيت:

نعم  لا

9. في معظم الأحيان أين تدخن النارجيلة: (الرجاء الاجابة باجابة واحدة فقط)

في منزلي (أو السكن)  في منازل الأصدقاء  في كافية أو مطعم

10. أدخن النارجيلة عادة: (عدة اجابات مسموحة)

لوحدي  بصحبة أفراد العائلة  مع الأصدقاء

11. معدل مدة جلسة تدخين النارجيلة:

أقل من نصف ساعة  من نصف ساعة الى ساعة

أكثر من ساعة الى ساعتين  أكثر من ساعتين

12. عند تدخين النارجيلة مع الأهل و الأصدقاء، بمعدل كم مرة تتشارك معهم بنفس قطعة

القم:

في كل أو معظم المرات  مرات قليلة  نهائياً

13. كم من أصدقاك الخمسة المقربين يوافقك على تدخين النارجيلة:

1  2  3  4

5

14. بعد استخدام النارجيلة أشعر بالتالي: (مسموح أكثر من اجابة)

غثيان  أتقيأ  صعوبة بالتنفس  ألم

بالصدر في اليوم التالي  كحة  جميع

ما سبق  لا شئ مما سبق

15. أي نكهة تفضل:

عجمي  معسل

16. من أين تحصل على مادة التبغ اللازمة للنارجيلة:

من السوق المحلي  من السوق الخارجي  حسب التوفر

17. هل تنوي الاقلاع عن تدخين النارجيلة؟

نعم  لا  لا أدري

18. هل حددت تاريخاً لذلك؟

نعم  لا

19. هل حاولت في يوم من الأيام الاقلاع عن تدخين النارجيلة؟

نهائياً  مرة واحدة  عدة مرات

20. كم مضى من الوقت على اخر محاولة جادة بالاقلاع عن تدخين النارجيلة

؟.....شهر

21. ما هي الأسباب الرئيسية التي تدفعك و تشجعك على تدخين النارجيلة ؟ (يمكن الاجابة

بأكثر من جواب)

أراها طريقة جيدة للتواصل بين الأهل و الأصدقاء	
تساعدني على التخلص من الضغوطات النفسية	
تساعدني على الشعور بالاسترخاء	
شئ أتسلى به عندما أشعر بالملل	
أدخن النارجيلة لتمضية أوقات الفراغ	
أستمتع بطعمها	
أستمتع برائحتها	
تساعدني على عدم تدخين السجائر	
تساعدني على التحكم بشهيتي للطعام	
تساعدني على التحكم بوزني	
أدخن النارجيلة بتأثير من الأهل و الأصدقاء	
أدخن النارجيلة حتى لا أشعر بأني مختلف عندما أكون بصحبة مدخنين للنارجيلة	
يزداد استخدامي للنارجيلة في أوقات التوتر و الضغط النفسي مثل فترة الامتحانات	
يزداد استخدامي للنارجيلة في أوقات الاسترخاء مثل الأعياد و العطل	

القسم الرابع: الآراء، المواقف و المعتقدات تجاه تدخين النارجيلة، و مستوى ادراك خطورة

تدخينها

الرجاء الاجابة على الجمل التالية بناء على مواقفك و معتقداتك تجاه تدخين النارجيلة

لا	لا	أوافق	
أعلم	أوافق		
			22. أعتقد أن تدخين النارجيلة عادة <u>غير سيئة</u> .
			23. عائلتي تتقبل تدخيني للنارجيلة.
			24. المجتمع المحيط بي يتقبل تدخين النارجيلة.
			25. المجتمع المحيط بي يتقبل تدخين النارجيلة أكثر من تدخين السجائر.
			26. أعتقد أنالشباب المدخن للنارجيلة يحظى بأصدقاء أكثر.
			27. أعتقد أن تدخين النارجيلة يجعل الشخص يبدو أكثر مرحا و حيوية.
			28. أعتقد أن الشباب يلحقون الضرر بأنفسهم بتدخينهم النارجيلة.
لا	لا	أوافق	
أعلم	أوافق		
			29. أعتقد أن تدخين النارجيله لمدة سنة أو سنتين لا يلحق الضرر بالصحة.
			30. أعتقد أن تدخين النارجيلة أقل ضررا على الصحة من تدخين السجائر.
			31. لا أشعر بالقلق تجاه الأضرار الصحية التي قد تصيبني من تدخين النارجيلة.
			32. أعتقد أن الاثباتات العلمية حول مدى ضرر النارجيلة بالصحة مبالغ بها كثيرا.
			33. أعتقد بأنني اذا أقلعت عن تدخين النارجيلة مبكرا فان الأضرار الصحية الناتجة عنها ممكن أن تزول.





**Annex (II)****IRB Approval Letter**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**An - Najah  
National University**Faculty of Medicine & Health Sciences  
Department of Graduate Studiesجامعة النجاح  
الوطنية  
كلية الطب وعلوم الصحة  
دائرة الدراسات العليا

IRB Approval letter

Study title:

**Prevalence and factors associated with water pipe smoking among An-Najah National University students / Palestine**

Submitted by:

**Mai Abu Al-Halaweh**

Date Reviewed:


Feb 6, 2014

Date approved:

Feb 25, 2014

Your study titled: " **Prevalence and factors associated with water pipe smoking among An-Najah National University students / Palestine** " Was reviewed by An-Najah National University IRB committee & approved on Feb 25, 2014 .

Samar Musmar, MD, FAAFP

  
IRB Committee Chairman  
An-Najah National University**IRB****IRB**

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جامعة النجاح الوطنية  
كلية الدراسات العليا

# تدخين النارجيلة و العوامل المرتبطة بها عند طلاب جامعة النجاح الوطنية

اعداد

مي أبو الحلاوة

اشراف

د. سمر مسمار

د. زاهر نزال

قدمت هذه الأطروحة استكمالاً لمتطلبات درجة الماجستير في الصحة العامة بكلية الدراسات  
العليا في جامعة النجاح الوطنية في نابلس- فلسطين

2015

ب

دراسة حول تدخين النارجيلة و العوامل المرتبطة بها عند طلاب جامعة النجاح الوطنية  
اعداد

مي أبو الحلاوة

اشراف

د. سمر مسمار

د. زاهر نزال

## الملخص

**المقدمة:** مؤخرًا، في العديد من دول الشرق الأوسط، أصبحت النارجيلة منتشرة بشدة خاصة بين طلاب الجامعات و المدارس الثانوية. و قد أشارت التقارير بأن انتشار تدخين النارجيلة بين الشباب الفلسطيني يشهد ازدياد دراماتيكي في السنوات الأخيرة لكن الاحصائيات التي تركز على تدخين النارجيلة فقط بين طلاب الجامعات الفلسطينية غير متوفرة. و بالتالي كان الهدف من هذه الدراسة تحديد العوامل المرتبطة بتدخين النارجيلة بين طلاب جامعة النجاح الوطنية.

**طريقة البحث:** تم توزيع استبيان على عينة من طلاب جامعة النجاح الوطنية (كل التخصصات، ذكور و اناث). الاستبيان احتوى على اسئلة عن المعلومات الشخصية، طريقة استخدام النارجيلة، الدوافع، المعتقدات و الاراء و المواقف حول تدخين النارجيلة و العوامل الاجتماعية و النفسية المرتبطة بتدخينها، بالضافة الى اسئلة حول المعلومات حول الاضرار الصحية المرتبطة بتدخين النارجيلة.

**النتائج:** وجدت الدراسة بأن 22.8% من عينة الدراسة مدخنين حاليين للنارجيلة. هذا المعدل كان أعلى بين الذكور عن الاناث (35.5% مقابل 11.5%). و أظهر التحليل الاحصائي بأن الجنس (ذكر)، نوع الكلية (العلوم الانسانية)، التقدم بالعمر، المعتقدات المجتمعية السلبية و الخاطئة و انخفاض مستوى المعلومات حول الاضرار الصحية التابعة لتدخين النارجيلة، جميعها عبارة عن عوامل مرتبطة بتدخين النارجيلة. كما وجد أن الاستمتاع بطعم و رائحة مادة التدخين و الشعور بالاسترخاء الناتج عن التدخين كانوا من الدوافع الاساسية وراء تدخين النارجيلة.

**الخلاصة:** تدخين النارجيلة شائع بين طلاب جامعة النجاح الوطنية و يجب أن يؤخذ بين الاعتبار، و بالتالي هناك حاجة ملحة لجهود مستقبلية لمحاربة هذه الافة.