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Demographic, Clinical, and Psychosocial Characteristics and Smoking Patterns among Adult Jordanian Cigarette or Waterpipe Smokers with Cardiovascular Diseases

by

Ahmad Hasan Abu Raddaha

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Nursing

in the

GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

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by
Ahmad Hasan Abu Raddaha

Dedication

First and foremost, I would like to thank Almighty Allah for giving me the abilities and capabilities to complete this dissertation.

In the name of Allah, the Most Beneficent, the Most Merciful

> "… It is only those of His servants who have knowledge who stand in true awe of Him. Verily, Allah is All-Mighty, Oft-Forgiving"
>
> *The Holy Quran, Chapter 35 (Fatir): 28.*

With extreme pride, I dedicate this work to my lovely wife, Ihda'a. Your unconditional love, understanding, and support provided the pillars for this accomplishment. Your presence in my life, my darling lady, gives me an exquisite sense of aliveness in the world.

Acknowledgments

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I would not have been able to reach this point without the financial support of UCSF Graduate Dean's Health Sciences Fellowship, UCSF Graduate Student Research Award, Alpha Eta Chapter of Sigma Theta Tau International Honor of Society of Nursing's Research Award, UCSF School of Nursing Century Club Award, UCSF Nursing Alumni Association Scholarship, UCSF Graduate Students' Association Conference Travel Funds, UCSF Nursing Student Council Enrichment Fund, and Lucile Petry Leone Scholarship. As a member of Prof. Christine Miaskowski's research team, my tuition fees were remitted throughout my study through National Institute of Health's funded research grants.

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Finally, I am grateful to the patients who agreed to participate in this research study.

Demographic, Clinical, and Psychosocial Characteristics and Smoking Patterns among Adult Jordanian Cigarette or Waterpipe Smokers with Cardiovascular Diseases

Ahmad Hasan Abu Raddaha

Abstract

Introduction: Smoking is a leading cause of cardiac diseases and deaths worldwide, killing 6 million people annually. Depression has been found to be an important comorbidity in persons with heart disease, and may play a significant role in patients' relapse to smoking after quit attempts. Despite the health hazards and the public's awareness of the tragic consequences of smoking, tobacco use remains surprisingly highly prevalent.

Objectives: To examine the relationships between demographic, clinical and health factors, smoking history and patterns, nicotine dependence and withdrawal symptoms, smoking outcome expectancies, social support, depression, and willingness to quit smoking after hospital discharge in adult Jordanian men who were smokers and were admitted to the hospital with a CVD diagnosis.

Methods: This cross-sectional study recruited adult men smokers from three hospitals. Data were collected using medical record abstraction and structured interviews.

Results: The sample included 167 men, 71% were cigarette smokers and 29% were waterpipe smokers. Their mean age was 50.7 (±6.9) years; 62.8% were nicotine dependent. 40.4% were classified as depressed (scored $\geq$ 10 on Patient Health Questioannaire-9). Willingness to quit smoking was positively correlated with depression score ($r = 0.16$, $p = 0.04$), and social support ($r = 0.33$, $p < 0.01$). A multiple logistic regression analysis showed that smokers who have no health insurance, who have no one

available to encourage them to quitting smoking “at least sometimes”, who had tried quitting smoking in the past, and had no difficulty with depressive symptoms while at work, taking care of things at home, or getting along with other people were less likely to quit smoking after hospital discharge.

Discussion: The high nicotine dependence in these men indicates that there is an urgent need for smoking cessation treatment, including behavioral counseling and pharmacological therapies, to achieve successful smoking cessation. This study showed a high prevalence of depressive symptoms. The presence of depression is associated with more severe nicotine withdrawal symptoms and is inversely associated with smoking cessation. Thus, screening all patients for tobacco use and depression is needed and should be incorporated in the care of these patients.

Approved:



Erika S. Froelicher, RN, MA, MPH, PhD, FAAN
Dissertation Chair

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Chapter 1: Introduction

Background

In 2010, cardiovascular disease (CVD) was the leading cause of death in the United States (US) and Jordan. It accounts for about 24% of the deaths in the US (Centers for Disease Control and Prevention [CDC], 2012), and more than 35% of the deaths in Jordan (World Health Organization, Regional Office for the Eastern Mediterranean [WHO EMRO], 2012).

Smoking cessation is a key component of secondary CVD risk prevention efforts (Smith et al., 2001) because smoking is (a) a risk factor for cardiac morbidity and mortality (Smith et al., 2006) and (b) a major cause of CVD resulting from atherosclerosis. Smoking is a chief contributor to the high number of deaths due to acute coronary syndrome and myocardial infarction because smoking damages the CVD system (American Heart Association [AHA], 2012).

Unfortunately, tobacco use is not only a leading cause of cardiac diseases, it is a leading cause or contributor to many chronic medical conditions including lung disease and cancer (U.S. Department of Health and Human Services [USDHHS], 2004). In fact, tobacco use is recognized as a worldwide public health threat that affects more than 1 billion current smokers (WHO, 2009, 2011). Smoking is the leading cause of death worldwide, killing 6 million people each year (at approximately 1 person every 6 seconds), and accounts for 1 in 10 adult deaths worldwide (WHO, 2011).

Use of nicotine, which is the primary active ingredient in tobacco, leads to nicotine dependence. This dependence is projected to be the leading cause of death and disability across all developed and developing countries by 2020 (Tan, Tang, & Hao, 2009). According to the American Psychiatric Association [APA] (2000), nicotine is

considered to be the most abused psychoactive substance. Also, nicotine dependence is recognized as a substance-related psychiatric disorder that represents a maladaptive pattern of tobacco use, leading to significant impairment or distress for the individual. The USDHHS (1988) considered nicotine dependence as the unifying construct of research on smoking behavior because the dependence makes attempts to quit very difficult.

Depression has been found to be an important comorbidity in persons with heart disease (Smith et al., 2006). Depression often (a) accelerates atherogenesis through endothelial dysfunction, (b) increases platelet activity and coagulation, and (c) increases heart rate (Carney & Freedland, 2008). The prevalence of depressive symptoms among smokers hospitalized with a CVD diagnosis is 22% to 24% (Thorndike & Rigotti, 2009). Depressive symptoms include depressed mood, loss of interest or pleasure in performing activities, feelings of guilt, low self-worth, disturbed sleep or appetite, low energy, and poor concentration. Furthermore, the presence of these depressive symptoms can lead to substantial impairments in the ability of the individual to take care of his or her everyday responsibilities (WHO, 2012).

In recent years a relationship between cigarette smoking and mood disorders such as depression was posited, yet the mechanisms that underlie this association are not well understood (Munafo & Araya, 2010). Depressive symptoms were found to play a significant role in patients' relapse to smoking after discharge from the hospital (Kronish et al., 2006; Thorndike et al., 2008). Moreover, depressed patients were found to be less likely to follow smoking cessation recommendations after a myocardial infarction (Kronish et al., 2006).

Nicotine may act as an anti-depressant (Ischaki & Gratziou, 2009) and depression often accompanies nicotine withdrawal (Dani & Harris, 2005; Hughes & Hatsukami, 1986). Nicotine has been linked to induction of feelings of stimulation and pleasure, and reduction of daily stress and anxiety. Consequently, smokers tend to use nicotine to modulate their arousal level and to control their mood when faced with different life situations (Benowitz, 2008). These psychoactive effects are considered rewarding for the nicotine users and triggers subsequent use (Benowitz, 2010).

Symptoms of depression along with several demographic and clinical characteristics, as well as smoking history and patterns, nicotine dependence and withdrawal symptoms, smoking outcome expectancies, and social support may influence the success of smoking cessation treatment interventions. While many studies have explored the association between depression and smoking cessation in the general population, few studies were done in patients with CVD. This gap in knowledge supports the need for additional research that evaluates this association in order to provide more informed smoking cessation treatments (Weinberger, George, & McKee, 2011)

Problem Statement

Despite the health hazards and the public's awareness of the tragic consequences of smoking, tobacco use remains surprisingly highly prevalent. In a recent report, the CDC (2009) estimated that approximately 20% (46 million) of adults in the US are smokers (23.1% of men and 18.3% of women). In comparison, the author's native country, Jordan, has much higher rates of smoking than the US. Smoking is a widely accepted social activity in both the workplace and at home. In 2007, the smoking prevalence among Jordanians (15+ years of age) was 29% (49.6% of men and 5.7% of

women) (WHO EMRO, 2010). In contrast to cigarette smoking, waterpipe smoking is a trendy social behavior. In Middle Eastern countries, waterpipe smoking is common in cafes and families tend to smoke a waterpipe with their visitors forming a backdrop to lively social discussions.

While a sizeable reduction in smoking rates in the US has occurred, due to a variety of public health policies and measures, Jordan has not yet benefited from public health campaigns.

Significance and Innovation

Evaluation of symptoms of nicotine dependence and depression in smokers with CVD diagnoses is important. Understanding whether it is depression that leads to smoking or whether it is smoking behavior that predisposes a smoker to depression has significant clinical implications and could make a substantial change in the way smoking cessation programs are provided. For example, if smoking influences the susceptibility to depression, then smoking cessation might be accompanied by a reduction in depression over time. In contrast, if depression leads to smoking, then successful treatment of depression might result in a reduction in smoking (Ischaki & Gratziou, 2009). Finally, starting treatment for depression during hospitalization has important clinical implications as it assists in both prevention of smoking relapse and minimization of the effects of depression on cardiac morbidity and mortality (Perez, Nicolau, Romano, & Laranjeira, 2008).

This study is innovative because little is known about the history and pattern of smoking in Jordanian CVD patients. In addition, no data exist about the relationships between nicotine withdrawal symptoms, nicotine dependence, symptoms of depression,

existence of social support, and willingness to quit smoking after hospital discharge in Jordanian patients with a CVD diagnosis.

The awareness of which smokers with CVD diagnosis are at risk for relapse to smoking after hospital discharge is important. Such awareness may improve the success of smoking cessation interventions. Furthermore, the identification of methods to increase CVD patients' willingness to quit smoking could have significant long term health and financial benefits. Results from this study can guide further clinical research and development of successful smoking cessation programs.

Research Purpose

This cross-sectional study aimed to examine the relationships between demographic, clinical, smoking history and smoking patterns, nicotine dependence and withdrawal symptoms, smoking outcome expectancies, social support and depression with willingness to quit smoking after hospital discharge in adult Jordanian men who were smokers and were admitted to the hospital with a CVD diagnosis.

Specific Aims

The specific aims of this study of adult Jordanian men smokers who were admitted to the hospital with a CVD diagnosis were to:

1. Describe the sample's sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking [cigarettes and waterpipes] history and patterns, nicotine dependence, smoking consequences, nicotine withdrawal symptoms, social support, symptoms of depression, and willingness to quit smoking.

2. Describe differences between cigarette smokers and waterpipe smokers in sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking history and patterns, nicotine dependence, smoking consequences, nicotine withdrawal symptoms, social support, symptoms of depression, and willingness to quit smoking.
3. Explore the relationships between the sample's sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking [cigarettes and waterpipes] history and patterns, social support, symptoms of depression, and willingness to quit smoking as well as nicotine dependence.
4. Compare the sample's sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking history and patterns, smoking consequences, social support, symptoms of depression, and willingness to quit smoking with nicotine dependence.
5. Compare the sample's sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking history and patterns, nicotine dependence, smoking consequences, nicotine withdrawal symptoms, social support, and willingness to quit smoking with symptoms of depression.
6. Estimate which independent variables (sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking history and patterns, nicotine dependence, smoking consequences, nicotine withdrawal, social support, and symptoms of depression) are predictors of willingness to quit smoking at the time of hospital discharge.

Organization of the Presentation in this Dissertation

The dissertation consists of six chapters. Chapter 1 contains the introduction and background, problem statement, significance and innovation, research purpose and specific aims. Chapter 2 provides a review of the relationship between nicotine dependence and symptoms of depression. It reviews the two common forms of tobacco use - cigarettes and waterpipes along with essential definitions of smoking, depression, nicotine dependence and withdrawal symptoms. International epidemiological data about smoking and depression and the health hazards of tobacco use along with the benefits of smoking cessation are summarized. Chapter 3 describes a theoretical framework of the neurobiology of nicotine dependence. Chapter 4 outlines the design and methods for this study including information about the study setting, sample, measures and procedures used to obtain the data. Chapter 5 presents the main study findings. In Chapter 6, a discussion of the salient findings and features will be presented followed by the study's strengths and limitations, and implications for practice, policy, and research.

Chapter 2: Literature Review

Introduction

According to the World Health Organization (2011), tobacco kills up to half of its users. The USDHHS (2004) reported that smoking harms nearly every organ in the body and provides an ever expanding list of diseases attributable to smoking that endangers and diminishes the health of smokers. Unfortunately, if current trends continue, tobacco is estimated to result in more than 8 million deaths each year until the year 2030, and 80% of those deaths will occur in the developing world (WHO, 2009, 2011).

Depression and smoking are two co-morbid factors in persons with heart diseases (Smith et al., 2006). Patients with depression often exhibit: (1) accelerated atherogenesis via endothelial dysfunction, (2) increase in platelet activity and coagulation, (3) increase in inflammatory markers, including tumor necrosis factor-α (TNF-α) and interleukin-6, and (4) dysregulation of the autonomic nervous system, including decreased heart rate variability and increased heart rate (Carney & Freedland, 2008). Tobacco smoking is a major cause of heart attacks due to atherosclerosis (American Heart Association, 2012). In a review paper of eight studies about depression in survivors of acute myocardial infarction (MI), Thombs et al. (2006) reported that the prevalence of major depression was 19.8% (95% CI: 19.1%, 20.6%).

Patients with depression have poor cardiovascular prognosis. van Melle et al. (2004) conducted a meta-analysis on 22 published prospective stduies that determined the association of depression with the cardiovascular outcome (such as mortality and subsequent cardiovascular events) within 2 years after MI. These studies described a follow up (on average, 13.7 months) of 6,367 MI patients. Depression after MI was significantly associated with all-cause mortality (odds ratio [OR] 2.38, 95% confidence

interval [CI], 1.76, 3.22) and cardiac mortality (OR 2.59; 95% CI, 1.77, 3.77). In addition, patients who were depressed after MI were also at risk for new cardiovascular events (OR 1.95: 95% CI, 1.33, 2.85) (van Melle et al., 2004).

Meanwhile, there is voluminous evidence about the comorbidity of smoking and depressive symptoms, with a lower probability of smoking cessation in smokers with symptoms of depression (Berlin & Covey, 2006; Breslau, Peterson, Schultz, Chilcoat, & Andreski, 1998; Dawood et al., 2008; Kronish et al., 2006; Perez et al., 2008; Rondina, Gorayeb, & Botelho, 2007; Thorndike et al., 2008; Tizabi, Getachew, Rezvani, Hauser, & Overstreet, 2009).

Stronger nicotine withdrawal symptoms were reported by patients with moderate depressive symptoms, and these symptoms have contributed to smoking cessation relapse (Thorndike & Rigotti, 2009). Increased depressive symptoms after smoking cessation attempts raise the risk of relapse to smoking (Burgess et al., 2002; Covey, 1999; Thorndike & Rigotti, 2009). The mechanisms of the association between smoking and mood disorders such as depression are not well understood (Munafo & Araya, 2010).

In fact, some smokers seek available resources for treating smoking. About 60% of smokers usually seen by clinicians each year receive minimal advice (i.e., less than 3 minutes) about smoking cessation (Hughes et al., 1992). Being hospitalized for a major cardiac event combined with acute involuntary smoking abstinence during hospitalization spurs many smokers to quit smoking (Burns, 2008; Holtrop, Stommel, Corser, & Holmes-Rovner, 2009; Thorndike et al., 2008). This has been labeled the "critical moment" that nurses and other health care providers should not miss as patients are especially receptive to consider quitting at this time.

Although smoking cessation significantly reduces the risk of subsequent mortality after MI by up to 61% (Wilson, Gibson, Willan, & Cook, 2000), successful smoking cessation that persists for 6–12 months after a quit attempt in untreated smokers is between 3% and 5% (Hughes, Keely, & Naud, 2004). Also, a majority of smokers with a diagnosis of acute CVD resume smoking after being discharged from the hospital (Quist-Paulsen & Gallefoss, 2003; Thorndike & Rigotti, 2009). A significant proportion (63% to 66%) of post MI patients relapsed to smoking within one year after hospital discharge (Dornelas, Sampson, Gray, Waters, & Thompson, 2000; Quist-Paulsen & Gallefoss, 2003).

This chapter provides essential background information on the studies that evaluated the premise that a history of major depression is associated with failure to quit smoking. The following literature review strategy was used to locate supporting literature. The chapter reviews two common forms of tobacco use - cigarettes and waterpipes (also known as: hookah, shisha, arghile, narghile, and hubble bubble). Key definitions of smoking, depression, nicotine dependence and withdrawal symptoms, along with epidemiological data that pertain to smoking and depression at an international level will be presented. A summary of the health hazards of tobacco use along with the benefits of smoking cessation, and a literature review of the state of the science of the relationship between depression and depression symptoms and smoking will be presented. This will be followed by evidence-based predictors of smoking cessation failure among patients with CVD and in the general population, and then the chapter will finish by a conclusion of the chapter.

Background

Before the year 2003, 15 studies evaluated the premise that a history of major depression is associated with failure to quit smoking (Breslau et al., 1998; Covey, Glassman, & Stetner, 1999; Covey, Glassman, Stetner, & Becker, 1993; Ginsberg, Hall, Reus, & Muñoz, 1995; Glassman et al., 1993; Glassman et al., 1988; Hall, Munoz, & Reus, 1994; Hall et al., 1996; Hall et al., 1998; Hayford et al., 1999; Keuthen et al., 2000; Killen et al., 2000; Muñoz, VanOss Marín, Posner, & Pérez-Stable, 1997; Niaura et al., 1999; Prochazka et al., 1998). Except for the study by Muñoz et al. (1997), the smoking cessation interventions had targeted smokers without current medical or psychiatric illness. Thirty-nine percent of the subjects recruited in the Muñoz et al.(1997) study had high depressive scores on the Center for Epidemiologic Studies Depression (CES-D) scale (i.e., having five or more of the diagnostic symptoms during the last 2 weeks). In 2003, Hitsman, Borrelli, McChargue, Spring, and Niaura published the only meta-analysis report; it included a total of 2,984 participants. Hitsman and colleagues (2003) concluded that a lifetime history of major depression did not appear to be an independent contributor for smoking cessation failure in either short- ($\leq$ 3 months) or long-term cessation ($\geq$ 6 months). No gender-specific differences were found in the influence of depression on either short- or long-term abstinence. They suggested that knowing whether a smoker has a history of depression yielded little or no predictive information regarding the success of smoking cessation treatment interventions. In contrast to a single-episode of depression, the investigators pointed out that it is possible that recurrent depression might have negative implications for smoking cessation because depressed people might have experienced a major loss or other significant life stressor. This finding

was noted by two studies in the meta-analysis, in which the researchers distinguished between smokers with single versus recurrent depression (Covey et al., 1999; Glassman et al., 1993). Until 2003, two studies (Muñoz et al., 1997; Thorsteinsson et al., 2001) explored but did not find a significant association between depressive symptoms and smoking abstinence rates, leaving a wide gap in knowledge about the effect of current depression or high scores on depressive symptoms scales on smoking cessation outcomes.

The evidence in the literature about the effect of the history of depression on smoking cessation attempts is still inconsistent. In the newer studies, a history of depression in smokers was found to be associated with failed smoking cessation attempts (Berlin & Covey, 2006; Holtrop et al., 2009; Perez et al., 2008); whereas other studies did not find that a history of depression had a long-term effect on smoking cessation success (Japuntich et al., 2007).

Literature Search Strategy

A search of *PubMed, CINAHL Plus with Full Text, Web of Science, ScienceDirect, SciTopics,* and *Cochrane Library* was conducted to find relevant articles. Several combinations of keywords (with their synonyms) were searched. The keywords used were: '*smoking*', '*nicotine*', '*nicotine dependence*', 'withdrawal symptoms', '*smoking cessation*', '*abstinence*', '*implementation*', '*intervention*', '*treatment*', '*programs*', '*depression*', '*depressive symptoms*', '*cigarettes*', '*waterpipe*', '*narghile*', '*hubble bubble*', '*shisha*', '*cardiovascular disease'*, '*heart disease'*, '*coronary heart syndrome*, '*implement**', and '*smok**'. The reference lists of the retrieved articles and other related articles were also utilized to find more articles. Particularly in the *PubMed*

database, keywords with [ti], [ab], and [tiab] restrictions were included to find search iterations. The search was limited to articles in English. For the most part, this paper examines the scientific research findings published after the meta-analysis conducted by Hitsman and colleagues (2003). Several other resources were used to support the findings presented in this chapter.

Smoking: Definitions and Epidemiology

A smoker is a person who has smoked a minimum of 100 cigarettes in his/her entire life. A current smoker is defined as a person who has smoked 100 cigarettes in his/her entire life and who currently smokes everyday (i.e., a daily smoker) or some days (i.e., an intermittent smoker) (CDC, 2010a). A former smoker is a person who has smoked 100 cigarettes in his/her entire life but currently has quit smoking (CDC, 2011). Waterpipe smokers are classified into three groups: heavy smokers (> 6 waterpipes/week), moderate smokers (3–6 waterpipes/ week), and mild smokers (<3 waterpipes/week) (Salameh, Waked, & Aoun, 2008). Quit attempt is defined as stopping smoking for at least one day with the intention of quitting (CDC, 2011).

In 2009, the CDC estimated that approximately 20% of adults (18+ years of age) in the US were smokers (men, 23.1%; women, 18.3%). Jordan, the author's native country, has much higher rates of smoking than the US. In 2007, 29% of Jordanians (15+ years of age) were smokers (men, 49.6%; women, 5.7%) (WHO EMRO, 2010). The low prevalence of smoking is likely an underestimate as smoking by women is considered taboo.

In contrast to cigarette smoking, international statistics currently do not show the prevalence of waterpipe smoking per se. However, some studies provide prevalence

ratios among some targeted study populations. For instance, waterpipe tobacco smoking appears to be common in cafes near US college campuses. Eissenberg, Ward, Smith-Simone, and Maziak (2008) conducted a cross-sectional study to identify the prevalence of waterpipe smoking among undergraduate students and their perceptions of waterpipe smoking. They reported that 20% of US students had smoked a waterpipe within the past 30 days. The participants were more likely to erroneously perceive their waterpipe smoking as less harmful than cigarette smoking.

In comparison, Jordanian university students had a higher prevalence of waterpipe smoking. Azab et al. (2010) assessed the prevalence of waterpipe smoking among students at four universities (two public and two private) in 2008. A total of 61.1% (335/548) of the study sample reported "having ever smoked tobacco using a waterpipe". Of those who had used a waterpipe, 25.6% used it yearly, 24.3% monthly, 30.5% weekly, and 19.7% daily. The average age of waterpipe smoking initiation was 18.1 years (± 3.6). Interestingly, first use was most commonly with friends (60.7%) or family (30.9%), but less commonly alone (8.4%). The place of first use was at home (37.3%) or in a cafe (32.6%). In the same vein, Dar-Odeh et al. (2010) conducted a cross-sectional survey of university students in three public Jordanian universities during 2008. Of the surveyed sample 37% indicated that they were smokers (61.9% of male students, 10.7% of female students). Cigarettes and waterpipes were the preferred smoking methods among men students (42%), while women students preferred waterpipe only (53%). Twenty-seven percent (396/1454) of the sample stated they were current waterpipe smokers. A total of 552 students indicated how frequently they used waterpipes; 13% indicated they smoked

a waterpipe on a daily basis, 54% indicated they smoked a waterpipe on a weekly basis, while 33% indicated they smoked a waterpipe only occasionally.

Depression: Definitions and Epidemiology

The two main types of depression are major depressive disorder (MDD) (also known as: clinical depression, major depression) and chronic depression (also known as: dysthymia). In the Diagnostic and Statistical Manual of Mental Disorders-IV-Treatment Revised (DSM-IV-TR), the APA published the criteria for major depression. For "most of the day", "every day", "or nearly every day" in a 2-week period, the individual experiences five (or more) of the following symptoms: one of them (at least) being either (a) depressed mood or (b) marked loss of interest or pleasure: (1) depressed mood, as indicated by either a subjective report or observation made by others; (2) markedly diminished interest or pleasure in all, or almost all, activities; (3) impaired ability to think or concentrate, including indecisiveness; (4) marked fatigue or loss of energy; (5) feelings of worthlessness or excessive guilt; (6) insomnia or hypersomnia (excessive sleeping); (7) psychomotor agitation or retardation (restlessness or being slowed down); (8) recurrent thoughts of death, suicidal ideation or attempt; and (9) significant weight loss or weight gain, or decrease or increase in appetite, characterized by a change of more than 5% of body weight in a single month. The presence of these depressive symptoms often leads to substantial impairment in the individual's ability to take care of his or her social, occupational, or other everyday life responsibilities. Furthermore, the symptoms should not result from direct physiological effects of a substance (e.g., a drug, or a medication), or another medical disorder (e.g., hypothyroidism) or be better accounted for by bereavement (e.g., loss of a loved one). On the other hand, chronic depression has

similar criteria but is characterized by less severe depressive symptoms than major depression and is associated with long-term (two years or more) depressed mood. It typically does not disable the person (APA, 2000).

The CDC (2010b) conducted a survey between 2006 and 2008 of 235,067 adults to assess the prevalence of depression in the general population. Of the respondents, 9.0% met the criteria for *current depression*, and 3.4% met the criteria for *major depression*. Respondents were considered to have major depression, if: (1) for "more than half the days," they met at least five of the eight criteria on the Patient Health Questioanire-8 (PHQ-8), and (2) they experienced at least one of the following symptoms: a) little interest or pleasure in doing things, or b) feeling down, depressed, or hopeless. Respondents were considered to have minor depression if they met two to four of eight criteria, including at least one of the following symptoms: a) little interest or pleasure in doing things, or b) feeling down, depressed, or hopeless.

There is sparse data in Jordan about the prevalence of depression because depression and psychiatric disorders in general are stigmatized. People deny or conceal such diseases, as much as possible, to preserve the reputation of the family or the tribe. Hamid et al. (2004) conducted a cross-sectional study in 1999 and 2000 to screen for depressive symptoms among Jordanian women. The researchers recruited 493 women who attended the Ministry of Health's primary healthcare centers in Amman, the capital of Jordan. They used the Beck Depression Inventory (BDI) to measure depressive symptoms. The mean BDI score was 13.02 (± 8.13), and ranged between 0 and 58. For the BDI, a score of 0-13 is considered minimal depression, 14-19 is mild, 20-28 is moderate, and 29-63 is severe. Although the women's mean BDI scores indicated that

they had a minimum level of depressive symptoms, there was a wide range of scores and variation around the mean BDI score.

In the US, the prevalence of smoking among patients with major depression is between 40% and 60% (Schroeder, 2009). Depression is common in patients hospitalized with acute coronary events. In a review paper of depression and depressive symptoms in acute MI survivors, Thombs et al. (2006) reported that the prevalence of major depression, when assessed with structured interviews, among acute MI survivors in eight studies was 19.8% (95% CI: 19.1%, 20.6%). In addition, six studies used the BDI scale to assess for depressive symptoms. The average prevalence of at least moderate depressive symptoms was 31.1% (95% CI: 29.2%, 33.0%).

Nicotine Dependence and Withdrawal Symptoms

According to the APA (2000), nicotine is considered to be the most abused psychoactive substance. Nicotine dependence is recognized as a substance-related psychiatric disorder that represents a maladaptive pattern of tobacco use, leading to significant impairment or distress for the individual. The DSM-IV provided general clinical diagnostic criteria for nicotine dependence. Nicotine dependence is characterized by ≥ 3 of the following criteria in a 12-month period: (1) *tolerance*, evidenced by either a need for markedly increased amounts of the substance to achieve the previously desired effect or by a markedly diminished effect with continued use of the same amount of the substance; (2) *withdrawal*, manifested by the appearance of the characteristic withdrawal symptoms when the person attempts to quit the substance; (3) the use of the substance in larger amounts or over a longer period than intended; (4) the presence of a persistent desire or unsuccessful efforts to quit substance use; (5) the spending of long time in

activities necessary to obtain or use the substance, or to recover from its effects; (6) the giving up or reducing important social, occupational, or recreational activities because of the substance use; and (7) the continued use of the substance despite knowledge of having persistent health problems caused or exacerbated by the substance use (APA, 1994).

Nicotine withdrawal symptoms ensue within 6-12 hours after an abrupt cessation in or reduction of nicotine use (Hughes, Higgins, & Bickel, 1994). In 2000, the DSM-IV-TR delineated the complete criteria for *nicotine withdrawal* syndrome. Four (or more) of the following symptoms appear: (1) anxiety, (2) decreased heart rate, (3) difficulty concentrating, (4) dysphoric or depressed mood, (5) increased appetite or weight gain, (6) insomnia, (7) irritability, frustration or anger, and (8) restlessness (or impatience). The withdrawal symptoms occur after daily use of nicotine for at least several weeks. Also, these symptoms should cause clinically significant distress or impairment in social, occupational, or other important areas of functioning for the individual and should not be due to a general medical or mental disorder (APA, 2000).

The individual smokes or uses nicotine-containing products to avoid or relieve the withdrawal symptoms. The presence of nicotine dependence symptoms is a barrier to quitting smoking because the smoker loses autonomy over his or her use of tobacco (DiFranza et al., 2002). Examples of common nicotine-seeking situations are during a cessation attempt, upon waking in the morning, or in response to situations in which smoking has been restricted (Colby, Tiffany, Shiffman, & Niaura, 2000).

Common Tobacco Forms: Cigarettes and Waterpipes

The cigarette consists of small, short and tightly rolled finely-cut tobacco leaves combined with other additives, enclosed in a cylindrical wrapper of thin paper, and often having a filter tip, intended to be smoked. There are three types of cigarettes: regular, light, and ultralight. The names correspond to the tar yield produced by the cigarettes. Tar is a condensable residue present after burning tobacco, and it contains combustion by-products such as resin hydrocarbons, acids, and phenols. The tar yield of cigarettes is measured by a standardized smoking-machine test using a Federal Trade Commission (FTC) method to ensure similarity of smoking manner (National Institutes of Health, 1996). The FTC method is based on four parameters: *puff frequency* (every 60 seconds), *puff volume* (35 ml), *puff duration* (2 seconds), and *cigarette butt length* (i.e., remains of a cigarette after smoking), which varies by brands of cigarettes, though it is commonly 23 mm in length. Using the FTC method, cigarette brands typically yield: *at least 6.5 mg* tar for ultralight cigarettes, *more than 6.5 to 14.5* mg tar for light cigarettes, and *more than 14.5 mg* tar for regular cigarettes (Hecht et al., 2005). The nicotine content of cigarettes is 10-15 mg. The systemic nicotine delivery is 1-2 mg (Benowitz, 2003).

Tobacco manufacturers redesign their brands of regular cigarettes with certain features to produce light and ultralight cigarette types. They may: (a) add a cellulose acetate filter to trap more tar during smoking, (b) use highly porous cigarette papers to allow toxic materials to escape during smoking, (c) add ventilation holes in the filter tip to dilute the smoke with air, and/or (d) use various types of tobacco blends (National Cancer Institute, 2011) [Further details about the types of tobacco blends are described in Chapter 3.]

Although light and ultralight cigarettes produce lower yields of tar and nicotine, there is little reason to expect that light cigarettes are safer than regular cigarettes or that they reduce the health risks of smoking. Smokers may inhale more deeply, rapidly and frequently, take larger puffs, and/or smoke extra cigarettes each day to achieve a nicotine level that is high enough to satisfy their craving for nicotine and to obtain the amount of nicotine that they need to sustain their nicotine dependence (National Cancer Institute, 2001). In the US, on June 22, 2009, the Family Smoking Prevention and Tobacco Control Act was released to prohibit manufacturers from labeling or advertising tobacco products as *light*, *low*, or *mild*. The prohibition, as a rule became effective after 1 year of its initial release (i.e., effective on June 22, 2010) was because such labeling for the tobacco products may actually increase the risk its use by the public (U.S. Government Printing Office, 2009).

The practice of waterpipe smoking (Figure 2.1) is a centuries-old method of using tobacco, with a global revival particularly in Middle Eastern countries (Maziak, 2011; Maziak, Ward, & Eissenberg, 2004; Maziak, Ward, Soweid, & Eissenberg, 2005). In the past decade, waterpipe smoking has been gradually spreading around the world, particularly among youth. In addition, waterpipe smoking is currently viewed as a burgeoning global epidemic that has serious implications for public health (Cobb, Ward, Maziak, Shihadeh, & Eissenberg, 2010; Maziak, 2011).

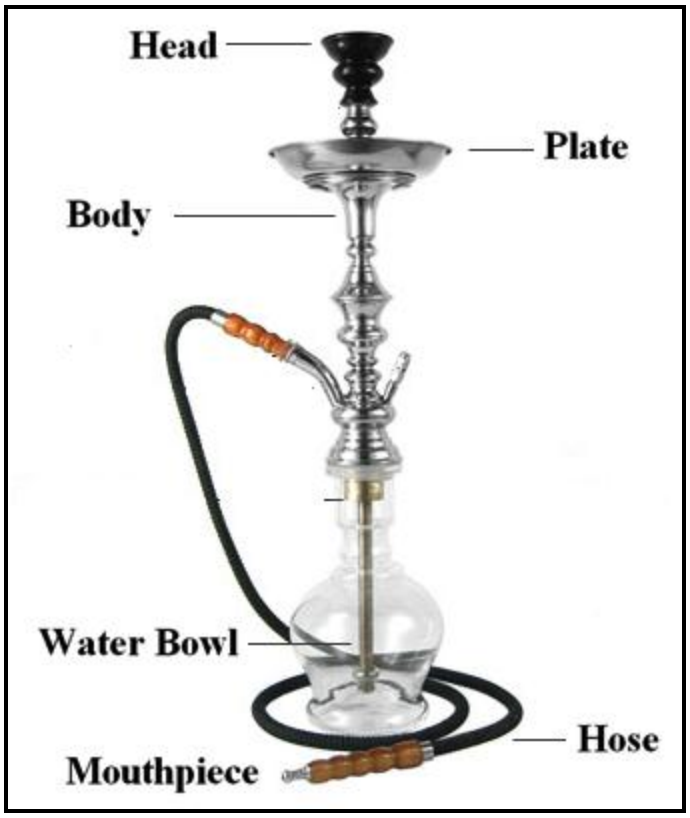


***Figure 2.1*. Waterpipe Apparatus**

Generally, a waterpipe apparatus consists of a *head*, a *mouthpiece* connected to a *hose*, a *water bowl*, and a *body*. The *head* holds the charcoal and tobacco. Perforated aluminum foil is used to separate the burning charcoal from the tobacco. The head is filled with 10-20 gm of a tobacco mixture (will be explained further shortly). Charcoal is used to heat and burn the tobacco to produce smoke. The burned charcoal ashes are caught by a plate or an ashtray which sits just below the head. The *hose* has a mouthpiece attached to it. The *body* connects the head, hose, and the water bowl. Drawing air through the hose attached to the *water bowl* causes the tobacco and charcoal smoke to bubble through the water. The water cools and humidifies the smoke, which is then inhaled by the smoker.

Two tobacco mixtures are used in waterpipes: *maassel* and *ajami* (aka tombac). *Maasel* is the flavored tobacco type, while *ajami* is not. *Maasel* in Arabic means honeyed or sweetened. It is prepared by cooking shredded tobacco with fruit and molasses, adding honey, glycerin, flavorants, and some color. It releases a pleasant sweet aroma during the waterpipe smoking session. Ajami tobacco is relatively plain, and is produced by mixing a small amount of water with dry and shredded tobacco.

In contrast to cigarette smoking, waterpipe smoking has become a trendy social behavior and public tolerance of this habit is becoming more widespread (Hadidi & Mohammed, 2004; Maziak, Rastam, et al., 2004). Waterpipe smoking is characterized mainly by intermittent and social use (Maziak et al., 2005). In Middle Eastern countries, families may smoke a waterpipe together with their visitors, forming a backdrop to lively social discussions. Also, waterpipe smoking is common in cafes. Cafes offering waterpipes are rapidly proliferating, expanding to shopping malls, hotels, and popular settings. They are often accompanied by music, bright lights, and frequently by big screen televisions. This increases the likelihood that people will socialize around the waterpipe, which itself is considered fashionable and trendy (Neergaard, Singh, Job, & Montgomery, 2007). Flavoring additives in the tobacco may attract young waterpipe smokers, particularly women and teenagers (Hadidi & Mohammed, 2004; Maziak, Rastam, et al., 2004).

Hadidi and Mohammed (2004) conducted a study to determine the nicotine content of tobacco mixtures used in waterpipes and to compare it with that found in cigarettes. They examined the nicotine content of 11 brands of flavored and 2 brands of unflavored tobacco. The average nicotine content in flavored tobacco was 3.35 mg/g

(range 1.8-6.3 mg/g), whereas in unflavored tobacco the average nicotine content was 35.65 mg/g (range 30-41.3 mg/g), which is about 10 times higher than that of flavored tobacco. With the average tobacco content in a cigarette of 10.2 mg (Kozlowski et al., 1998), 20 gm head of unflavored tobacco has the nicotine equivalent to 70 regular cigarettes on average, and 20 gm head of flavored tobacco has the nicotine equivalent to 6.5 regular cigarettes on average (Hadidi & Mohammed, 2004) . It is important to mention that waterpipe smoking does occur usually over a period of 30 minutes to 2 hours and often shared with others, so the precise amount of any person absorbs is unknown. Additionally, there is a risk of respiratory tract infection due to the practice of sharing waterpipe with friends and family.

Health Hazards of Tobacco Use

Smoking results in more than 440,000 deaths of the more than 2.4 million annual deaths in the US (AHA, 2012). Between 1995 and1999, smoking led to 13.2 and 14.5 years of potential life lost for men and women smokers, respectively (USDHHS, 2004).

In 2004, the Surgeon General's Report on the health consequences of smoking documented several diseases and other adverse effects caused by smoking. The report stated that *evidence is sufficient to infer a causal relationship* between smoking and each of the following: lung cancer, laryngeal cancer, oral cavity and pharyngeal cancers, esophageal cancer, pancreatic cancer, bladder and kidney cancers, cervical cancer, stomach cancer, acute leukemia, subclinical atherosclerosis, coronary heart disease, cerebrovascular disease, abdominal aortic aneurysms, acute respiratory illnesses including pneumonia in persons without underlying smoking-related chronic obstructive lung disease, all major respiratory symptoms among adults including coughing, phlegm,

wheezing and dyspnea, poor asthma control, chronic obstructive pulmonary disease, reduced fertility in women, premature rupture of membranes, placenta previa, placental abruptio, risk for preeclampsia, preterm delivery and shortened gestation, fetal growth restriction and low birth weight, low bone density in postmenopausal women, hip fracture, periodontitis, and peptic ulcer disease in persons who are *Helicobacter pylor*i positive.

The report noted that the current *evidence is suggestive but not sufficient to infer a causal relationship* between smoking and each of the following: colorectal adenomatous and colorectal cancer, liver cancer, brain cancer, breast cancer, acute respiratory infections among persons with preexisting chronic obstructive pulmonary disease, ectopic pregnancy, spontaneous abortion, oral clefts, low bone density in older men, and erectile dysfunction. The report also found that *current evidence is suggestive of no causal relationship* between smoking and each of the following: risk for prostate cancer, and the onset or progression of retinopathy in persons with diabetes. Furthermore, the report stated, *current evidence is inadequate to infer the presence or absence of a causal relationship* between smoking and each of the following: asthma in adults, exacerbation of acute asthma in persons with asthma, and sperm quality (USDHHS, 2004).

In addition to shortening life expectancy, smoking degrades the quality of life. In a prospective cohort study with a 26-year follow-up of 1,658 subjects, Strandberg et al. (2008) reported that subjects who had never smoked lived on average 10 years longer than heavy smokers ($\geq$ 20 cigarettes per day). Furthermore, a significant relationship was found between an increasing number of cigarettes smoked daily in midlife and poor quality of life.

Unfortunately, cigarette smoking and waterpipe smoking are frequently co-occurring. Many cigarette smokers rely on the misconception that waterpipe smoking is less harmful than cigarettes. As a consequence, they quit cigarette smoking by shifting to waterpipe thinking that it is less detrimental to their health (Hadidi & Mohammed, 2004). However, waterpipe smoking is not a safe alternative to cigarette smoking (Hadidi & Mohammed, 2004; Knishkowy & Amitai, 2005). Furthermore, while waterpipe tobacco flavoring additives may reduce the harshness of nicotine in maassel tobacco, they in turn encourage deeper inhalation while smoking if the smoker feels that the subjective satiation of nicotine has not been reached (Hadidi & Mohammed, 2004).

In 2005, an advisory report about the use and risk of waterpipe smoking was published by the WHO Study Group on Tobacco Product Regulation [called TobReg]. The advisory report highlighted the increasing prevalence and potential health effects of waterpipe smoking and the lack of existence of evidence that any device or accessory can make waterpipe smoking safer (WHO TobReg, 2005). In a recent systematic review, waterpipe smoking was found to be significantly associated with lung cancer, respiratory illness, low birth-weight infants, and gum disease (Akl et al., 2010).

Waterpipe smoking is associated with a significant delivery of nicotine (Hadidi & Mohammed, 2004; Neergaard et al., 2007), and carbon monoxide. Passing of the smoke through water does not produce a filtering effect as is commonly believed. Nor does it reduce the harm or addiction of this tobacco use method compared to cigarette smoking. These misconceptions have increased, at least in part, because of the popularity of waterpipe smoking (Hadidi & Mohammed, 2004; Maziak, 2008; Maziak et al., 2009). The study by Hadidi and Mohammed (2004) found that the nicotine content trapped in

waterpipe water was less than 5% of the available nicotine in the tobacco. After 45 minutes of a smoking session, the pH of the water used increased by 1.5 units but it remained acidic in both flavored (pH=4.78) and unflavored tobaccos (pH=4.75). The small amount of alkaloids and chemicals trapped in the water is expected to be higher in the early stage of waterpipe smoking. Over time, an increased portion of alkaloids will pass through the water to reach the mouth of the smoker. Consequently, absorption via the buccal membrane increases (Hadidi & Mohammed, 2004). Increased absorption occurs because as pH increases, lesser ionization of tobacco and increased rate of tobacco absorption occurs (Benowitz, 1999).

Benefits of Smoking Cessation

Former smokers' substantial health risks from smoking can be reduced by successfully quitting smoking at any age. In fact, smoking cessation has immediate and long-term benefits (USDHHS, 2004). The long-term benefits of quitting smoking have been illustrated in several US Surgeon General Reports.

- Smokers have about double the risk of dying from coronary heart disease compared to lifetime non-smokers. The excess risk of coronary heart disease is reduced by about a half among ex-smokers after only 1 year of smoking abstinence, and it declines gradually thereafter (USDHHS, 1990).
- The risk of stroke returns to the level of people who have never smoked within 5 to 15 years after quitting smoking (USDHHS, 1990).
- The lung cancer death rate is about 30-50% that of a continuing smoker after 10 years of smoking abstinence (USDHHS, 1990). However even after many years of not smoking, the risk of lung cancer in ex-smokers remains higher compared to persons who have never smoked (USDHHS, 2004).
- The risk of coronary heart disease (CHD) of smokers who have quit is that of persons who have never smoked after 15 years of smoking abstinence (USDHHS, 1990).

Smoking cessation is associated with a reduction in subsequent readmission and mortality rates in patients with a CHD diagnosis, emphasizing the importance of tobacco

dependence treatment in these smokers (USDHHS, 2004). In a systematic review, Critchley and Capewell (2003) reported that quitting smoking was associated with a 36% reduction in risk of mortality among patients with CHD, with a pooled crude risk ratio [RR] of 0.64 (95% CI: 0.58, 0.71).

The combined AHA and American College of Cardiology (ACC) guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular diseases (Smith et al., 2006) encouraged clinicians to: (1) ask about tobacco use status at every visit, (2) advise every tobacco user to quit, (3) assess the smoker's willingness to quit, (4) assist by providing counseling, making a smoking cessation plan, as well as arranging follow-up, referral to special programs, or providing pharmacotherapy (such as nicotine replacement and bupropion), and (5) urge avoidance of exposure to environmental tobacco smoke when at work or home. These guidelines were given a class I indicator, emphasizing the evidence available that these procedures are useful and effective (Smith et al., 2006). Furthermore, the AHA advisory board recommended that clinicians should consider screening for depression with the use of the 2-item PHQ-2 as the first step in screening for depression among cardiac patients (Lichtman et al., 2008). The PHQ-2 includes only 2 questions pertaining to: (1) anhedonia, and (2) depressed mood. If the patient answers "yes" to either or both questions, the patient is then asked to complete the PHQ-9. The PHQ-9 contains nine items derived from the DSM-IV and evaluates the patient for several depressive symptoms. The PHQ-2 and PHQ-9 were developed by Spitzer, Kroenke, Williams, and Primary (1999).

Studies in Patients with CVD Diagnosis

The role of depression in predicting smoking relapse in patients with CVD has not been well explored. Recent evidence suggests that current depression (Perez, et al. 2008) and depressive symptoms (Dawood et al., 2008; Kronish et al., 2006; Thorndike et al., 2008) contribute significantly to the failure of smoking cessation efforts among smokers with CVD. In a prospective cohort study of 560 patients with acute coronary syndrome (ACS), Kronish et al. (2006) demonstrated that smokers who were persistently depressed during the 3 months after admission for ACS had lower rates of adherence to smoking cessation (OR: 0.28; 95% CI: 0.09, 0.88). Furthermore, there were no significant differences between remittent depressed and not depressed patients, emphasizing depressive status in predicting mortality after ACS due to relapse to smoking (Kronish et al., 2006).

Dawood et al. (2008) conducted a secondary analysis on the data collected in the PREMIER Quality Improvement Registry study (Spertus et al., 2006) of patients hospitalized for MI in 19 US hospitals. The investigators evaluated several predictors of smoking cessation after MI on admission and 6 months after hospital discharge. Thirty-three percent (834/2498) of patients were smokers. Only 77% (639/834) were smokers and had follow-up at 6 months after discharge. Of those, 54% (n = 342) had relapsed to smoking and 24% (n = 153) were depressed with a score ≥10 on the PHQ-9 scale. In a hierarchical multivariable logistic regression, patients with significant depressive symptoms (PHQ score of ≥ 10) were statistically significantly less likely to quit smoking at 6 months after MI (OR: 0.57; 95% CI: 0.36, 0.90).

The presence of a smoking cessation program has been found to be superior to individual smoking cessation efforts. Smokers hospitalized with CVD need intensive smoking cessation counseling lasting at least 1 month after hospital discharge to decrease their likelihood of relapse to smoking (Rigotti, Munafo, & Stead, 2008; Thorndike & Rigotti, 2009). Dawood et al. (2008) found that MI patients who quit smoking at 6 months were more likely to quit smoking if they were admitted to a hospital that provided a smoking cessation program ($p < 0.001$). Importantly, documented individual counseling to stop smoking was not associated with quitting smoking (OR: 0.80; 95% CI: 0.51, 1.25), while admission to a hospital with an inpatient smoking cessation program was associated with quitting smoking after discharge (OR: 1.71; 95% CI: 1.03, 2.83). This finding emphasizes that smoking cessation programs should incorporate screening for depression and treatment of those who are found to be depressed because depression is highly prevalent in this population and is strongly associated with relapse to smoking.

The high relapse to smoking rate was also reported by Perez et al. (2008). They conducted a prospective study of 464 smokers hospitalized with MI and unstable angina (UA). Perez et al (2008) investigated whether depression was a predictor of relapse to smoking 6 months after hospital discharge. Thirteen percent dropped out, 21.3% relapsed within 7 days after hospital discharge, 33% relapsed within 30 days after hospital discharge, and 40.4% relapsed to smoking 6-months after hospital discharge. More of the patients who were depressed relapsed to smoking 6 months after discharge compared to those without depression (46.3% [$n = 124$] vs. 28.9% [$n = 39$] respectively, $p < 0.001$). Depression resulted in almost three times higher relapse rate [OR=2.55 (95% CI: 1.52,

4.28)], suggesting that depression is an important contributor to smoking in patients after an MI or with UA.

The findings of Dawood et al. (2008) and Perez et al. (2008) were concordant with those of Thorndike et al. (2008). In a secondary analysis of data from a placebo-controlled, double-blind, randomized trial of Bupropion hydrochloride, a smoking cessation aid and antidepressant, therapy with 248 hospitalized acute CVD smokers (Rigotti et al., 2006), Thorndike et al. (2008) demonstrated an association between depressive symptoms, using the Beck Depression Inventory (BDI), with the failure to quit smoking.

In Thorndike et al.'s (2008) study, smoking cessation was assessed using self-reported and biochemically-validated smoking cessation, as 7-day point prevalence tobacco abstinence (i.e., no smoking in the previous 7 days). The researchers found that during hospitalization, 22% of smokers had moderate to severe depressive symptoms (BDI score $\geq$ 16); 18% of subjects had a BDI score of $\geq$10 but < 16, indicating mild depressive symptoms. The self-reported duration of tobacco cessation after hospital discharge showed that smokers with high BDI scores were more likely to resume smoking by 4 weeks after discharge (incidence rate ratio=2.40; 95% CI: 1.48, 3.78; p = 0.007) than were smokers with lower BDI scores. Similarly, the effect of baseline depressive symptoms on biochemically validated tobacco cessation showed that moderate to severe depressive symptoms were independently associated with relapse to smoking after hospital discharge at 2 weeks, 12 weeks, and 52 weeks follow-up (Thorndike et al., 2008).

A prospective study in Michigan examined predictive factors for smoking status in ACS patients after hospitalizations, who were smokers at the time of admission. Holtrop, Stommel, Corser, and Holmes-Rovner (2009) analyzed data for 136 patients at three time points: shortly after hospital discharge (baseline), and 3 and 8 months after discharge. The investigators reported that 33% continued to smoke at baseline (i.e., after hospital discharge). At the two subsequent interviews, 48% quit smoking and remained nonsmokers, 19% reported quitting smoking shortly after their hospitalization, but had begun smoking again at either the 3-month or 8-month follow-up interview. The smoking cessation rate at 8 months of follow-up was 57%. Smokers with a history of depression were more likely to relapse; a history of depression increased the odds of relapse to smoking (OR 6.38, 95% CI: 2.34, 17.34).

Studies on the General Population

Nine studies have been conducted evaluating the relationship between depressive status and smoking in the general population. The results of the studies in the general population have been inconsistent. In a longitudinal study conducted in Canada over a 40-year period, Murphy et al. (2003) revealed that smoking at baseline did not predict the onset of depression. However, individuals who became depressed during the 40 years were more likely to start or continue smoking and were less likely to quit than those who had never been depressed. Conversely, three longitudinal studies reported that smoking predicted depression (Boden, Fergusson, & Norwood, 2010; Flensborg-Madsen et al., 2011; Kang & Lee, 2010).

In a birth cohort study, Boden et al. (2010) examined possible causal relationships between nicotine-dependence symptoms and depressive symptoms at ages 18, 21 and 25

years. They found that increasing levels of nicotine dependence symptoms were significantly associated with increasing rates of depressive symptoms ($p < 0.0001$). For instance, those reporting at least five symptoms of nicotine dependence had rates of depressive symptoms that were 2.13 times (95% CI: 1.98, 2.31) those of individuals who reported no symptoms of nicotine dependence.

Using structural equation modeling to fit a reciprocal causation model, there was a unidirectional association from symptoms of nicotine dependence to depressive symptoms ($\beta = 0.25$, $p = 0.004$), but no reverse effect from depressive symptoms to nicotine dependence ($\beta = -0.03$, $p = 0.21$). Consequently, the authors suggested that there was a cause and effect relationship between smoking and depression in which cigarette smoking increased the risk of symptoms of depression (Boden et al., 2010).

In an editorial, Sheikh (2011) argued that depression must be caused by nicotine withdrawal rather than smoking. Boden and colleagues (2010) relied on the findings from the work of Benowitz (2010) to show that active smokers experienced several nicotine withdrawal phases throughout each day, and that these withdrawal phases were among the factors that caused continual self-administration of nicotine to relieve the symptoms of nicotine withdrawal. Thus, the authors argued that this continual cycle of withdrawal and satiety could suggest that depressive symptomatology might be increased among active smokers due to this demanding cycle.

Kang and Lee (2010) conducted a longitudinal analysis of data from the Korea Welfare Panel, which contained a questionnaire survey on smoking and depression for the years 2006 and 2007. They analyzed a possible causal relationship between smoking and depression among participants in the general population $\geq$ 20 years old. For the

causal relationship, depression at year 2 was regressed on smoking status at year 1 only after excluding the data for the subjects who had depression in the year 1. Using those who were not smoking at year 1, smoking status at year 2 was regressed on depression at year 1 only. The logistic regression showed that smoking at year 1 was significantly related to depression at year 2. In the basic model that contained only the smoking variables, smoking $\geq$ two packs a day predicted the presence of depression (OR 3.22, 95% CI: 1.00, 10.33). Depression at year 1 was not significantly related to smoking at year 2 (OR 1.01, 95% CI: 1.00, 1.02) (Kang & Lee, 2010).

Kang and Lee (2010), in South Korea, reported interesting differences in the changes in ratios of smoking status and depression over two years. Among non-smokers in the first year, 95.8% continued to be non-smokers in the second year, yet 4.2% became smokers. In addition, 10.2% of the participants who were smokers in the first year became non-smokers in the second year. Smoking status in the first year was significantly associated with smoking status in the second year ($p < 0.001$). A total of 25.2% of the subjects had no depression in the first year but were smokers in the second year, while 24.9% had depression in the first year and were smokers in the second year. The chi-square test results showed that this difference was not significant ($p > 0.05$). On the other hand, among the non-smokers in the first year, 27.2% had depression in the second year, whereas among the smokers in the first year, 25.2% had depression in the second year. The chi-square test results showed that this difference was significant ($p = 0.03$). Among those who had depression in the first year, the rate of depression in the second year was higher (52.8%) than among those who did not have depression in the first year (17.5%) ($p < 0.001$). The study had some limitations. The authors considered those who had smoked

but quit smoking at the time of survey as non-smokers. Therefore, contamination of the results might have created some differences in the correlation with the presence of depression. The authors were concerned that women might have reported themselves as non-smokers because in Korea smoking is considered taboo among women (Kang & Lee, 2010).

Predictors for depression were assessed using a regression modeling, smoking at least half a pack of cigarettes a day increased the odds of being depressed by 50% (OR 1.50, 95% CI: 1.17, 1.92). It sharply increased the odds of being depressed (480%) in smokers of $\geq$ 2 packs per day (OR 5.83, 95% CI: 1.68, 20.28). In the model, negative predictors for depression were being a man (OR 0.60, 95% CI: 0.49, 0.72), unemployed (OR 0.82, 95% CI: 0.70, 0.96), and low self-esteem (OR 0.95, 95% CI: 0.93, 0.97). Positive predictors for depression were having low-income household (OR 1.56, 95% CI: 1.33, 1.81), unmarried (OR 1.41, 95% CI: 1.12, 1.76), experiencing the death of a spouse (OR 1.31, 95% CI: 1.02, 1.67), parents' divorce (OR 1.89, 95% CI: 1.15, 3.12), poor health (OR 1.79, 95% CI: 1.48, 2.16). While these factors were important findings, the study did not find evidence supporting depression as a cause of smoking (Kang & Lee, 2010).

Over a period of 26 years, 1976-78, 1981-83 and 1991-94, participants in the ongoing longitudinal Copenhagen City Heart Study in Denmark, were randomly invited to participate in an assessment of their risk of being diagnosed with depression according to their daily tobacco consumption (Flensborg-Madsen et al., 2011). The results of a Cox proportional hazard model were used to assess the association between smoking and depression over time. The investigators demonstrated that individuals who smoked more

than 10 gm of tobacco per day were at increased risk of being hospitalized with depression. Compared to those who did not smoke, the combined analysis (men and women) showed no significant effect in the hazard ratios [HRs] for the risk of being depressed among former smokers and those who smoked 1-10 gm of tobacco per day. However, the HR risk estimations were significant in smokers who smoked 11-20 gm of tobacco per day, 1.69 (95% CI: 1.33, 2.14), and among smokers who smoked more than 20 gms of tobacco per day, 1.97 (95% CI: 1.44, 2.70). Compared to women who did not smoke, the risk of depression among women smoking 11-20 gm of tobacco each day was 1.74 (95% CI: 1.33, 2.27). It was 2.17 (95% CI: 1.45, 3.26) in women smoking more than 20 gm per day. Among men, the risk of being depression in those who smoked 11-20 gms each day was not significant, 1.66 (95% CI: 0.96, 2.88) compared to men who did not smoke. However, it was 1.90 (95% CI: 1.05, 3.44) in men who smoked more than 20 g per day (Flensborg-Madsen et al., 2011).

In a secondary analysis of the data from Smith and colleagues' (2001) randomized smoking cessation trial, Japuntich et al. (2007) examined the relationship between smoking after a quit attempt and depression (current and past depression) at 1 week, 6 weeks, 3 months, and 6 months after a smoking quit attempt. Of these 24.1% (n = 163) had a history of major depression in the past 5 years. Of those 163 subjects, 43.6% (n = 71) had current depression [CD] within the past 2 weeks, and 56% (n = 92) had a history of depression but not current depression (i.e., past depression only [PDO]). They found that smoking during the first week post quit was less predictive of ultimate smoking cessation failure for those with current or those with past depression history. Furthermore, at one week post quit, individuals with CD showed significantly higher

smoking rates (95.8%) than those with PDO (75%) with $\chi 2 = 12.9$ ($p < 0.001$). This showed that subjects with current depression tended to show a stronger relationship with smoking than those with previous depression (Japuntich et al., 2007).

Surprisingly, in the logistic regression analyses, Japuntich et al. (2007) found that individuals with current or past depression, compared with the non-depressed group, were more likely to be smoking 1 week after a quit attempt (PDO, OR: 5.6; 95% CI: 3.36, 9.38; CD, OR: 40.6; 95% CI: 12.60, 130.87), but they significantly predicted smoking cessation success at follow-up sessions: (a) 6 weeks (PDO, OR: 0.94; 95% CI: 0.59, 1.49; CD, OR: 1.02; 95% CI: 0.61, 1.70), (b) 3 months (PDO, OR: 1.35; 95% CI: 0.83, 2.20; CD, OR: 1.20; 95% CI: 0.70, 2.05), or (c) 6 months (PDO, OR: 1.08; 95% CI: 0.61, 1.91; CD, OR: 0.93; 95% CI: 0.50, 1.71).

Furthermore, smoking during the first week was predictive of future smoking behavior for non-depressed smokers. One week after quitting, the smoking rate in those with no history of depression was 35.8% and it increased markedly throughout the study period, reaching 80.2% at the 6-month follow-up. A limitation to this study was that 18% ($n = 122$) of the subjects dropped out between the first counseling session and randomization. Those who dropped out were significantly more likely to have a history of current depression when compared with those who remained in the study ($\chi 2 = 5.5$, $p = 0.02$), which may have affected the results (Japuntich et al., 2007).

A randomized, double-blind, multi-site, therapeutic trial of smoking cessation comparing three doses of befloxatone (a reversible monoamine oxidase A inhibitor) to placebo. Berlin and Covey (2006) examined whether depressed mood predicted smoking cessation in 600 adult smokers without current depression from eight centers. An adverse

effect of depressed mood (BDI score of $\geq$ 10) on smoking cessation was observed. In the population of smokers with continuous abstinence until the 12th week of the study (i.e., late abstinence), smokers with a BDI $\geq$ 10, who did not meet a current diagnosis of major depression, were less likely to quit than those with BDI < 10 (OR: 5.59, 95% CI: 1.31, 23.9), and to a lesser extent they were less likely to quit by day 7 after the quit-day (called, early abstinence) (OR: 6.39, 95% CI: 1.44, 28.3). It is important to point out that data about previous history of depression was not collected. The authors did not control for socioeconomic status, educational level or the smoking status of other people in the household, which are common predictors of failure to quit smoking. Interestingly, the predictors of early abstinence and late abstinence were different. In the backward stepwise conditional logistic regression, smokers with continuous abstinence during the last 4 weeks of the study had baseline BDI scores that were statistically significantly associated with failure to quit (OR: 5.6, 95% CI: 1.31, 23.9). However, according to the backward stepwise conditional logistic regression, early abstinence was predicted only by the Fagerström Test for Nicotine Dependence [FTND] (OR: 1.17, 95% CI: 1.01, 1.35) and not by the BDI. In addition, during the last four weeks of the study, the proportion of smokers with a baseline BDI $\geq$ 10 was higher among the non-abstainers ($p < 0.009$) (Berlin & Covey, 2006).

In a secondary analysis of data on 101 nicotine dependent adult smokers who participated in Weinberger et al.'s (2010) double-blind placebo-controlled clinical trial of *selegiline hydrochloride* for smoking cessation, Weinberger, George, and McKee (2011) examined whether adult smokers with and without a history of MDD differed in the endorsement of smoking expectancies. The researchers also investigated the interaction

of gender and depression on the endorsement of smoking outcome expectancies. Smoking outcome expectancies include immediate and distally anticipated reinforcing and punishing consequences as a result of smoking. Such expectancies might have positive outcomes (e.g., alleviation of negative affect, enhancing sensory stimulation, assisting in weight control efforts, improving and facilitating social interactions, and enjoying the taste of smoking) or negative outcomes (e.g., negative affect, boredom, and cravings) (Rash & Copeland, 2008). Understanding each set of expectancies related to the smoking experience can be used in developing and assessing smoking cessation program outcomes, increasing the likelihood of preventing relapse to smoking when such expectancies became less positive, especially for abstaining subjects (Copeland, Brandon, & Quinn, 1995). The investigators used the Smoking Consequences Questionnaire - Adult [SCQ-A] (Copeland et al., 1995) to assess smoking expectancies. The subjects completed a 7-day 'timeline followback' as a self-report measure of daily cigarette consumption. The biochemical measures of smoking were expired carbon monoxide and plasma cotinine levels. Current symptoms of depression were assessed using the BDI (Beck, Steer, & Garbin, 1988).

The overall MANOVA analysis was significant for MDD history ($F = 1.97$, $df = 10.88$; $p < 0.05$). Adult smokers with a history of MDD were more likely to endorse the statements that smoking (a) reduces negative reinforcement and affect, boredom, and cravings, (b) increases stimulation and social facilitation, and (c) helps to control cravings and weight from overeating. They also reported that the taste of smoking was enjoyable. The investigators reported that the MANOVA analysis was not significant for gender or for the interaction of depression history and gender ($p > 0.05$ for both tests). Weinberger

and colleagues' study (2011) provided insight into the smoking expectations of the subjects with a history of MDD. It might be better to consider these expectations in cognitive–behavioral smoking cessation interventions that target these subjects. However, 26% (n = 26) of the sample had history of MDD, limiting the power to analyze differences.

Nakata, et al. (2008)) conducted a cross-sectional study of 2,770 Japanese workers in a suburb of Tokyo to assess the relationship between passive and active smoking and depression symptoms. They used a self-administered questionnaire to assess history and exposure to passive smoking (no exposure, occasional exposure, or regular exposure) at work or at home. Depression symptoms were assessed using the CES-D scale. To distinguish current smokers from nonsmokers, the gas chromatography/mass spectrometry method was used to measure urinary cotinine concentrations. The researchers used a creatinine-adjusted cotinine (cotinine–creatinine ratios) concentration cut-off of 100 μg/g creatinine. The distinguishing feature in the study by Nakata et al. (2008) was that they differentiated exposure to passive smoking at work and at home in order to make sources of smoking exposure more clearly.

Among men, 58% were current smokers, 13% were former smokers, and 29% never smoked. Among women, 23% were current smokers, 8% were former smokers, and 69% never smoked. There were no significant differences between men (38.3%) and women (39.8%) in depression symptoms scores on the CES-D scale (CES-D score > 16) (χ^2 = 0.27, df = 1, p = 0.61). Compared to those who had never smoked and were not exposed to passive smoking, never smokers who reported being regularly or occasionally exposed to passive smoking at work had significantly increased depression symptoms,

with an OR= 1.92 (95% CI: 1.14, 3.23) for regular exposure and 1.63 (95% CI: 1.08, 2.47) for occasional exposure. Never smokers who reported being regularly or occasionally exposed to passive smoking at home had no significant increases in their depressive symptoms scores (CES-D $\geq$ 16). Furthermore, current smokers had increased depression symptoms at work, at home and at work or at home (ORs ranging from 2.25 to 2.38), but former smokers had lower but significant increases in depression symptoms (ORs ranging from 1.43 to 1.55) (Nakata et al., 2008).

Friedman-Wheeler, Ahrens, Haaga, McIntosh, and Thorndike (2007) conducted two studies that examined the relationship between depression and smoking outcome expectancies. In study 1, they recruited a general population of adult regular smokers. In study 2, they recruited adult smokers seeking to quit smoking. In the general community sample of adult smokers, the researchers found that depression symptoms showed significant positive correlations with positive expectancies for cigarette smoking (Spearman's rho = 0.34, $p < 0.01$). Therefore, people with depression symptoms compared with the non-depressed group tended to view smoking as a way to obtain positive reinforcement and they became reliant on smoking for these effects.

In an effort to generalize the results to those smokers who intended to quit rather than general smokers, Friedman-Wheeler et al (2007) recruited another sample of subjects of cigarette smokers and who volunteered to participate in a smoking cessation trial. Depression symptoms were, again, found to be positively associated with positive expectancies for cigarette smoking (Spearman's rho = 0.31, $p < 0.05$), as was depression proneness (Pearson $r = .32$, $p < 0.01$). It was notable that depression symptoms and depression proneness were highly correlated with each other (Spearman's rho = .72, $p <$

0.01). Building on such findings, the investigators suggested that smoking cessation programs could benefit from incorporating positive expectancies for cigarette smoking. This could, in turn, lead to a decrease in difficulties often experienced by those smokers who have or who are vulnerable to depression symptoms when they attempt to quit smoking (Friedman-Wheeler et al., 2007)

In Canada, Khaled, Bulloch, Exner, and Patten (2009) conducted a secondary analysis of data from a cross-sectional survey of the Canadian general population aged ≥12 years who participated in the Canadian Community Health Survey: Health and Well-Being, Cycle 2.1 (January 2002 - December 2003). They purposed to describe the 12-month prevalence of major depression in relation to smoking status, nicotine dependence levels, commitment to quit, attempts to quit, and maintenance of smoking cessation. They found an elevated prevalence of major depression in current smokers (10.6%), daily smokers (11.4%), occasional smokers (8.0%), former smokers (5.3%), and never smokers (3.9%).

Khaled et al. (2009) reported the lowest prevalence of major depression among those who had quit smoking for a period longer than 1 year (4.8%). It was highest among those who tried to quit smoking (12.5%) followed by those who did not try to quit smoking (10.7%). The difference in prevalence between those who tried to quit unsuccessfully, and those who successfully quit for a period longer than 1 year was significant, 7.7% (95% CI: 5.5 - 9.9). However, due to the cross-sectional nature of the study, it is important to point out that it is unclear whether the high prevalence of major depression among the smokers who unsuccessfully tried to quit smoking suggests that they may be less able to successfully quit. Moreover, there was a significant relationship

between nicotine dependency level and major depression. Compared with those with a low nicotine dependence level, the difference in prevalence for major depression among smokers with a high nicotine dependence level was 7.8% (95% CI: 0.8 - 14.9) not significant. However, the CI was close to the null value (i.e., 1), indicating that the actual difference in the population may be marginal. The cross-sectional nature of the study cannot address the direction of the relationship between depression and smoking status. The investigators did not include factors that may influence the initiation or maintenance of smoking such as educational or socioeconomic factors.

Sociodemographic predictors of smoking cessation failure.

Several sociodemographic predictors of smoking cessation after MI were reported in a study by Dawood et al. (2008). Patients who quit smoking at 6 months were more likely to be married ($p < 0.001$) and have higher income ($p = 0.002$). On the other hand, age, gender, and education (>12 years) were not associated with smoking cessation ($p > 0.05$). Holtrop et al. (2009) found that higher household income also positively predicted successful smoking cessation (OR 4.72, 95% CI: 1.69, 12.87). Interestingly, the findings were partially replicated in a study by Thorndike et al. (2008), in which depressive symptoms measured using the BDI were higher in smokers who were women ($p = 0.005$), nonwhite ($p =0.002$), non-married ($p = 0.002$), but were not correlated with age ($p = 0.31$), or education (≤12 years) ($p = 0.13$). However, Weinberger et al. (2011) found that education level did not differ significantly among nicotine dependent smokers with or without a history of MDD ($p > 0.05$).

Perez et al. (2008) reported that no significant differences between relapsed and non-relapsed groups in regards to age, gender, education, coffee consumption, or

economic status ($p > 0.05$ for al comparisons). Compared with non-abstainers, abstinent smokers who continued abstinence from smoking during the last 4 weeks of the study were more likely to have a higher body mass index [BMI] (27.9 ± 5.9 vs. 26.6 ± 5.1, $p = 0.03$) (Berlin & Covey, 2006).

In a general community sample of adult smokers, Friedman-Wheeler et al (2007) found no significant differences in depression and smoking outcome expectancies between African Americans and Caucasians. Similarly, the correlations did not differ significantly according to gender ($p > 0.05$). In the smoking cessation trial, Friedman-Wheeler et al (2007) found that the relationships between depression symptoms scores and expectancies were not significantly different between men and women ($p > 0.05$). Khaled et al. (2009) found that there was a high prevalence of major depression among current smokers in the general Canadian population who were young (aged 12 to 44 years) compared with an older group aged 45 years and older). The prevalence of major depression among current smokers was higher in the younger age category than in the older one (difference in prevalence = 4.7%; 95% CI: 2.7 - 6.7).

Psychosocial predictors of smoking cessation failure.

In the study by Dawood et al. (2008), patients who quit smoking at 6 months were more likely to enjoy higher social support ($p = 0.01$) and had less depression with a score of < 10 on the PHQ ($p = 0.001$). Perez et al. (2008) reported that relapse to smoking six months after discharge was more likely to occur in patients who lived alone ($p < 0.05$).

Thorndike et al. (2008) found that smokers with low BDI scores were more confident in their ability to quit smoking ($p = 0.005$). This finding was consistent with the Perez et al. (2008) study. Six months after discharge, subjects who relapsed to smoking

were found to have lower self-efficacy scores for resisting smoking ($p < 0.05$). Furthermore, in multivariate regression analysis, they found that relapse to smoking was positively predicted by lack of willingness to quit smoking with an OR of 7.80 (95% CI: 2.44, 24.90).

Holtrop et al. (2009); using a logistic regression analysis to predict smoking cessation, found that smokers who reported living with smokers in the household had greater difficulty in both quitting and remaining abstinent (OR 0.20, 95% CI: 0.04, 0.99).

Smoking history and pattern predictors of smoking cessation failure.

In a study by Perez et al. (2008), patients who relapsed to smoking six months after discharge had higher scores for craving and smoking habit ($p < 0.05$), started smoking younger ($p < 0.05$), and made fewer smoking quit attempts ($p < 0.05$). However, no significant differences were found between the relapsed and non-relapsed groups with regard to frequency of living with other smokers, nicotine dependence, number of cigarettes smoked per day before hospitalization or the presence of nicotine withdrawal symptoms during hospitalization ($p > 0.05$). In multivariate regression analysis, relapse to smoking was negatively predicted by smoking onset age (OR: 0.95; 95% CI: 0.91, 0.99), and number of attempts to quit smoking (OR: 0.81; 95% CI: 0.68, 0.96) (Perez et al., 2008).

In the study by Thorndike, et al. (2008), smokers with a low BDI score (<16) did not differ significantly when compared with the high BDI score group (≥16) in the total number of cigarettes smoked per day (21 vs. 25; $p = 0.07$) or in the nicotine dependence score (5.0 vs. 5.7, $p = 0.06$). However, the low BDI score smokers had significantly lower withdrawal symptoms scores (7.7 vs. 11.6; $p = 0.001$). In both the joint test of

significance and the bootstrapping analysis 3 months after discharge, 27% of the effect of the BDI score on smoking cessation was mediated by stronger nicotine withdrawal symptoms experienced by smokers with higher depressive symptoms. Consequently, this may explain the association between depressive symptoms and early failure to quit smoking. Smokers with low BDI scores were more likely to remain abstinent than were those with high BDI scores at the 2-week follow-up (48% vs. 19%; adjusted OR 3.34; 95% CI: 1.53, 7.29), 3-month follow-up (37% vs. 15%; adjusted OR 3.02; 95% CI: 1.28, 7.09) and 1-year follow-up (27% vs. 10%; adjusted OR 3.77; 95% CI: 1.31,10.82) after adjusting for sex, race/ethnicity, number of cigarettes smoked per day, and nicotine dependence score (Thorndike et al., 2008).

Holtrop et al. (2009) demonstrated that being a lighter smoker (<10 cigarettes per day) decreased the odds of relapse to smoking (OR 0.16, 95% CI: 0.05, 0.57). In the Berlin and Covey study (2006), at day 7 after quit day, the desire to smoke significantly decreased in abstinent smokers and did not change in those who were non-abstinent (-0.44 ± 1 vs. 0.02 ± 0.9, $p = 0.001$). Compared with the non-abstainers, early abstainers had had lower FTND scores (4.9 ± 2 vs. 5.6 ± 2.1, $p = 0.024$). Similarly, abstinent smokers who continued abstinence from smoking during the last 4 weeks of the study were more likely to have lower FTND scores (4.9 ± 2.3 vs. 5.7 ± 2, $p = 0.002$) (Berlin & Covey, 2006).

Weinberger et al. (2011) found that nicotine dependent smokers with a history of MDD did not differ from smokers without a history of MDD in terms of age of smoking onset, number of quit attempts, number of cigarettes smoked per day, or nicotine dependence scores on the FTND scale ($p > 0.05$ in all comparisons). Likewise, in the

Canadian population, there was a high prevalence of major depression among current smokers who were trying to quit. High nicotine dependence levels assessed by the Fagerström Tolerance Questionnaire were also found. Also, the difference in prevalence between current smokers who smoked daily and those who smoked occasionally was 3.4% (95% CI: 1.2 - 5.5). Because poor smoking cessation outcomes may be related to a higher prevalence of major depression, the investigators suggested targeting effective management of depression for smokers in order to reduce rates of smoking (Khaled et al., 2009).

Clinical predictors of smoking cessation failure.

Thorndike et al. (2008) and Perez et al. (2008) found that depression symptoms were not correlated with alcohol use ($p > 0.05$). Dawood et al. (2008) reported the opposite; they found that patients who successfully quit smoking at 6 months after hospital discharge were less likely to have a history of alcohol abuse ($p = 0$ .002).

The evidence in the literature showed several comorbidity and behavioral predictors of relapse to smoking by those smokers who had CVD diagnosis. In a study by Dawood et al. (2008), patients who quit smoking at 6 months after discharge were more likely to have had a prior MI ($p = 0.01$), a prior percutaneous coronary intervention [PCI] ($p = 0.02$), or to be diagnosed with congestive heart failure ($p < 0.001$). On the other hand, the average number of cigarettes smoked per day, duration of smoking, and history of coronary artery bypass graft [CABG], angina, hypertension, hypercholesterolemia, diabetes mellitus [DM], heart or renal failure were not associated with smoking cessation ($p > 0.05$ for all comparisons).

In a study by Perez et al. (2008), patients who relapsed to smoking six months after discharge had diagnosis of UA vs. MI ($p < 0.001$), more previous MI events ($p < 0.05$), and shorter hospitalization ($p < 0.001$). Relapse to smoking was positively predicted by previous CABG surgery with an OR of 4.07 (95% CI: 1.36, 12.17). Negative predictors of relapse were diagnosis of current MI (OR: 0.58; 95% CI: 0.37, 0.92), and increased duration of hospitalization (OR: 0.94; 95% CI: 0.90, 0.97). Weinberger et al. (2011) found that a past history of alcohol use disorders, or current symptoms of depression on the BDI were not significantly different in nicotine dependent smokers with and without a history of MDD ($p > 0.05$).

Conclusion

Tobacco use is a worldwide prevalent public health threat that affects more than 1 billion current smokers, and causes or contributes to many illnesses. Current evidence suggests that depressive status and smoking are co-morbid factors in persons with heart diseases. In essence, the severity of depression symptoms contributes to the failure of smoking cessation efforts targeting smokers hospitalized with CVD. Hospitalization for a cardiac event represents a teachable moment for clinicians to initiate smoking cessation interventions due to the imminent pervasive and perceived threat to health caused by tobacco use. Smoking cessation significantly reduces the risk of mortality after a diagnosis of CVD. Smoking cessation has immediate and long-term benefits.

The evidence that a past history of depression predicts failed smoking cessation attempts is still inconsistent. Japuntich and colleagues (Japuntich et al., 2007) replicated the meta-analysis findings reported by Hitsman and collegeues (2003), which contradicted the premise that a history of major depression is associated with the failure

to quit smoking. Newly published studies have revitalized that premise (Berlin & Covey, 2006; Holtrop et al., 2009; Perez et al., 2008).

A few studies have explored the association of depression status in patients with CVD as well as in the general population. The perplexing issue is that some ex-smokers report being happier after quitting smoking, while others will seek smoking to improve their feelings and affect. This issue supports the notion that there is a reciprocal relationship between depression and smoking. Simultaneously, the current evidence shows that long-time smoking leads to depression (i.e., unidirectional relationship). The predominantly cross-sectional studies of the general population do not aid in determining the directionality of the relationship between smoking and depressive status.

In the studies that targeted patients with CVD, the current state of the science proposes that depression symptoms, although decreasing rapidly after hospital discharge, predict lower smoking cessation rates. Therefore, stronger nicotine withdrawal symptoms mediate the effect of depression and contribute to smoking cessation relapse in patients with a CVD diagnosis. The evidence suggests that CVD patients are less likely to follow smoking cessation recommendations. This makes the efforts provided by the clinicians who provide smoking cessation interventions more difficult. Several other factors have been suggested to affect the success of smoking cessation treatment interventions. Other possible mediators include: (a) the presence of hospital smoking cessation program, (b) the extent of social support, (c) willingness to quit smoking, and (d) confidence in being able to quit smoking. Furthermore, some other variables can be viewed as modifying variables (moderators). The modifying variable is a third variable exhibiting statistical interaction by virtue of its being antecedent in the relationship under study.

Figure 2.2 shows critical variables that may affect the relationship between depressive status and nicotine dependence (manifested by nicotine withdrawal symptoms) and which make smokers with a CVD diagnosis prone to relapse to smoking after hospitalization.

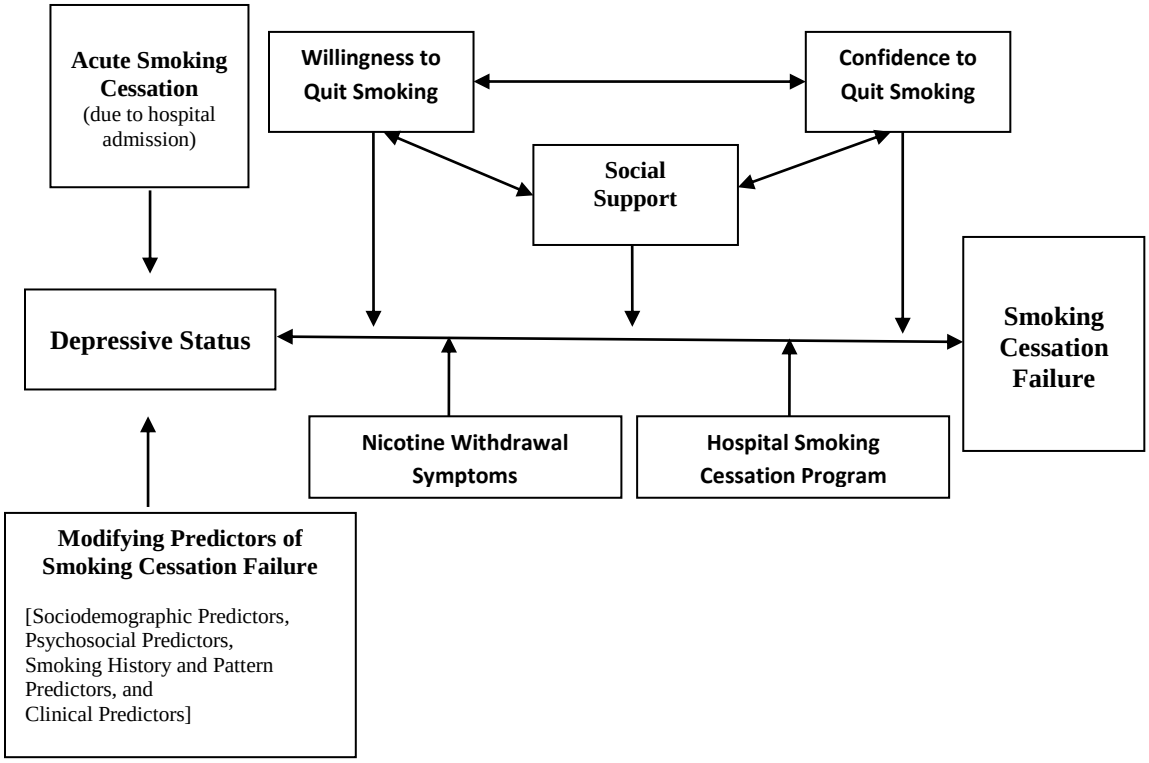


***Figure 2.2*. Research-Based Variables that may Affect the Relationship between Depressive Status and Nicotine Dependence and Prone the Smokers with CVD Diagnosis to Relapse into Smoking after Hospitalization**

In the next chapter, the theoretical framework used in the study is described, and it includes details of the neurobiology of nicotine dependence on the body.

Chapter 3: Theoretical Framework

Introduction

Tobacco use is a major cause of death from cancer, cardiovascular disease, and pulmonary diseases (USDHHS, 2004). It is important to understand the pharmacology of nicotine, the major constituent of tobacco, and how nicotine dependence arises and influences smoking and smoking cessation. This understanding provides a necessary basis for smoking cessation interventions. This chapter provides an overview of the chemical properties of nicotine, nicotine dependence and withdrawal symptoms, pharmacokinetics and pharmacodynamics of nicotine, cardiovascular effects of nicotine, as well as nicotine tolerance and craving symptoms.

Major Constituents of Tobacco

Tobacco is a plant product that is most commonly used as a recreational drug in a number of products such as cigarettes, cigars, waterpipe, chewing tobacco, and for oral and nasal snuffing. Tobacco smoke contains over 4,000 chemicals (Brennan, Lea, Fitzmaurice, & Truman, 2010), resulting in a mixture of the addictive constituent, nicotine, and many toxins and carcinogens (Hecht, Yuan, & Hatsukami, 2010). Many of these chemicals have known carcinogenic or striking irritating properties to airways (Brennan et al., 2010). This chapter focuses mainly on tobacco in cigarette smoking because of its common use.

Nicotine is a major chemical constituent of tobacco. It is of importance mainly because of its addictive effects (Balfour, 2002; Benowitz, 2008; Hukkanen, Jacob, & Benowitz, 2005). Inhalation of tobacco products, whether from a cigarette, cigar, or waterpipe, delivers nicotine into the lungs along with small droplets of tobacco particulates (Benowitz, 2010; Fowler, Logan, Wang, & Volkow, 2003). The total intake

of nicotine during smoking depends on several factors including the volume, rate, and duration of puffing, the intensity and depth of inhalation, and the extent of dilution with air (Hukkanen et al., 2005).

The content of nicotine in tobacco products varies by brand and by country of manufacturing. For instance, in an international sample of cigarette brands from the United States, Canada, and the United Kingdom, Kozlowski et al (1998) reported an average nicotine level contained in cigarette of 10.2 (±0.25), 12.5 (±0.33), and 13.5 (±0.04) mg in the three countries, respectively.

Tobacco Types

After harvesting, the tobacco plant is cured. In the curing process, tobacco leaves undergo a succession of biochemical transformations that result in a change in its color and biochemical composition. The smoke pH is substantially influenced by the nitrate content of the tobacco, which is partially reduced to ammonia during smoking (Hoffmann & Hoffmann, 1997). The curing process consists of four types: flue-curing, air-curing, fire-curing and sun-curing.

The flue-cure and air-cure processes are the two predominant methods of curing tobacco leaves used in cigarettes (Lee et al., 2009). Flue-curing involves the passing of heated air throughout the leaves. When the chlorophyll is degraded after about one week, tobacco leaves lose their green coloring for a bright yellow, gold or orange hue, but the content of sugar stays high, which gives its sweet taste (International Tobacco Growers' Association, 2011). Flue-cured tobacco is found in most cigarettes (Benowitz, 1999). Manufactured flue-cured cigarettes contain no flavoring ingredient, though the manufacturers add small number of substances such as processing aids and preservatives

(Lee et al., 2009). It is of note that menthol maybe added to the cigarettes later in the manufacturing process to produce “menthol cigarettes”.

Air-curing involves drying the leaves naturally in structures where air can freely circulate. The drying period extends to 4-8 weeks. During this period, chlorophyll is degraded and the sugar contents are lowered (International Tobacco Growers' Association, 2011). Air-cured tobacco products are commonly found in waterpipes and cigars and a few European cigarettes (Benowitz, 1999). When air-cured leaves are used in cigarettes, manufacturers add a number of different types of ingredients such as flavorants to enhance the taste (Lee et al., 2009).

Fire-curing can be done in barns that enable the slow burning of aromatic woods. Such exposure to the smoke gives tobacco leaves a specific flavor. Fire-curing is used in cigarettes, waterpipes, snuff or chewing tobaccos, and strong-tasting cigars. Sun-curing of the tobacco leaves is common in Greece and Turkey. The tobacco leaves are first cured in the sun before being air-cured. This process enriches the flavor of the tobacco. Sun-cured tobacco is used in cigarettes, cigars, waterpipe, snuff or chewing tobacco (International Tobacco Growers' Association, 2011).

Nicotine Chemical Properties

The nicotine compound is a tertiary amine alkaloid (Fowler et al., 2003), with a pKa (ionization dissociation constant) of 8.0 (aqueous solution, 25°C). The pKa refers to the strength of an acid or a base in solution, that is, it allows for the charge on a molecule to be determined at any given pH. For instance, a pKa of 8.0 means that at pH 8.0, 50 percent of nicotine is ionized and 50 percent is not ionized. In its ionized state, nicotine

does not rapidly cross membranes (U.S. Department of Health and Human Services, 1988).

Chemically, the absorption of nicotine across biologic membranes depends on pH. A higher pH leads to less ionization and therefore a greater rate of absorption by the body (Benowitz, 1999). In flue-cured tobacco (found in most cigarettes), the pH of smoke is acidic (pH 5.5 to 6.5) and the nicotine is primarily ionized, leading to marginal absorption in the buccal mucosa for cigarette smoke, even when the smoke is retained in the mouth (Benowitz, 1999; Gori, Benowitz, & Lynch, 1986). Nicotine will be absorbed readily in the small airways and alveoli where the pH is at physiological alkaline pH (approximately 7.4) (U.S. Department of Health and Human Services, 1988). On the contrary, the pH of smoke from air-cured tobacco, such as those found in waterpipes and cigars is alkaline with a pH of up to 8.5, and the nicotine is primarily non-ionized. Therefore, smoke from such products is well absorbed starting from the mouth all the way to the alveoli, increasing the rate of nicotine absorption, and possibly increasing the chance of developing nicotine dependence as a result of neurochemical and behavioral processes that sustain the use of tobacco products (Benowitz, 1999).

Nicotinic Acetylcholine Receptors

Nicotine binds to the cholinergic ligand-gated ion channels (i.e., transmembrane ion channels that are opened or closed in response to the binding of a ligand -- a chemical messenger) that normally bind acetylcholine; therefore, they are called nicotine acetylcholine (nACh) receptors (Benowitz, 2008; Tapper et al., 2004). There are neuronal nACh receptors, and non-neuronal nACh receptors in neuromuscular junctions.

The neuronal nACh receptors are found ubiquitously throughout both the central and peripheral nervous systems (Laviolette & van der Kooy, 2004). In the central nervous system, the nACh receptors are situated in the midbrain dopaminergic reward centers, including the ventral tegmental area (Mansvelder & McGehee, 2000), while, peripheral nACh receptors are largely located in the adrenal medulla (Brennan et al., 2010).

The nACh receptors are comprised of a combination of distinct structural α- and β-subunits, ranging from α2–α10 and β2–β4 (Benowitz, 2010; Tapper et al., 2004), which are arranged to form a pore (Laviolette & van der Kooy, 2004). The precise molecular structure of nACh receptors is not known; however, it is known they form pentameric (i.e., a polymer formed from five molecules) ion channels (Laviolette & van der Kooy, 2004). The most abundant nACh receptor subtypes in the brains of humans are α4β2, α3β4, and α7. The α7 subtype is homomeric. A homomeric receptor is made out of identical subunits. Thus, the α7 nACh receptor's channel can be made from five identical α7 nicotinic subunits (Benowitz, 2008; Lena & Changeux, 1997).

It is important to highlight that the distinct structures confer distinct functional properties to the resultant subtypes of nACh receptor (Benowitz, 2010; Dajas-Bailador & Wonnacott, 2004; Tapper et al., 2004). The α4β2 receptor, whether alone or with other subunits present with it, is the principal mediator of nicotine dependence (Benowitz, 2010). In rats, stimulation of α3β4 and α7 and subunits of nACh receptors resulted in bradycardic depressor responses (Aberger, Chitravanshi, & Sapru, 2001). The α7 has been linked with significant improvement in learning and memory functions (Levin, Bettegowda, Blosser, & Gordon, 1999).

Binding of nicotine molecules to the nACh receptors occurs at the α subunit (Brennan et al., 2010) and allows the entry of cations, including sodium and calcium (Dajas-Bailador & Wonnacott, 2004). These cations activate voltage-dependent calcium channels, allowing for additional calcium entry (Benowitz, 2008), resulting in abundant release of dopamine and other neurotransmitters (Benowitz, 2008, 2010). Dopamines, together with other chemicals, elicit a combination of behavioral and physiological effects on the body; this function will be further explained in the Pharmacodynamics of Nicotine section.

Nicotine Dependence and Withdrawal Symptoms

Nicotine is considered to be the most widely abused psychoactive substance (APA, 1994). When a smoker stops smoking, several behavioral and physiological nicotine withdrawal symptoms can ensue within 6-12 hours (Hughes et al., 1994). These symptoms were described in the DSM-IV-TR, and they include: anxiety, decreased heart rate, difficulty concentrating, depressed mood, increased appetite, insomnia, irritability, frustration or anger, and restlessness (APA, 2000). Furthermore, nicotine dependence is recognized as a substance-related psychiatric disorder that is manifested by three (or more) of the following criteria in a 12-month period: (a) tolerance; (b) withdrawal; (c) use of nicotine in larger amounts or over a longer period than intended; (d) presence of a persistent desire or unsuccessful efforts to quit nicotine use; (e) spending of long time in activities necessary to obtain or use the nicotine, or recover from its effects; (f) drop of or reduction of social, occupational, or recreational activities because of the nicotine use, and (g) continued use of nicotine despite the awareness of having a persistent health problems that are contributable or exacerbated by the use of nicotine (APA, 1994).

Most symptoms manifest within the first 1-2 days, peak within the first week, and subside within 2-4 weeks (Hughes, 2007). [Further details on the nicotine dependence and withdrawal symptoms are described Chapter 2.]

Pharmacokinetics of Nicotine

To understand what the body does to the nicotine, this section covers several aspects including nicotine absorption and distribution, nicotine metabolism and elimination, and the factors that influence nicotine metabolism and elimination.

Absorption.

Nicotine is rapidly absorbed into the pulmonary circulation, and then enters the arterial circulation and moves and diffuses readily into brain tissues (Benowitz, 2008). It is estimated that it takes about 11 seconds from the start of a 2-second puff (on average) to the delivery of nicotine to the brain and 19 seconds to complete transit through the brain (Benowitz, 1990).

The rapid rise in nicotine levels in the blood, along with the fact that the process of inhaling the tobacco smoke is complex and manipulated by the smoker to titrate the level of nicotine in his/her own blood by controlling the volume, rate, and length of puffing, the intensity and depth of inhalation. This makes the dose of nicotine and levels of nicotine in the brain depend upon a puff-by-puff basis. This, in turn, makes tobacco smoking a reinforcing and dependence-producing form of nicotine administration (Benowitz, Hukkanen, & Jacob, 2009; Henningfield & Keenan, 1993).

Distribution.

An average of 1 mg of nicotine is absorbed systemically during smoking each cigarette (Benowitz & Jacob, 1984), but this can typically range from 0.5-2 mg (Novotny

et al., 2011). Nicotine accumulates in the body with repetitive doses and declines after cessation of dosing. Nicotine accumulates over 6 to 8 hours if the person smokes regularly until bedtime and significant nicotine levels (and exposure) persist throughout the entire night (USDHHS, 1988). Smoking more in the morning, when the level of nicotine in the body is low, indicates greater physical dependence on nicotine (Fagerström, 1978), and craving to revert the discomfort of low nicotine level in the blood (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Physical dependence is the appearance of withdrawal symptoms with a decline of nicotine levels in the blood stream (Benowitz, 2010).

Metabolism and elimination.

Levels of nicotine in the body are modulated by the rate of nicotine metabolism, which occurs primarily in the liver. Nicotine is rapidly, extensively and primarily metabolized by the enzymes CYP2A6, UDPglucuronosyltransfease (UGT), and flavin-containing monooxygenase (FMO) (Benowitz et al., 2009), and to a lesser extent, by the CYP2B6 and CYP2E1 enzymes (Benowitz, 2009). In addition to the main metabolism in the liver, the lungs are involved to some extent in the metabolism processes (Benowitz, 1988).

The total clearance of nicotine (i.e., the amount of blood that has been cleared of the nicotine per interval of time) averages about 1,200 ml/min (Hukkanen et al., 2005). With a half-life estimated at 2 hours, 70% of the nicotine is metabolized (and extracted) from blood with each pass through the liver. Quantitatively, the most important metabolite of nicotine is cotinine. In humans, about 70–80% of nicotine is converted to cotinine. Cotinine is metabolized much more slowly than nicotine, with a clearance

average of about 45 ml/min (Benowitz et al., 2009). About 10–15% of nicotine appears in the urine as unchanged cotinine (Benowitz & Jacob, 1994).

A total of 5% of nicotine elimination occurs through renal excretion by glomerular filtration and tubular secretion, with variable re-absorption depending on urinary pH and urine flow (Benowitz et al., 2009; Hukkanen et al., 2005). In acidic urine, nicotine is mainly ionized and tubular re-absorption is reduced, increasing renal clearance. In alkaline urine, a larger fraction of nicotine is non-ionized, allowing for more tubular re-absorption, and, as a result, renal clearance will be lower (Benowitz & Jacob, 1985; Hukkanen et al., 2005). Increasing the rate of elimination by acidification of the urine can influence nicotine consumption in humans, demonstrating that rate of elimination can be linked with higher nicotine use (Benowitz & Jacob, 1985).

Blood and urine concentrations of cotinine are widely used to evaluate smoking status in surveys and randomized clinical trials of smoking cessation efficacy studies (Benowitz, Kuyt, Jacob, Jones, & Osman, 1983). Plasma or saliva cotinine concentrations of < 15 ng/ml, urinary cotinine of < 50 ng/ml, and expired air CO of <10 ppm have been widely used as cut-points and are likely to be appropriate for most circumstances to confirm self-reported smoking cessation (Benowitz et al., 2002).

Factors influencing nicotine metabolism and elimination.

Several factors have been found to influence the process of nicotine metabolism, including diet and meals, age, sex, use of estrogen-containing hormone preparations, and kidney disease. Because a high degree of nicotine metabolism occurs in the liver, physiological events, such as meals, posture, exercise, or drugs perturbing hepatic blood flow are predicted to affect the metabolism rate (Benowitz et al., 2009). A maximal

increase in nicotine clearance at 42%, due to increased hepatic blood flow, has been seen around 1 hour after a meal, which slowed down thereafter, returning to baseline after 2.8 hours (Gries, Benowitz, & Verotta, 1996).

Nicotine is found in low levels in foods such as potatoes, tomatoes, and eggplants (Siegmund, Leitner, & Pfannhauser, 1999). Menthol (a common flavorant-enhancing substance, found in a large number of consumer products such as cigarettes, foods, mouthwash and toothpastes) has a moderate inhibition of oxidation of nicotine to cotinine by CYP2A6 (MacDougall, Fandrick, Zhang, Serafin, & Cashman, 2003).

In a study of healthy nonsmokers, Hukkanen, Jacob, and Benowitz (2006) demonstrated that grapefruit juice inhibits the metabolism of nicotine to cotinine in nonsmokers, with evidence of a greater effect with larger doses of grapefruit juice. Grapefruit also increased the renal clearance of nicotine and cotinine by an unknown mechanism.

Clearance of nicotine is also affected by age. In a study on healthy elderly subjects (ages 65-76 years) and healthy adult subjects (ages 22-43 years), Molander, Hansson, and Lunell (2001) reported statistically significant decreases in nicotine total clearance (23%), nonrenal clearance (21%), renal clearance (49%) in elderly subjects when compared with the young adults. Also, the pharmacokinetics of cotinine were not significantly different in elderly subjects compared with adults. Specifically, baseline concentrations, elimination half-life, and mean residence time, were very similar for the two groups. The cotinine renal clearance was decreased by about 20% in the older subjects, an expected magnitude due to decreased glomerular filtration rate in the older age. Given that renal excretion accounts for 5% of nicotine total clearance and that

nicotine is metabolized (and extracted) mainly in the liver, lower nicotine metabolism in the elderly may be contributable to the reduced liver blood flow (Benowitz et al., 2009). Also, it was found that there was a weak correlation (r = -0.15, p = 0.44) between age and cotinine formation by CYP2A6 protein in the liver (Messina, Tyndale, & Sellers, 1997).

There is a difference in the nicotine metabolism between men and women. In a twin study with intravenous infusions of both nicotine and cotinine, nicotine and cotinine clearances were found higher in women than in men (18.8 ml/min.kg vs. 15.6 ml/min.kg, respectively, $p < 0.001$). Further, oral contraceptive use accelerated nicotine and cotinine clearances in women (22.5 ml/min.kg vs. 17.6 ml/min.kg respectively, $p < 0.05$) (Benowitz, Lessov-Schlaggar, Swan, & Jacob, 2006).

Decreased renal function has been found to affect nicotine and cotinine elimination. Renal clearance was reduced by 30% in moderate kidney failure and by 50% in severe kidney failure in comparison to the healthy subjects. Reduced activity of the CYP2A6 enzyme due to accumulating uremic toxins had been suggested as the pathophysiological mechanism responsible for the reduction in hepatic metabolism in kidney failure (Molander et al., 2000).

Biomarkers of Nicotine Exposure

Several biomarkers are used to quantify the systemic exposure of smokers to toxic constituents of smoke derived from tobacco products. Cotinine is the most widely used biomarker of nicotine intake, which may be measured in blood, urine, saliva, hair, or nails (Benowitz et al., 2009). Table 3.1 summarizes common biomarkers of tobacco exposure, their specimen sources, biological half-lives and possible non-tobacco sources.

Table 3.1: Common biomarkers of tobacco exposure, their specimen sources, biological half-lives and possible non-tobacco sources.

Biomarker	Specimen source	Half life	Non-tobacco source	Reference
Nicotine	Blood, urine, saliva, hair	1–2 hours	Nicotine replacement products	(Benowitz et al., 2009)
Cotinine	Blood, urine, saliva, hair	16–18 hours	Nicotine replacement products	(Benowitz et al., 2009)
NNAL and NNAL-Gluc.	Blood, urine	10–18 days	None	(Goniewicz et al., 2009)
Exhaled CO	Exhaled air	2–6 hours	Traffic, body formation	(Benowitz et al., 2009)
Carboxyhemoglobin	Blood	4–6 hours	Traffic, body formation	(Benowitz et al., 2009)
1-Hydroxypyrene and other PAH metabolites	Urine	3-10 hours	Traffic, grilled meat, occupation, biomass combustion in homes	(StHelen et al., 2012)

Abbreviations: NNAL: 4-(Methylnitrosamino) -1-(3-pyridyl)-1-butanol. NNAL-Gluc: [4-(Methylnitrosamino)-1-(3-Pyridyl) but-1-Yl]-beta-O-D-glucosiduronic acid. PAH: Polycyclic Aromatic Hydrocarbon

Pharmacodynamics of Nicotine

To understand how nicotine affects the body, this section covers several aspects including the nicotine neurotransmitters release and withdrawals symptoms occurrence, tobacco smoking and monoamine oxidase release, nicotine cardiovascular effects, and the nicotinic tolerance and craving symptoms.

Neurotransmitters release and mechanisms of withdrawals symptoms occurrence.

Nicotine not only directly releases dopamine (Benowitz, 2010), it also stimulates glutamate release, which facilitates the release of dopamine and contributes to the addictive effects of nicotine (Mansvelder & McGehee, 2000). Once the neurotransmitter dopamine is released, it elicits a combination of behavioral and physiological effects. For

instance, it promotes the pleasurable experience and self-administration of nicotine (Benowitz, 2010).

As a homeostatic response, nicotine also stimulates the release of γ-aminobutyric acid (GABA). GABA is a chief inhibitory neurotransmitter in the central nervous system, and it plays a role in regulating neuronal excitability throughout the nervous system. The release of GABA inhibits dopamine release. Chronic exposure to nicotine diminishes the GABA-mediated inhibitory tone, thereby increasing excitability and responsiveness to nicotine (Benowitz, 2010). This impaired sensitization is called desensitization (Wang & Sun, 2005).

Desensitization describes the closure and unresponsiveness of a ligand-gated channel that occurs after prolonged or repetitive stimulation, leading to a decrease or elimination of their biological response (Wang & Sun, 2005). Consequently, desensitization promotes the development of tolerance (i.e., neuroadaptation) in the body over time after repeated exposure from nicotine sources, diminishing normal bodily responses to these sources, and increasing the need for higher doses of nicotine to achieve pre-tolerance responses (Benowitz, 2010; Wang & Sun, 2005).

In addition to the rewarding reinforcements of smoking, such as the taste and feel of smoke, the nicotine, when acting on nACh receptors, triggers the release of several other neurotransmitters such as norepinephrine, acetylcholine, glutamate, β endorphin and serotonin (Benowitz, 1999, 2008). This nicotine receptor activation mediates various effects of nicotine use, which are summarized in Table 3.2.

Table 3.2: Effects of nicotine use on neurotransmitters after the activation of nicotine receptors.

Neurotransmitter	Effect	Reference
Dopamine	Pleasure, Appetite Suppression	(Benowitz, 1999, 2008)
Norepinephrine	Arousal, Appetite Suppression	(Benowitz, 1999, 2008)
Epinephrine	Increases in Heart, Blood Pressure and Respiratory Rates	(Benowitz, 1999; Brennan et al., 2010)
Acetylcholine	Arousal, Cognitive Enhancement	(Benowitz, 2008)
Glutamate	(1) Learning, Memory Enhancement	(Benowitz, 1999; Lawrence et al., 2002; Levin et al., 2006)
	(2) Facilitation of Dopamine Release	(Mansvelder & McGehee, 2000)
Serotonin	Mood Modulation, Appetite Suppression	(Benowitz, 1999, 2008)
Beta Endorphins	Reduction of Anxiety and Tension	(Benowitz, 2008)
γ-aminobutyric acid	Reduction of Anxiety and Tension	(Benowitz, 2008)

The neurotransmitters produce several psychoactive effects including enhanced performance, arousal and mood modulation, lowered body weight, reversal of nicotine withdrawal symptoms, and self-medication (Benowitz, 2010). Therefore, several withdrawal symptoms emerge after cessation of smoking such as irritability, anxiety, and restlessness (Hughes & Hatsukami, 1986). It is common that within 24 hours of nicotine withdrawal from the blood circulation, there is increased appetite, insomnia, and irritability that cause significant distress or impairment in the life of the smokers (American Psychiatric Association, 2000).

The neurotransmitters dopamine, norepinephrine, and serotonin also have appetite suppression effects (Benowitz, 1999, 2008). The release of β endorphins and GABA is linked to reduction of anxiety and tension (Benowitz, 2008). Conceivably, nicotine can

be viewed, by some smokers, as a self-administered 'medication' to treat affective/mood disorders (Benowitz, 1999). Furthermore, the activation of adrenal medullary nACh receptors increases epinephrine release, causing simultaneous increases in heart, blood pressure and respiratory rates (Brennan et al., 2010).

Difficulty concentrating is one of the most common nicotine withdrawal symptoms. Smoking improves short-term attentional functions, reaction time, and performance in cognitive tasks (Baschnagel & Hawk, 2008; Brody, 2006; Knott et al., 2009). Glutamate, as a neurotransmitter, promotes learning and the memory (Benowitz, 1999, 2008; Levin, McClernon, & Rezvani, 2006). The effect of nicotine on α7 subunits (Benowitz, 1999; Levin et al., 2006) and α4β2 subunits in the hippocampus and amygdala (Levin et al., 2006) causes the release of glutamate. Lawrence, Ross, and Stein (Lawrence, Ross, & Stein, 2002) found that nicotine improved task-performance and attention through enhancing the activities of occipital cortex activity. These areas are associated with visual attention, arousal and motor activation.

Tobacco smoking and monoamine oxidase.

Monoamine oxidases (MAO) enzymes catalyze the metabolism of dopamine, norepinephrine, and serotonin (Benowitz, 2010). MAOs are the major neurotransmitter-degrading enzymes in the central and peripheral nervous systems, and there are two subtypes, MAO A and MAO B (Abell & Kwan, 2001). They participate in the regulation of neurotransmitters in the body, including synaptic concentrations of many neurotransmitters such as dopamine, norepinephrine and serotonin (Binda, Newton-Vinson, Hubalek, Edmondson, & Mattevi, 2002). Although both forms oxidize dopamine (Youdim & Riederer, 1993), aldehyde intermediate compounds that are generated during

combustion of tobacco reduce both the MAO enzymes activity and the metabolism of dopamine, contributing in the addictiveness to smoking (Lewis, Miller, & Lea, 2007).

Nicotine and cardiovascular effects.

Given that the main toxicants in tobacco smoke are linked to oxidizing chemicals, particulates and carbon monoxide, nicotine may contribute to several adverse cardiac effects by reducing myocardial oxygen supply over oxygen demand. In addition, nicotine could increase the chances of myocardial ischemia or infarction, and possibly sudden death (Benowitz, 2003).

Nicotine activates the sympathetic nervous system leading to: (1) an increase in the heart rate, blood pressure, and myocardial contractility, which increases the cardiac oxygen demand and output, and (2) constriction in the coronary vessels, which reduces myocardial oxygen supply. In addition, smoking increases heart rate acutely and throughout the day; with regular smoking, an increase of 7 beats per minute and up to a total of 20 beats per minute can result (Benowitz, 2003).

The extent of elevation of heart rate is not linearly related to the blood level of nicotine absorbed from the tobacco products. The elevated heart rate is presumed to reflect nicotine-mediated persistent stimulation of the sympathetic nervous system. This persistent stimulation may play an important mechanism by which nicotine can contribute to cardiovascular disease (Benowitz, 2003).

In addition to nicotine, carbon monoxide (CO) is another key component of cigarette smoke. In regular smokers, carboxyhemoglobin levels average about 5% and ≥ 10% in heavy smokers; whereas the level ranges from 0.5% to 2% in nonsmokers, depending on their exposure to automobile exhaust and other CO emissions (Benowitz,

2003). Also, after a long-term exposure, total red blood cells (RBC) mass elevates in smokers due to the reduction in the oxygen's carrying capacity and availability (i.e., functional hypoxemia). The increase in the RBC mass increases blood viscosity level and contributes to hypercoagulable state in smokers (Benowitz, 2003).

Nicotine plays a role in producing endothelial dysfunction and/or injury, which is believed to be the initiating event in atherogenesis and subsequently a major contributing cause for acute cardiovascular events. This endothelial dysfunction and injury are thought to be primarily the effect of oxidant chemicals in tobacco smoke. Oxidant chemicals catalyze nitric oxide and reduce its release, antagonizing its action in dilating blood vessels and inhibiting platelet aggregation. This can enhance thrombosis formation (Benowitz, 2003). These effects are important to consider in patients with CVD diagnoses as they represent detrimental additional acute effects of smoking on those patients, while they are in the hospital or after hospital discharge.

Tolerance and craving of nicotine.

The α4β2 nACh receptors, after being activated, become desensitized to nicotine. This, consequently, causes a short-term tolerance of nicotine and a reduction in the satisfaction from smoking. Furthermore, tolerance leads to an increase in the number of binding sites on the nACh receptors in the brain (Wang & Sun, 2005). By maintaining typical daily smoking patterns, smokers sustain sufficient levels of plasma nicotine to prevent withdrawal symptoms. In the time between smoking and attempts to quit, brain nicotine levels decline, resulting in acute reduction in dopamine and other neurotransmitter levels, and withdrawal symptoms start to ensue (Benowitz, 2010). Also,

the presence of nicotine withdrawal symptoms is a barrier to quitting smoking because the smoker loses control over his or her use of tobacco (DiFranza et al., 2002). Craving triggers the act of smoking, which delivers an acute spike of nicotine to the brain. Also, both craving and withdrawal symptoms, especially in the abstinent smokers, can be alleviated by the nicotine itself or by smoking cues in the environment (Benowitz, 2010; Dani & Harris, 2005). Smokers tend to associate specific cues such as moods, situations or environmental factors with the practice of smoking. For instance, smokers usually take a cigarette after a meal with a cup of coffee, smoke with friends (i.e., social smoking or peer pressure), or in specific stressful situations. After many repetitions, such situations turn into powerful cues for smoking. So, physical dependence is not the only determinant of loss of control, and there are changes in brain function that contribute as well (Benowitz, 2010).

Is there a Link between Depressive Symptoms and Nicotine Dependence?

Smoking is speculated to serve as a sort of self-medication to relieve feelings of sadness or negative mood (Rondina et al., 2007). Depressed individuals alleviate some depressive symptoms using nicotine as a self-medication (Breslau et al., 1998). Nicotine induces feelings of stimulation and pleasure, and it reduces daily stress and anxiety (Benowitz, 2008). These psychoactive effects are considered rewarding for the smoker and provide triggers to maintain subsequent use (Benowitz, 2010). Interestingly, tobacco smoke contains other constituents such as acetaldehyde and monoamine oxidase inhibitors (MAOIs). They could contribute to potentiating the rewarding actions of nicotine and self-medicating effects of smoking (Gehricke et al., 2007). Furthermore, MAOIs have been used for the treatment of depression (Amsterdam & Chopra, 2001;

Fiedorowicz & Swartz, 2004; Gehricke et al., 2007; Krishnan, 2007; Robinson, 2002). [Further details on the link between depressive symptoms and nicotine dependence are described Chapters 1 and 2.]

Conclusion

Nicotine dependence contributes to compulsive use of tobacco, which results in high comorbidity and mortality rates. Molecular biology studies suggest that the α4β2 nACh subtype is the main receptor mediating nicotine dependence, which influences smoking and smoking cessation. Nicotine acts on central and peripheral nACh receptors, facilitating the release of several neurotransmitters, producing bodily effects such as pleasure, stimulation, mood modulation, and cardiovascular changes.

Diet and meals, age, sex, use of estrogen-containing hormone preparations, and kidney disease are among the factors that have been found to affect nicotine metabolism. Cotinine, a main metabolite of nicotine, is the most widely used biomarker of nicotine intake, which may be measured in blood, urine, saliva, hair, or nails. Neuroadaptation and tolerance to many of the effects of nicotine can develop after repetitive and chronic exposure to nicotine products.

When a smoker stops smoking, several behavioral and physiological nicotine withdrawal symptoms can ensue within 6-12 hours, including anxiety, decreased heart rate, difficulty concentrating, depressed mood, increased appetite, insomnia, irritability, frustration or anger, and restlessness. These symptoms are major barriers to quitting smoking. Smoking is reinforced by conditioned stimuli that become cues for an urge to smoke. These include the taste and smell of tobacco-product, particular mood or situation, and environmental cues.

There is also growing evidence on the links between depression and nicotine dependence. Depression and smoking exist in a reciprocal relationship. More studies are needed to determine whether smoking influences the susceptibility to depression or if depression leads to smoking.

In the next chapter the design and methodology that was used in this study are detailed.

Chapter 4: Methodology

Introduction

This chapter provides a description of the study design, settings, sample, measurements and data collection procedures, recruitment, and ethical considerations. It concludes with the plans for the data management, data coding and data analysis.

Methods

Design.

A descriptive, cross-sectional design was used to answer the research aims. The six aims will be evaluated using self-report measurements.

Settings.

Subjects of this study were recruited from: a military hospital (Queen Alia Heart Institute), a teaching hospital (Jordan University Hospital), and a private hospital (Al-Essra Hospital). The hospitals are in Amman, the capital of Jordan. These hospitals provide a full range of cardiovascular medical and surgical specialties. They offer diagnosis, treatment and rehabilitative services for patients admitted from different socioeconomic levels.

Patients with CVD diagnosis who were admitted to different departments in the hospital (e.g., medical and surgical wards, intensive care units, and coronary care units) were identified.

Queen Alia Heart Institute was established in 1983 to offer comprehensive cardiac services. It is part of the King Hussein Medical Center, which is the largest and most prestigious multidisciplinary medical institution in Jordan dedicated to providing the utmost in patient care and professional training. It offers its services to military personnel and their families as well as civilian citizens and indigents' persons from

Jordan and beyond. With over 6,500 annual admissions, Queen Alia Heart Institute has a capacity of 170 beds, including an 8-bed coronary care unit, an 8-bed day care unit, and a 16-bed intensive care unit for post cardiac surgery patients.

Jordan University Hospital is a major teaching hospital established in 1971. As one of the oldest and largest hospitals in Jordan, Jordan University Hospital is a comprehensive hospital that offers diagnosis, treatment and rehabilitative services for patients admitted from different socioeconomic levels. The Jordan University Hospital provides the highest quality medical services of general and specialized natures and is accredited by the Joint Commission International. Also, it provides different teaching and training programs, develops and promotes scientific research, and contributes to the prevention of diseases. In its heart center and post cardiac intensive care unit, 56 beds are dedicated for the cardiovascular cases.

Al-Essra Hospital is a private hospital known for providing comprehensive medical services. The hospital is known for its advanced medical expertise and multispecialty care, which is provided with advanced medical technology. Al-Essra Hospital is recognized for post-graduate medical education and training, and is accredited by the Joint Commission International. It provides coronary care services for patients with angina, myocardial infarction and post cardiac catheterization and balloon or stent angioplasty.

Sample.

The accessible sample was patients hospitalized with a CVD diagnosis who were admitted to any of the three participating hospitals in Amman, Jordan. Eligible patients were recruited once their medical condition was deemed stable by their health care

provider and at least 12 hours after hospital admission to allow for nicotine withdrawal symptoms to be manifested.

Subjects were considered for participation in the study if they: (1) had been admitted to the hospital with a primary diagnosis of CVD [i.e., (a) acute ischemic coronary heart disease (angina pectoris, unstable angina, or myocardial infarction), (b) coronary artery bypass graft surgery; or (c) other cardiovascular conditions (e.g., congestive heart failure, cardiac arrhythmia, valvular heart disease, or atherosclerotic disease of the aorta, carotids, renal or peripheral arteries, for interventional cardiology or a cardiac surgical procedure]; (2) were men; (3) were 18 years of age or older; (4) were conscious and oriented to time and place; (5) had smoked at least 100 cigarettes in their life and were current smokers of at least one cigarette/day and/or four waterpipe sessions during the month preceding hospital admission; (6) were able to read and speak the Arabic language; and (7) agreed to participate and give informed consent. Subjects were excluded if they had a medically unstable condition confirmed by the nursing care provider.

Women subjects were excluded due to low prevalence of smoking Jordanian women (5.7%). The limited time for the study and having no woman to serve as a research assistant to collect the data limited the ability to include women. Culturally, some women may be uncomfortable with an investigator who is a man entering their rooms for an interview, which could be considered a violation of their modesty.

Sample size calculation.

To address the Aim1, 4 and 5, a medium effect size (d =0.50 for *t* test, *f* =0.25 for ANOVA test, w = 0.30 for χ^2 test) with an alpha = 0.05 and a power level of 0.8 were

used. Considering their different grouping levels for the independent variables, a minimum of 128 subjects (64 per group) were needed for *t*- test comparisons. For ANOVA tests, a minimum of 128 (64 per group), 156 (52 per group), 180 (45 per group) and 195 (39 per group) were needed to address the comparisons in 2, 3, 4, and 5 groups (respectively) in the independent variables. Also, a total of 87, 107, 121 and 133 subjects were required for χ^2 tests with 1, 2, 3 and 4 degrees of freedom, respectively (Cohen, 1992). To address aim 2, at a medium effect size of 0.3, a level of significance (alpha: α) of 0.05, and a power level ($1 - \beta$) of 0.8, a total of 85 subjects was required to address each correlation coefficient between the different study variables (Cohen, 1992). To address aim 6, a sample size calculation for the logistic regression analysis was used to estimate any association between selected independent variables and the dichotomous outcome variable (i.e., *willingness to quit smoking at the time of hospital discharge*.) A minimum of 10 subjects per independent variable are needed for a stable estimate in a logistic regression model (Norman & Streiner, 2008; Nunnally & Bernstein, 1994). Univariate logistic regression estimation analysis was used to find candidate independent variables with a p value < 0.10 to be entered in the multivariate logistic regression model. A total of 195 subjects were needed in this study to be able to answer all study aims.

Recruitment Procedure

The investigator spoke with the charge nurse on the shift to know which men patients meet the eligible CVD diagnoses in this study; the medical records and nursing notes were then screened. Admitted adult men patients were reviewed to determine whether they meet these two primary eligibility criteria for participation:

1. Had one of several CVD diagnoses, and

2. Current smoker before admission to the hospital.

The two criteria were confirmed through the medical review when available, and cued the investigator about which patients he should speak to about the study.

Eligible patients were approached to be recruited once their medical condition was deemed stable by their health care provider and at least 12 hours after their hospital admission to allow for nicotine withdrawal symptoms to be manifested. The patients' nurses were consulted to determine whether or not the patient was hemodynamically stable.

The patients who met the eligibility criteria were approached directly by the investigator to explain the purpose, nature and risks of the study, and to invite them to participate.

To ensure privacy during the interviews, the interviews were conducted in the subjects' rooms during non-visiting hours, or at a time that the subject agreed to have the interview scheduled. Written informed consents were obtained from the subjects. The consent was reviewed with the subjects and all questions were answered. The subjects were given their copy of the consent form for their own records. For a prospective subject who needed additional time to decide about participating in the study, an additional meeting with the investigator was scheduled. Subjects were asked to sign a consent form for participation. Recruitment of subjects was on a voluntary basis, and they were assured anonymity and confidentiality.

Through face to face interviews with the investigator, the subject went through the Study Booklet (Appendix 4.1 for English version, and Appendix 4.2 for Arabic version), which consisted of several sections to elicit data about sociodemographic,

clinical and health factors, knowledge questions, history and pattern of smoking, willingness to quit smoking after hospital discharge, as well as several standardized questionnaires listed below. Each interview lasted 30-60 minutes.

The plan was that if the subject endorsed the items that suggest suicidal ideation, then the subject's primary physician would be advised of this finding by the investigator (to protect the confidentiality). No suicidal ideations were reported in this study.

Study Standardized Instruments

The following standardized instruments were used in the study: Fagerström Test for Nicotine Dependence, Nicotine Dependence Syndrome Scale, Wisconsin Smoking Withdrawal Scale, Smoking Consequences Questionnaire-Adult, Lebanon Waterpipe Dependence Scale-11, ENRICHD Social Support Instrument, Patient Health Questioannire-9, and Willingness to Quit Smoking Measures. All the questionnaires had strong psychometric properties as described below. Copyright owners of the study standardized instruments were contacted to obtain permission to use of the instruments. Appendix 4.3 shows the study instruments with names of their copyright owners, and numbers of the permissions obrained to use them.

Fagerström Test for Nicotine Dependence (FTND).

Heatherton et al. (1991) developed the FTND as a revised version of the Fagerström Tolerance Questionnaire, which was developed in 1978 to provide a short and convenient self-report measure of dependency on nicotine in adult populations (Fagerström, 1978). The FTND consists of six items, with responses range from 0 to 1 or 0 to 3, accordingly. The FTND asks questions like "How soon after you wake up do you smoke your first cigarette?", "How many cigarettes per day do you smoke?", and "Do

you smoke more during the first hours after waking than during the rest of the day?" The responses are summed to compute a score ranging from 0 (least dependent) to 10 (most dependent), with a score of $\geq$ 6 as a cutpoint to indicate nicotine dependency (de Leon, Becona, Gurpegui, Gonzalez-Pinto, & Diaz, 2002; Diaz et al., 2005; Fagerstrom et al., 1996).

Meneses-Gaya et al. (2009) reported that the scores obtained on the FTND permit the classification of nicotine dependence into five levels: very low (0 to 2 points), low (3 to 4 points), moderate (5 points), high (6 to 7 points) and very high (8 to 10 points), which helps to evaluate both nicotine dependence levels and the effectiveness of smoking cessation programs.

Although the FTND was originally developed for adult current smokers, it has been used in several other populations. Heatherton et al. (1991) found the coefficient alpha for the FTND to be 0.61, which is acceptable considering there are only 6 items.

The FTND demonstrated satisfactory convergent validity with biochemical measures such as serum and saliva cotinine and expiratory CO levels (Buckley et al., 2005; Burling & Burling, 2003; Etter, Duc, & Perneger, 1999; Heatherton et al., 1991; Huang, Lin, & Wang, 2008; Okuyemi et al., 2007; Payne, Smith, McCracken, McSherry, & Antony, 1994; Pomerleau, Carton, Lutzke, Flessland, & Pomerleau, 1994; Shiffman, Waters, & Hickcox, 2004; Steinberg, Williams, Steinberg, Krejci, & Ziedonis, 2005).

The FTND also demonstrated satisfactory sensitivity and specificity indices as a nicotine dependence measure, as evaluated by two studies (de Meneses-Gaya et al., 2009; Mikami et al., 1999). Mikami et al. (1999), who recruited a sample of 151 patients with diagnoses of cancer, reported that the FTND showed satisfactory sensitivity (0.75) and

specificity (0.80) when a cutpoint of five was used. In a sample of 61 students enrolled in four health-related courses at a private university in Brazil, de Meneses-Gaya et al. (2009) reported a sensitivity of 0.80 and specificity of 0.74 at a cutpoint of 4.

Although the FTND was originally developed for adult current smokers, it has been used in several other populations such as adult ex-smokers (Vink, Willemsen, Beem, & Boomsma, 2005), light smokers (Etter et al., 1999; Okuyemi et al., 2007), smoking university students and employees (de Meneses-Gaya et al., 2009; Etter et al., 1999), drug-/alcohol-dependent smokers (Burling & Burling, 2003), cancer patients (Haddock, Lando, Klesges, Talcott, & Renaud, 1999; Mikami et al., 1999), smokers with psychiatric disorders (Pomerleau et al., 1994), smokers with schizophrenia (Steinberg et al., 2005; Weinberger et al., 2007), and smokers with post traumatic distress syndrome (Buckley et al., 2005).

Nicotine Dependence Syndrome Scale (NDSS).

Shiffman and colleagues (2004) published the NDSS as a self-report instrument to measure nicotine dependence. The NDSS consists of 19 items and 5 theoretically-driven subscales: (1) Drive [craving, withdrawal and subjective compulsion to smoke], (2) Priority [preference for smoking over other reinforcers], (3) Tolerance [reduced sensitivity to the effects of smoking], (4) Continuity [regularity of smoking rate] and (5) Stereotypy [invariance of smoking]. Each item is rated on a 5-point Likert scale from 1 (Not at all true) to 5 (Extremely true). The coefficient alpha for the NDSS was computed to be 0.84. In addition, the five-factorial structure was confirmed using principal components analysis with Varimax rotation measures with 57.2% of the total item variance (Shiffman et al., 2004).

The NDSS can be used and scored in two ways: a single total score (NDSS-T) and in scores for each dependence subscale/factor. The NDSS-T is retained as a single score to capture overall severity of dependence (Shiffman et al., 2004). On the other hand, because the NDSS allows for a multidimensional view of nicotine dependence, it is able to reflect the operation of several dependence processes, such as craving and withdrawal, tolerance, and behavioral automaticity, rate, and saliency (i.e., attraction and motivation). Scoring all five subscales of the NDSS separately is also crucial for a differentiated assessment of nicotine dependence factors. Furthermore, the NDSS is scored using factor loadings (i.e., the researcher should multiply the participant's answer to each item by a specific factor loading). Some items are reverse scored and load on multiple subscales with either negative or positive loadings. The NDSS-T does not include all 19 items used in the instrument. The NDSS was used in some studies, and had shown moderate to high internal coefficient scores ranging from 0.79 to 0.89 for the total measure, while the range was from 0.60 to 0.91 for the measure's five subscales (Broms et al., 2007; Costello et al., 2007; Piper et al., 2008).

Wisconsin Smoking Withdrawal Scale (WSWS).

Wisconsin Smoking Withdrawal Scale (WSWS), a 28-item scale that assesses nicotine withdrawal, was developed by Welsch et al. in 1999. The WSWS contains 7 reliable subscales tapping the major symptom elements of the nicotine withdrawal syndrome (anger, anxiety, sadness, concentration, craving, sleepy, and hunger), with coefficient alphas for the subscales ranging from 0.75 to 0.93. This scale has predictive validity for smoking cessation outcomes, is sensitive to smoking withdrawal, and is sufficiently brief so that it can be used in both clinical and research contexts. The WSWS

items are rated on a 5-point Likert scale, ranging from Strongly Disagree (0) to Strongly Agree (4) (Welsch et al., 1999).

The Smoking Consequences Questionnaire-Adult (SCQ-A).

The Smoking Consequences Questionnaire-Adult (SCQ-A) is a 55-item scale developed by Copeland et al. in 1995 based on the likelihood that the consequences occur using a 10-point Likert scale (0 = completely unlikely to 9 = completely likely). Responses are averaged to create a mean score for each of the 10 scales. The scales are: negative affect reduction, stimulation/state enhancement, health risk, taste/sensorimotor manipulation, social facilitation, weight control, craving/addiction, negative physical feelings, boredom reduction, and negative social impression. The SCQ-A's 10 scales have coefficient alpha reliabilities ranging from 0.83 to 0.96 (Copeland et al., 1995).

Lebanon Waterpipe Dependence Scale-11 (LWDS-11).

Lebanon Waterpipe Dependence Scale (LWDS-11) is an 11-item scale developed by Salameh, Waked, and Aoun (2008) to assess dependency on waterpipe smoking. All items have a 4-point (0–3) Likert-type response format. The LWDS-11 consists of 4 subscales: (1) physiological nicotine dependence, (2) termination of dysphoric states or negative reinforcement, (3) psychological craving, and (4) positive reinforcement (encompassing pleasure and social interaction). Cronbach's alpha coefficients ranged from 0.55 to 0.88 for the four subscales, and alpha was equal to 0.83 for the total scale. The LWDS-11 had acceptable convergent construct validity with salivary cotinine and exhaled-air CO. The LWDS-11 total was found able to differentiate between heavy (> 6 water pipes/week), moderate (3–6 water pipes/ week), and mild (< 3 water pipes/week) smokers (Salameh et al., 2008).

ENRICHD Social Support Instrument (ESSI).

Social support was assessed using the ESSI (Mitchell et al., 2003), which is a self-report measure that consists of seven items. The first 6 items are scored on a 1 (none of the time) to 5 (all of the time) Likert scale. The item 7 is scored "4" when the subject is living with others, and it is scored "2" when the subject is living by himself (i.e., alone) (Mitchell et al., 2003). Individual items are summed for a total score, with higher scores indicating greater social support. It assesses the four defining attributes of social support: emotional, instrumental, informational, and appraisal. The ESSI is a valid and reliable measure of social support in patients undergoing treatment for coronary artery diseases with Cronbach's alpha 0.86 (Mitchell et al., 2003), 0.88 (Vaglio et al., 2004), and 0.78 (Sohn et al., 2008).

The Patient Health Questionnaire-9 (PHQ-9).

The Patient Health Questionnaire-9 (PHQ-9) was developed in 1999 by Spitzer, Kroenke, Williams, and Primary. The PHQ-9 is a concise, acceptable, and self-administered screener for depressive symptoms. It contains items derived from the DSM-IV to evaluate several depressive symptoms. The PHQ-9 contains 9 items that assess for: (1) anhedonia, (2) change in appetite, (3) depressed mood, (4) feeling slowed down or restless, (5) feeling tired, (6) guilt or worthlessness, (7) suicidal thoughts, (8) trouble sleeping, and (9) trouble concentrating (Gilbody, Richards, Brealey, & Hewitt, 2007). The subjects respond to the categories pertinent to frequency of symptom occurrence: "Not at all = 0"; "Several days = 1", "More than half the days = 2", and "Nearly every day = 3". Depression severity for the total score of the PHQ-9 is interpreted as follows: 0-4 = none, 5-9 = mild, 10-14 = moderate, 15-19 = moderately severe, and 20-27 = severe

(Spitzer, et al., 1999). In a meta-analysis of 14 studies (5,026 subjects) that aimed to validate the PHQ9 against major depressive disorder. Data showed sensitivity = 0.80 (95% CI: 0.71- 0.87) and specificity = 0.92 (95% CI: 0.88; 0.95) (Gilbody et al., 2007).

Willingness to Quit Smoking Measures.

The subjects' willingness to quit smoking was measured by a modified question, asking "After you are discharged from this hospital, how willing are you to stop smoking cigarettes [waterpipes]?" (Froelicher & Christopherson, 2000; Sohn et al., 2007). The subjects' responses are based on an 11-point scale that ranges from 0 (not at all willing) to 10 (extremely willing).

Scoring of Standardized Instruments

In this study, subjects were considered nicotine dependent if they had scores of $\geq$ 6 on the FTND scale (de Leon et al., 2002; Diaz et al., 2005; Fagerstrom et al., 1996), or scores > 18 (the median) on the LWDS scale (Salameh et al., 2008). Subjects were also classified as 'depressed' if their depression symptoms scores were $\geq$ 10 on the PHQ-9 (Thorndike & Rigotti, 2009).

Low social support was defined as (a) a total score of $\leq$ 18 on items 1, 2, 3, 5 and 6 and a score of $\leq$ 3 on at least two items (excluding items 4 and 7), or (b) a score of $\leq$ 2 on at least two items (excluding item 4) without regard to total score on the ESSI (The ENRICHD Investigators, 1998).

When scoring the WSWS scale, subjects were categorized as affected with the nicotine withdrawal symptoms when they rated the items from *Agree* (3) to *Strongly Agree* (4). For the SCQ-A, which shows several smoking consequences, the interest was to categorize the subjects into two groups (i.e., subjects who had vs. who had not each

smoking consequence). Thus, when scoring the SCQ-A scale subjects were categorized as having the smoking consequences when they rated the items from *A Little Likely* (5) to *Completely Likely* (9), and as not having the smoking consequences when they rated the items from *A Little Unlikely* (4) to *Completely Unlikely* (0).

Univariate logistic regression was performed to assess the impact of a number of independent variables on the likelihood that the subjects would report that they were willing to quit smoking after hospital discharge. A score of less than 7 denoted a low willingness for the subject to quit smoking (Froelicher & Christopherson, 2000; Sohn et al., 2007). Furthermore, Appendix 4.4 shows the coding method for variables used in the logistic regression analysis.

Translation of Standardized Instruments

The following study instruments were not available in the Arabic language: (1) the NDSS, (2) the WSWS, (3) the SCQ-A, and (4) the ESSI. Several translation techniques have been recommended in the literature, but none is perfect and they are complementary to each other (Maneesriwongul & Dixon, 2004). In addition, because word-by-word translation of instruments into another language may not adequately account for linguistic and cultural nuances (Erkut, 2010; Hilton & Skrutkowski, 2002; Maneesriwongul & Dixon, 2004), the investigator used the multi-step process described below for translating the four instrumetns from English into Arabic.

Two independent bilingual professionals translated the English instruments into the Arabic language (i.e., multiple-forward translation). The two bilingual translators examined each other's translated version and collaboratively worked on identifying any discrepancies, and adjustments were made for inconsistencies. The forward-translation

process was conducted using guidelines published by Hilton and Skrutkowski (2002). Each item's content is relevant and equivalent to each culture. The interpretation of the items remained the same with semantic equivalence (i.e., similarity of meaning of each item in each culture). The data collection method (i.e., interview) is comparable and equivalent, and the translated instrument measures the same theoretical construct in the Arabic culture (Hilton & Skrutkowski, 2002). Also, the two translators followed the guidelines for enhancing equivalence published by Brislin (1986). The guidelines include: making the translated version written at an easy level of readability (third-grade Arabic), keeping the items simple and short, repeating nouns rather than using pronouns, using specific rather than general terms.

As recommended in the review paper authored by Maneesriwongul and Dixon (2004), the committee approach, although useful, was avoided because it is regarded as a weak method as it does not necessarily control for shared misconceptions (i.e., a committee member may be reluctant to criticize another member's suggestions). Because back-translation is the most highly recommended method for translation in cross-cultural research (Maneesriwongul & Dixon, 2004), back translation with decentering (i.e., providing linguistically and culturally-accepted translated items that can be directly and easily understood) was carried out following the guidelines recommended by Erkut (2010). This combined process was carried out by two professionals; one of them is a subject expert. The investigator asked the two bilingual members to do back-translation independently. They then worked with the investigator to validate and check the content of the translated version of the instruments and to ensure that the translated version is likely equivalent in meaning and with parallel wording in the Arabic language.

The third step in translating the instruments was field testing. The translated instruments were refined by several monolingual members of the target Arabic culture. This testing is necessary to check for clarity and appropriateness of the target Arabic language version (Maneesriwongul & Dixon, 2004). The people were asked to read and listen to each item and paraphrase their understanding. Their responses closely resembled the original version. The translation quality and the practical aspects of instrument administration were satisfactory. In this study, the Cronbach's alphas for the NDSS-T, the WSWS, the SCQ-A, and the ESSI scales were 0.77, 0.91, 0.97, and 0.81, respectively. Reliability coefficients above 0.70 usually are considered satisfactory for behavioral studies (Nunnally & Bernstein, 1994; Polit & Beck, 2004)

It is of note that complete pilot testing on 30-40 subjects was opted out for several reasons: (1) It can only provide some measure of quality in terms of the instrument content validity, but, most importantly, it does not address the instrument's construct validity, reliability, or item response patterns, which are critical to describing a successful cross-cultural adaptation (Beaton, Bombardier, Guillemin, & Ferraz, 2000); (2) a pretest is useful to reveal problems with clarity of the target language version; however, use of pretesting alone cannot be used to establish equivalence between versions (Maneesriwongul & Dixon, 2004); and (3) the primary purpose for the research is not to test the psychometric properties of the translated instruments.

Ethical Considerations

Approvals from the Committee on Human Research at the University of California, San Francisco and the Institutional Review Boards at three participating hospitals were obtained before commencing the study.

Data Management and Analysis

Data files were built and analyzed using IBM SPSS 18 GradPack for Windows, 2009. The data were double entered and files were matched to verify the accuracy of the data. The data was systematically examined for missing data, out of range values and data inconsistencies. All the statistical analyses were conducted using two-tailed tests and $\alpha = 0.05$.

The following analysis approaches were used for the six Study Aims:

- To address the Study Aim 1, appropriate descriptive statistics (means and standard deviations for continuous variables and frequencies and percents for categorical variables) were calculated for all of the study variables.
- To address the Study Aim 2, differences between two groups of the smokers (cigarette smokers and waterpipe smokers) with comparisons by *t* test or χ^2 test, as appropriate, were carried out.
- To address the Study Aim 3, Pearson's and Spearman's correlation coefficient statistics were used, as appropriate, to assess the relationships between the variables.
- To address the Study Aims 4 and 5, differences between two outcome variables (not nicotine dependent group vs. nicotine dependent group, and not depressed group vs. depressed group) with comparisons by *t* test or χ^2 test, as appropriate, were carried out.
- To address the Study Aim 6, a logistic regression analysis was planned to estimate the odd ratios with 95% confidence intervals for sociodemographic, clinical and health factors, knowledge, smoking history and pattern, nicotine dependence, nicotine withdrawal, smoking consequences, social support, symptoms of depression as independent predictors for willingness to quit smoking at the time of hospital discharge.

Also, responses for brief open ended questions were coded and categorized into meaningful groups.

In the next chapter, the results for the six aims are presented in narrative and tables form.

Chapter 5: Results

Introduction

Data collection occurred between September and December 2011. A total of 188 patients met the inclusion criteria and were approached by the researcher to participate in this study; 3.2% (n =6) of the patients declined to participate in the study, and a total of 182 patients (96.8%) completed the interview. Of these subjects, 53% (n = 97) were recruited from the military hospital, 42% (n = 76) were recruited from the teaching hospital, and 5% (n = 9) were recruited from the private hospital. Of these subjects, 118 (62.8%) smoked only cigarettes, 49 (26.1%) smoked only waterpipe, and 15 (8%) smoked both cigarettes and waterpipe. Due to the small number of persons who smoke cigarettes and waterpipes (called "mixed users"), these subjects were excluded from the current analysis so as not to distort the study findings for smokers of a single smoking type. This subset of subjects will be the subject of future analysis. Thus, the findings in this dissertation represent data from 167 subjects.

In this chapter, results are provided to answer the study aims. The summarized results are shown in tables. Supplementary detailed responses and item responses are provided in appendices.

Findings to Answer Aims 1 and 2

The findings pertinent to Aims 1 and 2 are presented in Tables 5.1 to 5.11. Results are summarized for the total subjects, for cigarette smokers, and for waterpipe smokers.

Findings to answer aim 1.

Sociodemographic characteristics.

The sample consists of 167 men, who were cigarette or waterpipe smokers, whose ages range from 35 to 69 years with a mean age of 50.7 (±6.9) years, as shown in Table 5.1. Eighty-eight percent are married and 92.8% reported living with someone.

The total number of persons living in the household ranged from 1 to 13 with a mean of 4.0 (±1.7). Most were Muslims (83.8%) and the remainders were Christians. Eighteen percent had a high school education or less (as a highest level of education); and 37.1% had obtained a bachelor degree or higher.

Table 5.1 shows that the majority of the subjects reported being employed (69.5%). Among the employed, 32.8% were self-employed. They reported working an average of 42.7 (±5.2) hours per week. They reported personal monthly income ranged from 150 to 1500 Jordanian dinars (JD) (1 JD ≈ 1.41 US dollars), with a median of 460 JD and a mean (±SD) of 466.3 JD (±180.9). Also, 47.3% reported a monthly personal income of less than 450 JD and 47.9% reported a monthly household income of less than 600 JD. To the question, "Is this income sufficient to support you or to support your household?", 68.9% responded "yes" for sufficient income to support self and 25.1% said it provide adequate support for the household. The details of age, educational level, employment status, profession, monthly personal income and monthly household income are shown in Appendix 5.1.

Table 5.1. Description of Sociodemographic Characteristics *

	Study Sample (n=167)		**Cigarette Smokers** (n=118)		**Waterpipe Smokers** (n=49)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**
Marital Status						
Married	88.0	147	91.5	108	79.6	39
Not Married	12.0	20	8.5	10	20.4	10
Living Status						
With Others	92.8	155	**96.6**	**114**	**83.7**	**41**
Alone	7.2	12	**3.4**	**4**	**16.3**	**8**
Religion						
Muslim	83.8	140	84.7	100	81.6	40
Christian	16.2	27	15.3	18	18.4	9
Educational Level						
≤ Diploma /Associate	62.9	105	62.7	74	63.3	31
≥ Bachelor	37.1	62	37.3	44	36.7	18
Employment Status						
Employed	69.5	116	72.0	85	63.3	31
Not Employed	30.5	51	28.0	33	36.7	18
Self-Employment[(b)]						
Yes	32.8	38	**38.8**	**33**	**16.1**	**5**
Monthly Personal Income (JD) [(a)]						
< 450	47.3	79	**40.7**	**48**	**63.3**	**31**
≥ 450	52.7	88	**59.3**	**70**	**36.7**	**18**
Sufficiency of Income to Support Self						
Yes	68.9	115	**75.4**	**89**	**53.1**	**26**
Sufficiency of Income to Support Others						
Yes	25.1	42	28.0	33	18.4	9
Monthly Household Income (JD) [(a)]						
< 600	47.9	80	**42.4**	**50**	**61.2**	**30**
≥ 600	52.1	87	**57.6**	**68**	**38.8**	**19**
	Mean (S.D.) (Median) [Min - Max] [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]	
Age (Years)	50.7 (6.9) (51.5) [35 - 69]		50.7 (6.7) (52.1) [35 - 69]		50.6 (7.4) (50.3) [36 - 61]	
Total Number of Persons Living in Household	4.0 (1.7) (4) [1 - 13]		**4.2 (1.8) (4) [1 - 13]**		**3.4 (1.5) (4) [1 - 7]**	
Number of Hours Worked per Week for Employed[(b)]	42.7 (5.2) (40) [20 - 60]		43.1 (5.8) (40) [20 - 60]		41.5 (3.2) (40) [40 - 48]	
Personal Monthly Income	466.3 (180.9) (460) [150 - 1500]		**484.8 (189.5) (480) [150 - 1500]**		**421.9 (151.0) (380) [180 - 1100]**	

* Significant differences are in bold. [(a)] JD: Jordanian Dinar (1 JD ≈ 1.41 US Dollars); S.D.: Standard Deviation; Min: Minimum; Max: Maximum. [(b)] n = 116, limited to the subjects who were employed.

Health history, index diagnosis and risk factors.

The health history and current diagnosis for the subjects are shown in Table 5.2. At the time of data collection, most of the men were cared for on the ward (67.7%). Among 39 subjects who had previous CVD diagnoses, 10.3% had a history of myocardial infarction, and 87.2% had angina.

The reasons for the current hospital admissions were angina (71.3%), myocardial infarction (24%), and other cardiac diagnoses (4.8%). The following cardiac procedures were performed during the index admission: cardiac catheterization (80.2%), stent placement (45.5%), coronary artery bypass graft surgery (12%), and balloon angioplasty or other procedures (3.6%).

The reported CVD risk factors were: family history, 59.9%; sedentary life style, 65.9%; obesity and overweight, 38.9%; hypertension, 34.7%; diabetes, 34.7%; and 31.1% had hypercholesterolemia.

Most of the men (85%) reported that they did not drink any alcohol, and 10.2% consumed alcohol only on social occasions. When asked about daily caffeinated beverage consumption, the range was 0 to 20 cups with a mean of 3.8 (±2.6). The subjects' perception of their general health was "good," "very good," or "excellent" for 70.7% of the subjects and 64.7% reported having health insurance. The details of major aspects of the health history and risk factors are presented in Appendix 5.2.

Table 5.2. Description of Health History, Current Diagnosis and Risk Factors

	Study Sample (n=167)		Cigarette Smokers (n=118)		Waterpipe Smokers (n=49)	
Variable	%	n	%	n	%	n
Clinical Care Site						
Ward	67.7	113	65.3	77	73.5	36
Acute Care Unit	32.3	54	34.7	41	26.5	13
History of CVD [(b)]						
Myocardial Infarction	10.3	4	11.5	3	7.7	1
Angina/Chest Pain	87.2	34	84.6	22	92.3	12
Other	2.6	1	3.8	1	0.0	0
Type of Previous CVD Procedures [(b)]						
Cardiac Catheterization	92.3	36	88.5	23	100.0	13
Stent angioplasty	71.8	28	73.1	19	69.2	9
Balloon Angioplasty	10.3	4	3.8	1	23.1	3
Coronary Artery Bypass Graft	5.1	2	7.7	2	0.0	0
Other	2.6	1	3.8	1	0.0	0
Currently Confirmed CVD						
Myocardial Infarction	24.0	40	27.1	32	16.3	8
Angina/Chest Pain	71.3	119	67.8	80	79.6	39
Other	4.8	8	5.1	6	4.1	2
Type of Current CVD Procedures						
Cardiac Catheterization	80.2	134	78.8	93	83.7	41
Stent angioplasty	45.5	76	42.4	50	53.1	26
Coronary Artery Bypass Graft	12.0	20	13.6	16	8.2	4
Balloon Angioplasty	2.4	4	3.4	4	0.0	0
Other	1.2	2	0.8	1	2.0	1
CVD Risk Factors						
Family History of CVD	59.9	100	57.6	68	65.3	32
Sedentary Lifestyle	65.9	110	76.8	80	61.2	30
Overweight and Obesity	38.9	65	39	46	38.8	19
Hypertension	34.7	58	37.3	44	28.6	14
Diabetes Mellitus	34.7	58	33.1	39	38.8	19
Hypercholesterolemia	31.1	52	30.5	36	32.7	16
General Health						
Poor and Fair	29.3	49	31.4	37	24.4	12
Good, Very good and Excellent	70.7	118	68.6	81	75.5	37
Health Insurance						
Yes	64.7	108	69.5	82	53.1	26
	Mean (S.D.) (Median) [Min - Max] [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]	
Number of Daily Caffeinated Beverages	3.8 (2.6) (3.0) [0 - 20]		4.0 (3.0) (3.0) [1 - 20]		3.3 (1.2) (3.0) [0 - 6]	
Body Mass Index	24.5 (1.9) (24.2) [17.8 - 32.3]		24.5 (2.0) (24.2) [17.8 - 32.3]		24.5 (1.7) (23.9) [21.7 - 28.1]	

[(a)] S.D.: Standard Deviation; Min: Minimum; Max: Maximum.

[(b)] n = 39, limited to the subjects who were previously admitted to a hospital with a heart problem.

Knowledge and health beliefs.

Table 5.3 shows that 90% or more had correct answers to the knowledge and belief questions. When asked "Do you believe that waterpipe smoking is less harmful to a smoker than cigarette smoking?" 38.3% responded "yes." Detailed item responses to the knowledge and health belief questions are presented in Appendix 5.3.

Table 5.3. Description of Responses to Knowledge and Health Belief Questions

	Study Sample (n=167)		**Cigarette Smokers** (n=118)		**Waterpipe Smokers** (n=49)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**
Do you think that tobacco smoking is harmful to health?						
Yes	93.4	156	93.2	110	93.9	46
Do you think that waterpipe smoking is less harmful to a smoker than cigarette smoking?						
Yes	38.3	64	33.9	40	49.0	24
To what extent do you think the number of cigarettes a person smokes affects his/her future health?						
Very much, or Much	90.4	151	89.8	106	91.8	45
Not very much, Nothing, or I don't know	9.6	16	10.2	12	8.2	4
To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack (myocardial infarction) or a chest pain (angina)?						
Very much, or Much	91.0	152	89.8	106	93.9	46
Not very much, Nothing, or I don't know	9.0	15	10.2	12	6.1	3
How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?						
Very likely, or Likely	92.2	154	92.4	109	91.8	45
Unlikely, Very unlikely, or Uncertain	7.8	13	7.6	9	8.2	4
How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?						
Very likely, or Likely	89.8	150	91.5	108	85.7	42
Unlikely, Very unlikely, or Uncertain	10.2	17	8.5	10	14.3	7

Smoking status assessment while seeking healthcare.

Of the 167 men, 70.7% (n = 118) reported smoking cigarettes only, and 29.3% (n = 49) reported smoking waterpipes only. As shown in Table 5.4, the subjects reported whether the nurses and physicians inquired about their smoking status; 89.8% (n = 150)

of the subjects reported that they were asked about their smoking status while they were in the hospital, 99.3% (n = 149) were asked by physicians and 44.7% (n = 67) by nurses.

Table 5.4. Description of Responses to Smoking Status Assessment while Seeking Healthcare Services

	Study Sample (n=167)		Cigarette Smokers (n=118)		Waterpipe Smokers (n=49)	
Variable	%	n	%	n	%	n
Asked about smoking status?						
Yes	89.8	150	90.7	107	87.8	43
Who asked about smoking status? [a/b]						
Nurse	44.7	67	42.1	45	51.2	22
Physician	99.3	149	99.1	106	100.0	43
Advised to quit smoking tobacco products? [c]						
Yes	100.0	150	100.0	107	100.0	43
Who advised to quit smoking tobacco products when smoking status was assessed? [c]						
Nurse	46.0	69	42.1	45	55.8	24
Physician	99.3	149	99.1	106	100.0	43
Had he seen any healthcare provider (HCP) in the past 12 months?						
Yes	29.9	50	28.0	33	34.7	17
During the visits in the past 12 months with HCP, asked about smoking status? [d]						
Yes	68.0	34	72.7	24	58.8	10
During the visits in the past 12 months with HCP, advised to quit smoking tobacco products? [d]						
Yes	68.0	34	72.7	24	58.8	10

[a] n = 150, limited to the subjects who were asked if they smoke tobacco products. [b] Dietitians and other were reported as 0. [c] n = 150, limited to the subjects who were advised to quit smoking tobacco products. [d] n = 50, limited to the subjects who had seen a healthcare provider in the past 12 months.

When asked "Who advised you to quit smoking tobacco products?", they reported that they were advised to quit smoking tobacco products by nurses (46%) and by physicians (99%). Furthermore, 29.9% (n = 50) had been seen by a health care provider in the past 12 months. During these past visits, 68% (n = 34/50) reported being asked about their smoking status and that they were also advised to quit smoking.

History, patterns, and customs of cigarette smokers.

The cigarette smokers (n = 118) reported smoking their first puff of a cigarette on average at age 17.2 years (±2.4), ranging from 6 to 22 years; and the age at which they consumed their first cigarette was about the same (Table 5.5).

Table 5.5. Description of Cigarette Smoking History, Pattern and Customs (n=118)

Variable	%	n
How soon after you wake up do you smoke your first cigarette?		
Within 30 minutes	88.1	104
After 30 minutes	11.8	14
Have you smoked cigarettes during this hospitalization?		
Yes	8.5	10
Have you ever made a serious attempt to quit cigarette smoking that lasted at least 24 hours?		
Yes	24.6	29
What motivated or led you to resume cigarette smoking? (n=29)		
Stress	69.0	20
Social/party situation	34.5	10
Boredom	31.0	9
Relief of nicotine withdrawal symptoms	27.6	8
Crisis	10.3	3
Other	10.3	3
	Mean (S.D.) (Median) [Min - Max] [(a)]	
Age of First Puff of a Cigarette (Years)	17.2 (2.4) (17.0) [6 - 22]	
Age of First Whole Cigarette (Years)	17.3 (2.3) (17.5) [9 - 22]	
Number of Years of Smoking at least 1 Cigarette a Day	28.8 (7.0) (30.0) [10 - 50]	
Number of Smoked Cigarettes per Day	28.9 (8.0) (30) [12 - 70]	
Total Amount Paid for Cigarettes per Month (JD) [(a)]	62.4 (19.7) (60) [20 - 175]	
Percent of Income Spent on Cigarettes per Month	14.5 (7.2) (13.1) [5.7 - 60]	
FTND Score[(b)]	6.2 (1.6) (6) [1 - 10]	
Days Since Last Cigarette	2.5 (1.3) (2.5) [0.0 - 7.7]	
Number of Times that Serious Quit Cigarette Smoking Attempt was Made and Lasted at Least 24 Hours (n=29)	3.2 (1.7) (3.0) [1 - 10]	

[(a)] JD: Jordanian Dinars (1 JD ≈1.41 US Dollars); S.D.: Standard Deviation; Min: Minimum; Max: Maximum.
[(b)] FTND: Fagerström Test for Nicotine Dependence.

The cigarette smokers reported that they smoked at least one cigarette for an average of 28.8 years (± 7.0), with an average of 28.9 (±8.0) cigarettes a day. The median was 30 cigarettes a day, with a range from 12 to 70. The total amount paid for cigarettes per month was reported as 62.4 JD (±19.7) (range: 20 – 175 JD). This represents 14.5% (±7.2) of their monthly income. About a quarter (24.6%, n = 29) had previously made a quit attempt that lasted at least 24 hours. When asked "how many quit attempts have you made that lasted at least 24 hours?", the range was 1 to 10, with a mean of 3.2 (±1.7).

Most of the cigarette smokers attempted to quit smoking on their own without any help (72.4%). The methods they used in their past quit attempts were: gradually decreasing number of cigarettes smoked per day (37.9%), consuming snacks (such as gums or candies) as an alternative for cigarette smoking (27.6%), decision made with other smoker to mutually quit smoking (13.8%), using of pamphlets (3.4%), private consultation from a healthcare provider (3.4%). None of them had used medications, participated in a formal smoking cessation program, or practiced physical exercises. When "asked what led you to start smoking again?", the most common reasons were stress (69%), social or party situation (34.5%), boredom (31%), and relief of nicotine withdrawal symptoms (27.6%).

Some (8.5%) reported having smoked cigarettes during this hospitalization. The subjects reported that the cigarette smoking policy at their most recent work place was restricted to some indoor areas for 52.5%, and allowed to smoke anywhere for 27.1%. Only 20.3% of employers did not allow smoking in the workplace. Most (99.2%) smoked cigarettes inside their homes, and 50.8% stated that they smoke in every room. When

asked, “Does cigarette smoking occur while children are present?”, 90.7% responded “yes” (Table 5.6).

Table 5.6. Description of Cigarette Smoking Policy in Home and Workplace (n=118)

Variable	%	n
Is cigarette smoking allowed inside your home?		
Yes	99.2	117
Inside your home, is cigarette smoking allowed in every room?		
Yes	50.8	60
Inside your home, does cigarette smoking occur while children are present?		
Yes	90.7	107
Which of the following best describes cigarette smoking policy at your most recent place of employment?		
Allowed anywhere	27.1	32
Allowed only in some indoor areas	52.5	62
Not allowed	20.3	24

The average Fagerström Test for Nicotine Dependence [FTND] score on a scale from 0 to 10 was 6.2 (±1.6). The ranked order of nicotine withdrawal symptoms showed craving as being the most frequent (70.9%) and sadness being the least frequent (40.2%). The ranked order (most to least) for smoking consequences showed health risks (99.1%) and craving addiction (97.4%) as the first and second most common consequences for smoking, while social impression ranked lowest (29.9%). The detailed responses to the FTND, nicotine withdrawal symptoms, and smoking consequences questionnaires are presented in Appendix 5.4.

History, patterns, and customs of waterpipe smokers.

The results for waterpipe smoking are presented in Tables 5.7 and 5.8. The 49 waterpipe smokers reported smoking their first puff of a waterpipe on average at age 20.9 (±4.1), ranging from 16 to 30 years. The age at which they first consumed a whole waterpipe was about the same. They reported that they smoked a waterpipe for an average of 29.6 (±7.6) years (ranging from 13 to 42 years).

A large proportion of waterpipe smokers (61.2%) reported that they smoked three to six waterpipes per week and 65.3% usually shared their waterpipe with someone else. Almost all of them (98%) considered themselves as "regular waterpipe smokers", and 91.8% smoked a specific flavor of waterpipe tobacco.

Table 5.7. Description of Waterpipe Smoking History, Patterns and Customs (n=49)

Variable	%	n
Do you consider yourself as a regular waterpipe smoker?		
Yes	98.0	48
How many waterpipes do you usually smoke per week?		
1–2 waterpipes/week	38.8	19
3–6 waterpipes/week	61.2	30
Do you usually share waterpipe smoking?		
Yes	65.3	32
Do you consistently smoke specific flavor(s) of waterpipe tobacco?		
Yes	91.8	45
Have you ever made a serious attempt to quit waterpipe smoking?		
Yes	26.5	13
What motivated or led you to return to waterpipe smoking? (n=13)		
Stress	69.2	9
Boredom	76.9	10
Social/party situation	30.8	4
Crisis	7.7	1
Relief of nicotine withdrawal symptoms	0.0	0
Other	0.0	0
	Mean (S.D.) (Median) [Min - Max] [(a)]	
Age of First Puff of a Waterpipe (Years)	20.9 (4.1) (20.0) [16 - 30]	
Age of First Whole Waterpipe (Years)	21.0 (4.0) (20.0) [16 - 30]	
Number of Years of Smoking Waterpipe	29.6 (7.6) (29.0) [13 – 42]	
Total Amount Paid for Waterpipe Smoking per Month (JD) [(a)]	20.8 (4.7) (20.0) [15 - 30]	
Percent of Income Spent on Waterpipe Smoking per Month	5.5 (2.4) (5.3) [1.8 - 13.6]	
LWDS Score [(b)]	18.0 (2.2) (18) [14 - 24]	
Days Since Last Waterpipe	3.3 (1.2) (2.9) [1.5 - 7.7]	
Times of Serious Attempt to Quit Waterpipe Smoking (n = 13)	2.4 (1.3) (2.0) [1 - 6]	

[(a)] JD: Jordanian Dinars (1 JD ≈1.41 US Dollars); S.D.: Standard Deviation; Min: Minimum; Max: Maximum.
[(b)] LWDS: Lebanon Waterpipe Dependence Scale.

Table 5.8. Description of Waterpipe Smoking Policy in Home (n=49)

Variable	%	n
Is waterpipe smoking allowed inside your home?		
Yes	100.0	49
Inside your home, is waterpipe smoking allowed in every room?		
Yes	30.6	15
Inside your home, does waterpipe smoking occur while children (less than 18 years of age) are present?		
Yes	98.0	48

On average, waterpipe smokers paid 20.8 JD (±4.7) per month (ranging from 15 to 30 JD). This represents 5.5% (±2.4) of their monthly income. Days since last waterpipe smoking ranged from 1.5 to 7.7, with a mean of 3.3 (±1.2) days.

About a quarter (26.5%) of the 49 waterpipe smokers (n = 13) had previously made a quit attempt. When asked how many serious attempts they had made to quit waterpipe smoking, the range was 1 to 6 with a mean of 2.4 (±1.3).

Most of the waterpipe smokers attempted to quit smoking on their own without any help (61.5%). They only used two methods in their past quit attempts: gradually decreasing number of waterpipe sessions smoked (61.5%) and consumption of snacks (such as gums or candies) as an alternative for waterpipe smoking (23.1%). The two most common reasons for returning to waterpipe smoking were boredom (76.9%) and stress (69.2%). The Lebanon waterpipe dependence scale with a response option of 0 to 3 for the 11 items, showed a mean of 18.0 (±2.2), ranging from 14 to 24. All of the waterpipe smokers reported that they smoke waterpipe in their homes, 30.6% of them stated that they smoke in every room, and 98% smoke when children are present.

Social support and depression.

As seen in Table 5.9, the mean score on the ENRICHD Social Support Instrument [ESSI] was 21.0 (±4.3) (range: 11-34). On the ESSI, 87.3% (*n* = 145) of the subjects were categorized as having low social support.

Table 5.9. Description of Social Support Findings *

	Study Sample‡ (n=166)		**Cigarette Smokers** (n=117)		**Waterpipe Smokers** (n=49)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**
Is there someone available to you whom you can count on to loan you cigarettes or tobacco if you need them?						
None of the Time, and A little of the Time	4.8	8	6.0	7	2.0	1
Some of the Time, Most of the Time, and All of the Time	95.2	158	94.0	110	98.0	48
Is there someone available to you who encourages you to quit smoking?						
None of the Time, and A little of the Time	66.3	110	61.5	72	77.6	38
Some of the Time, Most of the Time, and All of the Time	33.7	56	38.5	45	22.4	11
Is there someone available to you with whom you can smoke while you are talking about your stress?						
None of the Time, and A little of the Time	8.4	14	7.7	9	10.2	5
Some of the Time, Most of the Time, and All of the Time	91.6	152	92.3	108	89.8	44
Social Support Group						
High Social Support	12.7	21	**16.2**	**19**	**4.1**	**2**
Low Social Support	87.3	145	**83.1**	**98**	**95.9**	**47**
	Mean (S.D.) (Median) [Min - Max] [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]	
ESSI Score [(b)]	21.0 (4.3) (21) [11 - 34]		**21.7 (4.3) (21) [11 - 34]**		**19.2 (3.9) (19) [11 - 27]**	

* Significant differences are in bold. ‡ n = 166 due to missing data.
[(a)] S.D.: Standard Deviation; Min: Minimum; Max: Maximum. [(b)] ESSI: ENRICHD Social Support Inventory.

Additional questions to evaluate social support in relation to smoking revealed that 95.2% of subjects responded that "some, most or all of the time" they had someone available they could count on to loan them cigarettes or tobacco if they needed them. Only 33.7% stated that they had someone available who encouraged them to quit smoking, and 91.6% had someone who, "some, most or all of the time" was available to them with whom they could smoke while they are talking about their problems. Detailed item responses to social support items are presented in Appendix 5.5.

In Table 5.10, responses to the PHQ-9 (depression screening tool) and 7 additional questions about smoking and depressive symptoms are shown. The PHQ-9 showed that 4.2% of respondents were classified as not depressed, 55.4% had mild depression, and 40.4% had moderate or severe depression. In response to the question, "How difficult have the depressive symptoms made it for you to do work, take care of things at home, or get along with other people?", 6% replied "not at all difficult," 62% replied "somewhat difficult," and 31.9% replied "very difficult" or "extremely difficult."

In response to the question, "Have you ever had a period of 2 weeks (or more) where you had the same depressive symptoms nearly every day?", 25.9% responded "yes." To the question "Do you believe that smoking leads to these depressive symptoms?", a majority (75.8%) responded "yes," 17.6% responded "no," and 6.7% responded "I don't know". In response to the question, "Do you believe that depressive symptoms lead to smoking?", more than half (55.8%) responded "yes."

Table 5.10. Description of Depression Status and History

	Study Sample‡ (n=166)		Cigarette Smokers (n=117)		Waterpipe Smokers (n=49)	
Variable	%	n	%	n	%	n
Depression Category						
None (0-4)	4.2	7	5.1	6	2.0	1
Mild (5-9)	55.4	92	54.7	64	57.1	28
Moderate (10-14)	39.8	66	39.3	46	40.8	20
Moderately Severe (15-19)	0.0	0	0.0	0	0.0	0
Severe (20-27)	0.6	1	0.9	1	0.0	0
How difficult have the depressive symptoms made it for you to do work, take care of things at home, or get along with other people?						
Not difficult at all	6.0	10	4.3	5	10.2	5
Somewhat difficult	62.0	103	64.1	75	57.1	28
Very difficult	31.3	52	30.8	36	32.7	16
Extremely difficult	0.6	1	0.9	1	0.0	0
Felt the same depressive symptoms before starting smoking						
Yes	0.6	1	0.9	1	0.0	0
Ever had a period of 2 weeks (or more) where you had the same depressive symptoms nearly every day						
Yes	25.9	43	23.9	28	30.6	15
Do you believe that smoking leads to these depressive symptoms?						
No	17.6	29	16.4	19	20.4	10
Yes	75.8	125	77.6	90	71.4	35
I don't know	6.7	11	6.0	7	8.2	4
Do you believe that these depressive symptoms lead to smoking?						
No	37.0	61	36.2	42	38.8	19
Yes	55.8	92	56.9	66	53.1	26
I don't know	7.3	12	6.9	8	8.2	4
Even if you felt okay at times, have you had a continuous period of 2-year (or more) in your life when you felt depressed or sad on most days?						
Yes	0.6	1	0.9	1	0.0	0
Have you ever been diagnosed with depression?						
Yes	0.6	1	0.9	1	0.0	0

‡ n = 166 due to missing data.

Responses to willingness to quit smoking.

As seen in Table 5.11, in response to questions about the stage of readiness to stop smoking cigarettes, 9.4% reported that they had no intention of quitting within the next 6 months; 44.4% endorsed "I am seriously considering quitting within the next 6 months"; and almost half (46.2%) responded "I am seriously planning to quit within the next 30 days."

Table 5.11. Description of Willingness to Quit Smoking Findings *

	Study Sample‡ (n=166)		**Cigarette Smokers** (n=117)		**Waterpipe Smokers** (n=49)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**
Stage of readiness to stop smoking						
I have no intention to quit within the next 6 months	13.9	23	**9.4**	**11**	**24.5**	**12**
I am seriously considering quitting within the next 6 months	41.6	69	**44.4**	**52**	**34.7**	**17**
I am seriously planning to quit within the next 30 days	44.6	74	**46.2**	**54**	**40.8**	**20**
Does current willingness to quit smoking once discharged from the hospital differ from before this interview?						
Yes	9.6	16	11.1	13	6.1	3
	Mean (S.D.) (Median) [Min - Max] [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]		**Mean (S.D.) (Median) [Min - Max]** [(a)]	
Willingness to stop smoking after discharge	7.5 (1.1) (8.0) [4 - 10]		7.6 (1.2) (8.0) [4 - 10]		7.2 (1.0) (7.0) [5 - 9]	
Willingness to quit smoking before this interview [(b)]	5.3 (1.7) (5.0) [0 - 7]		5.0 (1.7) (5.0) [0 - 7]		6.3 (0.6) (6.0) [6 - 7]	
Willingness to quit smoking after this interview[(b)]	8.3 (1.2) (8.0) [5 - 10]		8.3 (1.3) (8.0) [5 - 10]		8.3 (0.6) (8.0) [8 - 9]	

* Significant differences are in bold. ‡ n = 166 due to missing data.

[(a)] S.D.: Standard Deviation; Min: Minimum; Max: Maximum. ‡ n = 166 due to missing data.

[(b)] n = 16, limited to the subjects who changed their willingness to quit smoking after the interview.

Among waterpipe smokers, 24.5% reported that they had no intention of quitting within the next 6 months in response to questions about the stage of readiness to stop smoking waterpipe. Furthermore, 34.7% endorsed "I am seriously considering quitting

within the next 6 months"; and 40.8% responded "I am seriously planning to quit within the next 30 days."

When asked, "Does current willingness to quit smoking once discharged from the hospital differ from before this interview?", among cigarette smokers 11.1% responded "yes" whereas 6.1% responded "yes" among waterpipe smokers. When cigarette smokers were asked if they were willing to quit smoking after discharge from the hospital, the mean score was 7.6 (±1.2) (range: 4-10) on a scale from 0 to 10. However, for the 13 subjects who expressed that their current willingness to quit smoking once discharged from the hospital differed from before the interview, their mean willingness to quit smoking score before this interview was significantly lower than after the interview [5.0 (±1.7) vs. 8.3 (±1.3), $t = -9.636$, $p < 0.01$]. The reasons given by the subjects for the greater willingness to quit smoking were linked to their knowledge and awareness of the effect of smoking on the body as they recognized them from the questions asked during the interview. "I felt the extent of smoking on me," "The questions clarified aspects that I did not know before about smoking," "I was not aware enough about the effect of smoking on me" are examples of the reasons the subjects gave for the differences in their willingness scores before and after the interview.

When waterpipe smokers were asked if they were willing to quit smoking after discharge the mean score was 7.2 (±1.0) (range: 5-9) on a scale from 0 to 10. However, for the 3 subjects who expressed that their current willingness to quit smoking once discharged from the hospital differed from before this interview, their mean willingness to quit smoking score before this interview was 6.3 (±0.6) (range: 6-7), and after the interview it changed to 8.3 (±0.6) (range: 8-9).

Findings to answer aim 2.

The differences between cigarette smokers and waterpipe smokers are presented in Tables 5.1 to 5.11

Of the sociodemographic variables (Table 5.1), six variables had statistically significant differences between cigarette smokers and waterpipe smokers. These were: living status, total number of household members, employment status, personal monthly income, sufficiency of personal income to support self, and monthly household income. Cigarette smokers reported more often (96.6%) living with someone else compared with waterpipe smokers (83.7%) (χ^2= 6.86, df = 1, $p < 0.01$). The total number of household members for cigarette smokers was higher [mean of 4.2 ±1.8] than waterpipe smokers [mean of 3.4 ±1.5] (t = 0.133, $p < 0.05$). Thirty nine percent of cigarette smokers were self-employed compared with only 16.1% of waterpipe smokers (χ^2 = 4.33, df = 1, $p < 0.05$).

It is of note that 40.7% of cigarette smokers reported a monthly income of less than 450 JD as compared to 63.3% of waterpipe smokers (χ^2 = 6.21, df = 1, $p < 0.05$). Furthermore, 75.4% of cigarette smokers reported that this income was sufficient to support themselves compared to 53.1% of waterpipe smokers (χ^2 = 7.07, df = 1, $p < 0.01$). The results for household income reflected the same statistically significant difference (χ^2 = 4.20, df = 1, $p < 0.05$). Table 5.11 shows a statistically significant difference in social support score between cigarette smokers with a mean of 21.7 (±4.3) compared with waterpipe smokers with a mean of 19.2 (±3.9) (t = 3.53, $p < 0.01$).

Statistically significant differences between cigarette smokers and waterpipe smokers were also found in willingness to quit smoking. Only 9.4% of cigarette smokers

compared with 24.5% waterpipe smokers claimed to have no intention of quitting smoking within the next 6 months ($\chi^2 = 6.69$, $df = 2$, $p < 0.05$). Also, 44.4% of cigarette smokers vs. 34.78% of waterpipe smokers endorsed "I am seriously planning quitting within the next 6 months" ($\chi^2 = 6.69$, $df = 2$, $p < 0.05$).

Findings to Answer Aim 3

The relationship between the subjects' sociodemographic characteristics, clinical and health factors, knowledge, smoking [cigarettes and waterpipes] history and pattern, social support, symptoms of depression, and willingness to quit smoking nicotine as well as nicotine dependence were explored using Pearson's correlation and Spearman's rho correlation coefficients.

The correlation matrix in Table 5.12 shows that the willingness to quit smoking score was weakly positively correlated with the percentage of income spent on smoking ($r = 0.20$, $p < 0.01$), the number of daily smoked cigarettes ($r = 0.29$, $p < 0.01$) and depression score ($r = 0.16$, $p = 0.04$). It was moderately positively correlated with the number of persons living in the household ($r = 0.34$, $p < 0.01$) and social support ($r = 0.33$, $p < 0.01$). Furthermore, there was a strong positive statistically significant correlation between willingness score and stage of readiness to quit smoking (rho = 0.71, $p < 0.01$). Age of smoking initiation had a small negative correlation with willingness to quit smoking (rho = -0.21, $p < 0.01$).

The correlation matrix shows the relationships with indices of nicotine dependence (FTND for cigarettes smokers, LWDS for waterpipe smokers). For cigarette smokers, a weak, statistically significant positive relationship was observed between the FTND score and depression score ($r = 0.21$, $p = 0.02$) and the difficulty with depressive

symptoms at work, while taking care of things at home, or getting along with other people (rho = 0.18, $p < 0.05$).

Table 5.12. Pearson's Correlation and Spearman's rho Correlation Coefficients between Several Variables by the scores of Fagerström Test for Nicotine Dependence (FTND), Lebanon Waterpipe Dependence Scale (LWDS), Patient Health Questionnaire-9 (PHQ-9), and Willingness to Quit Smoking after Hospital Discharge

		Cigarette Smokers' FTND Score	Waterpipe Smokers' LWDS Score	Willingness Score
Marital Status [(a)]	rho	0.09	**0.36 ***	-0.05
	Sig.	0.31	**0.01**	0.49
Number of Persons Living in Household	Pearson Correlation	-0.07	**-0.31 ***	**0.34 ****
	Sig.	0.47	**0.03**	**0.00**
Percent of Income Spent on Smoking	Pearson Correlation	0.10	**0.38 ****	**0.20 ****
	Sig.	0.30	**0.008**	**0.008**
Sufficiency of Income to Support Others [(b)]	rho	0.09	**0.33 ***	0.07
	Sig.	0.31	**0.02**	0.36
Age at Starting Smoking	Pearson Correlation	**-0.27 ****	-0.07	**-0.21 ****
	Sig.	**0.00**	0.64	**0.007**
Number of Daily Cigarettes Smoked	Pearson Correlation	**0.65 ****	NA	**0.29 ****
	Sig.	**0.00**		**0.00**
Number of Weekly Waterpipes Smoked	Pearson Correlation	NA	**0.53 ****	-0.10
	Sig.		**0.00**	0.50
Smoking is Allowed in Every Room in the Home [(b)]	rho	**0.34 ****	0.21	0.03
	Sig.	**0.00**	0.14	0.74
PHQ-9 Score	Pearson Correlation	**0.21 ***	0.26	**0.16 ***
	Sig.	**0.02**	0.07	**0.04**
Difficulty Depressive Symptoms Made [(c)]	rho	**0.18 ***	0.06	0.10
	Sig.	**0.048**	0.66	0.20
Social Support Score	Pearson Correlation	0.03	**-0.37 ****	**0.33 ****
	Sig.	0.74	**0.009**	**0.00**
Willingness Score	Pearson Correlation	0.04	-0.23	1.00
	Sig.	0.66	0.11	
Stage of Readiness to Stop Smoking [(d)]	rho	-0.07	-0.27	**0.71 ****
	Sig.	0.44	0.06	**0.00**

Abbreviations: NA: not applicable; ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed). (a) Coded: 0 = 'Married', 1 = 'Unmarried'. [(b)] Coded: 0 = 'No', 1 = 'Yes'. [(c)] Coded: 1 = 'Not difficult at all', 2 = 'Somewhat difficult', 3 = 'Very difficult', 4 = 'Extremely difficult'. [(d)] Coded: 1 = 'I have no intention to quit within the next 6 months' 2 = 'I am seriously considering quitting within the next 6 months', 3 = 'I am seriously planning to quit within the next 30 days'.

A moderate positive relationship was present between the FTND score and smoking allowance in every room in the home (rho = 0.34, $p < 0.01$). Furthermore, a strong relationship existed between the FTND score and the number of daily cigarettes

smoked ($r = 0.65$, $p < 0.01$). Age of smoking initiation had a small negative correlation with the FTND score ($r = -0.27$, $p < 0.01$).

For waterpipe smokers, moderate positive statistically significant relationships existed between the LWDS score and marital status (rho = 0.36, $p = 0.01$), the percentage of income spent on smoking ($r = 0.38$, $p < 0.01$), and sufficiency of income to support others (rho = 0.33 $p = 0.02$). A statistically significant strong positive correlation between the LWDS score and the number of weekly waterpipes smoked ($r = 0.53$, $p < 0.01$) was noted. On the other hand, the LWDS score had two statistically significant moderate negative correlations with the number of persons living in the household ($r = -0.31$, $p = 0.03$) and social support (rho = -0.37, $p < 0.01$). Appendix 5.6 presents the values for the Pearson correlations separately for the subscales of the Wisconsin Smoking Withdrawal Scale, the Smoking Consequences Questionnaire-Adult, and the scores for the Fagerström Test for Nicotine Dependence scale and the Nicotine Dependence Syndrome Scale.

Findings to Answer Aims 4 and 5

The findings pertinent to Aims 4 and 5 are presented in Tables 5.13 to 5.23. To minimize repetition, the results for Aim 4 are given in columns 2 and 3; and for Aim 5 in columns 4 and 5. All the findings by nicotine dependence will be presented to answer Aim 4 followed by those findings for depression status to answer Aim 5.

Findings to answer aim 4.

Results to answer Aim 4 are given in Tables 5.13 to Table 5.23, in columns 2 and 3, for nicotine dependence status. Men in the nicotine dependent group had a score of 7 or higher on the FTND or more than a score of 18 on the LWDS. 62.8% of the sample (*n*

= 105/167) were categorized as nicotine dependent. 74.6% (*n* = 88) of the 118 cigarette smokers and 34.7% (*n* = 17) of the 49 waterpipe smokers were nicotine dependent.

A comparison of the subjects' sociodemographic information shows no statistically significant differences between the not nicotine dependent and nicotine dependent groups (Table 5.13). The details of comparisons for age, education and profession are shown in Appendix 5.7.

Similarly, there were no statistically significant differences between the not nicotine dependent and nicotine dependent groups in health history, index diagnosis, type of procedures and risk factors (Table 5.14). The details of comparisons for some of the health history and risk factors are presented in Appendix 5.8.

The comparison between the responses to knowledge and health belief questions by nicotine dependence group also shows no statistically significant differences between the two groups (Table 5.15). Detailed comparisons of the knowledge and health belief questions are presented in Appendix 5.9.

The five comparisons of responses to smoking status by nicotine dependence in Table 5.16 show there were no differences between the not nicotine dependent and nicotine dependent groups.

Table 5.13. Comparisons of Sociodemographic Characteristics by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=105)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Marital Status								
Married	93.5	58	84.8	89	**94.9**	**94**	**77.6**	**52**
Not Married	6.5	4	15.2	16	**5.1**	**5**	**22.4**	**15**
Living Status								
With Others	96.8	60	90.5	95	96.0	95	88.1	59
Alone	3.2	2	9.5	10	4.0	4	11.9	8
Religion								
Muslim	79.0	49	86.7	91	82.8	82	85.1	57
Christian	21.0	13	13.3	14	17.2	17	14.9	10
Educational Level								
≤ Diploma /Associate	62.9	39	62.9	66	64.7	64	61.2	41
≥ Bachelor	37.1	23	37.1	39	35.4	35	38.8	26
Employment Status								
Not Employed	37.1	23	26.7	28	28.3	28	34.3	23
Employed	62.9	39	73.3	77	71.7	71	65.7	44
Self-Employment‡								
Yes	25.6	10	36.4	28	35.2	25	29.5	13
Monthly Personal Income (JD) [(a)]								
< 450	51.6	32	44.8	47	48.5	48	46.3	31
≥ 450	48.4	30	55.2	58	51.5	51	53.7	36
Sufficiency of Income to Support Self								
Yes	64.5	40	71.4	75	74.7	74	59.7	40
Sufficiency of Income to Support Others								
Yes	19.4	12	28.6	30	22.2	22	29.9	20
Monthly Household Income (JD) [(a)]								
< 600	43.5	27	50.5	53	50.5	50	44.8	30
≥ 600	56.5	35	49.5	52	49.5	49	55.2	37
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Age (Years)	50.9 (±6.9)		50.5 (±6.9)		51.2 (±6.4)		49.7 (±7.5)	
Total Number of Persons Living in Household	4.1 (±1.9)		3.9 (±1.6)		3.9 (±1.6)		4.0 (±1.9)	
Number of Hours Worked per Week for Employed [(b)]	42.3 (±3.6)		42.9 (±5.9)		42.1 (±4.9)		43.5 (±5.7)	

* Significant differences are in bold. [(a)] JD: Jordanian Dinar (1 JD ≈ 1.41 US Dollars), S.D.: Standard Deviation. [(b)] n = 115, limited to the subjects who were employed.

Table 5.14. Comparisons of Health History, Current Diagnosis and Risk Factors by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group**(n=105)		**No Depression Group (**n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Clinical Care Site								
Ward	72.6	45	64.8	68	63.6	63	73.1	49
Acute Care Unit	27.4	17	35.2	37	36.4	36	26.9	18
History of CVD [(b)]								
Myocardial Infarction	11.8	2	9.1	2	11.1	3	8.3	1
Angina/Chest Pain	82.4	14	90.9	20	88.9	24	83.3	10
Other	5.9	1	0.0	0	0.0	0	8.3	1
Type of Previous CVD Procedures [(b)]								
Cardiac Catheterization	94.1	16	90.9	20	96.3	26	83.3	10
Stent angioplasty	64.7	11	77.3	17	77.8	21	58.3	7
Balloon Angioplasty	11.8	2	9.1	2	7.4	2	16.7	2
Coronary Artery Bypass Graft	5.9	1	4.5	1	3.7	1	8.3	1
Other	5.9	1	0.0	0	0.0	0	8.3	1
Currently Confirmed CVD								
Myocardial Infarction	21.0	13	25.7	27	21.2	21	28.4	19
Angina/Chest Pain	74.2	46	69.5	73	73.7	73	67.2	45
Other	4.8	3	4.8	5	5.1	5	4.5	3
Type of Current CVD Procedures								
Cardiac Catheterization	82.3	51	79.0	83	78.8	78	82.1	55
Stent angioplasty	50.0	31	42.9	45	47.5	47	41.8	28
Coronary Artery Bypass Graft	9.7	6	13.3	14	10.1	10	14.9	10
Balloon Angioplasty	1.6	1	2.9	3	1.0	1	4.5	3
Other	1.6	1	1.0	1	0.0	0	3.0	2
CVD Risk Factors								
Family History of CVD	58.1	36	61.0	64	59.6	59	59.7	40
Sedentary Lifestyle	71.0	44	62.9	66	63.6	63	70.1	47
Overweight and Obesity	41.9	26	37.2	39	39.4	39	38.8	26
Hypertension	38.7	24	32.4	34	33.3	33	35.8	24
Diabetes Mellitus	30.6	19	37.1	39	34.3	34	34.3	23
Hypercholesterolemia	29.0	18	32.4	34	30.3	30	32.8	22
General Health								
Poor and Fair	25.8	16	31.4	33	25.2	25	35.8	24
Good, Very good and Excellent	74.2	46	68.6	72	74.7	74	64.1	43
Health Insurance								
Yes	56.5	35	69.5	73	66.7	66	62.7	42
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Number of Daily Caffeinated Beverages	3.9 (±2.6)		3.8 (±2.6)		3.8 (±2.8)		3.8 (±2.3)	
Body Mass Index	24.6 (±2.1)		24.4 (±1.8)		24.5 (±1.9)		24.5 (±1.9)	

[(a)] S.D.: Standard Deviation. [(b)] n = 39, limited to the subjects who were previously admitted to a hospital with a heart problem.

Table 5.15. Comparisons of Responses to Knowledge and Health Belief Questions by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=105)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Do you think that tobacco smoking is harmful to health?								
Yes	95.2	59	92.4	97	92.9	92	94.0	63
Do you think that waterpipe smoking is less harmful to a smoker than cigarette smoking?								
Yes	38.7	24	38.1	40	35.4	35	41.8	28
To what extent do you think the number of cigarettes a person smokes affects his/her future health?								
Very much, or Much	91.9	57	89.5	94	89.9	89	91.0	61
Not very much, Nothing, or I don't know	8.1	5	10.5	11	10.1	10	9.0	6
To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack (myocardial infarction) or a chest pain (angina)?								
Very much, or Much	90.3	56	91.4	96	88.9	88	94.0	63
Not very much, Nothing, or I don't know	9.7	6	8.6	9	11.1	11	6.0	4
How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?								
Very likely, or Likely	91.9	57	92.4	97	90.9	90	94.0	63
Unlikely, Very unlikely, or Uncertain	8.1	5	7.6	8	9.1	9	6.0	4
How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?								
Very likely, or Likely	88.7	55	90.5	95	90.9	90	88.1	59
Unlikely, Very unlikely, or Uncertain	11.3	7	9.5	10	9.1	9	11.9	8

Table 5.16. Comparisons of Responses to Smoking Status by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=105)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Asked about smoking status?								
Yes	88.7	55	90.5	95	92.9	92	86.6	58
Who asked about smoking status?[(a)]								
Nurse	52.7	29	40.0	38	47.8	44	39.7	23
Physician	100.0	55	98.9	94	100.0	92	98.3	57
Advised to quit smoking tobacco products when smoking status was assessed?[(b)]								
Yes	100.0	55	100.0	95	100.0	92	100.0	58
Who advised to quit smoking tobacco products when smoking status was assessed?[(b)]								
Nurse	56.4	31	40.0	38	50.0	46	39.7	23
Physician	100.0	55	98.9	94	100.0	92	98.3	57
Had he seen any healthcare provider (HCP) in the past 12 months?								
Yes	30.6	19	29.5	31	32.3	32	26.9	18
During the visits in the past 12 months with HCP, asked about smoking status?[(c)]								
Yes	68.4	13	67.7	21	**84.4**	**27**	**38.9**	**7**
During the visits in the past 12 months with HCP, advised to quit smoking tobacco products?[(c)]								
Yes	68.4	13	67.7	21	**84.4**	**27**	**38.9**	**7**

* Significant differences are in bold. [(a)] n = 150, limited to the subjects who were asked if they smoke tobacco products. [(b)] n = 150, limited to the subjects who were advised to quit smoking tobacco products when smoking status was assessed. [(c)] n = 50, limited to the subjects who had seen a healthcare provider in the past 12 months.

Focusing on the comparisons among cigarette smokers only, Table 5.17 provides a comparison for cigarette smoking history and patterns by nicotine dependence status. The average age when the first whole cigarette was smoked was statistically significantly earlier for the dependent group [17.1 years (±2.0) vs. 17.9 years (±2.9), t = -1.98, p < 0.05)]. The total amount paid for cigarettes per month was statistically significantly higher in the nicotine dependent group [66.2 JD (±19.1) vs. 51.3 JD (±17.3), t = 4.34, p < 0.01)].

Table 5.17. Comparisons of Cigarette Smoking History by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=30)		**Nicotine Dependent Group** (n=88)		**No Depression Group** (n=70)		**Depression Group** (n=47)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Have you smoked cigarettes during this hospitalization?								
Yes	3.3	1	10.2	9	7.1	5	10.6	5
Have you ever made a serious attempt to quit cigarette smoking that lasted at least 24 hours?								
Yes	26.7	8	23.9	21	28.6	20	19.1	9
What motivated or led you to return to cigarette smoking? (n=29)								
Stress	62.5	5	71.4	15	70.0	14	66.7	6
Social/party situation	37.5	3	33.3	7	25.0	5	55.6	5
Relief of nicotine withdrawal symptoms	25.0	2	28.6	6	15.0	3	55.6	5
Boredom	12.5	1	38.1	8	35.0	7	22.2	2
Crisis	12.5	1	9.5	2	15.0	3	0.0	0
Other	0.0	0	14.3	3	15.0	3	0.0	0
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Age of First Puff of a Cigarette (Years)	17.8 (±3.2)		16.9 (±2.0)		17.3 (±2.6)		17.1 (±2.1)	
Age of First Whole Cigarette (Years)	**17.9 (±2.9)**		**17.1 (±2.0)**		17.4 (±2.5)		17.1 (±2.1)	
Number of Years of Smoking at least 1 Cigarette a Day	29.2 (±8.7)		28.7 (±6.4)		**30.0 (±6.7)**		**27.1 (±7.1)**	
Total Amount Paid for Cigarettes per Month (JD) [(a)]	**51.3 (±17.3)**		**66.2 (±19.1)**		60.4 (±17.4)		65.1 (±22.7)	
Days Since Last Cigarette	2.7 (±1.3)		2.4 (±1.3)		2.4 (±1.0)		2.6 (±1.6)	
Number of Times that Serious Quit Cigarette Smoking Attempt was Made and Lasted at Least 24 Hours (n=29)	2.8 (±1.4)		3.3 (±1.9)		3.1 (±1.9)		3.4 (±1.3)	

* Significant differences are in bold. [(a)] JD: Jordanian Dinars (1 JD ≈1.41 US Dollars); S.D.: Standard Deviation.

Furthermore, Table 5.18 compares cigarette smoking patterns and customs and shows the following statistically significant differences between not nicotine dependent and nicotine dependent groups. The number of cigarettes smoked daily was statistically significantly higher in the nicotine dependent group [30.7 cigarettes (±7.9) vs. 23.4 cigarettes (±5.6), $t = 5.30$, $p < 0.01$)], and their FTND scores were also statistically significantly higher [6.9 (±1.0) vs. 4.1 (±1.0), $t = 13.25$, $p < 0.01$)].

In addition, the nicotine dependent group smoked their first cigarette more often within 30 minutes after waking up than the not nicotine dependent group (96.6% vs. 63.3%, $\chi^2 = 16.06$, $df = 1$, $p < 0.01$). They found it "more difficult to refrain from cigarette smoking in places where it is forbidden" (43.2% vs. 3.3%, $\chi^2 = 16.06$, $df = 1$, $p < 0.01$), and would hate to give up their first cigarette in the morning (88.6% vs. 40.0%, $\chi^2 = 29.24$, $df = 1$, $p < 0.01$).

The nicotine dependent group smoked more cigarettes during the first hours after waking than during the rest of the day (78.4% vs. 56.7%, $\chi^2 = 5.35$, $df = 1$, $p < 0.05$), and they "smoked cigarettes even when they are ill enough to be in bed most of the day" (56.8% vs. 16.7%, $\chi^2 = 14.49$, $df = 1$, $p < 0.01$). Moreover, they tended to often smoke at home in every room (56.8% vs. 33.3%, $\chi^2 = 4.94$, $df = 1$, $p < 0.05$) and while children are present (94.3% vs. 80.0%, $\chi^2 = 5.43$, $df = 1$, $p < 0.05$).

Detailed nicotine withdrawal symptoms and smoking consequences are listed in Appendix 5.10 by nicotine dependent group. Only one out of seven nicotine withdrawal symptoms "anger" was statistically significantly more frequent in the nicotine dependent group (52.9% vs. 30.0%, $\chi^2 = 4.69$, $df = 1$, $p < 0.05$).

Table 5.18. Comparisons of Cigarette Smoking Patterns and Customs by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=30)		**Nicotine Dependent Group** (n=88)		**No Depression Group** (n=70)		**Depression Group** (n=47)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Number of cigarettes smoked daily								
11-20	**60.0**	**18**	**10.2**	**9**	27.1	19	17.0	8
21-30	**36.7**	**11**	**64.8**	**57**	54.3	38	61.7	29
31 or more	**3.3**	**1**	**25.0**	**22**	18.6	13	21.3	10
How soon after you wake up do you smoke your first cigarette?								
Within 30 minutes	**63.3**	**19**	**96.6**	**85**	85.7	60	91.4	43
After 30 minutes	**36.7**	**11**	**3.4**	**3**	14.3	10	8.5	4
Do you find it difficult to refrain from cigarette smoking in places where it is forbidden?								
Yes	**3.3**	**1**	**43.2**	**38**	30.0	21	38.3	18
Which cigarette would you hate most to give up?								
The first one in the morning	**40.0**	**12**	**88.6**	**78**	77.1	54	74.5	35
All others	**60.0**	**18**	**11.4**	**10**	22.9	16	25.5	12
Do you smoke cigarettes more during the first hours after waking than during the rest of the day?								
Yes	**56.7**	**17**	**78.4**	**69**	74.3	52	70.2	33
Do you smoke cigarettes even when you are ill enough to be in bed most of the day?								
Yes	**16.7**	**5**	**56.8**	**50**	**38.6**	**27**	**59.6**	**28**
Is cigarette smoking allowed inside your home?								
Yes	100.0	30	98.9	87	100.0	70	97.9	46
Inside your home, is cigarette smoking allowed in every room?								
Yes	**33.3**	**10**	**56.8**	**50**	50.0	35	53.2	25
Inside your home, does cigarette smoking occur while children are present?								
Yes	**80.0**	**24**	**94.3**	**83**	88.6	62	93.6	44
Which of the following best describes the indoor cigarette smoking policy at your most recent place of employment?								
Allowed anywhere	26.7	8	27.3	24	28.6	20	25.5	12
Allowed only in some indoor areas	46.7	14	54.5	48	48.6	34	59.6	28
Not allowed	26.7	8	18.2	16	22.9	16	14.9	7
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Number of Smoked Cigarettes Daily	**23.4 (±5.6)**		**30.7 (±7.9)**		27.9 (±7.0)		30.3 (±9.3)	
FTND Score[(b)]	**4.1 (±1.0)**		**6.9 (±1.0)**		6.0 (±1.6)		6.6 (±1.5)	

* Significant differences are in bold. [(a)] S.D.: Standard Deviation. [(b)] FTND: Fagerström Test for Nicotine Dependence.

Focusing on the comparisons among waterpipe smokers only, Tables 5.19 and 5.20 provide the results for history and pattern of waterpipe smoking. The following were statistically significantly different between the not nicotine dependent and nicotine

dependent groups. The number of waterpipes smoked per week was statistically significantly higher in the nicotine dependent group, where 94.1% of the nicotine dependent group smoked 3-6 waterpipes per week compared to 43.5% among the not nicotine dependent group (χ^2= 11.86, *df* = 1, $p < 0.01$).

Table 5.19. Comparisons of Waterpipe Smoking History by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=32)		**Nicotine Dependent Group** (n=17)		**No Depression Group** (n=29)		**Depression Group** (n=20)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Have you ever made a serious attempt to quit waterpipe smoking?								
Yes	34.4	11	11.8	2	34.5	10	15.0	3
What motivated or led you to return to waterpipe smoking? (n=13)								
Stress	72.7	8	50.0	1	80.0	8	33.3	1
Social/party situation	27.3	3	50.0	1	30.0	3	33.3	1
Relief of nicotine withdrawal symptoms	0.0	0	0.0	0	0.0	0	0.0	0
Boredom	72.7	8	100.0	2	70.0	7	100.0	3
Crisis	9.1	1	0.0	0	10.0	1	0.0	0
Other	0.0	0	0.0	0	0.0	0	0.0	0
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Age of First Puff of a Waterpipe (Years)	21.0 (±4.4)		20.8 (±3.4)		20.2 (±3.7)		22.0 (±4.5)	
Age of First Whole Waterpipe (Years)	21.1 (±4.4)		20.8 (±3.4)		20.3 (±3.6)		22.0 (±4.5)	
Number of Years of Smoking Waterpipe	29.8 (±6.4)		29.1 (±9.7)		29.8 (±7.2)		29.3 (±8.3)	
Total Amount Paid for Waterpipe Smoking per Month (JD) [(a)]	19.5 (±4.3)		23.2 (±4.7)		20.5 (±5.1)		21.3 (±4.3)	
Days Since Last Waterpipe	3.3 (±1.1)		3.3 (±1.5)		3.0 (±0.8)		3.6 (±1.6)	
Times of Serious Attempt to Quit Waterpipe Smoking (n=13)	2.5 (±1.4)		1.5 (±0.7)		2.5 (±1.3)		2.0 (±1.7)	

[(a)] JD: Jordanian Dinars (1 JD ≈1.41 US Dollars); S.D.: Standard Deviation.

When asked "Do you usually share the waterpipe with others?", a statistically significant difference was reported between the nicotine dependent (41.2%) and the not nicotine dependent groups (78.1%) (χ^2= 6.69, *df* = 1, $p < 0.05$). A higher proportion of

the nicotine dependent group smoked a waterpipe in every room in their home (52.9% vs. 18.8%) (χ^2= 6.11, *df* = 1, $p < 0.05$). Furthermore, the mean LWDS score was statistically significantly higher in the nicotine dependent group [20.5 (±1.5) vs. 16.7 (±1.2), $t = 6.72$, $p < 0.01$)].

Table 5.20. Comparisons of Waterpipe Smoking Patterns and Customs by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=32)		**Nicotine Dependent Group** (n=17)		**No Depression Group** (n=29)		**Depression Group** (n=20)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Do you consider yourself as a regular waterpipe smoker?								
Yes	96.9	31	100.0	17	96.6	28	100.0	20
How many waterpipes do you usually smoke per week?								
1–2 waterpipes/week	**56.3**	**18**	**5.9**	**1**	37.9	11	40.0	8
3–6 waterpipes/week	**43.8**	**14**	**94.1**	**16**	62.1	18	60.0	12
Do you usually share waterpipe smoking?								
Yes	**78.1**	**25**	**41.2**	**7**	69.0	20	60.0	12
Do you consistently smoke specific flavor(s) of waterpipe tobacco?								
Yes	90.6	29	94.1	16	89.7	26	95.0	19
Is waterpipe smoking allowed inside your home?								
Yes	100.0	32	100.0	17	100.0	29	100.0	20
Inside your home, is waterpipe smoking allowed in every room?								
Yes	**18.8**	**6**	**52.9**	**9**	27.6	8	35.0	7
Inside your home, does waterpipe smoking occur while children (less than 18 years of age) are present?								
Yes	96.9	31	100.0	17	100.0	29	95.0	19
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
LWDS Score[(b)]	**16.7 (±1.2)**		**20.5 (±1.5)**		17.5 (±2.1)		18.8 (±2.2)	

* Significant differences are in bold. [(a)] S.D.: Standard Deviation. [(b)] LWDS: Lebanon Waterpipe Dependence Scale.

Comparisons between social support findings by nicotine dependence are shown in Table 5.21. There were no statistically significant differences in the average ESSI score between the not nicotine dependent and the nicotine dependent groups. Similarly, there were no differences in the three additional social support questions inquiring about availability of support in regard to smoking. Detailed information about the relation between social support and nicotine dependence are shown in Appendix 5.11.

Table 5.21. Comparisons of Social Support Findings by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=104)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Is there someone available to you whom you can count on to loan you cigarettes or tobacco if you need them?								
None of the Time, and A little of the Time	1.6	1	6.7	7	4.0	4	6.0	4
Some of the Time, Most of the Time, and All of the Time	98.4	61	93.3	97	96.0	95	94.0	63
Is there someone available to you who encourages you to quit smoking?								
None of the Time, and A little of the Time	62.9	39	68.3	71	63.6	63	70.1	47
Some of the Time, Most of the Time, and All of the Time	37.1	23	31.7	33	36.4	36	29.9	20
Is there someone available to you with whom you can smoke while you are talking about your stress?								
None of the Time, and A little of the Time	4.8	3	10.6	11	9.1	9	7.5	5
Some of the Time, Most of the Time, and All of the Time	95.2	59	89.4	93	90.9	90	92.5	62
Social Support Group								
High Social Support	12.9	8	12.5	13	14.1	14	10.4	7
Low Social Support	87.1	54	87.5	91	85.9	85	89.6	60
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
ESSI Score [(b)]	21.4 (±4.0)		20.7 (±4.6)		21.3 (±3.8)		20.6 (±5.0)	

[(a)] S.D.: Standard Deviation. [(b)] ESSI: ENRICHD Social Support Inventory.

Comparisons between depression status findings by nicotine dependence are shown in Table 5.22. The PHQ-9 mean score for the nicotine dependent group was statistically significantly higher than that for the nicotine dependent group [9.4 (±2.8) vs. 8.5 (±2.2), $t = 2.38$, $p < 0.05$)]. Comparisons between the five questions about depressive symptoms and nicotine dependence also did not differ by nicotine dependence status.

Table 5.22. Comparisons of Depression Status and History by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=104)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
How difficult have the depressive symptoms made it for you to do work, take care of things at home, or get along with other people?								
Not difficult at all	9.7	6	3.8	4	**10.1**	**10**	**0.0**	**0**
Somewhat difficult	66.1	41	59.6	62	**81.8**	**81**	**32.8**	**22**
Very difficult	24.2	15	35.6	37	**8.1**	**8**	**65.7**	**44**
Extremely difficult	0.0	0	1.0	1	**0.0**	**0**	**1.5**	**1**
Felt the same depressive symptoms before starting smoking								
Yes	1.6	1	0.0	0	0.0	0	1.5	1
Ever had a period of 2 weeks (or more) where you had the same depressive symptoms nearly every day								
Yes	30.6	19	23.1	24	**15.2**	**15**	**41.8**	**28**
Do you believe that smoking leads to these depressive symptoms?								
No	21.0	13	15.5	16	19.4	19	14.9	10
Yes	69.4	43	79.6	82	74.5	73	77.6	52
I don't know	9.7	6	4.9	5	6.1	6	7.5	5
Do you believe that these depressive symptoms lead to smoking?								
No	40.3	25	35.0	36	39.8	39	32.8	22
Yes	50.0	31	59.2	61	52.0	51	61.2	41
I don't know	9.7	6	5.8	6	8.2	8	6.0	4
Even if you felt okay at times, have you had a continuous period of 2-year (or more) in your life when you felt depressed or sad on most days?								
Yes	1.6	1	0.0	0	0.0	0	1.5	1
Have you ever been diagnosed with depression?								
Yes	0.0	0	1.0	1	0.0	0	1.5	1
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Patient Health Questionnaire-9	**8.5 (±2.2)**		**9.4 (±2.8)**		**7.3 (±1.6)**		**11.5 (±1.9)**	

* Significant differences are in bold. [(a)] S.D.: Standard Deviation.

Table 5.23 shows the comparisons between willingness to stop smoking for three different time frames by nicotine dependence group. A comparison for stages of readiness to stop smoking by nicotine dependent group shows that a lower proportion of the nicotine dependent group were seriously considering quitting in the next 30 days (39.4% vs. 53.2%) with a higher proportion of the nicotine dependent group (49.0% vs. 29.0%, seriously considering quitting in the next 6 months ($\chi^2 = 6.48$, $df = 2$, $p < 0.05$)

Table 5.23. Comparisons of Willingness to Quit Smoking Findings by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=104)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Stage of readiness to stop smoking								
I have no intention to quit within the next 6 months	**17.7**	**11**	**11.5**	**12**	15.2	15	11.9	8
I am seriously considering quitting within the next 6 months	**29.0**	**18**	**49.0**	**51**	40.4	40	43.3	29
I am seriously planning to quit within the next 30 days	**53.2**	**33**	**39.4**	**41**	44.4	44	44.8	30
Does current willingness to quit smoking once discharged from the hospital differ from before this interview?								
Yes	6.5	4	11.5	12	8.1	8	11.9	8
	Mean (±S.D.) [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]		**Mean (±S.D.)** [a]	
Willingness to stop smoking after discharge	7.5 (±1.2)		7.5 (±1.1)		7.4 (±1.1)		7.7 (±1.1)	
Willingness to quit smoking before this interview[(b)]	5.8 (±1.0)		5.1 (±1.8)		5.0 (±2.1)		5.5 (±1.1)	
Willingness to quit smoking after this interview[(b)]	8.8 (±1.0)		8.1 (±1.3)		8.0 (±1.3)		8.6 (±1.1)	

*Significant differences are in bold. [(a)] S.D.: Standard Deviation. [(b)] n = 16, limited to the subjects who changed their willingness to quit smoking after the interview.

Only 16 of either cigarette or waterpipe smokers reported that their current willingness to quit smoking once discharged from the hospital differed from before the interview. A statistically significant difference was found in their reported willingness to quit smoking scores between before and after the interview; with a mean of 8.1 (±1.3) among the nicotine dependent group considering quitting smoking after the interview

compared to a mean score of 5.1 (±1.8) before the interview ($t = 8.61$, $p < 0.01$). For the not nicotine dependent group, the mean score after interview was 8.8 (±1.0) compared with a mean score of 5.8 (±1.0) before the interview ($t = 4.24$, $p < 0.05$).

Findings to answer aim 5.

Results to answer Aim 5 are given in Tables 5.13 to Table 5.23 in columns 4 and 5 for depression status. Men were classified as 'depressed' if their depression symptoms scores were $\geq$ 10 on the PHQ-9. Thus, 40.4% of the sample ($n = 67/166$) were categorized as depressed. 40.2% ($n = 47$) of the 117 cigarette smokers and 40.8% ($n = 20$) of the 49 waterpipe smokers were depressed.

Among the sociodemographic characteristics, only marital status was found to be statistically significantly different between the not depressed and the depressed group. Married men were statistically significantly less likely to be depressed (77.6% vs. 94.9%, $\chi^2 = 11.34$, $df = 1$, $p < 0.01$) (Table 5.13). The detailed comparisons for age, education, profession and depression status are shown in Appendix 5.7.

Health history, index diagnosis, procedures, CVD risk factors, knowledge and health beliefs did not differ by depression group (Tables 5.14 and 5.15). The detailed comparisons for the health history and risk factors are presented in Appendix 5.8. Detailed comparisons of the knowledge and health belief questions are presented in Appendix 5.9.

Table 5.16 compares responses to smoking status by depression group. There were statistically significant differences between the not depressed and depressed groups. Compared to the not depressed group, there was a much lower proportion of the depressed who were asked (38.9% vs. 84.4%) and advised (38.9% vs. 84.4%) about their

smoking status during their health visits in the last 12 months (χ^2= 10.95, *df* = 1, $p <$ 0.01).

Comparing cigarette smoking history, patterns and customs by depression group in Tables 5.17 and 5.18 shows that a statistically significantly higher proportion in the depressed group (59.6% vs. 38.6%, χ^2= 4.98, *df* = 1, $p < 0.05$) reported that they smoked cigarettes even when they were ill enough to be in bed most of the day. The number of years that the depressed group smoked at least one cigarette per day was 27.1 (±7.1) compared to 30.0 (±6.7) for not depressed group, a statistically significant difference (t = -2.00, $p < 0.05$). The comparisons of the presence of nicotine withdrawal symptoms and smoking consequences by depression groups are displayed in Appendix 5.10, which shows that there were no significant differences between the two groups.

Focusing on the comparisons among waterpipe smokers only, the results for waterpipe smoking history, patterns and customs by depression status are shown in Tables 5.19 and 5.20. There were no statistically significant differences in any of the waterpipe smoking variables between the not depressed and depressed groups. Table 5.21 shows the mean ESSI scores for depression in the two groups as well as three additional questions about the availability of support with regard to smoking. None of these were statistically significant by group. Detailed information about the relation between social support and depression is shown in Appendix 5.11. In Table 5.22, the PHQ-9 mean score for the depressed group was statistically significantly higher than that for the not depressed group [11.5 (±1.9) vs. 7.3 (±1.6), t = 16.23, $p < 0.01$)]. Of the five additional questions about depressive symptoms, the depressed group reported much more difficulty with their depressive symptoms at work, while taking care of things at home, or getting

along with other people; 65.7% of the depressed group reported facing 'very difficult' times with their depressive symptoms compared with 8.1% for the not depressed group (χ^2= 66.00, *df* = 3, $p < 0.01$). Furthermore, a statistically significant proportion of the depressed group (41.8% vs. 15.2%) also reported that they had depressive symptoms nearly every day for 2 weeks or more (χ^2= 14.77, *df* = 1, $p < 0.01$).

Table 5.23 shows the comparisons between willingness to stop smoking by depression group. A comparison for the stages of readiness to stop smoking by depression group showed no significant differences between the not depressed and depressed groups. Sixteen subjects expressed a current willingness to quit smoking once discharged from the hospital which differed from before the interview. A statistically significant mean difference was found in their reported willingness to quit smoking between before and after the interview; with a mean of 8.6 (±1.1) among the depressed group after the interview compared to a mean score of 5.5 (±1.1) before the interview (t = 6.06, $p < 0.05$). For the not depressed group, the after interview mean score was 8.0 (±1.3) compared with a mean score of 5.0 (±2.1) before the interview (t = 7.94, $p < 0.01$).

Findings to Answer Aim 6

Table 5.24 shows the univariate logistic regression estimation analyses for 20 independent variables and willingness to quit smoking as a dependent variable.

Only variables with a p value < 0.10 in univariate logistic regression analysis along with previously identified variables in the literature (marital status, educational level, depressive symptom group, nicotine dependence group and social support group) were presented. Among the 20 variables, eleven independent variables were shown to be statistically significant at p value < 0.05.

Table 5.24. Univariate Logistic Regression Analysis of Selected independent Variables and Willingness to Quit Smoking as a Dependent Variable*

Variable	B	S.E.	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
					Lower	Upper
Marital Status [Married]	0.097	0.598	.871	1.10	0.34	3.56
Educational Level [Bachelor and Above]	0.426	0.433	.325	1.53	0.65	3.58
Employment Status [Employed]	0.780	0.409	.057	2.18	0.98	4.86
Household Total Number [≤ 4 persons]	**-1.439**	**0.635**	**.024**	**0.24**	**0.07**	**0.82**
Household Monthly Income [≥ 600 Jordanian Dinars]	**0.821**	**0.413**	**.047**	**2.27**	**1.01**	**5.11**
Sufficiency of Personal Income to Support Self [Yes]	0.743	0.409	.069	2.10	0.94	4.68
General Health ["Good", "Very Good", and "Excellent"]	**0.856**	**0.411**	**.037**	**2.35**	**1.05**	**5.26**
Health Insurance [Yes]	**0.859**	**0.405**	**.034**	**2.36**	**1.07**	**5.22**
Thinking that tobacco smoking is harmful to health [Yes]	**1.419**	**0.643**	**.027**	**4.13**	**1.17**	**14.57**
Thinking that number of cigarettes a person smokes affects his future health ["Much" and "Very Much"]	1.099	0.561	.050	3.00	1.00	9.01
Thinking that number of cigarettes a person smokes influences his risk of having a heart attack or a chest pain ["Much" and "Very Much"]	**1.212**	**0.571**	**.034**	**3.36**	**1.10**	**10.28**
Thinking that the heart disease will worsen if he does not quit smoking ["Likely" and "Very Likely"]	**1.479**	**0.598**	**.013**	**4.39**	**1.36**	**14.16**
Thinking that he will avoid or decrease serious health problems if he quit smoking ["Likely" and "Very Likely"]	0.995	0.553	.072	2.71	0.92	8.00
Age at Starting Smoking [> 18]	**-0.894**	**0.405**	**.027**	**0.41**	**0.18**	**0.90**
Attempted Quitting Smoking [Yes]	**-1.146**	**0.419**	**.006**	**0.32**	**0.14**	**0.72**
Social Support Group [High Social Support]	0.368	0.407	.366	1.44	0.65	3.21
Availability of someone who encourages to quit smoking ["Some of the Time", "Most of the Time", and "All of the Time"]	**1.150**	**0.520**	**.027**	**3.16**	**1.14**	**8.74**
Depressive Group [Not Depressed]	-0.428	0.422	.310	0.65	0.29	1.49
Difficulty due to the depressive symptoms to do work, take care of things at home, or get along with other people ["Not difficult at all"]	**-1.609**	**0.668**	**.016**	**0.20**	**0.05**	**0.74**
Nicotine Dependency Group [Not Dependent]	-0.071	0.410	.862	0.93	0.42	2.08

***** Variables with significant regression scores with $p < 0.10$ and variables of interest were presented.

These univariate results showed that men who: resided in a household of four or fewer members [OR: 0.24 (95% CI: 0.07, 0.82), $p = 0.02$]; had started smoking at an age older than 18 years [OR: 0.41 (95% CI: 0.18, 0.90), $p = 0.03$]; had made a previous quit attempt [OR: 0.32 (95% CI: 0.14, 0.72), $p = 0.01$]; and had not had difficulty in their life due to depressive symptoms [OR: 0.20 (95% CI: 0.05, 0.74), $p = 0.02$] were statistically significantly less likely to quit smoking after hospital discharge.

On the other hand, there were seven statistically significant variables increased the willingness to quit smoking after hospital discharge. Men who: had a monthly household income $\geq$ 600 JD [OR: 2.27 (95% CI: 1.01, 5.11), $p = 0.05$]; viewed their general health as 'good,' 'very good' or 'excellent' [OR: 2.35 (95% CI: 1.05, 5.26), $p = 0.04$]; had health insurance [OR: 2.36 (95% CI: 1.07, 5.22), $p = 0.03$]; knew that tobacco smoking is harmful to their health [OR: 4.13 (95% CI: 1.17, 14.57), $p = 0.03$]; knew that the number of cigarettes a person smokes influences his risk of having a heart attack or a chest pain [OR: 3.36 (95% CI: 1.10, 10.28), $p = 0.03$]; knew that heart disease will worsen if he does not quit smoking [OR: 4.39 (95% CI: 1.36, 14.16), $p = 0.01$]; and had someone available who encouraged him to quit smoking "at least some of the time" [OR: 3.16 (95% CI: 1.14, 8.74), $p = 0.03$] were statistically significnalty more likely to quit smoking after hospital discharge.

Variables with a significant p value (< 0.10) in univariate logistic regression analysis were candidates for multivariate analysis. After performing the multivariate logistic regression analysis with Wald forward selection at a p-value cut-off point of 0.05, only four independent variables were shown to be statistically significantly contributing to the likelihood of quitting smoking after hospital discharge. Table 5.25 shows the final

multivariate logistic regression model. Seven variables were not statistically significant but were retained in the final model as they were variables previously identified in the literature (marital status, educational level, employment status, sufficiency of personal income to support self, depressive symptom group, nicotine dependence group and social support group).

The full model containing 11 independent variables was statistically significant, χ^2 (11, N = 167) = 37.358, $p < 0.001$, indicating that the regression model was able to estimate those who were willing to quit smoking. The model as a whole explained between 20.2% (Cox and Snell R square) and 32.6% (Negelkerke R squared) of the variance in willingness to quit smoking after discharge, and correctly classified 84.9% of the subjects.

As shown in Table 5.25, only four independent variables made a unique statistically significant contribution in the model in the presence of 11 variables: health insurance, previous attempts to quit smoking, difficulties experienced due to depressive symptoms, and availability of someone who encouraged quitting smoking. Smokers who have health insurance [OR: 3.51 (95% CI: 1.27, 9.71), $p = 0.02$], and who have someone available to encourage quitting smoking "at least sometimes" [OR: 4.69 (95% CI: 1.36, 16.22), $p = 0.02$] were more likely to quit smoking after hospital discharge, while controlling for all other variables. Whereas, smokers who had tried quitting smoking in the past [OR: 0.23 (95% CI: 0.08, 0.64), $p < 0.01$], and who did not have any difficulty with depressive symptoms while at work, taking care of things at home, or getting along with other people [OR: 0.04 (95% CI: 0.01, 0.25), $p < 0.000$] were less likely to quit smoking after hospital discharge, while controlling for all other variables.

Table 5.25. Multivariate Logistic Regression Analysis of Independent Variables and Willingness to Quit Smoking as a Dependent Variable*

Variable	B	S.E.	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
					Lower	Upper
Marital Status [Married]	-.484	.746	.516	.62	.14	2.66
Educational Level [Bachelor and Above]	.414	.540	.443	1.51	.53	4.36
Employment Status [Employed]	.692	.548	.207	2.00	.68	5.85
Sufficiency of Personal Income to Support Self [Yes]	.860	.578	.136	2.36	.76	7.33
Health Insurance [Yes]	**1.256**	**.519**	**.016**	**3.51**	**1.27**	**9.71**
Attempted Quitting Smoking [Yes]	**-1.459**	**.517**	**.005**	**.23**	**.08**	**.64**
Depressive Group [Not Depressed]	-.217	.523	.678	.80	.29	2.24
Difficulty due to the depressive symptoms to do work, take care of things at home, or get along with other people ["Not difficult at all"]	**-3.166**	**.907**	**.000**	**.04**	**.01**	**.25**
Nicotine Dependency Group [Not Dependent]	.553	.516	.284	1.74	.63	4.78
Social Support Group [High Social Support]	.355	.843	.674	1.43	.27	7.45
Availability of someone who encourages to quit smoking ["Some of the Time", "Most of the Time", and "All of the Time"]	**1.546**	**.633**	**.015**	**4.69**	**1.36**	**16.22**
Constant	.273	.795	.731	1.31		

*χ^2 = 37.358, df = 11. Variables with significant regression scores with $p < 0.10$ and variables of interest were retained in the model. Significant differences are in bold.

In summary, important study findings have been reported in this chapter. In Chapter 6, the study results are discussed with respect to how they built on existing knowledge. Recommendations for practice, policy, and research are alos provided.

Chapter 6: Discussion

Introduction

This cross-sectional study investigated smoking behaviors of adult Jordanian men who were admitted with a CVD diagnosis to one of three hospitals in Amman, Jordan, between September and December 2011. These hospitals provide a full range of cardiovascular medical and surgical services for patients from different socioeconomic levels.

The study described the sample's sociodemographic, clinical and health factors, knowledge about smoking, history and patterns of smoking, smoking consequences, nicotine dependence, nicotine withdrawal symptoms, social support, symptoms of depression, and willingness to quit smoking. It also compared cigarette smokers to waterpipe smokers, not nicotine dependent smokers to nicotine dependent smokers, and not depressed smokers to depressed smokers with regard to sociodemographic characteristics, clinical and health factors, knowledge about smoking, smoking history and patterns, smoking consequences, nicotine withdrawal symptoms, social support, and willingness to quit smoking. The study also explored the relationships between the above factors with nicotine dependence and willingness to quit smoking after hospital discharge among the study subjects. Finally, an estimation model was tested and provided to identify which independent variables were predictors of willingness to quit smoking at the time of hospital discharge.

Discussion of Salient Features of this Study

The sample included 167 men, 71% (n = 118) were cigarette smokers and 29% (n = 49) were waterpipe smokers. Their ages ranged from 35 to 69 years with a mean age of 50.7 (±6.9) years. Eighty-eight percent were married and 92.8% reported living with

someone. About 18% had a high school education or less, and 37.1% had completed a bachelor degree or higher. Approximately 70% of the subjects were employed and worked an average of 42.7 (±5.2) hours per week.

The cigarette smokers reported starting smoking on average at age 17 years (±2), ranging from 9 to 22 years. They smoked at least one cigarette a day for an average of 28.8 years (± 7.0), with an average of 28.9 (±8.0) cigarettes a day (i.e., around 1 ½ packs a day). On the FTND, a scale from 0 to 10, their mean score was 6.2 (±1.6), with scores ranging from 1 to 10. The waterpipe smokers reported starting smoking on average at age 21 (±4) years, with ages ranging from 16 to 30 years. About 61% reported that they smoked three to six waterpipes per week and 65.3% usually shared their waterpipe with someone else. They reported that they had smoked a waterpipe for 29.6 (±7.6) years, ranging from 13 to 42 years. On the LWDS, using a scale from 0 to 33, their mean score was 18.0 (±2.2), ranging from 14 to 24.

In addition to smoking, this sample had a very high prevalence of other CVD risk factors, including: family history of CVD (59.9%), sedentary life style (65.9%), overweight or obesity (38.9%), hypertension (34.7%), diabetes mellitus (34.7%), and hypercholesterolemia (31.1%). The prevalence of obesity (38.9%) in this sample was higher compared to the prevalence of obesity in the Jordanian general population of men aged 20 years or older (27.3%) (WHO EMRO, 2008). Being a smoker and having these additional risk factors greatly increases the likelihood of future CVD events. The findings from this sample are consistent with national statistics showing that death due to CVD is the number one killer of Jordanian adults (WHO Regional Office for the Eastern Mediterranean, 2012).

Since most of the study subjects (82%) were well educated, it was not unexpected that more than 90% correctly answered the knowledge and belief questions “Do you think that tobacco smoking is harmful to health?”, “To what extent do you think the number of cigarettes a person smokes affects his/her future health?”, “How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?”. It is of concern that despite this knowledge, subjects continued smoking although they knew about these harmful consequences of smoking, indicating that knowledge alone is not enough to give up this addictive behavior.

The majority of the subjects started smoking early in life. Cigarette smokers began at 17.3 (±2.3) years old and waterpipe smokers began at 21.0 (±4.0) years old. Also, they smoked cigarettes or waterpipes for several years with very few quit attempts. This resulted in the development of a serious dependence on nicotine. Their active, long term smoking increased their risk for CVD diseases because smoking is known to be a chief contributor to the buildup of fatty substances in the arteries and formation of atherosclerosis and development of cardiovascular diseases (AHA, 2012).

Some subjects reported that they started smoking when they were children and adolescents (beginning as early as age 6 years). This practice takes place even though Jordanian law prohibits the purchase of any tobacco product by juveniles (i.e., persons who are older than 7 years of age but less than 18 years of age). It is also against the law to sell tobacco products to juveniles, or to provide a waterpipe to them in cafes, restaurants and similar places that offer this service. Such regulations are not enforced. Anecdotally, in Jordan, fathers are likely to send their boys to buy them cigarettes, because these laws are not enforced by storekeepers or by the police.

There is a lack of smoking prohibition policies in approximately 27% of workplaces. Only 52.5% of workplaces had some restrictions on smoking, allowing smoking in some indoor areas. Awareness of smoking health hazards is needed and policies that prohibit smoking at the workplaces are essential for decreasing the risks inherent in second hand smoke as well as the prevalence of smoking.

As identified in this study, some subjects reported that they smoked cigarettes secretly in the hospital. It is important to note that these hospitals prohibit smoking and regulations have been instituted to protect the public from the dangers of smoking in public areas in Jordan. Although several restrictions on the marketing and promotion of tobacco, along with printed health warnings, have been adequately implemented and enforced, restrictions on tobacco use in public places has not been enforced. To make progress in this domain of public policy, active monitoring and implementation of these regulations in public places is important and would be beneficial for both active smokers and others in the community.

The subjects reported that they started smoking with their relatives or friends, creating a difficult challenge to discontinue smoking at such social activities. Smoking occurs in almost every home (99.2% for cigarette smokers vs. 100% for waterpipe smokers), and most of them smoke while children are present (90.7% for cigarette smokers vs. 98.0% for waterpipe smokers). This exposes all household members to tobacco smoke, and increases the second or third hand smokers' proneness to developing diseases caused by or associated with tobacco smoking. Smoking cessation programs as well as anti-smoking campaigns need to emphasize the facts about the health hazards of

smoking and encourage smokers to decrease the risk of disease in themselves and others as a result of their smoking.

A small proportion of subjects (7%) reported that they believed that there was no direct association between smoking and CVD and health in general. Their lack of knowledge about the hazards of smoking suggests that there is inadequate public education. The problem of the lack of knowledge about the risks of smoking is augmented when a large proportion of the subjects (55.3%) reported not being asked or advised by nurses about their smoking during their hospitalization. Among the 50 subjects (29.9% of the sample) who had seen a health care provider in the past 12 months, 68% (n = 34) were not asked nor advised about their smoking status. Consequently, health education by health providers is necessary to correct erroneous beliefs about the dangers of tobacco use. Healthcare providers should be encouraged to ask their patients at every visit about their smoking status and to advise smokers to quit smoking. According to evidence-based guidelines, this smoking evaluation and education should occur during each health care visit (Fiore et al., 2008).

Approximately 38.3% (n = 64) of smokers believed that waterpipe smoking was less detrimental to their health than cigarette smoking. The common misconception that harm from waterpipe smoking might be lessened by the filtering effect of tobacco smoke through water need to be addressed in order to decrease waterpipe smoking rates. Furthermore, smoking cessation programs should show them that waterpipe smoking also increases their potential for nicotine dependence as well as exposure to substantial levels of carbon monoxide, toxins, and carcinogens such as NNAL and PAHs, raising concerns of cancer risk.

Most of the cigarette smokers reported that they smoked more than a pack of cigarettes (i.e., 20 cigarettes) every day, and most of them (88.1%) reported that they smoked their first cigarette within 30 minutes after waking, suggesting high levels of nicotine dependence (Heatherton et al., 1991). Because heavy smoking (>10 cigarettes per day) increases the odds of relapse to smoking (Holtrop et al., 2009), there is a need for treatment with pharmacological medications and behavioral counseling therapies to increase the likelihood of successful smoking cessation, to achieve long-term abstinence from tobacco, and to prevent relapse.

Approximately a quarter of the each type of smoker (24% of cigarette smokers, 26.5% of waterpipe smokers) had unsuccessfully attempted quitting smoking in the past. Too few and inadequate methods were used. None of the subjects who had attempted to quit smoking in the past used any pharmacotherapy method to assist in quitting smoking. The use of a method combining pharmacotherapy and counseling to treat tobacco has been recommended (Fiore et al., 2008). Encouraging healthcare providers to consider dispensing pharmacological treatments should increase the likelihood of smoking cessation. Moreover, a mean of 3.2 (±1.7) attempts and a mean of of 2.4 (±1.3) attempts were reported to show the number of previous attempts of quitting smoking by cigarette smokers and waterpipe smokers, respectively. These findings are consistent with Fiore et al. (2008) that most smokers make an average of 2-3 quit attempts before they become permanent non-smoker. This information is important to be included in patient education as many smokers who have failed in smoking cessation may believe that it is pointless to continue trying.

In addition to the adverse effects of nicotine, carbon monoxide as well as other toxins in waterpipe smoke, there is a risk of respiratory tract infection due to common practice of sharing waterpipe. However, recently establishments provide disposable hoses in order to avert that risk.

This study showed a high prevalence of depressive symptoms (40%) among smokers hospitalized with CVD. This prevalence is higher than what has been reported in other studies (22% to 24%) (Dawood et al., 2008; Thorndike et al., 2008), but it is lower than the 66.5% reported in the study conducted by Perez et al. (2008).

In this study, subjects who were nicotine dependent reported significantly higher PHQ-9 scores [9.4 (±2.8)] compared with the not nicotine dependent group [8.5 (±2.2)]. In addition, a lower proportion of the nicotine dependent group was seriously considering quitting smoking the month after the hospital stay. These findings are consistent with other studies (Dawood et al., 2008; Holtrop et al., 2009; Kronish et al., 2006; Perez et al., 2008; Thorndike et al., 2008), showing that depressed CVD patients are less likely to quit smoking and may have more severe nicotine withdrawal symptoms. This supports the findings in the literature that nicotine has been linked to feelings of pleasure and to reduction in daily stress and anxiety (Benowitz, 2008). Higher levels of depressive symptoms after smoking cessation attempts may increase the likelihood of relapse to smoking (Burgess et al., 2002; Covey, 1999; Thorndike & Rigotti, 2009).

The positive association between the cigarette smoker's FTND score and depressive symptoms, as measured by the PHQ-9, ($r = 0.21$, $p = 0.02$) and marginal positive association between waterpipe smokers' LWDS scores and PHQ-9 scores ($r = 0.26$, $p = 0.06$) indicates that there is a link between a high number of daily cigarettes and

weekly waterpipe smoking and depression. Since this is a cross-sectional study, it does not aid in determining the directionality of the relationship between smoking and depressive status. However, the presence of depression has been inversely associated with successful smoking cessation in previous studies on smokers with CVD diagnoses (Dawood et al., 2008; Holtrop et al., 2009; Kronish et al., 2006; Perez et al., 2008; Thorndike et al., 2008). Most of chronic and heavy smokers (75.8%) responded that they "believe that smoking leads to depressive symptoms." Thus, screening and treatment for depression is needed and should be incorporated into the care of these patients. The incorporation of such screening and treatment into smoking cessation programs could increase the likelihood of the success of these programs (Dawood et al., 2008).

Most (94%) of the subjects reported that they had "somewhat, very difficult or extremely difficult" consequences from their depressive symptoms. Compared with the not depressed group, the depressed group reported that depressive symptoms had a large effect on their being able to work, take care of things at home or get along with other people. Also, depressed subjects who are cigarette smokers reported that they smoked even if they were ill enough to be in bed most of the day. These findings show that the depressive symptoms the subjects had substantial effect on their quality of life and their social activities.

The majority of the subjects in this study scored low on social support (87.3%, *n* = 145), despite the fact that 88% of them were married and 92.8% reported living with someone. Although surrounded by others, they did not feel supported in their emotional dimension (e.g., care, love, and empathy), instrumental dimension (e.g., tangible or practical assistance in getting tasks achieved), informational dimension (providing

needed information and viewpoints), or appraisal dimension (e.g., information specifically related to self-evaluation). Similarly, the subjects who failed in their previous quit attempts reported that they resumed smoking due to boredom (69% for cigarette smokers, 76.9% for waterpipe smokers).

Most (95%) of the subjects responded that they had someone "some, most or all of the time" available to them who they were able to count on to loan them cigarettes or tobacco. Also, 91.6% responded that they had someone with whom they could smoke while talking about their problems. Being in contact with smokers makes it more difficult for smokers to both quit and to remain abstinent from tobacco (Holtrop et al., 2009). These responses raise many concerns about the adverse influence the social support and network and the risk these conditions may have on their health in the future after their hospital stay.

The importance of being encouraged to quit smoking by the smoker's household members or friends is significant. This is because smoking cessation efforts are enhanced by the presence of others who support the smoker in quitting attempts (Fiore et al., 2008). In future studies and smoking cessation programs, participants could be instructed to have someone with them during the smoking cessation sessions. This would foster encouraging smoking cessation efforts by someone close to them. Furthermore, the presence of a supportive community in smoking cessation programs would lessen the low social support perceived by these smokers and would have the potential of improving their moods.

In this study, waterpipe smokers reported living with someone else (83.7%) less often than cigarette smokers (96.6%), and the subjects who were married were found to

be less likely to be depressed (77.6% vs. 94.9%). These findings revealed that both living with someone and marital status could impact not only on the smoking status of the individual but also on their depressive symptoms scores.

In the study by Dawood et al. (2008), patients who quit smoking after discharge were more likely to be married and had fewer depressive symptoms (with a < 10 score on the PHQ-9). The study findings were concordant with those from Thorndike et al. (2008) in which more married smokers were in the not depressed group, and the depressed and not depressed groups did not differ in age, educational achievement, alcohol use, total number of cigarettes smoked per day, or FTND score. However, the smokers who were depressed experienced more nicotine withdrawal symptoms during hospitalization and smoking consequences than the not depressed group. Therefore, this may explain the association between depressive symptoms and early failure to quit smoking. Further work in this area is warranted.

A small proportion of the cigarette smokers (9.4%) and approximately a quarter of the waterpipe smokers (24.5%) reported that they were not willing to quit smoking within the six months following hospital discharge. Such patients may benefit from motivational interviewing (a directive, patient-centered counseling intervention) to learn what barriers may need to be overcome for them to even consider quitting (Miller & Weisner, 2002). In addition, it is important to assess their willingness to quit smoking and provide motivational intervention during subsequent encounters with health care providers (Fiore et al., 2008).

The statistically significantly higher willingness to quit smoking after the study interview suggests that the very process of interviewing resulted in heightened motivation

to consider quitting smoking. Possibly this is due to the information gained and heightened awareness related to tobacco gained from interviewing process. This is consistent with the findings that even brief counseling results in beneficial smoking cessation outcomes (Fiore et al., 2008).

Similar to the findings of Holtrop et al. (2009), a higher household income positively predicted successful smoking cessation (OR: 2.27, 95% CI: 1.01, 5.11). Furthermore, as indicated in the multiple logistic regression analysis, a lower likelihood of willingness to quit smoking is found in men smokers who do not have health insurance, who do not have someone available to encourage them to quit smoking at least sometimes, who had tried quitting smoking in the past, and in those whose depressive symptoms did not present them with any difficulty while at work, taking care of things at home or getting along with other people. Healthcare professionals need to keep these findings in mind when developing smoking cessation interventions for men with CVD.

Limitations and Strengths

This cross-sectional study was descriptive in nature and subject to survivor bias. Survivor bias may have occurred because this study described the people who survived cardiac events and were available for recruitment into the study. This study provides a snapshot of the different factors related to smoking and is not intended to infer causality. Future longitudinal studies can be built based on the findings of this study. Future work on smoking in Jordanian women is needed.

This is the first study to comprehensively investigate the multidimensional nature of both nicotine and depressive symptoms among men Jordanian smokers. The information that the subjects provided may help health professionals better understand

the smoking habits of men Jordanian smokers, and help them to successfully establish smoking cessation programs. The findings of this study can serve as a foundation for other researchers to build upon, and to define intervention studies.

Implications for Practice

It is important that healthcare professionals not miss the opportunity to initiate smoking cessation interventions during hospitalization. Patients are especially receptive to consider quitting during hospitalization for a major cardiac event and it has the advantage of providing care as they are in acute involuntary smoking abstinence.

There is a pressing need to provide more attention and risk-reduction efforts directed at smoking cessation. Smoking is a modifiable heart disease risk factor. Also, it is important to adopt smoking cessation guidelines (Fiore et al., 2008). Nurses, along with other healthcare professionals, are encouraged to "Ask" and "Advise" about smoking status in their patients in order to minimize the knowledge deficit of some patients. In order to achieve effective smoking cessation outcomes, healthcare professionals should participate in appropriate training programs to develop their knowledge and gain confidence in their skills about smoking cessation counseling. This might be addressed through the departments of continuing education in each hospital and be included in the curriculums in the undergraduate and graduate health professional education programs.

Furthermore, given the importance of quitting smoking in the prevention of subsequent morbidity and mortality, hospitals need to establish performance measures that include documentation of the health education events about quitting smoking. Formal inpatient smoking cessation programs are recommended to provide a valuable structural

measure of high quality care. Other researchers have found that such programs increase successful quit rates (Dawood et al., 2008).

It is important to implement screening for depression in patients with CVD diagnoses because of the known effects on cardiac morbidity and mortality (Lichtman et al., 2008; Smith et al., 2006). Starting treatment for depression during hospitalization can minimize the effect of depression on cardiac morbidity, mortality and smoking (Perez et al., 2008).

Implications for Policy

The Jordanian regulations that have been instituted should be enforced to protect the public from the dangers of smoking in public areas. For instance, the prohibition of smoking inside public places, including hospitals, should be enforced. Smoking cessation campaigns could be expanded so that owners of private workplaces could adopt some policies prohibiting smoking in their workplaces. Finally, as recommended by the AHA (Lichtman et al., 2008), further screening, referral, and treatment of depression is needed.

As a part of health education programs, the risks of passive smoking need to be made public. Also, emphasizing such risks in educational programs could decrease smoking rates and passive exposure to tobacco smoke.

Implications for Future Research

Smoking cessation interventions for hospitalized CVD men need to be tested. Also, recruiting women in future research will be important to gain an understanding of and insight into women's characteristics, knowledge and patterns of smoking.

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Appendix 4.1. Study Booklet (English Language Version)

Subject's ID#: _____

Research Site's ID#: _____

Research Site's Unit/Floor/Ward: _____

Date of interview: _____/_____/_____ (day / month / year)

Time of interview:_____: _____ (hour : minute)

Demographic, Clinical, and Psychosocial Characteristics and Smoking Patterns among Adult Jordanian Cigarette or Waterpipe Smokers with Cardiovascular Diseases

Study Booklet

Section 1: Sociodemographic Data

1) What is your date of birth?
   _____/_____/_____
   (day / month / year)

2) Describe your current marital status?
   - ☐ Single (never engaged) **[1]**
   - ☐ Married (or engaged) **[2]**
   - ☐ Separated **[3]**
   - ☐ Divorced **[4]**
   - ☐ Widowed **[5]**

3) Do you live by yourself (alone)?
   - ☐ No **[0]**
   - ☐ Yes **[1]** → (Go to Question 5)

4) In total, how many persons (including you) live in your household? _____

5) What is your religion?
   - ☐ Islam **[1]**
   - ☐ Christianity **[2]**

6) What is your highest level of education?
   - ☐ No formal schooling **[1]**
   - ☐ Introductory schooling **[2]**
     If **yes**, specify the highest completed grade:
     1 2 3 4 5 6
   - ☐ Preparatory schooling **[3]**
     If **yes**, specify the highest completed grade:
     7 8 9 10
   - ☐ Secondary schooling **[4]**
     If **yes**, specify the highest completed grade:
     11 12
   - ☐ College Program **[5]**
   - ☐ Undergraduate Program **[6]**
   - ☐ Graduate Program, a Diploma program **[7]**
   - ☐ Graduate Program, a Masters program **[8]**
   - ☐ Graduate Program, a Doctoral program **[9]**

7) Currently, do you work for pay?
   - ☐ No **[0]** → (Go to Question 11)
   - ☐ Yes **[1]**

8) Are you self-employed?
   - ☐ No **[0]**
   - ☐ Yes **[1]**

9) Which of the following categories best describes your current employment / occupation? (select only one)
   - ☐ Legislator, senior official, or manager **[1]**
   - ☐ Professional **[2]**
   - ☐ Technician **[3]**
   - ☐ Clerk **[4]**
   - ☐ Services and sales worker **[5]**
   - ☐ Skilled agricultural worker **[6]**
   - ☐ Crafts and related worker **[7]**
   - ☐ Plant and machine operator **[8]**
   - ☐ Elementary occupation staff **[9]**

10) How many hours per week do you work?
    _____ (hours/week)

11) If you do **NOT** currently work for pay, which of the following possible reasons applies to you? (Select all that apply)
    - ☐ Student **[1]**
    - ☐ On a temporary leave of absence **[2]**
    - ☐ Disabled **[3]**
    - ☐ Retired **[4]**
    - ☐ I cannot find a job **[5]**

12) Which of the following choices best represents your personal monthly income (in Jordanian Dinars)?
    - ☐ Less than 150 **[1]**
    - ☐ 150-299 **[2]**
    - ☐ 300-449 **[3]**
    - ☐ 450-599 **[4]**
    - ☐ 600-749 **[5]**
    - ☐ 750-899 **[6]**
    - ☐ 900 or more **[7]**

13) For this study, we are interested in knowing your personal monthly net income. If you don't mind, please let us know it: _____ Jordanian Dinars

14) Is this personal income sufficient to support yourself?
    - ☐ No **[0]**
    - ☐ Yes **[1]**

15) How many adults and children does this personal income support?
   ☐ ____ adults (including you)
   ☐ ____ children

16) Is this personal income sufficient to support the people whom you support?
   ☐ No **[0]**
   ☐ Yes **[1]**

17) (If the subject has been engaged) Which of the following choices best represents your household monthly income (in Jordanian Dinars)?
   ☐ 150-299 **[1]**
   ☐ 300-449 **[2]**
   ☐ 450-599 **[3]**
   ☐ 600-749 **[4]**
   ☐ 750-899 **[5]**
   ☐ 900 or more **[6]**

Section 2: Clinical and Health Factors

1) What is your current height? ____ centimeters

2) What is your current weight? ____ kilograms

3) How many caffeinated beverages do you drink each day (coffee, tea, soda, etc.)?
   ____

4) Do you drink alcohol?
   ☐ No (and never drank alcohol) **[1]**
   → (Go to Question 7)
   ☐ No (but a social drinker) **[2]**
   → (Go to Question 7)
   ☐ No (but an ex-alcoholic) **[3]**
   → (Go to Question 7)
   ☐ Yes (and on a regular base) **[4]**

5) How often do you have a drink containing alcohol?
   ☐ Daily **[1]**
   ☐ Two to three times a week **[2]**
   ☐ Four or more times a week **[3]**
   ☐ Two to four times a month **[4]**
   ☐ Monthly or less **[5]**

6) How many drinks containing alcohol do you have on a typical day when you are drinking? ____ drinks

7) Do you engage in physical activities (such as walking, hiking, weight training, running, jogging, biking, aerobics such as spinning class, or exercise machines) a minimum of 30 minutes on most or all days of the week?
   ☐ No **[0]**
   ☐ Yes **[1]**

8) What is your confirmed medical diagnosis?
   ☐ Myocardial infarction **[1]**
   ☐ Angina/Chest pain **[2]**
   ☐ Other **[3]**: _____

9) What type of procedures have you had during this admission? (Select all that apply)
   ☐ Cardiac catheterization
   ☐ Balloon angioplasty
   ☐ Stent angioplasty
   ☐ Coronary artery bypass graft
   ☐ Other: _____

10) Before this admission, how many times have you been admitted to a hospital with a heart problem? ____ times → (If **0**, go to Question 13)

11) What was your confirmed medical diagnosis during those hospitalization(s)?
   ☐ Myocardial infarction **[1]**
   ☐ Angina/Chest pain **[2]**
   ☐ Other **[3]**: _____

12) What type of procedures did you have during those hospitalization(s)? (Select all that apply)
   ☐ Cardiac catheterization
   ☐ Balloon angioplasty
   ☐ Stent angioplasty
   ☐ Coronary artery bypass graft

13) Do you have any of these cardiovascular disease risk factors? (Select all that apply)
- ☐ Hypertension
- ☐ Hypercholesterolemia
- ☐ Diabetes mellitus
- ☐ Family history of early cardiovascular disease in male first degree relative (a father or a sibling) less than 55 years of age; or in female first degree relative (a mother or a sibling) less than 65 years of age

14) Do you have health insurance?
- ☐ No **[0]**
- ☐ Yes **[1]**

15) During this hospitalization, were you asked if you smoke tobacco products?
- ☐ No **[0]** → (Go to Question 17)
- ☐ Yes **[1]**

16) If **yes**, by whom? (Select all that apply)
- ☐ Nurse
- ☐ Physician
- ☐ Dietitian
- ☐ Other (Specify: _____)

17) During this hospitalization, were you advised to quit smoking tobacco products?
- ☐ No **[0]** → (Go to Question 19)
- ☐ Yes **[1]**

18) If **yes**, by whom? (Select all that apply)
- ☐ Nurse
- ☐ Physician
- ☐ Dietitian
- ☐ Other (Specify: _____)

19) Aside from visits associated with this admission, have you seen any doctor or health care provider in the past 12 months?
- ☐ No **[0]** → (Go to Question 22)
- ☐ Yes **[1]**

20) During those visits, were you asked if you smoke tobacco products?
- ☐ No **[0]** → (Go to Question 22)
- ☐ Yes **[1]**

21) During those visits, were you advised to quit smoking tobacco products?
- ☐ No **[0]**
- ☐ Yes **[1]**

22) In general, how would you describe your health (before this hospitalization)?
- ☐ Excellent **[5]**
- ☐ Very good **[4]**
- ☐ Good **[3]**
- ☐ Fair **[2]**
- ☐ Poor **[1]**

Section 3: Knowledge Questions

1) Do you think that tobacco smoking is harmful to health?
   - ☐ Yes **[1]**
   - ☐ No **[0]**

2) Do you think that waterpipe smoking is less harmful to a smoker than cigarette smoking?
   - ☐ No **[0]**
   - ☐ Yes **[1]**
   - ☐ Unsure **[2]**

3) To what extent do you think the number of cigarettes a person smokes affects his/her future health?
   - ☐ Very much **[1]**
   - ☐ Much **[2]**
   - ☐ Not very much **[3]**
   - ☐ Nothing **[4]**
   - ☐ I don't know **[5]**

4) To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack (myocardial infarction) or a chest pain (angina)?
   - ☐ Very much **[1]**
   - ☐ Much **[2]**
   - ☐ Not very much **[3]**
   - ☐ Nothing **[4]**
   - ☐ I don't know **[5]**

5) How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?
   - ☐ Very likely **[1]**
   - ☐ Likely **[2]**
   - ☐ Unlikely **[3]**
   - ☐ Very unlikely **[4]**
   - ☐ Uncertain **[5]**

6) How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?
   - ☐ Very likely **[1]**
   - ☐ Likely **[2]**
   - ☐ Unlikely **[3]**
   - ☐ Very unlikely **[4]**
   - ☐ Uncertain **[5]**

Section 4: Cigarette Smoking History and Pattern

1) Have you smoked at least one cigarette a day in the 30 days prior to your current hospitalization?
   - ☐ No **[0]**
   - ☐ Yes **[1]** → (Go to Question 3)

2) Which of the following describes you? (Select all that apply)
   - ☐ I am a current cigarettes smoker but not on a daily base in the 30 days prior to my current hospitalization
   - ☐ I only smoke cigarettes in social activities
   - ☐ I only smoke cigarettes during the holidays
   - ☐ I am a former cigarette smoker
   - ☐ I never smoked cigarettes

   Go to Question 29 and skip the entire Section 5

3) At what age did you take your first puff of a cigarette? ____

4) At what age did you smoke your first whole cigarette? ____

5) What were the reasons or situations that led you to smoke cigarettes?
   _____
   _____

6) How many cigarettes per day do you smoke? ____

7) How many years have you smoked at least 1 cigarette a day? ____

8) What is your total pay on cigarettes per month (in Jordanian Dinars)? ____

9) What percentage of your income do you spend on cigarettes?
   - ☐ 1% or less of monthly income **[0]**
   - ☐ 2%–10% of monthly income **[1]**
   - ☐ 11%–50% of monthly income **[2]**
   - ☐ More than 50% of monthly income **[3]**

10) Have you smoked cigarettes during this hospitalization?
    - ☐ No **[0]**
    - ☐ Yes **[1]**

11) What was the date and time of your last cigarette?

    Date: _____/_____/_____
    (day / month / year)

    Time:_____: _____ (hour: minute)

12) How soon after you wake up do you smoke your first cigarette?
    - ☐ Within 5 minutes **[3]**
    - ☐ Within 6-30 minutes **[2]**
    - ☐ Within 31-60 minutes **[1]**
    - ☐ After 60 minutes **[0]**

13) Do you find it difficult to refrain from cigarette smoking in places where it is forbidden (e.g., in a mosque, in a church, at a library, in a cinema, etc.)?
    - ☐ Yes **[1]**
    - ☐ No **[0]**

14) Which cigarette would you hate most to give up?
    - ☐ The first one in the morning **[1]**
    - ☐ All others **[0]**

15) Do you smoke cigarettes more during the first hours after waking than during the rest of the day?
    - ☐ Yes **[1]**
    - ☐ No **[0]**

16) Do you smoke cigarettes even when you are ill enough to be in bed most of the day?
    - ☐ Yes **[1]**
    - ☐ No **[0]**

17) Do you consider smoking a cigarette after a meal more important for you than smoking the first cigarette in the morning?
    - ☐ Yes **[1]**
    - ☐ No **[0]**

18) Have you ever made a serious attempt to quit cigarette smoking that lasted at least 24 hours?
- ☐ Yes **[1]**
- ☐ No **[0]** → (Go to Question 29)

19) How many times have you made a serious attempt to quit cigarette smoking that lasted at least 24 hours? _____

20) When was the last time you tried to make a serious attempt to quit cigarette smoking? _____/_____ (month/year)

21) What was the longest amount of time you have been off cigarettes?
- ☐ ____ years
- ☐ ____ months
- ☐ ____ days
- ☐ ____ hours

22) When did this time occur? _____ calendar year

23) After you quit cigarette smoking for at least 24 hours, what motivated or led you to return to smoking? (Select all that apply)
- ☐ Stress
- ☐ Social/party situation
- ☐ Relief of nicotine withdrawal symptoms
- ☐ Boredom
- ☐ Crisis (death of a family member/relative/friend, illness, loss of job, family)
- ☐ Other, please explain: _____

24) What method for quitting cigarette smoking has worked best for you in the past? (Select all that apply)
- ☐ Quit on own (without any help)
- ☐ Pamphlets
- ☐ Decision made with another smoker to mutually quit smoking
- ☐ Formal stop smoking program
- ☐ Private consultation or therapy from a health care provider (e.g., a doctor)
- ☐ Physical exercise
- ☐ Gradually decreasing number of cigarettes smoked per day
- ☐ Snacks (such as gums or candies) as an alternative for cigarette smoking
- ☐ Other, please explain: _____

25) Have you ever used any medication to help you stop cigarette smoking?
- ☐ No **[0]** → (Go to Question 29)
- ☐ Yes **[1]**

26) Please list the name of the medication:
- ☐ _____
- ☐ _____
- ☐ _____

27) When did you last use this medication?
- ☐ ____ years ago
- ☐ ____ months ago
- ☐ ____ days ago
- ☐ I don't remember

28) Was this medication helpful?
- ☐ No **[0]**
- ☐ Yes **[1]**

29) Including yourself (where applicable), how many members of your household, 18 years of age or older, are current cigarette smokers?
- ☐ ____ # of people
- ☐ ____ # of men (≥ 18 years)
- ☐ ____ # of women (≥ 18 years)

30) How many members of your household, less than 18 years of age, are current cigarette smokers?
   - ☐ ____ # of people
   - ☐ ____ # of boys (< 18 years)
   - ☐ ____ # of girls (< 18 years)

31) (If married or engaged) Does your wife smoke cigarettes on a daily base?
   - ☐ No **[0]**
   - ☐ No but she is a cigarette smoker **[1]**
   - ☐ Yes **[2]**

32) (If widowed or divorced) did your wife smoke cigarettes on a daily base?
   - ☐ No **[0]**
   - ☐ No but she used to smoke cigarettes **[1]**
   - ☐ Yes **[2]**

33) Is cigarette smoking allowed inside your home?
   - ☐ No **[0]**
   - ☐ Yes **[1]**

34) Inside your home, is cigarette smoking allowed in every room?
   - ☐ No **[0]**
   - ☐ Yes **[1]**

35) Inside your home, does cigarette smoking occur while children (less than 18 years of age) are present?
   - ☐ No **[0]**
   - ☐ Yes **[1]**

36) Which of the following best describes cigarette smoking policy at your most recent place of employment?
   - ☐ Allowed anywhere **[1]**
   - ☐ Allowed only in some indoor areas **[2]**
   - ☐ Not allowed **[3]**
   - ☐ Don't know **[4]**

Section 5: Nicotine Dependence and Withdrawal Symptoms and Smoking Consequences Questionnaires

Instructions: Using the scale below, select the number that indicates how well each of the statements (1-19) describes you.

1	**2**	**3**	**4**	**5**
Not at all True	Somewhat True	Moderately True	Very True	Extremely True

1	My smoking pattern is very irregular throughout the day. It is not unusual for me to smoke many cigarettes in an hour, then not have another one until hours later.	1	2	3	4	5
2	My smoking is not much affected by other things. I smoke about the same amount whether I'm relaxed or working, happy or sad, alone or with others, etc.	1	2	3	4	5
3	Even if traveling a long distance, I'd rather not travel by airplane because I wouldn't be allowed to smoke.	1	2	3	4	5
4	Sometimes I decline offers to visit with my non-smoking friends because I know I'll feel uncomfortable if I smoke.	1	2	3	4	5
5	If a restaurant does not allow smoking, I will avoid that restaurant even if I will enjoy the food over there if I go.	1	2	3	4	5
6	I smoke consistently and regularly throughout the day.	1	2	3	4	5
7	I smoke at different rates in different situations.	1	2	3	4	5
8	Compared to when I first started smoking, I need to smoke a lot more now in order to get what I really want out of it.	1	2	3	4	5
9	Compared to when I first started smoking, I can smoke much, much more now before I start to feel nauseated or ill.	1	2	3	4	5
10	After not smoking for a while, I need to smoke in order to keep myself from experiencing any discomfort.	1	2	3	4	5
11	It's hard to estimate how many cigarettes I smoke per day because the number often changes.	1	2	3	4	5
12	I feel a sense of control over my smoking. I can ''take it or leave it'' at any time.	1	2	3	4	5
13	The number of cigarettes I smoke per day is often influenced by other factors - how I'm feeling, what I'm doing, etc.	1	2	3	4	5
14	When I'm really craving a cigarette, it feels like I'm in the grip of some unknown force that I cannot control.	1	2	3	4	5
15	Since the time when I became a regular smoker, the amount I smoke has either stayed the same or has decreased somewhat.	1	2	3	4	5
16	Whenever I go without a smoke for a few hours, I experience craving.	1	2	3	4	5

1	2	3	4	5
Not at all True	Somewhat True	Moderately True	Very True	Extremely True

17	My cigarette smoking is fairly regular throughout the day.	1	2	3	4	5
18	After not smoking for a while, I need to smoke to relieve feelings of restlessness and irritability.	1	2	3	4	5
19	I smoke about the same amount of cigarettes on Fridays and Holidays as on regular days.	1	2	3	4	5

Instructions: For the period since the last cigarette you smoked, please rate yourself if you had experienced any of the following symptoms on a scale from 0 to 4.

0	1	2	3	4
Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree

1	Food is not particularly appealing to me.	0	1	2	3	4
2	I am getting restful sleep.	0	1	2	3	4
3	I have been tense or anxious.	0	1	2	3	4
4	My level of concentration is excellent.	0	1	2	3	4
5	I awaken from sleep frequently during the night.	0	1	2	3	4
6	I have felt impatient.	0	1	2	3	4
7	I have felt upbeat and optimistic.	0	1	2	3	4
8	I have found myself worrying about my problems.	0	1	2	3	4
9	I have had frequent urges to smoke.	0	1	2	3	4
10	I have felt calm lately.	0	1	2	3	4
11	I have been bothered by the desire to smoke a cigarette.	0	1	2	3	4
12	I have felt sad or depressed.	0	1	2	3	4
13	I have been irritable, easily angered.	0	1	2	3	4
14	I want to nibble on snacks or sweets.	0	1	2	3	4
15	I have been bothered by negative moods such as anger, frustration, and irritability.	0	1	2	3	4
16	I have been eating a lot.	0	1	2	3	4
17	I am satisfied with my sleep.	0	1	2	3	4
18	I have felt frustrated.	0	1	2	3	4
19	I have felt hopeless or discouraged.	0	1	2	3	4
20	I have thought about smoking a lot.	0	1	2	3	4
21	I have felt hungry.	0	1	2	3	4
22	I feel that I am getting enough sleep.	0	1	2	3	4
23	It's hard to pay attention to things.	0	1	2	3	4
24	I have felt happy and content.	0	1	2	3	4
25	My sleep has been troubled.	0	1	2	3	4
26	I have trouble getting cigarettes off my mind.	0	1	2	3	4
27	It had been difficult to think clearly.	0	1	2	3	4
28	I think about food a lot.	0	1	2	3	4

Instructions: This questionnaire is designed to assess beliefs people have about the consequences of smoking a cigarette. Below is a list of statements about smoking. We would like you to rate how LIKELY or UNLIKELY you believe each consequence is for you when you smoke. If the consequence seems UNLIKELY to you, select a number from 0-4. If the consequence seems LIKELY to you, select a number from 5-9. That is if you believe the consequence would never happen, circle 0; if you believe a consequence would happen every time you smoke, select 9. Use the guide below to aid you further. For example, if a consequence seems completely likely to you, you would select 4.

0	1	2	3	4	5	6	7	8	9
Completely	Extremely	Very	Somewhat	A little	A little	Somewhat	Very	Extremely	Completely
←	**UNLIKELY**		→		←		**LIKELY**		→

1	Cigarettes taste good.	0	1	2	3	4	5	6	7	8	9
2	Smoking controls my appetite.	0	1	2	3	4	5	6	7	8	9
3	My throat burns after smoking.	0	1	2	3	4	5	6	7	8	9
4	Cigarettes help me deal with anxiety or worry.	0	1	2	3	4	5	6	7	8	9
5	Nicotine "fits" can be controlled by smoking.	0	1	2	3	4	5	6	7	8	9
6	When I'm angry, a cigarette can calm me down.	0	1	2	3	4	5	6	7	8	9
7	When I'm alone, a cigarette can help me pass the time.	0	1	2	3	4	5	6	7	8	9
8	I become more addicted the more I smoke.	0	1	2	3	4	5	6	7	8	9
9	If I'm tense, a cigarette helps me to relax.	0	1	2	3	4	5	6	7	8	9
10	Cigarettes keep me from overeating.	0	1	2	3	4	5	6	7	8	9
11	Smoking a cigarette energizes me.	0	1	2	3	4	5	6	7	8	9
12	Cigarettes help me deal with anger.	0	1	2	3	4	5	6	7	8	9
13	Smoking calms me down when I feel nervous.	0	1	2	3	4	5	6	7	8	9
14	Cigarettes make my lungs hurt.	0	1	2	3	4	5	6	7	8	9
15	I feel like I do a better job when I am smoking.	0	1	2	3	4	5	6	7	8	9
16	A cigarette can give me energy when I'm bored and tired.	0	1	2	3	4	5	6	7	8	9
17	Cigarettes can really make me feel good.	0	1	2	3	4	5	6	7	8	9
18	When I'm feeling happy, smoking helps me keep that feeling.	0	1	2	3	4	5	6	7	8	9

		0	1	2	3	4	5	6	7	8	9
		Completely	Extremely	Very	Somewhat	A little	A little	Somewhat	Very	Extremely	Completely
		←	**UNLIKELY**		→		←		**LIKELY**		→
19	I will enjoy the flavor of a cigarette.	0	1	2	3	4	5	6	7	8	9
20	If I have nothing to do, a smoke can help kill time.	0	1	2	3	4	5	6	7	8	9
21	I will enjoy feeling a cigarette on my tongue and lips.	0	1	2	3	4	5	6	7	8	9
22	Smoking will satisfy my nicotine cravings.	0	1	2	3	4	5	6	7	8	9
23	I feel like part of a group when I'm around other smokers.	0	1	2	3	4	5	6	7	8	9
24	Smoking makes me seem less attractive.	0	1	2	3	4	5	6	7	8	9
25	By smoking, I risk heart disease and lung cancer.	0	1	2	3	4	5	6	7	8	9
26	Smoking makes me enjoy people more.	0	1	2	3	4	5	6	7	8	9
27	Cigarettes help me reduce or handle tension.	0	1	2	3	4	5	6	7	8	9
28	I feel better physically after having a cigarette.	0	1	2	3	4	5	6	7	8	9
29	I enjoy parties more when I am smoking.	0	1	2	3	4	5	6	7	8	9
30	People think less of me if they see me smoking.	0	1	2	3	4	5	6	7	8	9
31	A cigarette can satisfy my urge to smoke.	0	1	2	3	4	5	6	7	8	9
32	Just handling a cigarette is pleasurable.	0	1	2	3	4	5	6	7	8	9
33	If I'm feeling irritable, a smoke will help me relax.	0	1	2	3	4	5	6	7	8	9
34	Smoking irritates my mouth and throat.	0	1	2	3	4	5	6	7	8	9
35	When I feel bored and tired, a cigarette can really help.	0	1	2	3	4	5	6	7	8	9
36	I will become more dependent on nicotine if I continue smoking.	0	1	2	3	4	5	6	7	8	9
37	Smoking helps me control my weight.	0	1	2	3	4	5	6	7	8	9
38	When I'm upset with someone, a cigarette helps me cope.	0	1	2	3	4	5	6	7	8	9

		0	1	2	3	4	5	6	7	8	9
		Completely	Extremely	Very	Somewhat	A little	A little	Somewhat	Very	Extremely	Completely
		←	**UNLIKELY**	→			←		**LIKELY**	→	
39	The more I smoke, the more I risk my health.	0	1	2	3	4	5	6	7	8	9
40	Cigarettes keep me from eating more than I should.	0	1	2	3	4	5	6	7	8	9
41	I enjoy the steps I take to light up.	0	1	2	3	4	5	6	7	8	9
42	Conversations seem more special if we are all smoking.	0	1	2	3	4	5	6	7	8	9
43	I look ridiculous while smoking.	0	1	2	3	4	5	6	7	8	9
44	Smoking keeps my weight down.	0	1	2	3	4	5	6	7	8	9
45	I like the way a cigarette makes me feel physically.	0	1	2	3	4	5	6	7	8	9
46	Smoking is hazardous to my health.	0	1	2	3	4	5	6	7	8	9
47	I enjoy feeling the smoke hit my mouth and the back of my throat.	0	1	2	3	4	5	6	7	8	9
48	When I smoke, the taste is pleasant.	0	1	2	3	4	5	6	7	8	9
49	I like to watch the smoke from my cigarette.	0	1	2	3	4	5	6	7	8	9
50	When I am worrying about something, a cigarette is helpful.	0	1	2	3	4	5	6	7	8	9
51	Smoking temporarily reduces those repeated urges for cigarettes.	0	1	2	3	4	5	6	7	8	9
52	I enjoy the taste sensations while smoking.	0	1	2	3	4	5	6	7	8	9
53	I feel more at ease with other people if I have a cigarette.	0	1	2	3	4	5	6	7	8	9
54	Cigarettes are good for dealing with boredom.	0	1	2	3	4	5	6	7	8	9
55	Smoking is taking years off my life.	0	1	2	3	4	5	6	7	8	9

Section 6: Waterpipe Smoking History and Pattern

1) Have you smoked at least 4 waterpipe sessions during the 30 days prior to your current hospitalization?
   - ☐ No **[0]**
   - ☐ Yes **[1]** → (Go to Question 3)

2) Which of the following describes you? (Select all that apply)
   - ☐ I am a current waterpipe smoker but smoked less than 4 waterpipe sessions during the 30 days prior to my current hospitalization
   - ☐ I only smoke waterpipe in social activities
   - ☐ I only smoke waterpipe during the holidays
   - ☐ I am a former waterpipe smoker
   - ☐ I never smoked waterpipe

   Go to Question 31

3) Do you consider yourself as a regular waterpipe smoker?
   - ☐ No **[0]**
   - ☐ Yes **[1]**

4) At what age did you take your first puff of a waterpipe? ____

5) At what age did you take your first whole session of waterpipe smoking? ____

6) What were the reasons or situations that led you to smoke waterpipe?
   _____
   _____

7) Do you usually share waterpipe smoking?
   - ☐ No **[0]** → (Go to Question 9)
   - ☐ Yes **[1]**

8) How long do you smoke during a shared waterpipe smoking session? ____ minutes out of ____ total session minutes (on average).

9) What was the date and time of your last waterpipe smoking session before hospitalization?

   Date: _____/_____/_____
   (day / month / year)

   Time:_____: _____ (hour: minute)

10) Do you consistently smoke specific flavor(s) of waterpipe tobacco?
   - ☐ No **[0]**
   - ☐ Yes **[1]**

11) Select among the list which flavor(s) you usually smoke and indicate how many grams of such flavor you do consume per month.

Flavor	**# of monthly grams**
a. Apple	_____
b. Double Apple	_____
c. Peach	_____
d. Mango	_____
e. Strawberry	_____
f. Fruits	_____
g. Mint	_____
h. Grape	_____
i. Sweet Melon	_____
j. Cherry	_____
k. Arabic Coffee	_____
l. Vanilla	_____
m. Apricot	_____
n. Raspberry	_____
o. Other _____	_____
p. Other _____	_____

12) How many waterpipes you usually smoke per week?
   - ☐ < 1 waterpipe/week **[0]**
   - ☐ 1–2 waterpipes/week **[1]**
   - ☐ 3–6 waterpipes/week **[2]**
   - ☐ 7 or more waterpipes/week **[3]**

13) How many times have you stopped waterpipe smoking for more than 7 days?
- ☐ None **[3]**
- ☐ Once **[2]**
- ☐ Several times **[1]**
- ☐ It always happens **[0]**

14) How many days could you spend without a waterpipe?
- ☐ One day or less **[3]**
- ☐ 2–3 days **[2]**
- ☐ 4–7 days **[1]**
- ☐ More than 7 days **[0]**

15) Do you smoke waterpipe when you are seriously ill?
- ☐ Yes, absolutely **[3]**
- ☐ Yes, probably **[2]**
- ☐ Yes, maybe **[1]**
- ☐ No **[0]**

16) Do you smoke waterpipe alone?
- ☐ Yes, always **[3]**
- ☐ Yes, most of the times **[2]**
- ☐ Yes, sometimes **[1]**
- ☐ No, never **[0]**

17) Are you ready not to eat in exchange for a waterpipe?
- ☐ Yes, absolutely **[3]**
- ☐ Yes, probably **[2]**
- ☐ Yes, maybe **[1]**
- ☐ No **[0]**

18) What is your total pay on waterpipe smoking per month (in Jordanian Dinars)?
____

19) What percentage of income do you spend on waterpipe smoking?
- ☐ 1% or less of your monthly income **[0]**
- ☐ 2%–10% of your monthly income **[1]**
- ☐ 11%–50% of your monthly income **[2]**
- ☐ More than 50% of your monthly income **[3]**

20) Do you smoke waterpipe to improve your morale?
- ☐ Yes, absolutely **[3]**
- ☐ Yes, probably **[2]**
- ☐ Yes, maybe **[1]**
- ☐ No **[0]**

21) Do you smoke waterpipe for pleasure?
- ☐ Yes, absolutely **[3]**
- ☐ Yes, probably **[2]**
- ☐ Yes, maybe **[1]**
- ☐ No **[0]**

22) Do you smoke waterpipe to relax your nerves?
- ☐ Yes, absolutely **[3]**
- ☐ Yes, probably **[2]**
- ☐ Yes, maybe **[1]**
- ☐ No **[0]**

23) Do you smoke waterpipe to please others (for conviviality)?
- ☐ Yes, absolutely **[3]**
- ☐ Yes, probably **[2]**
- ☐ Yes, maybe **[1]**
- ☐ No **[0]**

24) Have you ever made a serious attempt to quit waterpipe smoking?
- ☐ No **[0]** → (If **no**, go to Question 31)
- ☐ Yes **[1]**

25) How many times have you made a serious attempt to quit waterpipe smoking? _____

26) When was the last time you tried to make a serious attempt to quit waterpipe smoking?
_____/_____ (month/year)

27) What was the longest amount of time you have been off waterpipe smoking?
- ☐ ____ years
- ☐ ____ months
- ☐ ____ days
- ☐ ____ hours

28) When did this time occur? _____
calendar year

29) After you quit waterpipe smoking, what motivated or led you to return to smoking? (Select all that apply)
- ☐ Stress
- ☐ Social/party situation
- ☐ Relief of nicotine withdrawal symptoms
- ☐ Boredom
- ☐ Crisis (death of a family member/relative/friend, illness, loss of job, family)
- ☐ Other, please explain: _____

30) What method for quitting waterpipe smoking has worked best for you in the past? (Select all that apply)
- ☐ Quit on own (without any help)
- ☐ Pamphlets
- ☐ Decision made with another smoker to mutually quit smoking
- ☐ Formal stop smoking program
- ☐ Private consultation/therapy from a health care provider (e.g., a doctor)
- ☐ Physical exercise
- ☐ Gradually decreasing number of waterpipe session smoked
- ☐ Snacks (such as gums or candies) as an alternative for waterpipe smoking
- ☐ Other, please explain: _____

31) Including yourself (where applicable), how many members of your household, 18 years of age or older, are current waterpipe smokers?
- ☐ ____ # of people
- ☐ ____ # of men (≥ 18 years)
- ☐ ____ # of women (≥ 18 years)

32) How many members of your household, less than 18 years of age, are current waterpipe smokers?
- ☐ ____ # of people
- ☐ ____ # of boys (< 18 years)
- ☐ ____ # of girls (< 18 years)

33) (If married or engaged) Does your wife smoke waterpipe at least 4 waterpipe sessions a month?
- ☐ No **[0]**
- ☐ No but she is a waterpipe smoker **[1]**
- ☐ Yes **[2]**

34) (If widowed or divorced) did your wife smoke waterpipe at least 4 waterpipe sessions a month?
- ☐ No **[0]**
- ☐ No but she used to smoke waterpipe **[1]**
- ☐ Yes **[2]**

35) Is waterpipe smoking allowed inside your home?
- ☐ No **[0]**
- ☐ Yes **[1]**

36) Inside your home, is waterpipe smoking allowed in every room?
- ☐ No **[0]**
- ☐ Yes **[1]**

37) Inside your home, does waterpipe smoking occur while children (less than 18 years of age) are present?
- ☐ No **[0]**
- ☐ Yes **[1]**

Section 7: Social Support Instruments

Instructions: Please read the following questions and circle the response that most closely describes your situation before this hospitalization.

1. Is there someone available to you whom you can count on to listen to you when you need to talk?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

2. Is there someone available to you to give you good advice about a problem?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

3. Is there someone available to you who shows you love and affection?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

4. Is there someone available to help you with daily chores?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

5. Can you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

6. Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

7. Do you live by yourself (alone)?

Yes No

Instructions: Please read the following questions and circle the response that most closely describes your situation before this hospitalization.

1. Is there someone available to you whom you can count on to loan you cigarettes or tobacco if you need them?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

2. Is there someone available to you who encourages you to quit smoking?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

3. Is there someone available to you with whom you can smoke while you are talking about your stress?

None of the Time	A little of the Time	Some of the Time	Most of the Time	All of the Time
1	**2**	**3**	**4**	**5**

Section 8: Willingness to Quit Smoking Instruments

Part 1: For current cigarette smokers.

1. After you are discharged from this hospital, how willing are you to stop smoking cigarettes?

0	1	2	3	4	5	6	7	8	9	10
Not At All Willing										**Extremely Willing**

2. How do you describe your stage of readiness to stop smoking cigarettes?
   - □ I have no intention to quit within the next 6 months **[1]**
   - □ I am seriously considering quitting within the next 6 months **[2]**
   - □ I am seriously planning to quit within the next 30 days, and I had not made a quit attempt in the past year **[3]**
   - □ I am seriously planning to quit within the next 30 days, and I had made at least one quit attempt in the past year **[4]**

3. Does your willingness to quit cigarette smoking **once you are discharged** from the hospital **now** differ than **before this interview**?
   - □ No **[0]** → (Go to Question 6)
   - □ Yes **[1]**

4. How would you rate your willingness to quit cigarette smoking **before this interview**?

0	1	2	3	4	5	6	7	8	9	10
Not At All Willing										**Extremely Willing**

5. What is the reason for this difference?

   _____
   _____

Part 2: For current waterpipe smokers.

6. After you are discharged from this hospital, how willing are you to stop waterpipe smoking?

0	1	2	3	4	5	6	7	8	9	10
Not At All Willing										**Extremely Willing**

7. How do you describe your stage of readiness to stop waterpipe smoking?
   - □ I have no intention to quit within the next 6 months **[1]**
   - □ I am seriously considering quitting within the next 6 months **[2]**
   - □ I am seriously planning to quit within the next 30 days, and I had not made a quit attempt in the past year **[3]**
   - □ I am seriously planning to quit within the next 30 days, and I had made at least one quit attempt in the past year **[4]**

8. Does your willingness to quit waterpipe smoking **once you are discharged** from the hospital **now** differ than **before this interview**?
   - □ No **[0]** → (Go to Section 9)
   - □ Yes **[1]**

9. How would you rate your willingness to quit waterpipe smoking **before this interview**?

0	1	2	3	4	5	6	7	8	9	10
Not At All Willing										**Extremely Willing**

10. What is the reason for this difference?

_____
_____

Section 9: Depression Screening Instruments

Instructions:
Over the <u>last 2 weeks</u>, how often have you been bothered by any of the following symptoms?
(Use "✔" to indicate your answer)

		Not at all	Several days	More than half the days	Nearly every day
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3

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10) (If the subject had **<u>any</u>** of the symptoms) How **<u>difficult</u>** have these symptoms made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	**Somewhat difficult**	**Very difficult**	**Extremely difficult**
☐	☐	☐	☐

---

11) (If the subject had **<u>any</u>** of the symptoms) Do you recall if you felt the same way of these symptoms (1 to 9) before you started smoking?
☐ No **[0]**
☐ Yes **[1]**

12) Have you ever had **a period of 2 weeks (or more)** where you had the same way of these symptoms ***nearly every day***?
   ☐ No **[0]** → (Go to Question 15)
   ☐ Yes **[1]**

13) If **yes,** how many times? _____

14) If **yes**, were the symptoms (1 to 9) you experienced related to major life events that can bring about stress (including a death of family member, divorce, quitting school due to economic difficulties)?
   ☐ No **[0]**
   ☐ Yes **[1]** → (how many times? _____)

15) Do you believe that smoking leads to these symptoms (1 to 9)?
   ☐ No **[0]**
   ☐ Yes **[1]**
   ☐ I don't know **[2]**

16) Do you believe that these symptoms (1 to 9) lead to smoking?
   ☐ No **[0]**
   ☐ Yes **[1]**
   ☐ I don't know **[2]**

17) Do you believe that these symptoms (1 to 9) and smoking arise at the same time?
   ☐ No **[0]**
   ☐ Yes **[1]**
   ☐ I don't know **[2]**

18) Even if you felt okay at times, have you had **a continuous period of 2-year (or more)** in your life when you felt depressed or sad on most days?
   ☐ No **[0]**
   ☐ Yes **[1]**

19) Have you used or currently using prescribed medications for your mood?
   ☐ No **[0]** → (Go to Question 22)
   ☐ Yes **[1]**

20) When did you start using these medications? _____ (month/year)

21) What are the names of these medications?
   ☐_____☐_____☐_____

22) Have you ever been diagnosed with depression?
   ☐ No **[0]**
   ☐ Yes **[1]**

Appendix 4.2. Study Booklet (Arabic Language Version)

رقم المشارك: _____

الرقم الخاص بموقع إجراء البحث: _____

الوحدة|الطابق في موقع إجراء البحث: _____

تاريخ المقابلة: _____|_____|_____ (يوم |شهر |سنة)

وقت المقابلة: _____ : _____ (دقيقة : ساعة)

الخصائص الديموغرافية، السريرية، النفسية والاجتماعية وأنماط التدخين لدى مدخني السجائر و النرجيلة الأردنيين البالغين الذين يعانون من أمراض القلب والأوعية الدموية

كتيب الدراسة

القسم الأول: البيانات الاجتماعية والديموغرافية

1. ما هو تاريخ ميلادك؟ _____|_____|_____
(يوم | شهر | سنة)

2. كيف تصف حالتك الاجتماعية؟
□ أعزب (لم يسبق لي الارتباط) **(1)**
□ متزوج (أو مرتبط) **(2)**
□ منفصل **(3)**
□ مطلق **(4)**
□ أرمل **(5)**

3. هل تسكن بمفردك (أي أنك لا تسكن مع آخرين)؟
□ لا **(0)**
□ نعم **(1)** ← (انتقل إلى السؤال رقم 5)

4. ما مجموع عدد الأشخاص (بما فيهم أنت) الذين يعيشون في منزلك ؟ _____

5. ما هو دينك؟
□ الإسلام **(1)**
□ المسيحية **(2)**

6. ما هو أعلى مستوى تعليمي حققته؟
□ لم أدخل المدرسة **(1)**
□ الدراسة الابتدائية **(2)**
إذا كان هذا هو أعلى مستوى تعليمي حققته، فأي صف أنهيت؟
1 2 3 4 5 6
□ الدراسة الإعدادية **(3)**
إذا كان هذا هو أعلى مستوى تعليمي حققته، فأي صف أنهيت؟
7 8 9 10
□ الدراسة الثانوية **(4)**
إذا كان هذا هو أعلى مستوى تعليمي حققته، فأي صف أنهيت؟
11 12 (التوجيهي)
□ الدراسة في كلية لتمام درجة الدبلوم **(5)**
□ الدراسة في جامعة لإتمام درجة البكالوريوس**(6)**
□ الدراسة في جامعة لإتمام درجة الدبلوما العليا **(7)**
□ الدراسة في جامعة لإتمام درجة الماجستير **(8)**
□ الدراسة في جامعة لإتمام درجة الدكتوراة **(9)**

7. حالياً، هل تعمل و تحصل على أجر جرّاء عملك؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 11)
□ نعم **(1)**

8. هل أنت صاحب العمل الذي تعمل فيه؟
□ لا **(0)**
□ نعم **(1)**

9. أي من التصنيفات التالية تصف مهنتك أو طبيعة عملك بشكل أفضل؟ (اختر واحدة فقط)
□ مشرّع، موظف إدارة عليا، أو مدير **(1)**
□ متخصص **(2)**
□ فني **(3)**
□ كاتب **(4)**
□ عامل خدمات و مبيعات **(5)**
□ عامل ماهر في الزراعة **(6)**
□ عامل في الحِرَفْ **(7)**
□ مشغّل و مُجَمِّع آلات **(8)**
□ عامل بمهنة أولية **(9)**

10. ما مجموع ساعات العمل الأسبوعية التي تعملها؟
_____

11. إذا كنت **لا** تعمل حالياً و تحصل على أجر نتيجة عملك، أي من الأسباب المحتملة التالية تنطبق عليك؟
□ طالب **(1)**
□ في إجازة مؤقتة **(2)**
□ عندي إعاقة ما **(3)**
□ متقاعد **(4)**
□ لم أتمكن من العثور على وظيفة **(5)**

12. أي من الخيارات التالية يمثل دخلك الشهري بشكل أفضل (بالدنانير الأردنية)؟
□ أقل من 150 **(1)**
□ من 150 إلى 299 **(2)**
□ من 300 إلى 449 **(3)**
□ من 450 إلى 599 **(4)**
□ من 600 إلى 749 **(5)**
□ من 750 إلى 899 **(6)**
□ 900 فأكثر **(7)**

13. لغاية في هذه الدراسة، نحن مهتمون بمعرفة صافي دخلك الفردي الشهري. إذا كنت لا تمانع ذلك، اسمح لنا أن نعرفه: _____ دينار أردني

14. هل هذا الدخل يكفي لدعم نفسك؟
□ لا **(0)**
□ نعم **(1)**

15. كم عدد الأشخاص البالغين والأطفال الذين يتم الإنفاق عليهم من هذا الدخل الفردي؟
□ _____ بالغ (ممن عمرهم 18 سنة فأكثر) - بمن فيهم أنت
□ _____ طفل (ممن يقل عمرهم عن 18 سنة)

16. هل يكفي هذا الدخل لدعم الأشخاص الذين تقوم أنت برعايتهم (أي تقوم أنت بالإنفاق عليهم)؟
□ لا **(0)**
□ نعم **(1)**

17. أي من الخيارات التالية يمثل دخل أسرتك أنت الشهري بشكل أفضل (بالدنانير الأردنية) ؟
- □ من 150 إلى 299 **(1)**
- □ من 300 إلى 449 **(2)**
- □ من 450 إلى 599 **(3)**
- □ من 600 إلى 749 **(4)**
- □ من 750 إلى 899 **(5)**
- □ 900 فأكثر **(6)**

القسم الثاني: العوامل الصحية و السريرية

1. ما هو طولك الحالي؟ _____ سم

2. ما هو وزنك الحالي؟ _____ كغم

3. كم عدد المشروبات التي تحتوي على الكافيين تشرب أنت كل يوم (قهوة، شاي، كولا، الخ) ؟ _____

4. هل تشرب المشروبات الكحولية؟
- □ لا ، و لم يسبق لي أن شربت الكحوليات **(1)** ← (انتقل إلى السؤال رقم 7)
- □ لا، و لكن أشرب في المناسبات الاجتماعية **(2)** ← (انتقل إلى السؤال رقم 7)
- □ لا ، و لكن كنت في السابق من شاربي الكحوليات **(3)** ← (انتقل إلى السؤال رقم 7)
- □ نعم و بشكل منتظم **(4)**

5. كيف تصف نمط شربك للمشروبات الكحولية؟
- □ أشرب يوميا **(1)**
- □ أشرب مرتين إلى ثلاثة مرات في الأسبوع **(2)**
- □ أشرب أربعة مرات فأكثر في الأسبوع **(3)**
- □ أشرب مرتين إلى أربع مرات في الشهر **(4)**
- □ أشرب شهريا أو أقل من ذلك **(5)**

6. عندما تشرب الكحول، كم مرة تشرب المشروبات الكحولية في اليوم الواحد؟ _____ مرة

7. هل تشارك أو تمارس الأنشطة البدنية بما و لا يقل عن 30 دقيقة في معظم أو كل يوم من أيام الأسبوع؟ (من الأمثلة على الأنشطة البدنية: المشي، المشي لمسافات طويلة كالمشي في الريف، رفع الأثقال، الجري، الهرولة، ركوب الدراجات الهوائية، تمارين رياضية من مثل الركوب على الدراجات الثابتة أو ممارسة الرياضة على الأجهزة الرياضية).
- □ لا **(0)**
- □ نعم **(1)**

8. ما هو التشخيص الطبي النهائي الذي وُجد عندك بعد إجراء المزيد من الفحوصات الطبية بعد دخولك للمستشفى؟
- □ احتشاء عضلة القلب **(1)**
- □ الذبحة الصدرية / ألم في الصدر **(2)**
- □ غير ذلك **(3)**: _____

9. ما هو نوع الإجراءات التي تمت لك خلال دخولك هذا للمستشفى؟ (اختر كل ما ينطبق)
- □ قسطرة تاجية
- □ توسيع الشرايين بالبالون
- □ تركيب شبكة
- □ جراحة زرع الشريان التاجي لتحويل الدم
- □ غير ذلك : _____

10. قبل هذه الدخول للمستشفى، كم عدد المرات التي كنت قد أُدخلت فيها للمستشفى لمشاكل تتعلق بالقلب؟ _____ مرة

← (إذا كانت الإجابة **صفر** فانتقل إلى السؤال رقم 13)

11. ماذا كان التشخيص الطبي النهائي الذي وُجد عندك في تلك المرات؟
- □ احتشاء عضلة القلب **(1)**
- □ الذبحة الصدرية / ألم في الصدر **(2)**
- □ غير ذلك **(3)**: _____

12. ما هي الإجراءات التي تمت لك في تلك المرات؟ (اختر كل ما ينطبق)
- □ قسطرة تاجية
- □ توسيع الشرايين بالبالون
- □ تركيب شبكة
- □ جراحة زرع الشريان التاجي لتحويل الدم
- □ غير ذلك : _____

13. هل لديك أي من العوامل التالية و التي تزيد من خطر الاصابة بأمراض القلب والأوعية الدموية؟
- □ ارتفاع ضغط الدم
- □ ارتفاع الكولسترول
- □ السكري
- □ التاريخ العائلي لأمراض القلب والشرايين في وقت مبكر من العمر. على أن تكون الإصابة لدى الذكور القريبين من الدرجة الأولى (والدك أو أحد اخوانك) قبل عمر 55 سنة، أو أن تكون الإصابة لدى الإناث القريبات من الدرجة الأولى (والدتك أو أحدى أخواتك) قبل عمر 65 سنة.

14. هل لديك تأمين صحي؟
- □ لا **(0)**
- □ نعم **(1)**

15. أثناء دخولك الحالي للمستشفى، هل قام أحد أفراد الكادر الصحي بسؤالك عمّا إذا كنت مدخناً؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 17)
□ نعم **(1)**

16. من قام بسؤالك عمّا إن كنت مدخناً؟ (اختر كل ما ينطبق)
□ ممرض | ممرضة
□ طبيب | طبيبة
□ اختصاصي | اختصاصية التغذية
□ غير ذلك (حدد من فضلك: _____)

17. أثناء دخولك الحالي للمستشفى، هل قام أحد أفراد الكادر الصحي بتقديم النصيحة لك بالتوقف عن التدخين؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 19)
□ نعم **(1)**

18. من قام بتقديم النصيحة لك بالتوقف عن التدخين؟ (اختر كل ما ينطبق)
□ ممرض | ممرضة
□ طبيب | طبيبة
□ اختصاصي | اختصاصية التغذية
□ غير ذلك (حدد من فضلك: _____)

19. باستثناء زيارتك المتعلقة بدخولك الحالي للمستشفى، هل قمت بزيارة طبيب أو أي من مقدمي خدمات الرعاية الصحية خلال السنة الماضية؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 22)
□ نعم **(1)**

20. خلال تلك الزيارات، هل تم سؤالك عمّا إذا كنت مدخناً؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 22)
□ نعم **(1)**

21. خلال تلك الزيارات، هل تم تقديم النصيحة لك بالتوقف عن التدخين؟
□ لا **(0)**
□ نعم **(1)**

22. بشكل عام ، كيف تصف حالتك الصحية (قبل دخولك الحالي للمستشفى)؟
□ ممتازة **(5)**
□ جيدة جداً **(4)**
□ جيدة **(3)**
□ مقبولة **(2)**
□ ضعيفة **(1)**

القسم الثالث: أسئلة معرفة

1. هل تعتقد أن التدخين مضر بالصحة؟
□ لا **(0)**
□ نعم **(1)**

2. هل تعتقد أن تدخين النرجيلة أقلُ ضرراً من تدخين السجائر؟
□ لا **(0)**
□ نعم **(1)**
□ غير متأكد **(2)**

3. إلى أي مدى تعتقد أنت أنّ عدد السجائر التي يدخنها الشخص سوف يؤثر على صحته في المستقبل؟
□ كثيراَ جداَ **(1)**
□ كثيراَ **(2)**
□ ليس كثيراً جداَ **(3)**
□ لا يوجد بينهما أيّة علاقة **(4)**
□ لا أعرف **(5)**

4. إلى أي مدى تعتقد أنت أنّ عدد السجائر التي يدخنها الشخص سوف يعرضه لخطر الاصابة بالنوبات القلبية (احتشاء عضلة القلب) أو ألم في الصدر (الذبحة الصدرية)؟
□ كثيراً جداً **(1)**
□ كثيراً **(2)**
□ ليس كثيراً جداً **(3)**
□ لا علاقة بينهما **(4)**
□ لا أعرف **(5)**

5. حسب اعتقادك، ما احتمال أنّ أمراض القلب سوف تتفاقم في حال أن المدخّن لم يقلع عن التدخين؟
□ محتمل جداً **(1)**
□ محتمل **(2)**
□ غير محتمل **(3)**
□ غير محتمل جداً **(4)**
□ غير متأكد **(5)**

6. حسب اعتقادك، ما احتمال أنك ستتجنب أو تقلل من خطر الإصابة بمشاكل صحية خطيرة إذا أقلعت و توقفت عن التدخين؟
□ محتمل جداً **(1)**
□ محتمل **(2)**
□ غير محتمل **(3)**
□ غير محتمل جداً **(4)**
□ غير متأكد **(5)**

القسم الرابع: أسئلة متعلقة بنمط و تاريخ تدخين السجائر

1. هل دخّنت سيجارة واحدة على الأقل يومياً خلال الشهر الذي سبق دخولك الحالي للمستشفى؟
   - □ لا **(0)**
   - □ نعم **(1)** ← (انتقل إلى السؤال رقم 3)

2. أي من التالية تصفك؟ (اختر كل ما ينطبق)
   - □ أنا أدخّن السجائر حالياً و لكن ليس في كل يوم خلال الشهر الذي سبق دخولي الحالي للمستشفى
   - □ أنا أدخّن السجائر فقط بالمناسبات الاجتماعية
   - □ أنا أدخّن السجائر فقط خلال الإجازات
   - □ أنا كنت أدخن سجائر في السابق
   - □ أنا لم يسبق لي أن دخّنت السجائر

انتقل إلى السؤال رقم 29 و لا تجب عن القسم الخامس من كتيب الدراسة

3. كم كان عمرك عندما أخذت أول نَفَسْ سيجارة؟ _____

4. كم كان عمرك عندما دخّنت سيجارة كاملة؟ _____

5. ما هي الأسباب أو المواقف التي جعلتك تُدَخّن السجائر؟
   _____
   _____

6. كم عدد السجائر التي تدخّنها في اليوم الواحد؟ _____

7. كم سنة مضت من عمرك و أنت تُدَخّن ما لا يقل عن سيجارة واحدة في اليوم؟ _____

8. كم تدفع شهرياً ثمناً للسجائر (بالدنانير الأردنية)؟ _____

9. كم نسبة المال من دخلك الشهري تدفع ثمناً لشراء السجائر؟
   - □ 1% أو أقل من مدخولك الشهري **(0)**
   - □ 2% - 10% من مدخولك الشهري **(1)**
   - □ 11% - 50% من مدخولك الشهري **(2)**
   - □ أكثر من 50% من مدخولك الشهري **(3)**

10. هل قمت بتدخين سجائر خلال وجودك الحالي في المستشفى؟
    - □ لا **(0)**
    - □ نعم **(1)**

11. متى دخّنت آخر سيجارة؟
    - □ التاريخ: _____|_____|_____ (يوم | شهر | سنة)
    - □ الوقت: _____:_____ (دقيقة : ساعة)

12. بعد استيقاظك من النوم، متى تُدَخّن أول سيجارة؟
    - □ خلال 5 دقائق **(3)**
    - □ خلال 6-30 دقيقة **(2)**
    - □ خلال 31-60 دقيقة **(1)**
    - □ بعد أكثر من 60 دقيقة **(0)**

13. هل تجد صعوبة في الامتناع عن تدخين السجائر في الأماكن التي يُحْظَر فيها التدخين (مثلاً: في المسجد ، في الكنيسة، في المكتبة ، في سينما، الخ)؟
    - □ نعم **(1)**
    - □ لا **(0)**

14. أي السجائر تكره جداً أن تتوقف عن تدخينها؟
    - □ أول سيجارة في الصباح **(1)**
    - □ أيّة سيجارة أخرى **(0)**

15. هل السجائر التي تدخّنها خلال الساعات الأولى بعد الاستيقاظ من النوم أكثر مقارنة بعدد السجائر التي تدخّنها خلال ما تبقى من اليوم؟
    - □ نعم **(1)**
    - □ لا **(0)**

16. هل تُدَخّن السجائر حتى عندما تكون مريضاً بما فيه الكفاية حتى و إن كنتَ مستلقٍ على فراشك مريضاً خلال معظم اليوم؟
    - □ نعم **(1)**
    - □ لا **(0)**

17. هل تعتبر أن تدخين سيجارة بعد تناول الوجبات أكثر أهمية بالنسبة لك عن أول سيجارة تدخّنها في الصباح؟
    - □ نعم **(1)**
    - □ لا **(0)**

18. هل قمت بمحاولة جادة للإقلاع عن تدخين السجائر و استمريت بعدم التدخين لمدة 24 ساعة على الأقل؟
    - □ لا **(0)** ← (انتقل إلى السؤال رقم 29)
    - □ نعم **(1)**

19. كم عدد المرات التي نجحت فيها في الاقلاع عن تدخين السجائر لمدة لا تقل عن 24 ساعة؟ _____

20. متى كانت اخر محاولة جادة للإقلاع عن تدخين السجائر و امتنعت خلالها عن التدخين؟
    _____ | _____ (شهر | سنة)

21. ما هي أطول فترة كنت فيه مقلعاً عن تدخين السجائر؟
    - □ _____ سنوات
    - □ _____ أشهر
    - □ _____ أيام
    - □ _____ ساعات

22. في أي سنة حصلت أطول مدة اقلاع عن تدخين السجائر؟
    _____

23. بعد أن تركت تدخين السجائر لمدة لا تقل عن 24 ساعة، ماذا حفّزك أو أدّى بك للعودة لتدخين السجائر مرة أخرى؟ (اختر كل ما ينطبق)
- ☐ التوتر (أو الضغط)
- ☐ سهرة أو حفلة اجتماعية
- ☐ لتخفيف الأعراض الانسحابية للنيكوتين
- ☐ الملل
- ☐ الأزمات (موت أحد أفراد العائلة / موت قريب / موت صديق، مرض، فقد وظيفة، أو الابتعاد عن عائلتك)
- ☐ غير ذلك، يرجى توضيح ذلك : _____

24. أي من طرق الإقلاع عن تدخين السجائر التالية كانت ناجحة بالنسبة لك؟ (اختر كل ما ينطبق)
- ☐ التوقف عن التدخين لوحدي و بدون أية مساعدة
- ☐ اتباع كتيّبات و نشرات تعليمية
- ☐ اتخاذ قرار مع مدخّن آخر للإقلاع عن التدخين معاً
- ☐ المشاركة في برنامج خاص للتوقف عن التدخين
- ☐ استشارة خاصة أو علاج حصلت عليه من مقدم رعاية صحية (مثل دكتور)
- ☐ التمارين الرياضية
- ☐ تقليل عدد السجائر المدخنة يومياً بشكلٍ تدريجي
- ☐ تناول وجبات خفيفة (مثل العلكة (اللُبان) أو الحلوى) كبديل عن تناول السيجارة
- ☐ غير ذلك، يرجى توضيح ذلك : _____

25. هل سبق و أن استخدمت أي دواء لمساعدتك على التوقف عن تدخين السجائر؟
- ☐ لا **(0)** ← (انتقل إلى السؤال رقم 29)
- ☐ نعم **(1)**

26. يرجى ذكر اسم الدواء:
- ☐ _____
- ☐ _____
- ☐ _____

27. متى كانت آخر مرة تناولت فيها الدواء لمساعدتك على التوقف عن تدخين السجائر؟
- ☐ _____ سنوات مضت
- ☐ _____ أشهر مضت
- ☐ _____ أيام مضت
- ☐ _____ لا أتذكر

28. هل كان الدواءُ مفيداً؟
- ☐ لا **(0)**
- ☐ نعم **(1)**

29. بما فيهم أنت (حيث انطبق)، كم عدد أفراد أسرتك ممن لا تقل أعمارهم عن 18 سنة وهم حالياً من مدخني السجائر؟
- ☐ _____ فرد
- ☐ _____ من الرجال (عمرهم 18 سنة فأكثر)
- ☐ _____ من النساء (عمرهن 18 سنة فأكثر)

30. كم عدد أفراد أسرتك الذين تقل أعمارهم عن 18 سنة وهم حالياً من مدخني السجائر؟
- ☐ _____ فرد
- ☐ _____ من الأولاد (يقل عمرهم عن 18 سنة)
- ☐ _____ من البنات (يقل عمرهن عن 18 سنة)

31. **(إذا كان المشارك متزوجاً أو مرتبطاً)** هل زوجتك مدخّنة للسجائر بشكل يومي؟
- ☐ لا **(0)**
- ☐ لا و لكنها مدخّنة للسجائر **(1)**
- ☐ نعم **(2)**

32. **(إذا كان المشارك مطلقاً أو أرملاً)** هل كانت زوجتك مدخّنة للسجائر بشكل يومي؟
- ☐ لا **(0)**
- ☐ لا و لكنها كانت مدخّنة للسجائر **(1)**
- ☐ نعم **(2)**

33. هل يسمح بتدخين السجائر داخل بيتك؟
- ☐ لا **(0)**
- ☐ نعم **(1)**

34. داخل منزلك، هل تدخين السجائر مسموح به في كل الغرف؟
- ☐ لا **(0)**
- ☐ نعم **(1)**

35. داخل منزلك، هل تدخين السجائر يتم حتى و إن كان الأطفال ممن تقل أعمارهم عن 18 سنة موجودين؟
- ☐ لا **(0)**
- ☐ نعم **(1)**

36. أيّ من التالية يصف السياسة المتّبعة بالنسبة لتدخين السجائر في آخر مكان عمل التحقت به؟
- ☐ مسموحٌ به في أي مكان **(1)**
- ☐ مسموحٌ به فقط في بعض الأماكن المغلقة (مثلا: المكاتب، غرفٌ خاصة) **(2)**
- ☐ غيرُ مسموحٍ به **(3)**
- ☐ لا أعرف **(4)**

القسم الخامس: استبيانات الاعتماد على النيكوتين والأعراض الانسحابية للنيكوتين و نتائج ناجمة عن التدخين

تعليمات :

باستخدام المقياس أدناه، **اختر الرقم الذي يدل على مدى انطباق الأوصاف** الواردة في الجمل من 1 الى 19 **عليك**.

1	2	3	4	5
ليست صحيحةً على الإطلاق	صحيحةٌ بعضَ الشيء	صحيحةٌ بشكلٍ متوسط	صحيحةٌ جداً	صحيحةٌ إلى أبعدِ الحدود

1	نمطَ تدخيني غيرُ منتظمٍ للغاية على مدار اليوم. حيث أنّه من المألوف بالنسبة لي أن أدّخن عدة سجائر خلال ساعة، ثم أن لا أدخّن أيّة سيجارة في عدة ساعات.	1	2	3	4	5
2	إنّ تدخيني لا يتأثر كثيراً بأشياء أخرى. فأنا أدخّن نفس الكمية تقريباً إذ كنت أرتاح أو أعمل، سعيد أو حزين، لوحدي أو مع الآخرين، الخ.	1	2	3	4	5
3	عند السفر لأماكن بعيدة أفضل عدم السفر بالطائرة لأنه لن يسمح لي بالتدخين على متنها.	1	2	3	4	5
4	أحيانا أمتنع عن زيارة أصدقائي غير المدخنين لأنني أعرف أنني سأشعر بعدم الراحة إذا قمت بالتدخين في حضورهم.	1	2	3	4	5
5	إذا كان هناك مطعم لا يسمح بالتدخين، سأتجنب ذلك المطعم حتى و لو كنت سأتلذذ بالطعام في حال ذهبت.	1	2	3	4	5
6	أنا أدخّن باستمرار وبشكل منتظم طوال اليوم.	1	2	3	4	5
7	أنا أدخّن سجائر بأعداد متباينة (متفاوتة) في المواقف المختلفة.	1	2	3	4	5
8	مقارنة ببدايتي للتدخين، أنا الآن بحاجة لأن أدخّن أكثرَ لكي أحصل على ما أريده حقاً من التدخين.	1	2	3	4	5
9	مقارنة ببدايتي للتدخين، فأنا الآن يمكنني أن أدخّن أكثرَ و أكثرَ بكثيرٍ قبلَ أن أبدأ أشعر بالغثيان أو بأن فِيَّ علّة.	1	2	3	4	5
10	بعد أن أتوقف عن التدخين لفترة من الوقت، فإني أحتاج لأن أدخّن لكي لا أعاني من عدم الراحة.	1	2	3	4	5
11	من الصعب تقديرُ عدد السجائر التي أدخّنها في اليومِ الواحدِ لأن عدد السجائر يتغيّر كثيراً.	1	2	3	4	5
12	أشعر أن لدي احساس بالسيطرة على تدخيني. أنا أستطيع أن أدخن أو أن أترك التدخين متى شئت و في أي وقت.	1	2	3	4	5

1	2	3	4	5
ليست صحيحةً على الإطلاق	صحيحةٌ بعضَ الشيء	صحيحةٌ بشكلٍ متوسط	صحيحةٌ جداً	صحيحةٌ إلى أبعدِ الحدود

13	عدد السجائر التي أدخّنها في اليوم الواحد كثيراً ما يتأثر بعوامل أخرى (مثل: كيف أشعر، ماذا أفعل، الخ.)	1	2	3	4	5
14	عندما أشتهي تدخين سيجارة فإني أشعر و كأنني تحت سيطرة قوة مجهولة.	1	2	3	4	5
15	منذ أن أصبحت أدخّن بانتظام، عدد السجائر التي أدخنها بقيت كما هي أو نقصت قليلاً.	1	2	3	4	5
16	حينما أتوقف عن التدخين لعدة ساعات فإني أشعر برغبة شديدة بتدخين سيجارة.	1	2	3	4	5
17	تدخيني للسجائر منتظم إلى حدٍّ ما طوال اليوم.	1	2	3	4	5
18	بعد أن امتنع عن التدخين لفترة من الوقت فإني أحتاج إلى أن أدخّن لتخفيف مشاعر الضيق و سرعة الانفعال و الغضب.	1	2	3	4	5
19	أنا أدخّن تقريباً نفسَ كمية السجائر في أيام الجمعة و العطل بالمقارنة مع الأيام العادية.	1	2	3	4	5

تعليمات :

<u>خلالَ الفترة التي تلت آخر سيجارة قمت بتدخينها</u>، يرجى تقييم نفسك إن كنتَ قد شعرت بأيٍّ من الأعراضِ التاليةِ مستخدماً المقياسَ المُبَيَّن أدناه من 0 إلى 4.

0	1	2	3	4
لا أوافقُ بشدة	لا أوافق	مُحايد	أوافق	أوافقُ بشدة

1	لم يكن الطعام يشدّني أو يجذبني.	0	1	2	3	4
2	حصلت على نوم مريح.	0	1	2	3	4
3	كنت متوتراً أو قلقاً.	0	1	2	3	4
4	كان مستوى تركيزي ممتاز.	0	1	2	3	4
5	استيقظتُ من النوم بشكل متكرر خلال الليل.	0	1	2	3	4
6	شعرت بأنّي فاقد الصبر.	0	1	2	3	4
7	شعرت بأنّي مبتهجٌ ومتفائل.	0	1	2	3	4
8	وجدت نفسي قلقاً حول مشاكلي.	0	1	2	3	4
9	شعرت برغبة شديدة و متكررة لأن أدخّن.	0	1	2	3	4
10	شعرت بالهدوء في الآونة الاخيرة.	0	1	2	3	4
11	انزعجت بسببِ الرغبةِ بتدخينِ سيجارة.	0	1	2	3	4
12	شعرت بأنّي حزينٌ أو مكتئب.	0	1	2	3	4
13	كنت سريعَ الانفعال و أغضبُ بسهولة.	0	1	2	3	4
14	أردت أن آكلَ بتأنّي الوجباتِ الخفيفة أو الحلويات.	0	1	2	3	4
15	انزعجت بسببِ المِزاجِيّات السلبية مثل الغضبِ والإحباط، و سرعةِ الانفعال.	0	1	2	3	4
16	كنت آكلُ كثيراً.	0	1	2	3	4
17	كنت راضٍ عن نومي.	0	1	2	3	4
18	شعرت بأنّي محبط.	0	1	2	3	4
19	شعرت بأنّي يائسٌ و متدني العزيمة.	0	1	2	3	4
20	فكّرت كثيراً بالتدخين.	0	1	2	3	4
21	شعرت بأنّي جائع.	0	1	2	3	4
22	شعرت بأنّي أحصلُ على قسطٍ كافٍ من النوم.	0	1	2	3	4
23	كان من الصعبِ اعارة الانتباه للأشياء.	0	1	2	3	4
24	شعرت بأنّي سعيد و قنوع.	0	1	2	3	4
25	نومي كان مضطرباً.	0	1	2	3	4
26	وجدت صعوبةً في جعل السجائر تغيبُ عن بالي.	0	1	2	3	4
27	كان من الصعب علي التفكير بوضوح.	0	1	2	3	4
28	كنت أفكرُ بالطعامِ كثيراً.	0	1	2	3	4

تعليمات :

تم تصميم هذا الاستبيان لتقييم معتقدات للناس حول تبعات تدخين السجائر. فيما يلي قائمة من الجمل المتعلقة بالتدخين. بحسب اعتقادك، نودّ منك أن تقيّم ما مدى **امكانية حدوث** أو **عدم امكانية حدوث** أي من التبعات عندك عندما تدخّن. في حال كانت الجملة تصف تبعة للتدخين **غير ممكنة الحدوث** بالنسبة لك، اختر رقم من 0 إلى 4. في حال كانت الجملة تصف تبعة للتدخين **ممكنة الحدوث** بالنسبة لك، اختر رقم من 5 إلى 9. إنّ هذا يعني أنه إذا كنت تعتقد أنّ التبعة التي تَصِفُها الجملة غيرُ ممكنٍ حدوثها بالنسبة لك عندما تدخّن السجائر فاختر الرقم 0. و كذلك، إذا كنت تعتقد أنّ التبعة التي تَصِفُها الجملة يمكن حدوثها في كل مرة تدخّن السجائر فاختر الرقم 9. استخدم الدليل أدناه لمساعدتك أكثر. على سبيل المثال، إذا كانت التبعة (التي تَصِفُها الجملة) تبدو ممكنة الحدوث دائماً بالنسبة لك، فعندها اختر الرقم 9 . وكذلك، إذا كانت (الجملة تصف تبعة للتدخين) تبدو لك غير ممكنة الحدوث و لكن بنسبة قليلة، فعندها اختر الرقم 4.

0	1	2	3	4	5	6	7	8	9
دائماً	للغاية (بشدة)	جداً	إلى حد ما	قليلاً	قليلاً	إلى حد ما	جداً	للغاية (بشدة)	دائماً
← **غيرممكنة الحدوث**					→ **ممكنة الحدوث**				

1	السجائرُ لها مذاقٌ جيد.	0	1	2	3	4	5	6	7	8	9
2	التدخين يتحكّم في شهيّتي.	0	1	2	3	4	5	6	7	8	9
3	أشعر بحرقة في حلقي بعد التدخين.	0	1	2	3	4	5	6	7	8	9
4	السجائر تساعدني في التعامل مع القلق أو الهموم.	0	1	2	3	4	5	6	7	8	9
5	نوبات التهيّج بسبب نقص النيكوتين يمكنُ السيطرةُ عليها بالقيام بالتدخين.	0	1	2	3	4	5	6	7	8	9
6	عندما أكون غاضباً ، يمكن لسيجارة أن تهدئني.	0	1	2	3	4	5	6	7	8	9
7	عندما أكون لوحدي، يمكن للسيجارة أن تساعدني في تسريع الوقت.	0	1	2	3	4	5	6	7	8	9
8	كلّما زاد تدخيني كلما أدمنت أكثر.	0	1	2	3	4	5	6	7	8	9
9	عندما أكون متوتراً، السيجارة تساعدني على الاسترخاء.	0	1	2	3	4	5	6	7	8	9
10	السجائر تجنّبني الإكثار من تناول الطعام.	0	1	2	3	4	5	6	7	8	9
11	تدخينُ السيجارة يمدّني بالطاقة.	0	1	2	3	4	5	6	7	8	9
12	السجائر تساعدني على التعامل مع الغضب	0	1	2	3	4	5	6	7	8	9
13	التدخين يهدئني عندما أشعر بالعصبية.	0	1	2	3	4	5	6	7	8	9
14	السجائرُ تجعلُ رئتاي تُؤْلمان.	0	1	2	3	4	5	6	7	8	9
15	أشعر بأنّني أنجز عملي بشكلٍ أفضل عندما أدخّن.	0	1	2	3	4	5	6	7	8	9
16	يمكن للسيجارة أن تمدّني بالطاقة عندما أشعرُ بالملل والتعب.	0	1	2	3	4	5	6	7	8	9
17	السجائر يمكنها حقاً أن تجعلني أشعر بحالة جيدة.	0	1	2	3	4	5	6	7	8	9
18	عندما أشعرُ بالسعادة، التدخين يساعدني على الحفاظ على هذا الشعور.	0	1	2	3	4	5	6	7	8	9
19	سوف أستمتع بنكهةِ السيجارة.	0	1	2	3	4	5	6	7	8	9
20	إذا لم يكن لديَّ شيءٌ أفعله، فإنَّ التدخين يمكنُ أن يساعدني في قتلِ وقت فراغي.	0	1	2	3	4	5	6	7	8	9
21	سوف أستمتع بالشعور بسيجارة على لساني وشفتاي.	0	1	2	3	4	5	6	7	8	9
22	التدخين سوف يلبّي اشتهائي للنيكوتين.	0	1	2	3	4	5	6	7	8	9
23	أنا أشعر وكأنّي جزء من المجموعة عندما أكونُ معَ مدخّنينَ آخرينَ.	0	1	2	3	4	5	6	7	8	9

		0	1	2	3	4	5	6	7	8	9
		دائماً	للغاية (بشدة)	جداً	إلى حد ما	قليلاً	قليلاً	إلى حد ما	جداً	للغاية (بشدة)	دائماً
		غيرممكنة الحدوث					**ممكنة الحدوث**				
24	التدخين يجعلني أبدو أقلّ جاذبية.	0	1	2	3	4	5	6	7	8	9
25	عندما أدخّن فأنا أزيدُ من خطورة اصابتي بأمراض القلبِ وسرطانِ الرّئة.	0	1	2	3	4	5	6	7	8	9
26	التدخينُ يساعدني كثيرا على استمتاع صحبة الناس.	0	1	2	3	4	5	6	7	8	9
27	السجائر تساعدني في التخفيف من حدة التوتر أو التعامل معه.	0	1	2	3	4	5	6	7	8	9
28	أنا أشعرُ بتحسّن جسدي بعد أن أدخّن سيجارة.	0	1	2	3	4	5	6	7	8	9
29	أستمتعُ بالحفلاتِ و السهراتِ أكثرَ عندما أدخّن.	0	1	2	3	4	5	6	7	8	9
30	الناس يقللوا من شأني عندما يروننني أدخّن.	0	1	2	3	4	5	6	7	8	9
31	تدخينُ السيجارة يعمل على تلبية رغبتيَ الشديدة بالتدخين.	0	1	2	3	4	5	6	7	8	9
32	إنَّ مُجرَّدَ حَمْلِ سيجارة فيه متعة.	0	1	2	3	4	5	6	7	8	9
33	إذا شعرتُ بأنّي سريعُ الانفعال و الغضب، فإن الدخّان سوف يساعدني أن أهدأ.	0	1	2	3	4	5	6	7	8	9
34	التدخينُ يخرّشُ و يهيّجُ فمي و حلقي.	0	1	2	3	4	5	6	7	8	9
35	عندما أشعر بالملَلِ والتعب، فسيجارة يمكنها حقاً أن تساعد.	0	1	2	3	4	5	6	7	8	9
36	سأصبح معتمداً أكثرَ على النيكوتين إذا استمريتُ في التدخين.	0	1	2	3	4	5	6	7	8	9
37	التدخينُ يساعدني على التحكّم بوزني.	0	1	2	3	4	5	6	7	8	9
38	عندما أكون منزعجاً من شخص ما، يمكن للسيجارة أن تساعدني على التأقلم على هذا الشعور.	0	1	2	3	4	5	6	7	8	9
39	كلما زاد تدخيني، عرّضت صحّتي للخطر أكثر.	0	1	2	3	4	5	6	7	8	9
40	السجائر تبعدني عن تناولِ طعامٍ زائدٍ عن حاجتي.	0	1	2	3	4	5	6	7	8	9
41	أستمتعُ بكل خطوة أقومُ بها عند إشعال سيجارة.	0	1	2	3	4	5	6	7	8	9
42	الحواراتُ و الأحاديثُ تبدو أكثرَ امتاعاً إذا كنّا جميعاً ندخّن.	0	1	2	3	4	5	6	7	8	9
43	أبدو مثيراً للسخرية عندما أدخّن.	0	1	2	3	4	5	6	7	8	9
44	التدخينُ يعمل على عدم زيادة وزني.	0	1	2	3	4	5	6	7	8	9
45	أحبُّ الشعور الجسدي الذي تمنحه السيجارة لي عندما أدخن.	0	1	2	3	4	5	6	7	8	9
46	التدخينُ خَطِرٌ على صحّتي.	0	1	2	3	4	5	6	7	8	9
47	أستمتعُ بالشعورِ بالدخّان عندما يلامس فمي وحلقي.	0	1	2	3	4	5	6	7	8	9
48	عندما أدخّن، يكون المذاق ممتعاً.	0	1	2	3	4	5	6	7	8	9
49	أحبّ أن أراقب الدخّان المتصاعد من سيجارتي.	0	1	2	3	4	5	6	7	8	9
50	عندما أكونُ متضايقاً (قلقاً) من أمرٍ ما ، فالسيجارة تكون مفيدة.	0	1	2	3	4	5	6	7	8	9
51	التدخين يخفّفُ (و لكن بشكل مؤقت) رغبتي الشديدة و المتكررة للسجائر.	0	1	2	3	4	5	6	7	8	9
52	أستمتعُ بأحاسيس التذوق لدي عندما أدخّن.	0	1	2	3	4	5	6	7	8	9
53	أشعرُ بالهدوء و الراحة أكثرَ مع الأشخاص الآخرين إذا كان معي سيجارة.	0	1	2	3	4	5	6	7	8	9
54	السجائر جيدةٌ للتعاملِ مع الملل.	0	1	2	3	4	5	6	7	8	9
55	التدخينُ يُنقصُ من سنين عمري.	0	1	2	3	4	5	6	7	8	9

القسم السادس: أسئلة متعلقة بنمط و تاريخ تدخين النرجيلة

1. هل دخّنت نرجيلة على الأقل 4 مرات خلال الشهر الذي سبق دخولك الحالي للمستشفى؟
   - □ لا **(0)**
   - □ نعم **(1)** ← (انتقل إلى السؤال رقم 3)

2. أي من التالية تصفك؟ (اختر كل ما ينطبق)
   - □ أنا أدخّن النرجيلة حالياً و لكن لم أدخّن 4 مرات خلال الشهر الذي سبق دخولي الحالي للمستشفى
   - □ أنا أدخّن النرجيلة فقط بالمناسبات الاجتماعية
   - □ أنا أدخّن النرجيلة فقط خلال الإجازات
   - □ أنا كنت أدخن النرجيلة في السابق
   - □ أنا لم يسبق لي أن دخّنت النرجيلة

انتقل إلى السؤال رقم 31

3. هل تعتبر نفسك مدخّن نرجيلة بشكل منتظم؟
   - □ لا **(0)**
   - □ نعم **(1)**

4. كم كان عمرك عندما أخذت أول نَفَسْ من نرجيلة؟ _____

5. كم كان عمرك عندما دخنت نرجيلة خلال جلسة كاملة؟ _____

6. ما هي الأسباب أو المواقف التي جعلتك مدخناً للنرجيلة؟
   _____
   _____

7. هل أنت بالعادة تشارك الآخرين تدخين نفس رأس النرجيلة؟
   - □ لا **(0)** ← (انتقل إلى السؤال رقم 9)
   - □ نعم **(1)**

8. عندما تشارك تدخين نفس رأس النرجيلة، كم دقيقة تدخّن أنت خلال جلسة التدخين الواحدة؟ _____ دقيقة من أصل _____ (مجموع وقت التدخين)

9. متى دخّنت آخر نرجيلة قبل دخولك هذا للمستشفى؟
   - □ التاريخ: _____|_____|_____ (يوم | شهر | سنة)
   - □ الوقت: _____:_____ (دقيقة : ساعة)

10. هل تدخّن عادةً نكهة معينة (أو نكهات معينة) من تبغ النرجيلة؟
    - □ لا **(0)**
    - □ نعم **(1)**

11. اختر من القائمة التالية نكهة تبغ النرجيلة التي تدخّنها عادةً. و أشر إلى عدد الغرامات التي تستهلكها في الشهر.

	النكهة	عدد الغرامات المستهلكة شهرياً
a.	تفاح	_____
b.	تفاحتين	_____
c.	خوخ	_____
d.	منجا	_____
e.	فراولة	_____
f.	فواكه	_____
g.	نعنع	_____
h.	عنب	_____
i.	بطيخ	_____
j.	كرز	_____
k.	قهوة عربية	_____
l.	فانيلا	_____
m.	مشمش	_____
n.	توت	_____
o.	غيرها _____	_____
p.	غيرها _____	_____

12. كم نرجيلة تدخّن حالياً في الأسبوع؟
    - □ أقل من واحدة في الأسبوع **(0)**
    - □ 1-2 في الأسبوع **(1)**
    - □ 3-6 في الأسبوع **(2)**
    - □ 7 أو أكثر في الأسبوع **(3)**

13. كم من المرات استطعت أن توقف تدخين النرجيلة لأكثر من سبعة أيام؟
    - □ ولا مرة **(3)**
    - □ مرة واحدة **(2)**
    - □ عدة مرات **(1)**
    - □ دائما يتكرر ذلك **(0)**

14. كم من الأيام يمكن أن تمضي من دون أن تدخّن النرجيلة؟
    - □ يوم أو أقل **(3)**
    - □ يومين - ثلاثة **(2)**
    - □ أربعة - أسبوع **(1)**
    - □ أكثر من أسبوع **(0)**

15. هل تدخّن النرجيلة إذا كنت مريضاً طريحَ الفِراش؟
    - □ نعم أكيد **(3)**
    - □ نعم على الأرجح **(2)**
    - □ نعم ربما **(1)**
    - □ كلا **(0)**

16. هل تدخّن عادةً بمفردك؟
□ نعم دائما **(3)**
□ نعم أكثر الأوقات **(2)**
□ نعم أحيانا **(1)**
□ كلا **(0)**

17. هل أنت مستعدٌ لعدم الأكل مقابلَ الحصولِ على نَفَسِ نرجيلة؟
□ نعم أكيد **(3)**
□ نعم على الأرجح **(2)**
□ نعم ربما **(1)**
□ كلا **(0)**

18. كم تدفع شهرياً ثمناً للسجائر (بالدنانير الأردنية)؟ _____

19. كم من المال أنت مستعدٌ لدفعِ ثمنِ نَفَسٍ نرجيلة عند الحاجة؟
□ 1% أو أقل من مدخولك الشهري **(0)**
□ 2% - 10% من مدخولك الشهري **(1)**
□ 11% - 50% من مدخولك الشهري **(2)**
□ أكثر من 50% من مدخولك الشهري **(3)**

20. هل تدخّن النرجيلة لرفع المعنويات؟
□ نعم أكيد **(3)**
□ نعم على الأرجح **(2)**
□ نعم ربما **(1)**
□ كلا **(0)**

21. هل تدخّن النرجيلة للّذة؟
□ نعم أكيد **(3)**
□ نعم على الأرجح **(2)**
□ نعم ربما **(1)**
□ كلا **(0)**

22. هل تدخّن النرجيلة لتخفيف التوتر العصبي؟
□ نعم أكيد **(3)**
□ نعم على الأرجح **(2)**
□ نعم ربما **(1)**
□ كلا **(0)**

23. هل تدخّن النرجيلة للمسايرة؟
□ نعم أكيد **(3)**
□ نعم على الأرجح **(2)**
□ نعم ربما **(1)**
□ كلا **(0)**

24. هل قمت بمحاولةٍ جادةٍ للإقلاع عن تدخينِ النرجيلة؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 31)
□ نعم **(1)**

25. كم هو عددُ المراتِ التي نجحتَ فيها في الاقلاعِ عن تدخين النرجيلة؟ _____

26. متى كانت آخرُ محاولةٍ جادّةٍ للإقلاع عن تدخينِ النرجيلة؟
_____ | _____ (شهر | سنة)

27. ما هي أطولُ فترةٍ كنتَ فيها مُقْلِعاً عن تدخين النرجيلة؟
□ _____ سنوات
□ _____ أشهر
□ _____ أيام
□ _____ ساعات

28. في أي سنة حصلت أطولُ مدةِ اقلاعٍ عن تدخين النرجيلة؟
_____

29. بعد أن تركتَ تدخينَ النرجيلة ، ما هي الدوافع التي حفّزتك أو أدت بك للعودة لتدخين النرجيلة مرة أخرى؟ (اختر كل ما ينطبق)
□ التوتر (أو الضغط)
□ سهرة أو حفلة اجتماعية
□ لتخفيف الأعراض الانسحابية للنيكوتين
□ الملل
□ الأزمات (موت أحد أفراد العائلة / موت قريب / موت صديق، مرض، فقد وظيفة، أو الابتعاد عن عائلتك)
□ غير ذلك، يرجى توضيح ذلك : _____

30. أي من طرق الإقلاع عن تدخين النرجيلة التالية كانت ناجحة بالنسبة لك؟ (اختر كل ما ينطبق)
□ التوقف عن التدخين لوحدي و بدون أية مساعدة
□ اتباع كتيّبات و نشرات تعليمية
□ اتخاذ قرار مع مدخّن آخر للإقلاع عن التدخين معاً
□ المشاركة في برنامج خاص للتوقف عن التدخين
□ استشارة خاصة أو علاج حصلت عليه من مقدم رعاية صحية (مثل دكتور)
□ التمارين الرياضية
□ تقليل عدد مرات تدخين النرجيلة بشكلٍ تدريجي
□ تناول وجبات خفيفة (مثل العلكة (اللُبان) أو الحلوى) كبديل عن تدخين النرجيلة
□ غير ذلك، يرجى توضيح ذلك : _____

31. بمن فيهم أنت (حيث انطبق)، كم عدد أفراد أسرتك ممن لا تقل أعمارهم عن 18 سنة وهم حالياً من مدخني النرجيلة؟
□ _____ فرد
□ _____ من الرجال (عمرهم 18 سنة فأكثر)
□ _____ من النساء (عمرهن 18 سنة فأكثر)

32. كم عدد أفراد أسرتك الذين تقل أعمارهم عن 18 سنة وهم حالياً من مدخني النرجيلة؟
□ _____ فرد
□ _____ من الأولاد (يقل عمرهم عن 18 سنة)
□ _____ من البنات (يقل عمرهن عن 18 سنة)

33. **(إذا كان المشارك متزوجاً أو مرتبطاً)** هل زوجتك مدخّنة للنرجيلة على الأقل 4 مرات شهرياً؟
□ لا **(0)**
□ لا و لكنها تدخن النرجيلة **(1)**
□ نعم **(2)**

34. **(إذا كان المشارك مطلقاً أو أرملاً)** هل زوجتك كانت مدخّنة للنرجيلة على الأقل 4 مرات شهرياً؟
- □ لا **(0)**
- □ لا و لكنها كانت تدخن النرجيلة **(1)**
- □ نعم **(2)**

35. هل يسمح بتدخين النرجيلة داخل بيتك؟
- □ لا **(0)**
- □ نعم **(1)**

36. داخل منزلك، هل تدخين النرجيلة مسموح به في كل الغرف؟
- □ لا **(0)**
- □ نعم **(1)**

37. داخل منزلك، هل تدخّن النرجيلة يتم حتى و إن كان الأطفال ممن تقل أعمارهم عن 18 سنة موجودين؟
- □ لا **(0)**
- □ نعم **(1)**

القسم السابع: أسئلة متعلقة بالدعم الاجتماعي

تعليمات: يرجى قراءة الاسئلة التالية و اختيار الاجابة التي تصف وضعك قبل دخولك هذا للمستشفى بشكل أكثر دقة.

1. هل يوجد عندك شخصٌ ما تعتمد عليه ليستمع إليك عند حاجتك للتحدث؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

2. هل يوجد عندك شخصٌ ما ليقدّم لك نصيحةً جيدةً بخصوص مشكلة؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

3. هل يوجد عندك شخصٌ ما يُظْهِرُ لك المحبةَ والعاطفة؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

4. هل يوجد عندك شخصٌ ما يساعدكُ في الأعمالِ اليومية؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

5. هل يمكنكُ الاعتمادُ على شخصٍ ما في تقديم الدعمِ العاطفيِّ و المعنوي لك (للحديثِ عن مشاكلكَ أو مساعدتكَ في اتخاذِ قراراتٍ صعبة)؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

6. هل أنت على تواصل دائم و كما ترغب مع شخص ما تشعر أنّه مقرّب لك ، أو شخص ما تثقُ به؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

7. هل تسكن بمفردك (أي أنك لا تسكن مع آخرين)؟

نعم لا

تعليمات: يرجى قراءة الاسئلة التالية و اختيار الاجابة التي تصف وضعك قبل دخولك هذا للمستشفى بشكل أكثر دقة.

1. هل يوجد عندك شخصٌ ما يمكنكَ الاعتمادُ عليه في إعطائك السجائر (أو التبغ) إذا احتجت إليها؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

2. هل يوجد عندك شخصٌ ما يشجّك على الإقلاع عن التدخين؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

3. هل يوجد عندك شخصٌ ما يمكن أن تدخّن معه بينما تتحدّث عن ضغوطاتك النفسية؟

لا شيءَ من الوقت	قليلاً من الوقت	بعضَ الوقت	أغلبَ الوقت	كلَّ الوقت
1	2	3	4	5

القسم الثامن: الاستبانات المتعلقة بالرغبة بالإقلاع عن التدخين

<u>الجزء الأول: متعلق بمدخني السجائر الحاليين.</u>

1. بعد خروجك من المستشفى، ما هي درجة رغبتك بوقف تدخين السجائر؟

0	1	2	3	4	5	6	7	8	9	10
غير راغب على الإطلاق										**راغب للغاية**

2. كيف تصف درجة استعدادك للإقلاع عن تدخين السجائر؟
   - □ ليس لدي أي نية للإقلاع عن تدخين السجائر خلال ال 6 أشهر المقبلة **(1)**
   - □ أنا أفكر بجدية بالإقلاع عن تدخين السجائر خلال ال 6 أشهر المقبلة **(2)**
   - □ أنا أخطط بجدية لإنهاء تدخين السجائر خلال ال 30 يوما المقبلة ، وأنا لم أبذل أي محاولةٍ للإقلاع عن تدخين السجائر خلال السنة الماضية **(3)**
   - □ أنا أخطط بجدية لإنهاء تدخين السجائر خلال ال 30 يوما المقبلة ، وكنت قد قمت بمحاولة واحدة على الأقل للإقلاع عن التدخين خلال السنة الماضية **(4)**

3. هل رغبتك بالإقلاع عن تدخين السجائر **<u>بمجرد خروجك من المستشفى</u>** اختلفت **<u>الآن</u>** عما كانت عليه **<u>قبل هذه المقابلة</u>؟**
   - □ لا **(0)** ← <u>(انتقل إلى السؤال رقم 6)</u>
   - □ نعم **(1)**

4. كم كانت درجة رغبتك بوقف تدخين السجائر **قبل هذه المقابلة؟**

0	1	2	3	4	5	6	7	8	9	10
غير راغب على الإطلاق										**راغب للغاية**

5. ما هو سبب هذا الفرق؟

_____
_____

<u>الجزء الثاني: متعلق بمدخني النرجيلة الحاليين.</u>

6. بعد خروجك من المستشفى، ما هي درجة رغبتك بوقف تدخين النرجيلة؟

0	1	2	3	4	5	6	7	8	9	10
غير راغب على الإطلاق										**راغب للغاية**

7. كيف تصف درجة استعدادك للإقلاع عن تدخين النرجيلة؟
   - □ ليس لدي أي نية للإقلاع عن تدخين النرجيلة خلال ال 6 أشهر المقبلة **(1)**
   - □ أنا أفكر بجدية بالإقلاع عن تدخين النرجيلة خلال ال 6 أشهر المقبلة **(2)**
   - □ أنا أخطط بجدية لإنهاء تدخين النرجيلة خلال ال 30 يوما المقبلة ، وأنا لم أبذل أي محاولة للإقلاع عن تدخين النرجيلة خلال السنة الماضية **(3)**
   - □ أنا أخطط بجدية لإنهاء تدخين النرجيلة خلال ال 30 يوما المقبلة ، وكنت قد قمت بمحاولة واحدة على الأقل للإقلاع عن التدخين خلال السنة الماضية **(4)**

8. هل رغبتك بالإقلاع عن تدخين النرجيلة **<u>بمجرد خروجك من المستشفى</u>** اختلفت **<u>الآن</u>** عما كانت عليه **<u>قبل هذه المقابلة</u>؟**
   - □ لا **(0)** ← <u>(انتقل إلى القسم رقم 9)</u>
   - □ نعم **(1)**

9. كم كانت درجة رغبتك بوقف تدخين النرجيلة **قبل هذه المقابلة؟**

0	1	2	3	4	5	6	7	8	9	10
غير راغب على الإطلاق										**راغب للغاية**

10. ما هو سبب هذا الفرق؟

_____
_____

القسم التاسع: استبانات فحص الاكتئاب

تعليمات:
<u>خلال الأسبوعين الماضيين</u>، كم مرة عانيت من أي من الأعراض التالية؟
(استخدم علامة " ✔" للإشارة لجوابك)

		ولا مرة	عدة أيام	أكثر من نصف الأيام	تقريباً كل يوم
1	قلّة الاهتمام أو قلّة الاستمتاع بممارسة أي عمل	0	1	2	3
2	الشعور بالحزن أو ضيق الصدر أو اليأس	0	1	2	3
3	صعوبة في النوم أو نوم متقطع أو النوم أكثرَ من العادة	0	1	2	3
4	الشعور بالتعب أو بامتلاك القليلِ جداً من الطاقة	0	1	2	3
5	قلّة الشهية أو الزيادة في تناول الطعام عن المعتاد	0	1	2	3
6	الشعور بعدم الرضا عن النفس أو الشعور بأنك قد أخذلت نفسك أو عائلتك	0	1	2	3
7	صعوبة في التركيز، مثلاً أثناء قراءةِ الصحيفة أو مشاهدةِ التلفزيون	0	1	2	3
8	بُطء في الحركة أو بُطء في التحدّث عما هو مُعتاد لدرجة ملحوظة من الآخرين | أو على العكس من ذلك التحدث بسرعة و كثرة الحركة أكثرّ من المعتاد	0	1	2	3
9	راودتك أفكارٌ بأنّه من الأفضل لو كنتَ ميتاً أو أفكارٌ بأن تقوم بإيذاء النفس	0	1	2	3

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10. إذا أشار المشارك إلى **<u>أيّة</u>** من الأعراض أعلاه، إلى أيّة درجة **<u>صَعَّبَتْ</u>** عليك هذه الأعراض القيامَ بعملك، الاعتناء بالأمور المنزلية، أو الانسجام مع أشخاص آخرين؟

ليست هناك أية صعوبة	**هناك بعض الصعوبات**	**هناك صعوبات شديدة**	**هناك صعوبات بالغة التعقيد**
□	□	□	□

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11. إذا أشار المشارك إلى **<u>أيّة</u>** من الأعراض أعلاه، هل تذكر أنك كنت قد شعرت بنفس حدة هذه الأعراض (من 1 إلى 9) قبل أن تبدأ بالتدخين؟
□ لا **(0)**
□ نعم **(1)**

12. هل مرّ عليك فترة أسبوعين (أو أكثر) كنت قد شعرت بنفس حدة هذه الأعراض (من 1 إلى 9) ***تقريباً كل يوم*****؟**
□ لا **(0)** ← (انتقل إلى السؤال رقم 15)
□ نعم **(1)**

13. **إذا كانت الاجابة بنعم،** كم مرة حصل ذلك؟ _____

14. **إذا كانت الاجابة بنعم،** هل كانت تلك الأعراض (من 1 إلى 9) قد حدثت بسبب أحداث رئيسية في الحياة يمكن لها أن تؤدي إلى الضغط و التوتر (علي سبيل المثال: وفاة أحد أفراد الأسرة، حالة طلاق، ترك المدرسة بسبب الصعوبات الاقتصادية)؟
□ لا **(0)**
□ نعم **(1)** ← (كم مرة حصل ذلك؟_____)

15. هل تعتقد أن التدخين يؤدي إلى مثل هذه تلك الأعراض (من 1 إلى 9)؟
□ لا **(0)**
□ نعم **(1)**
□ لا أعرف **(2)**

16. هل تعتقد أن تلك الأعراض (من 1 إلى 9) تؤدي إلى التدخين؟
□ لا **(0)**
□ نعم **(1)**
□ لا أعرف **(2)**

17. هل تعتقد أن تلك الأعراض (من 1 إلى 9) والتدخين يأتيان معاً في قت واحد؟
□ لا **(0)**
□ نعم **(1)**
□ لا أعرف **(2)**

18. حتى و إن شعرتَ أحياناً بأنك بخير، هل مرّ عليك **فترة لا تقل عن سنتين مستمرتين (أو أكثر)** في حياتك شعرت بأنك مكتئب أو حزين في معظم الأيام؟
□ لا **(0)**
□ نعم **(1)**

19. هل استخدمت أو تستخدم حالياً أدويةً موصوفةً لتغييرِ المِزاجِ الخاصِّ بك؟
□ لا **(0)** ← (انتقل إلى السؤال رقم 22)
□ نعم **(1)**

20. متى بدأت باستخدام تلك الأدوية؟ ____ | ____ (شهر | سنة)

21. ما هي أسماء تلك الأدوية؟ □_____ □_____□_____

22. هل سبق لك و أن تمَّ تشخيصكَ بمرض الاكتئاب؟
□ لا **(0)**
□ نعم **(1)**

Appendix 4.3. Study Standardized Instruments with Names of their Copyright Owners, and Numbers of Permissions to Use Licenses

Study Standardized Instrument	Copyright Owner	Permission to Use License Number
Fagerström Test for Nicotine Dependence	Karl Fagerström	Approval received by email.
Nicotine Dependence Syndrome Scale	Oxford University Press	2724171438695
Wisconsin Smoking Withdrawal Scale	Elsevier	2724011279060
The Smoking Consequences Questionnaire-Adult	Elsevier	2724020616923
Lebanon Waterpipe Dependence Scale-11	Oxford University Press	2724171375132
ENRICHD Social Support Instrument	Wolters Kluwer Health	2724031510398
The Patient Health Questionnaire-9	Pfizer Inc	No permission is required

Appendix 4.4. Coding Method for Variables Used in Logistic Regression Analysis

	0	**1**
Dependent Variable		
Willingness to Quit Smoking	< 7	≥ 7
Independent Variable		
Marital Status	Not Married	Married
Educational Level	Diploma or Less	Bachelor and above
Employment Status	Not Employed	Employed
Sufficiency of Personal Income to Support Self	No	Yes
Household Total Number	> 4 persons	≤ 4 persons
Household Monthly Income	< 600 Jordanian Dinars	≥ JD Jordanian Dinars
General Health	"Poor" and "Fair"	"Good", "Very Good", and "Excellent"
Health Insurance	No	Yes
Do you think that tobacco smoking is harmful to health?	No	Yes
To what extent do you think the number of cigarettes a person smokes affects his/her future health?	"Not very much", "Nothing", and "I don't know"	"Much" and "Very Much"
To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack or a chest pain?	"Not very much", "Nothing", and "I don't know"	"Much" and "Very Much"
How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?	"Unlikely", "Very unlikely", and "Uncertain"	"Likely" and "Very Likely"
How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?	"Unlikely", "Very unlikely", and "Uncertain"	"Likely" and "Very Likely"
Attempted Quitting Smoking	No	Yes
Age at Starting Smoking	≤ 18	> 18
Depressive Group	Depressed	Not Depressed
How difficult have the depressive symptoms made it for you to do your work, take care of things at home, or get along with other people?	"Somewhat difficult", "Very difficult", and "Extremely difficult"	"Not difficult at all"
Nicotine Dependency Group	Dependent	Not Dependent
Social Support Group	Low Social Support	High Social Support
Is there someone available to you who encourages you to quit smoking?	"None of the Time", and "A little of the Time"	"Some of the Time", "Most of the Time", and "All of the Time"

Appendix 5.1. Detailed Description of Some Sociodemographic Characteristics

	Study Sample (n=167)		Cigarette Smokers (n=118)		Waterpipe Smokers (n=49)	
Variable	%	n	%	n	%	n
Age (Years)						
< 40	8.4	14	10.2	12	4.1	2
40-49	28.7	48	23.7	28	40.8	20
50-59	55.1	92	61.0	72	40.8	20
> 60	7.8	13	5.1	6	14.3	7
Educational Level						
< High School	6.0	10	6.8	8	4.1	2
High School	12.0	20	14.4	17	6.1	3
Diploma /Associate	44.9	75	41.5	49	53.1	26
≥ Bachelor	37.1	62	37.3	44	36.7	18
Employment Status						
Employed	69.5	116	72.0	85	63.3	31
Retired	26.9	45	23.7	28	34.7	17
On Leave	0.6	1	0.8	1	0.0	0
Disable	0.6	1	0.8	1	0.0	0
Unemployed	2.4	4	2.5	3	2.0	1
Current Employment Position[a]						
Legislator, Senior Official, or Manager	8.6	10	9.4	8	6.5	2
Professional	31.9	37	30.6	26	35.5	11
Technician	22.4	26	21.2	18	25.8	8
Clerk	12.1	14	9.4	8	19.4	6
Services and Sales Worker	24.1	28	28.2	24	12.9	4
Elementary Occupation Staff	0.9	1	1.2	1	0.0	0
Monthly Personal Income (JD) [b]						
150-299	9.0	15	8.5	10	10.2	5
300-449	38.3	64	32.2	38	53.1	26
450-599	32.9	55	34.7	41	28.6	14
600-749	16.8	28	21.2	25	6.1	3
750-899	1.2	2	1.7	2	0.0	0
900 or more	1.8	3	1.7	2	2.0	1
Monthly Household Income (JD)						
150-299	3.6	6	2.5	3	6.1	3
300-449	18.0	30	14.4	17	26.5	13
450-599	26.3	44	25.4	30	28.6	14
600-749	34.1	57	36.4	43	28.6	14
750-899	9.6	16	11.0	13	6.1	3
900 or more	8.4	14	10.2	12	4.1	2

[a] n = 116, limited to the subjects who were employed. [b] JD: Jordanian Dinar (1 JD ≈ 1.41 US Dollars).

Appendix 5.2. Detailed Description of Some Health History and Risk Factors

	Study Sample (n=167)		**Cigarette Smokers** (n=118)		**Waterpipe Smokers** (n=49)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**
Drinking Alcohol						
No (and never drank alcohol)	85.0	142	86.4	102	81.6	40
No (but a social drinker)	10.2	17	8.5	10	14.3	7
No (but an ex-alcoholic)	4.2	7	5.1	6	2.0	1
Yes (and on a regular base)	0.6	1	0.0	0	2.0	1
General Health						
Poor	1.8	3	1.7	2	2.0	1
Fair	27.5	46	29.7	35	22.4	11
Good	58.7	98	55.9	66	65.3	32
Very good	11.4	19	11.9	14	10.2	5
Excellent	0.6	1	0.8	1	0.0	0
Body Mass Index						
Underweight	0.6	1	0.8	1	0.0	0
Normal	60.5	101	60.2	71	61.2	30
Overweight	37.7	63	37.3	44	38.8	19
Obese	1.2	2	1.7	2	0.0	0

Appendix 5.3. Detailed Item Responses to Knowledge and Health Belief Questions *

	Study Sample (n=167)		Cigarette Smokers (n=118)		Waterpipe Smokers (n=49)	
Variable	%	n	%	n	%	n
Do you think that tobacco smoking is harmful to health?						
Yes	93.4	156	93.2	110	93.9	46
Do you think that waterpipe smoking is less harmful to a smoker than cigarette smoking?						
No	58.7	98	**64.4**	**76**	**44.9**	**22**
Yes	38.3	64	**33.9**	**40**	**49.0**	**24**
Unsure	3.0	5	**1.7**	**2**	**6.1**	**3**
To what extent do you think the number of cigarettes a person smokes affects his/her future health?						
Very much	10.2	17	**11.9**	**14**	**6.1**	**3**
Much	80.2	134	**78.0**	**92**	**85.7**	**42**
Not very much	7.2	12	**9.3**	**11**	**2.0**	**1**
Nothing	1.8	3	**0.0**	**0**	**6.1**	**3**
I don't know	0.6	1	**0.8**	**1**	**0.0**	**0**
To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack (myocardial infarction) or a chest pain (angina)?						
Very much	51.5	86	48.3	57	59.2	29
Much	39.5	66	41.5	49	34.7	17
Not very much	4.2	7	5.9	7	0.0	0
Nothing	4.2	7	3.4	4	6.1	3
I don't know	0.6	1	0.8	1	0.0	0
How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?						
Very likely	45.5	76	48.3	57	38.8	19
Likely	46.7	78	44.1	52	53.1	26
Unlikely	5.4	9	5.1	6	6.1	3
Very unlikely	1.8	3	2.5	3	0.0	0
Uncertain	0.6	1	0.0	0	2.0	1
How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?						
Very likely	28.1	47	26.3	31	32.7	16
Likely	61.7	103	65.3	77	53.1	26
Unlikely	9.0	15	7.6	9	12.2	6
Very unlikely	0.6	1	0.8	1	0.0	0
Uncertain	0.6	1	0.0	0	2.0	1

* Significant differences are in bold.

Appendix 5.4. Detailed Item Reponses of Some Cigarette Smoking Questions

Variable	%	n
Percentage of Income Spent on Cigarettes		
6 - 10	28.8	34
11 - 15	38.1	45
16 - 20	22.0	26
More than 20	11.0	13
Number of cigarettes smoked daily		
10 or less	0.0	0
11-20	22.9	27
21-30	57.6	68
31 or more	19.5	23
How soon after you wake up do you smoke your first cigarette?		
Within 5 minutes	11.0	13
Within 6-30 minutes	77.1	91
Within 31-60 minutes	9.3	11
After 60 minutes	2.5	3
Do you find it difficult to refrain from cigarette smoking in places where it is forbidden?		
Yes	33.1	39
Which cigarette would you hate most to give up?		
The first one in the morning	76.3	90
All others	23.7	28
Do you smoke cigarettes more during the first hours after waking than during the rest of the day?		
Yes	72.9	86
Do you smoke cigarettes even when you are ill enough to be in bed most of the day?		
Yes	46.6	55
Nicotine Withdrawal Symptoms, Presence of:		
Craving	70.9	83
Anxiety	68.4	80
Concentration	58.1	68
Hunger	52.1	61
Anger	47	55
Sleep	41.9	49
Sadness	40.2	47
Smoking Consequences, Presence of:		
Health Risks	99.1	116
Craving Addiction	97.4	114
Social Facilitation	94	110
Negative Affect Reduction	90.6	106
Appetite Weight Control	90.6	106
Boredom Reduction	90.6	106
Stimulation State Enhancement	89.7	105
Taste Sensorimotor Manipulation	87.2	102
Negative Physical Feelings	59.8	70
Social Impression	29.9	35

[(a)] JD: Jordanian Dinars (1 JD ≈1.41 US Dollars); S.D.: Standard Deviation; Min: Minimum; Max: Maximum.

Appendix 5.5. Detailed Item Responses to Some Social Support Findings

	Study Sample‡ (n=166)		**Cigarette Smokers** (n=117)		**Waterpipe Smokers** (n=49)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**
Is there someone available to you whom you can count on to loan you cigarettes or tobacco if you need them?						
None of the Time	3.0	5	4.3	5	0.0	0
A little of the Time	1.8	3	1.7	2	2.0	1
Some of the Time	22.9	38	19.7	23	30.6	15
Most of the Time	50.0	83	51.3	60	46.9	23
All of the Time	22.3	37	23.1	27	20.4	10
Is there someone available to you who encourages you to quit smoking?						
None of the Time	19.3	32	15.4	18	28.6	14
A little of the Time	47.0	78	46.2	54	49.0	24
Some of the Time	22.3	37	23.1	27	20.4	10
Most of the Time	6.0	10	7.7	9	2.0	1
All of the Time	5.4	9	7.7	9	0.0	0
Is there someone available to you with whom you can smoke while you are talking about your stress?						
None of the Time	1.8	3	2.6	3	0.0	0
A little of the Time	6.6	11	5.1	6	10.2	5
Some of the Time	32.5	54	34.2	40	28.6	14
Most of the Time	39.2	65	37.6	44	42.9	21
All of the Time	19.9	33	20.5	24	18.4	9

‡ n = 166 due to missing data.

Appendix 5.6. Pearson's Correlation Coefficients between the Fagerström Test for Nicotine Dependence (FTND) Score and the Nicotine Dependence Syndrome Scale (NDSS), and the Subscales of Wisconsin Smoking Withdrawal Scale and Smoking Consequences Questionnaire-Adult

		FTND Score	NDSS Total
Anger (WSWS)	Pearson Correlation	**0.37 ****	**0.18 ***
	Sig.	**0.00**	**0.05**
Anxiety (WSWS)	Pearson Correlation	**0.29 ****	**0.37 ****
	Sig.	**0.00**	**0.00**
Concentration (WSWS)	Pearson Correlation	**0.22 ***	0.16
	Sig.	**0.02**	0.09
Craving (WSWS)	Pearson Correlation	**0.21 ***	**0.25 ****
	Sig.	**0.02**	**0.01**
Hunger (WSWS)	Pearson Correlation	**0.20 ***	**0.20 ***
	Sig.	**0.03**	**0.03**
Sadness (WSWS)	Pearson Correlation	**0.29 ****	**0.19 ***
	Sig.	**0.00**	**0.04**
Sleep (WSWS)	Pearson Correlation	**0.18 ***	0.11
	Sig.	**0.05**	0.22
Negative Affect Reduction (SCQ-A)	Pearson Correlation	0.16	**0.31 ****
	Sig.	0.09	**0.00**
Stimulation/State Enhancement (SCQ-A)	Pearson Correlation	0.12	**0.33 ****
	Sig.	0.20	**0.00**
Health Risks (SCQ-A)	Pearson Correlation	-0.04	0.07
	Sig.	0.65	0.45
Taste/Sensorimotor Manipulation (SCQ-A)	Pearson Correlation	0.15	**0.25 ****
	Sig.	0.11	**0.01**
Social Facilitation (SCQ-A)	Pearson Correlation	0.13	**0.39 ****
	Sig.	0.15	**0.00**
Appetite/Weight Control (SCQ-A)	Pearson Correlation	0.09	0.17
	Sig.	0.32	0.07
Craving/Addiction (SCQ-A)	Pearson Correlation	0.11	**0.34 ****
	Sig.	0.25	**0.00**
Negative Physical Feelings (SCQ-A)	Pearson Correlation	-0.13	-0.05
	Sig.	0.17	0.57
Boredom Reduction (SCQ-A)	Pearson Correlation	0.16	**0.36 ****
	Sig.	0.08	**0.00**
Social Impression (SCQ-A)	Pearson Correlation	**0.22 ***	-0.01
	Sig.	**0.02**	0.89

Abbreviations: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed). WSWS: Wisconsin Smoking Withdrawal Scale, SCQ-A: Smoking Consequences Questionnaire-Adult.

Appendix 5.7. Comparisons of Some Sociodemographic Characteristics by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=105)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Age (Years)								
< 40	6.5	4	9.5	10	5.1	5	13.4	9
40-49	32.3	20	26.7	28	29.3	29	28.4	19
50-59	51.6	32	57.1	60	59.6	59	47.8	32
> 60	9.7	6	6.7	7	6.1	6	10.4	7
Educational Level								
< High School	8.1	5	4.8	5	5.1	5	7.5	5
High School	4.8	3	16.2	17	13.1	13	10.4	7
Diploma /Associate	50.0	31	41.9	44	46.5	46	43.3	29
≥ Bachelor	37.1	23	37.1	39	35.4	35	38.8	26
Current Employment Position[(a)]								
Legislator, Senior Official, or Manager	10.3	4	7.8	6	5.6	4	13.6	6
Professional	35.9	14	29.9	23	33.8	24	27.3	12
Technician	20.5	8	23.4	18	25.4	18	18.2	8
Clerk	10.3	4	13.0	10	11.3	8	13.6	6
Services and Sales Worker	20.5	8	26.0	20	22.5	16	27.3	12
Elementary Occupation Staff	2.6	1	0.0	0	1.4	1	0.0	0

[(a)] n = 115, limited to the subjects who were employed.

Appendix 5.8. Detailed Comparisons of Some Health History and Risk Factors by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=105)		**No Depression Group (**n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Drinking Alcohol								
No (and never drank alcohol)	80.6	50	87.6	92	85.9	85	83.6	56
No (but a social drinker)	12.9	8	8.6	9	8.1	8	13.4	9
No (but an ex-alcoholic)	4.8	3	3.8	4	5.1	5	3.0	2
Yes (and on a regular base)	1.6	1	0.0	0	1.0	1	0.0	0
General Health								
Poor	1.6	1	1.9	2	1.0	1	3.0	2
Fair	24.2	15	29.5	31	24.2	24	32.8	22
Good	59.7	37	58.1	61	62.6	62	52.2	35
Very good	12.9	8	10.5	11	12.1	12	10.4	7
Excellent	1.6	1	0.0	0	0.0	0	1.5	1
Body Mass Index								
Underweight	1.6	1	0.0	0	0.0	0	1.5	1
Normal	56.5	35	62.9	66	60.6	60	59.7	40
Overweight	40.3	25	36.2	38	38.4	38	37.3	25
Obese	1.6	1	1.0	1	1.0	1	1.5	1

Appendix 5.9. Detailed Comparisons of Responses to Knowledge and Health Belief Questions by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=105)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Do you think that tobacco smoking is harmful to health?								
Yes	95.2	59	92.4	97	92.9	92	94.0	63
Do you think that waterpipe smoking is less harmful to a smoker than cigarette smoking?								
No	58.1	36	59.0	62	61.6	61	55.2	37
Yes	38.7	24	38.1	40	35.4	35	41.8	28
Unsure	3.2	2	2.9	3	3.0	3	3.0	2
To what extent do you think the number of cigarettes a person smokes affects his/her future health?								
Very much	8.1	5	11.4	12	9.1	9	11.9	8
Much	83.9	52	78.1	82	80.8	80	79.1	53
Not very much	4.8	3	8.6	9	6.1	6	9.0	6
Nothing	3.2	2	1.0	1	3.0	3	0.0	0
I don't know	0.0	0	1.0	1	1.0	1	0.0	0
To what extent do you think the number of cigarettes a person smokes influences his/her risk of having a heart attack (myocardial infarction) or a chest pain (angina)?								
Very much	51.6	32	51.4	54	50.5	50	53.7	36
Much	38.7	24	40.0	42	38.4	38	40.3	27
Not very much	1.6	1	5.7	6	4.0	4	4.5	3
Nothing	6.5	4	2.9	3	6.1	6	1.5	1
I don't know	1.6	1	0.0	0	1.0	1	0.0	0
How likely do you think it is that the heart disease will worsen in a smoker who does not quit smoking?								
Very likely	35.5	22	51.4	54	46.5	46	44.8	30
Likely	56.5	35	41.0	43	44.4	44	49.3	33
Unlikely	4.8	3	5.7	6	6.1	6	4.5	3
Very unlikely	1.6	1	1.9	2	2.0	2	1.5	1
Uncertain	1.6	1	0.0	0	1.0	1	0.0	0
How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?								
Very likely	24.2	15	30.5	32	26.3	26	31.3	21
Likely	64.5	40	60.0	63	64.6	64	56.7	38
Unlikely	9.7	6	8.6	9	7.1	7	11.9	8
Very unlikely	0.0	0	1.0	1	1.0	1	0.0	0
Uncertain	1.6	1	0.0	0	1.0	1	0.0	0

Appendix 5.10. Detailed Comparisons of those with Presence of Nicotine Withdrawal Symptoms and Smoking Consequences among Cigarette Smokers by Nicotine Dependence and Depression Groups *

	Not Nicotine Dependent Group (n=33)		**Nicotine Dependent Group** (n=87)		**No Depression Group** (n=70)		**Depression Group** (n=47)	
Presence of:	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Nicotine Withdrawal Symptoms (n=117)								
Anger	**30.0**	**9**	**52.9**	**46**	44.3	31	51.1	24
Anxiety	63.3	19	70.1	61	65.7	46	72.3	34
Concentration	46.7	14	62.1	54	54.3	38	63.8	30
Craving	70.0	21	71.3	62	68.6	48	74.5	35
Hunger	53.3	16	51.7	45	50.0	35	55.3	26
Sadness	26.7	8	44.8	39	37.1	26	44.7	21
Sleep	36.7	11	43.7	38	42.9	30	40.4	19
Smoking Consequences (n=117)								
Negative Affect Reduction	86.7	26	92.0	80	85.7	60	97.9	46
Stimulation State Enhancement	86.7	26	90.8	79	87.1	61	93.6	44
Health Risks	100.0	30	98.9	86	98.6	69	100.0	47
Taste Sensorimotor Manipulation	80.0	24	89.7	78	82.9	58	93.6	44
Social Facilitation	90.0	27	95.4	83	92.9	65	95.7	45
Appetite Weight Control	90.0	27	90.8	79	87.1	61	95.7	45
Craving Addiction	93.3	28	98.9	86	95.7	67	100.0	47
Negative Physical Feelings	66.7	20	57.5	50	55.7	39	66.0	31
Boredom Reduction	86.7	26	92.0	80	88.6	62	93.6	44
Social Impression	30.0	9	29.9	26	27.1	19	34.0	16

* Significant differences are in bold.

Appendix 5.11. Detailed Comparisons of Social Support Findings by Nicotine Dependence and Depression Groups

	Not Nicotine Dependent Group (n=62)		**Nicotine Dependent Group** (n=104)		**No Depression Group** (n=99)		**Depression Group** (n=67)	
Variable	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**
Is there someone available to you whom you can count on to loan you cigarettes or tobacco if you need them?								
None of the Time	1.6	1	3.8	4	3.0	3	3.0	2
A little of the Time	0.0	0	2.9	3	1.0	1	3.0	2
Some of the Time	22.6	14	23.1	24	23.2	23	22.4	15
Most of the Time	51.6	32	49.0	51	49.5	49	50.7	34
All of the Time	24.2	15	21.2	22	23.2	23	20.9	14
Is there someone available to you who encourages you to quit smoking?								
None of the Time	16.1	10	21.2	22	20.2	20	17.9	12
A little of the Time	46.8	29	47.1	49	43.4	43	52.2	35
Some of the Time	24.2	15	21.2	22	26.3	26	16.4	11
Most of the Time	6.5	4	5.8	6	6.1	6	6.0	4
All of the Time	6.5	4	4.8	5	4.0	4	7.5	5
Is there someone available to you with whom you can smoke while you are talking about your stress?								
None of the Time	3.2	2	1.0	1	2.0	2	1.5	1
A little of the Time	1.6	1	9.6	10	7.1	7	6.0	4
Some of the Time	35.5	22	30.8	32	34.3	34	29.9	20
Most of the Time	43.5	27	36.5	38	41.4	41	35.8	24
All of the Time	16.1	10	22.1	23	15.2	15	26.9	18

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