Full Length Research Paper

Risk factors for failure to quit cigarette smoking among male Saudi's in Abha City

Mohammad Y. M. Alqassem

Abstract

Family medicine program, Asser Region, Abha, Saudi Arabia

E-mail:
mohd.alqassem@gmail.com
Tel: 00966555755963

Many smokers with chronic diseases that are clearly worsened by cigarette smoking fail to quit in spite of their repeated attempts. One reality is that not all smokers, even in the face of debilitating disease, can stop smoking. To assess the success/failure rates for quitting cigarette smoking as well as to identify risk factors for failure to maintain smoking abstinence for more than 12 months among male Saudis attending the "Anti-Smoking Clinic" in Abha City. This study followed a cross-section design conducted in Abha city. The study included all ex-smokers registered for at the Anti-Smoking Clinic for at least one year. A data collection sheet was utilized. It includes personal characteristics, clinical picture and investigations, received treatment, and status of cigarette smoking quitting.

Keywords: Quit smoking, Anti-smoking clinic, Males, Saudi Arabia.

INTRODUCTION

Globally, smoking is among the leading causes of ill health. Though it is possible to prevent, public health and smoking remain old enemies (Asaria et al., 2007). It takes its heavy toll of lives, both directly and indirectly, through exposure to passively inhaled tobacco smoke (Nilsson and Fagerström, 2009). Each year on May 31st, the "World No Tobacco Day" reminds us of the hazards of tobacco smoking and the importance of smoking cessation (Al-Doghether, 2001).

Health risks related to tobacco use have been well established, with major avoidable causes of illness and death. Smoking is a known cause of cancer, heart disease, stroke, and chronic obstructive pulmonary disease. However, tobacco use is surprisingly prevalent, given the health dangers it presents and the public's awareness of those dangers (Mannino, 2009).

Many smokers with chronic diseases that are clearly worsened by cigarette smoking fail to quit in spite of their repeated attempts. One reality is that not all smokers, even in the face of debilitating disease, can stop smoking. The reasons for this are not completely clear

and may be, in large part, related to the addictive nature of smoking (Lucan and Katz, 2006).

Nicotine meets the criteria for drug dependency in that it promotes compulsive use, has psychoactive effects, and reinforces its own use (Benowitz, 2008). It is the pharmacologic agent that is critical in maintaining smoking. While burning cigarettes emit over 4,000 different agents, the evidence that nicotine is the main single factor in maintaining addiction is strong (Mannino, 2009). Cigarettes with ultra-low levels of nicotine have never been widely accepted by smokers, whereas chewing tobacco and snuff, both of which deliver large amounts of nicotine, are widely used (Benowitz, 2008).

Among the adult smoking population who would like to quit, the median prevalence of current daily smokers who quit for at least 1 day was 58.6% (Lucan and Katz, 2006). Among smokers who attempt to quit on their own, 80% relapse within one month and 97% relapse within six months. Smokers typically need four or more quit attempts before they achieve long term abstinence (Mannino, 2009). Relapse rates at twelve months range

from 77% to 92% (Gonzales et al., 2006). These studies provide strong evidence that the factors that keep smokers smoking are very powerful and that cigarettes are, in fact, addictive (Jorenby et al., 2006).

Research efforts have been devoted to finding new ways to help the individual smoker quit the harmful habit of smoking. Even if nicotine replacement therapy in its various forms has been around for almost 3 decades and the atypical antidepressant bupropion for about 10 years, new target drugs are constantly being developed to support the addicted smoker in quitting permanently (Nilsson and Fagerström, 2009). Such drugs may be useful for very large groups of addicted smokers who have tried the other ways to quit in vain. One example is varenicline, a partial nicotine receptor agonist that has been proven successful in randomized controlled trials, both for smoking cessation and for relapse prevention. The effect is more pronounced than recorded by use of nicotine replacement therapy or bupropion. Other ways might also exist to achieve smoking cessation, such as the use of acupuncture, hypnosis, or psychopharmacological approaches, but these remedies are less well proven and therefore not truly evidence based (Tonstad et al., 2006).

The prevalence of smoking in the Kingdom of Saudi Arabia (KSA) is rapidly rising and the KSA moving up, among the tobacco importing countries, from 52nd position (1970-1972) to 23rd (1990-1992). It was estimated that more than 25% of smoke related deaths are in middle age (35-69 years) resulting in the reduced workforce of the affected countries (Siddiqui and Ogbeide, 2001). (Al-Haddad et al., 2003) reported a prevalence rate of 52.3% among attendants of primary health care center in Al-Qassim Region. (Abdalla et al., 2009) reported that among male students in Tabuk aged 12-19 years 65% were ever smokers.

Al-Doghether, 2001 stated that, in KSA, smoking cessation practices in primary health care centers have been inconsistent in providing advice and counseling against smoking, and are characterized by the use of different and sometimes ineffective methods for smoking cessation. Primary health care physicians and other health care personnel often fail to assess and treat tobacco use consistently and effectively. Consequently, many anti-smoking clinics have been initiated.

This study aims to identify risk factors for failure to quit cigarette smoking among male Saudis in Abha City.

SUBJECTS AND METHODS

This study followed a cross-section design conducted in Abha City. It is the capital of Aseer Region. It lies in the southwestern part of KSA, about 3000 m above the sea level. It has an Anti-Smoking Clinic. It helps Saudi smokers quit smoking. Clients are almost totally males. The number of attendants during the last year (1431 H) was 1237, of whom 415 (33.5%) failed to continue abstinence of cigarette smoking for 12 months (Abha Anti-Smoking Clinic, 2011)

The study included all ex-smokers registered for at the Anti-Smoking Clinic for at least one year.
According to the followed guidelines at the Anti-Smoking Clinic, the following definitions were put:

Successful quitter of cigarette smoking

A registered cigarette smoker who could successfully refrain from smoking for at least one year.

Failure to quit smoking

A registered smoker who could not continue a whole one year without smoking.

Sample size determination and sampling technique

The minimum sample size for this study has been decided according to (Dahiru et al., 2006), as follows:

$$n = \frac{Z\alpha^2 \times P \times Q}{D^2}$$

where:
- n: Calculated sample size
- $Z\alpha$: The z-value for the selected level of confidence $(1-\alpha) = 1.96$.
- P: The proportion of smokers who fail to maintain smoking abstinence (estimated to be 0.5).
- Q: $(1 - P)$, i.e., 0.5.
- D: The maximum acceptable error = 0.05.

The calculated minimum sample size is:

$$n = \frac{(1.96)^2 \times 0.335 \times 0.665}{(0.05)^2} = 342.$$

To fulfill the required sample size, the researcher followed a consecutive sample to interview 350 ex-smokers attending the Abha Anti-smoking Clinic.

A data collection sheet was utilized. It include the following variables: personal characteristics (age, education, employment, marital status, duration of smoking, age at start of smoking), clinical picture and investigations (symptoms of nicotine addiction, withdrawal symptoms, co-morbidity, and referral), received treatment (Bupropion "Zyban" tablets, nicotine patches, silver spike point sessions) and status of cigarette smoking quitting (Duration of current abstinence, number of previous attempts to quit smoking: (0) is indicative of success, while (1 or more) is indicative of failure; and reasons for relapse among those who experienced previous unsuccessful attempts to quit.

All the necessary official permissions were obtained before data collection from the Research Commit-tee at the Joint Program of Family Medicine in Aseer. All

Table 1. Personal characteristics of study sample

Personal characteristics	No.	%
Age groups		
• <30 years	113	32.3
• 30-50 years	212	60.6
• >50 years	25	7.1
Marital status		
• Single	56	16.0
• Married	294	84.0
Educational level		
• Illiterate	4	1.1
• Primary/Intermediate	20	5.7
• Secondary	87	24.9
• University	239	68.3
Employment		
• Employed	254	72.6
• Unemployed	96	27.4

Table 2. Treatment modalities received by participants

Treatment Modalities	No.	%
Applied treatment modalities		
• Nicotine patch	149	42.6
• Bupropion (Zyban) tablets	144	41.1
• Silver spike point sessions	93	26.6
No. of treatment modalities that quitters receive		
• One	321	91.7
• Two	22	6.3
• Three	7	2.0

collected data were handled as completely confidential and were used only for research.

Statistical analysis

The Statistical Package for Social Sciences (SPSS ver 18.0) was used for computerized data entry and analysis. Descriptive statistics were calculated and the appropriate tests of significance (i.e., Chi square) were applied. Differences were considered as statistically significant when $p<0.05$.

RESULTS

The study included 350 ex-smokers males. Table (1) shows that 32.3% of participants were less than 30 years old, almost two thirds of them (60.6%) aged 30-50 years. Most of participants were married (84%). More than two thirds of them had university education (68.3%), while about one fourth of them had secondary education

(24.9%). About one fourth of participants were unemployed (27.4%).

Half of participants had at least one smoker parent (50%), while 43.7% of participants' siblings were smokers and almost all participants had at least one close friend who is a smoker (97.7%).

The great majority of participants (92.6%) started smoking before the age of 20 years. More than one third started smoking before 16 years of age (36.6%) Duration of smoking was less than 10 years in 23.1% of participants, 10-12 years in 45.7% of participants and more than 20 years in 31.1% of participants.

The great majority of participants experienced symptoms attributed to smoking and when they quit smoking, they experienced craving and withdrawal symptoms (92% and 92.9%, respectively). More than one fourth of them were referred by the anti-smoking clinic physician to a specialist (26.3%), while 26.6% of them claimed to have developed a health complication attributed to smoking (e.g., ischemic heart and/or pulmonary diseases).
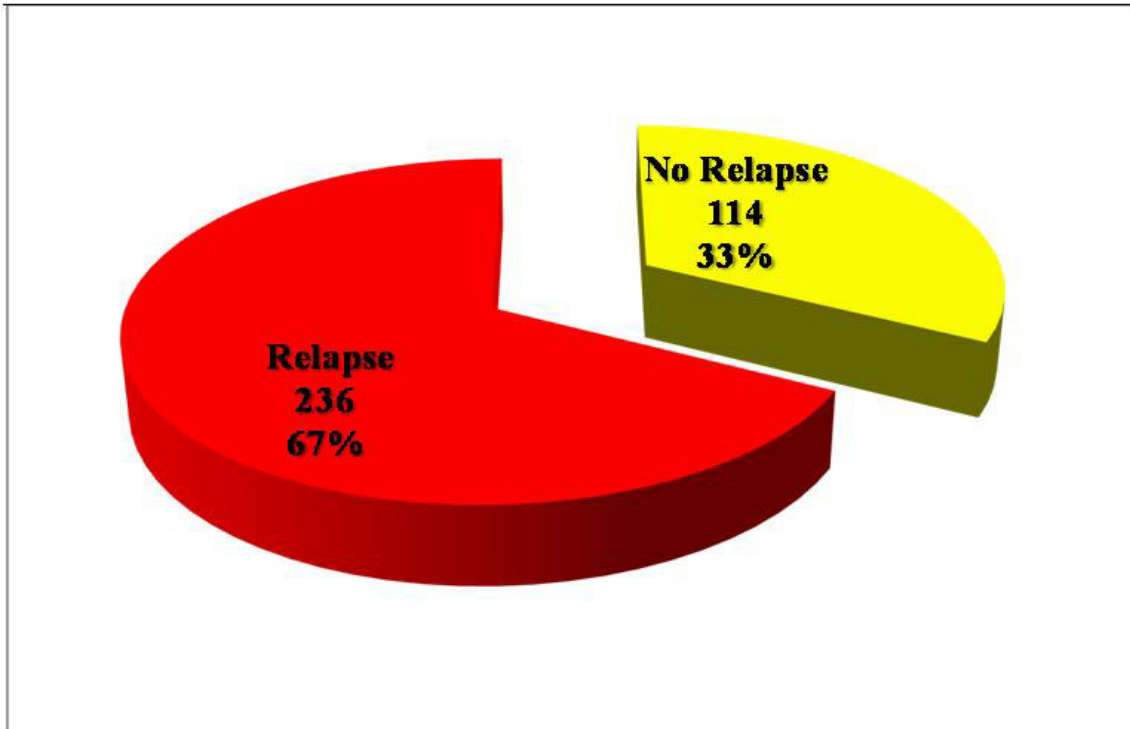
Table (2) shows that nicotine patches and bupropion

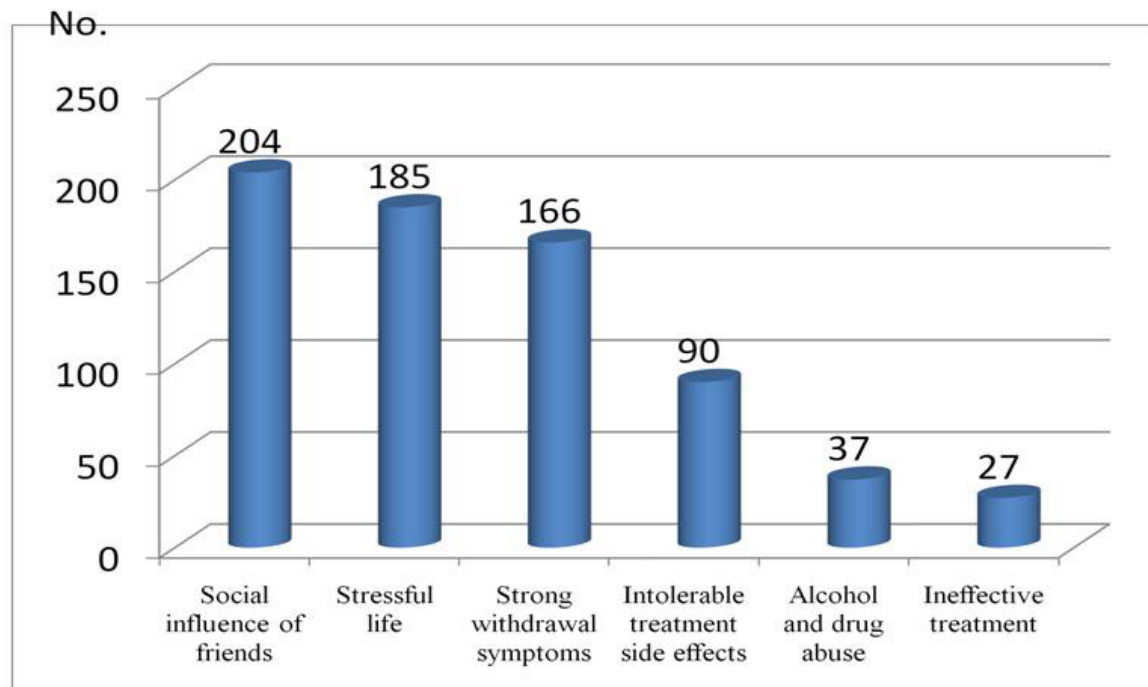**Figure 1.** Distribution of participants according to their relapse

Figure 2. Distribution of relapsed participants according to reasons for relapse

tables were the main treatment modalities given to participants (42.6% and 41.1%, respectively. Moreover, 26.6% received silver spike point sessions. One treatment modality was received by the great majority of participants (91.7%). Nevertheless, 6.3% received two modalities, while 2% received three modalities.

Figure (1) shows that more than two thirds of participants experienced relapse(s) (67.4%), Those who

Table 3. Occurrence of relapse among participants and stated reasons for relapse

Personal characteristics	No relapse		Relapse		P
	No.	%	No.	%	Value
Age groups					
• <30 years	36	44.4	45	55.6	
• 30-50 years	48	30.0	112	70.0	
• >50 years	30	27.5	79	72.5	0.031
Marital status					
• Single	10	17.9	46	82.1	
• Married	104	35.4	190	64.6	0.010
Educational level					
• Illiterate	3	75.0	1	25.0	
• Primary/Intermediate	5	25.0	15	75.0	
• Secondary	27	31.0	60	69.0	
• University	79	33.1	160	66.9	0.270
Employment					
• Employed	81	31.9	173	68.1	
• Unemployed	33	34.4	63	65.6	0.658

Table 4. Occurrence of relapse according to smoking status of participants' contacts

Variables	No relapse		Relapse		P
	No.	%	No.	%	Value
At least one parent is a smoker					
• Yes	58	33.1	117	66.9	
• No	56	32.0	119	68.0	0.820
At least one brother/sister smokes					
• Yes	44	28.8	109	71.2	
• No	70	35.5	127	64.5	0.180
At least one close friend smokes					
• Yes	109	31.9	233	68.1	
• No	5	62.5	3	37.5	0.068

had relapse(s) attributed that for the social influence of smoker friends (86.4%), the impact of the daily stressful life (78.4%), suffering strong withdrawal symptoms (70.3%), experiencing intolerable treatment side effects (38.1%), being a drug abuser (15.7%), while 11.4% of participants attributed their relapse to the "ineffective" treatment they received, (Figure, 2).

Table (3) shows that younger participants (<30 years) had the lowest relapse rate (55.6%), while the oldest participants (>50 years) had the highest for relapse rate (72.5%). Relapse rate was significantly associated with age of participant (p=0.031). Single participants had a higher relapse rate than married participants (82.1% vs. 64.6%, respectively, p=0.010). On the other hand, the highest relapse rate was observed among those with primary/intermediate levels of education, while the lowest was observed among those who were illiterate (25%). Differences in occurrence of relapse according to

educational status were not statistically significant. Moreover, 68.1% of employed participants had relapse compared with 65.6% of unemployed participants. Differences in relapse rates according to employment status were not statistically significant.

Table (4) shows that the proportions of participants who sustained relapse were almost equal whether they had at least one smoking parent or not (66.9% vs. 68%, respectively). There was a minor difference between the proportion of participants who sustained relapse according to having one smoking sibling or not (71.2% vs. 64.5%, respectively). However, participants who had at least one close friend who smokes had much higher proportion of relapse than those who did not have a close friend who does not smoke (68.1% vs. 37.5%, respectively).

Table (5) demonstrates that the proportions of participants who sustained relapse were least among

Table 5. Occurrence of relapse among participants according to their age at start of smoking and duration of smoking

Variables	No relapse		Relapse		P Value
	No.	%	No.	%	
Age at start of smoking:					
• <16 years	49	38.3	79	61.7	
• 16-20	59	30.1	137	69.9	
• >20 years	6	23.1	20	76.9	0.173
Duration of smoking:					
• <10 years	36	44.4	45	55.6	
• 10-20 years	48	30.0	112	70.0	
• > 20 years	30	27.5	79	72.5	0.031

Table 6. Occurrence of relapse among participants according to their experienced symptoms, health complications and referral to a specialist due to smoking

Variables	No relapse		Relapse		P Value
	No.	%	No.	%	
Having symptoms attributed to smoking					
• Yes	104	32.3	218	67.7	
• No	10	35.7	18	64.3	0.711
Experiencing withdrawal symptoms					
• Yes	104	32.0	221	68.0	
• No	10	40.0	15	60.0	0.411
Being previously referred to a specialist					
• Yes	25	27.2	67	72.8	
• No	89	34.5	169	65.5	0.198
Development of complication(s)					
• Yes	25	26.9	68	73.1	
• No	89	34.6	168	65.4	0.172

Table 7. Occurrence of relapse among participants and stated reasons for relapse

Applied treatment modalities	No relapse		Relapse		P Value
	No.	%	No.	%	
Bupropion (zyban) tablets					
• Yes	45	31.3	99	68.8	
• No	69	33.5	137	66.5	0.659
Nicotine patch					
• Yes	43	28.9	106	71.1	
• No	71	35.3	130	64.7	0.202
Silver spike point sessions					
• Yes	30	32.3	63	67.7	
• No	84	32.7	173	67.3	0.940
No. of treatment modalities					
• One	111	34.6	210	65.4	
• Two	2	9.1	20	90.9	
• Three	1	14.3	6	85.7	0.028

those who started smoking before 16 years of age (61.7%), while the highest proportions were among those who started smoking after the age of 20 years (23.1%). Differences in relapse proportions according to age at start of smoking were not statistically significant. On the other hand, the proportions of participants who sustained relapse were least among those who had the least duration of smoking (55.6%), while the highest proportions were among those who have been smoking for more than 20 years (72.5%). Differences in relapse rates according to duration of smoking were statistically significant (p=0.031).

As shown in Table (6), the proportion of relapse among participants who had symptoms attributed to smoking was almost equal to that of those who had no symptoms attributed to smoking (67.7% vs. 64.3%). Similarly, the proportion of relapse among participants who experienced withdrawal symptoms were almost equal to that of those who had did not have withdrawal symptoms (68% vs. 60%). Moreover, the proportion of relapse among participants who have been referred to a specialist was almost equal to that of those who had were not referred (72.8% vs. 65.5%). In addition, the proportion of relapse among participants who developed health complications attributed to smoking was almost equal to that of those who did not develop health complications attributed to smoking (73.1% vs. 65.4%).

Table (7) shows almost equal proportions of relapse among participants who had different treatment modalities. However, the proportions for relapse among participants who had more than one treatment modalities were higher than those who received only one treatment modality. Differences were statistically significant (p=0.028).

DISCUSSION

Most smokers have thought about quitting smoking at one point or another, for various reasons. However, the fact that they are still smoking highlights the difficulty most smokers have with achieving successful cessation as well as the importance of characterizing individuals who at least attempt to quit, since they may be more likely to benefit from smoking cessation programs (Davila et al., 2009).

This study assessed factors associated with failure of attempts to quit smoking among a sample of 350 adult male ex-smokers who have been attending the "Anti-Smoking Clinic" in Abha City, because they all felt the need to stop smoking.

Personal characteristics of these participants showed that more than two thirds of these participants aged 30 years or more, most of them were married, more than two thirds attained university education while about one fourth of them were unemployed.

This finding is consistent with those of (Davila et al., 2009) who stated that older smokers are more likely than younger smokers to have ever attempted quitting smoking. They explained that by the perceived benefits of quitting, smoking risk perception, and history or presence of tobacco-related medical conditions. However, (Messer et al., 2008) found that older smokers are least likely to attempt quitting in the past year. In KSA, (Siddiqui and Ogbeide, 2001) found that smoking began at about the age of 20 years. (Messer et al., 2008) stated that a possible explanation for the difference in quit attempts by age group could be due to the resistance to smoking cessation advice by younger smokers due to difficulty quitting, particularly those with many failed attempts. This study showed that nicotine patches and bupropion tablets were the main treatment modalities given to participants followed by acupuncture (silver spike point sessions).

Leung et al., 2009 suggested that, to increase the success rate of tobacco use cessation, there are many quitting methods ranging from brief advice by medical providers to quit smoking, more intensive interventions that provide social support, and coaching on problem-solving skills, to pharmacotherapy such as nicotine replacement therapies, e.g., bupropion. As a whole, nicotine replacement therapies and other pharmacological quitting aids can approximately double the chances that an individual will succeed in quitting compared with unaided attempts.

However, (Al-Doghether, 2001) criticized some of the treatment modalities applied for smoking cessation practices. He described these modalities as being sometimes ineffective methods for smoking cessation, such as the use of acupuncture. Similarly, (White et al., 1998) stated that acupuncture is frequently used for smoking cessation. Positive results from uncontrolled studies have not been supported by meta-analysis of controlled trials. It is no more effective than placebo in reducing nicotine withdrawal symptoms.

Nevertheless, (Cabioglu et al., 2007) reported that acupuncture application may increase the levels of endorphin, enkephalin, epinephrine, norepinephrine, serotonin, and dopamine in the central nervous system and plasma. Its application provides the patients with deterioration in the taste of smoking, decrease in desire of smoking, and the obstruction of psychological symptoms that appear as a result of smoking cessation. Because of these effects it is presumed that acupuncture application is an important method for smoking cessation treatment.

This study showed that half of participants had at least one smoker parent (50%), while 43.7% of participants' siblings were smokers and almost all participants had at least one close friend who is a smoker (97.7%). In addition, this study showed that participants who had at least one close friend who smokes had much higher proportion of relapse than those who did not. These findings are in agreement with results of the study Thakur

et al., (20) who reported that 47.7% smokers' parents were also smokers. However, the most common reason for initiating smoking among the youth was influence of friends, 97% of the young smokers had one or more smoker friends. Having friends who smoked substantially increased the likelihood of being a smoker. They stressed the importance of social influence and enabling environment, in particular peer pressure, on the smoking habits of the young people. So, it is recommended that while designing intervention for tobacco control, parents should be advised to refrain from smoking in front of their children. (Thakur et al., 2010) added that the most common reason for initiating smoking among the youth was the influence of friends (86.8%), whereas the most common reason for maintenance of smoking among youth was tension (64.8%) followed by fear of withdrawal symptoms (46%).

Leventhal et al., 1987 stated that smokers are mostly aware of the adverse health consequences of their habit. However, they seem to ignore the risk, which is best explained as a result of behaviorally induced conflict, a psychologically unacceptable inconsistency between belief and behavior. History of having a tobacco-related medical condition was associated with greater likelihood of having attempted to quit smoking, both in the last 12 months and in their lifetime (Davila et al., 2009). In KSA, (Siddiqui and Ogbeide, 2001) stated that the influence of friends and family is a key factor involved in the decision to begin smoking, given that young people start smoking largely because of social reasons such as peer pressure.

This study showed that the great majority of participants started smoking before the age of 20 years. The great majority of participants experienced symptoms attributed to smoking and when they quit smoking, they experienced withdrawal symptoms (92% and 92.9%, respectively). More than one fourth of them were referred by the anti-smoking clinic physician to a specialist (26.3%), while 26.6% of them claimed to have developed health complication(s) due to smoking (e.g., cardiovascular or pulmonary diseases, peptic ulcers, etc.). These findings are in agreement with those of Mannino, (4) who noted that though many people with chronic diseases are clearly worsened by cigarette smoking, yet they are unable to quit. These results have been explained by the results of several studies. (Ives et al., 2008) stated that there is a link between diagnosis of cardiovascular disease and increased motivation to quit smoking and smoking cessation.

In a study of emergency department patients, Bernstein and Cannata (Bernstein and Cannata, 2006) found that patients with a diagnosis of a cigarette-related medical condition (i.e., cardiovascular and respiratory diseases, peptic ulcer disease, and cancers such as of the lip, esophagus, lung, etc.) were less motivated to quit smoking when compared to smokers without such conditions. (Bock et al., 2007) stressed that the desire to quit smoking may be dependent on whether the smoker

believes their medical condition is related to their smoking, and/or whether they believe quitting will help their condition (since it is already present). Smokers who perceive that there are health benefits to quitting smoking are more likely to have ever attempted to quit smoking, which is consistent with a study of emergency patients.

The present study revealed a high relapse, which reached more than two thirds of participants. (Giovino et al., 1995) emphasized that smokers typically need four or more quit attempts before they achieve long-term abstinence. Different relapse rates were reported by different authors. Hughes (Hughes, 1992) stated that, among smokers who attempt to quit on their own, 80% relapse within 1month and 97% relapse within 6 months. (Gonzales et al., 2006) reported that relapse rates at 12 months ranged from 77% in the active treatment group to 92% in the placebo group. These provide strong evidence that the factors that keep smokers smoking are very powerful and that cigarettes are, in fact, addictive (Mannino, 2009).

The high relapse rates among smoking quitters has been explained by (Hughes, 2006) by the fact that, expected health benefits of quitting are often not directly experienced especially in the short term, while any losses or other negative experiences associated with quitting are.

This study revealed several reasons for relapse. These were the social influence of smoker friends (86.4%), the impact of the daily stressful life (78.4%), suffering strong withdrawal symptoms (70.3%), suffering treatment side effects (38.1%), being a drug abuser (15.7%), while 11.4% of participants attributed their relapse to the "ineffective" treatment they received. These findings are in agreement with those of (Thakur et al., 2010) who stated that the most common reason for maintenance of smoking among youth was tension (64.8%) followed by fear of withdrawal symptoms (46%). (Van der Veen et al., 2008) explained that the internal turmoil is more threatening than the challenge of dealing with more external stressors. If indeed it is reduced impulse control of negative affect that is critical, then it would suggest a common mechanism for relapse—that relapse is a result of reduced capacity to inhibit an impulse to act, thus being more likely to succumb to a craving or to explode when annoyed.

Failure to quit has been explained by (Hughes et al., 2004; Lancaster et al., 2006) and (McCarthy et al., 2006) who stated that quitting is difficult for most smokers, and most quit attempts end in relapse. This is because, during the first 2–3 weeks of quitting, smokers generally experience nicotine withdrawal symptoms, which tend to diminish over time and are typically resolved by the fourth week of quitting. Beyond this initial phase where cravings and temptations to smoke are strong, the challenge changes from having to struggle to stay quit to a focus on becoming comfortable being a nonsmoker. (Segan et al., 2008) added that this is likely to involve the need to

develop alternative ways of gaining pleasures associated with smoking and learning ways of coping with life's stressors and negative feelings that do not rely on cigarettes. (Lucan and Katz, 2006) pointed out that, while a large proportion of smokers wish to stop smoking, particularly if they have developed a disease due to or worsened by smoking, there remains a significant minority of smokers who have no desire to quit. The reasons for this may be, in large part, related to the addictive nature of smoking (Mannino, 2009). (Dijkstra et al., 1996) added that these patients may perceive that the "benefits" of smoking outweigh the "risks". Some of these patients may be completely aware of the problems related to smoking but have decided that they are so unhappy if not smoking that they decide to continue. In other cases, people may have developed a terminal disease, such as metastatic lung cancer, and the "comfort" of continued smoking outweighs, at least for them, any benefits of stopping.

Benowitz, 2008 pointed out that while burning cigarettes emits over 4,000 different agents, the evidence that nicotine is the main substance in maintaining addiction. Cigarettes from which nicotine has been removed or those with ultra-low levels of nicotine have never been widely accepted by the smoking public, whereas chewing tobacco and snuff, both of which deliver large amounts of nicotine, are widely used. (Mannino, 2009) added that nicotine meets criteria for drug dependency in that it promotes compulsive use, has psychoactive effects, and reinforces its own use. (Benowitz, 2008) stated that physiological dependence on nicotine is thought to be related to its action on nicotinic acetylcholine receptors in the brain. This leads to some of the "positive" effects of smoking, such as pleasure, arousal, and the reduction of anxiety and tension. (Wang and Sun, 2005) noted that repeated exposure to nicotine over time, such as occurs in habitual smokers, results in both a desensitization of these receptors to nicotine and an increase in the number of receptors. During periods of abstinence, these desensitized receptors may recover and elicit symptoms of "withdrawal", which include irritability, depressed mood, anxiety, difficulty concentrating, insomnia, and craving for tobacco. Thus, the acute changes that occur when a person stops smoking suddenly provide a powerful reinforcement to start smoking again. Benowitz, 2008 added that the behavioral component of addiction to cigarettes is a powerful reinforcer of the physiological component of this addiction. People smoke in certain situations, such as while driving, while drinking a cup of coffee in the morning, or while out at a bar with friends. They also may smoke in response to certain cues, such as feeling stressed or annoyed.

In addition, the actual act of inhaling smoke from a cigarette is highly ritualized and repeated hundreds of times per day and thousands of times per year. It is thought that this conditioning may be a major factor in relapses that occur in patients, months to years after they stop smoking—an extremely stressful situation and nicotine receptors that have returned to their normal state of sensitization maybe enough for the patient to start smoking again (Mannino, 2009).

While nicotine is the primary substance responsible for addiction in smokers, tobacco smoke also contains thousands of other chemicals that may contribute to this addiction. Some of these, such as acetaldehyde, result from tobacco industry manipulation of sugar levels in tobacco, with the end result being enhancement of nicotine's physiological properties (Talhout et al., 2007).

This study showed that younger participants had the lowest relapse rate compared with oldest participants who had the highest for relapse rate. Single participants had a higher relapse rate than married ones. Differences in occurrence of relapse according to educational or employment status were not statistically significant. Relapse rates were not different according to participants' age at start of smoking while these were significantly lower among participants with shorter duration of smoking. These findings are in agreement with those of (Leung et al., 2009) who stated that early adolescence (age 11–15years) is the period when young people are most likely to try smoking for the first time. Moreover, Ockene et al., 2000 concluded that preventive factors against smoking relapse include being older, married and the shorter smoking duration. However, (Messer et al., 2008) found that older smokers to be less likely to be successful at quitting.

This study showed relapse rates did not differ significantly even if the smoker developed symptoms attributed to smoking, experiencing withdrawal symptoms, having been referred to a specialist, or developing a complication due to smoking. (Vangeli and West, 2008) stated that, this finding is not entirely surprising given that one reason individuals give for attempting to quit is their health. Furthermore, when smokers have been asked if being diagnosed with a medical condition (e.g., heart disease) would increase their desire to quit smoking, the majority have agreed (Davila et al., 2009).

This study showed that the proportions for relapse among participants who had more than one treatment modalities were significantly higher than those who received only one treatment modality. This finding can be explained by that additional treatment modality were administered to participants who fail to quit smoking, while no indication for adding other modalities to those who show successful response to treatment.

In conclusion, most smoking quitters experience relapse(s). Reasons for relapse(s) among quitters are social influence of smoker friends, impact of the daily stressful life, experiencing overwhelming withdrawal symptoms, experiencing intolerable treatment side effects, and being a drug abuser. Development of

symptoms or complications due to smoking does not affect relapse rates among smoking quitters.

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