

Nicotine Addiction and Withdrawal among Orthodox Jews: the Effect of Sabbath Abstinence

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ABSTRACT: **Background:** Cigarette smoking is a widespread problem around the world. In Israel, the prevalence of smoking is 23%. Smokers who are Orthodox abstain from smoking during the Sabbath, i.e., from sundown Friday to sundown Saturday, due to a religious prohibition. The prevalence of smoking among Orthodox men is 13%. However, there are no data on patterns of smoking or on the addiction profiles in this population.

Objectives: To explore the smoking patterns, motivation for smoking and nicotine addiction among Orthodox Jewish men, compared to non-Orthodox men, as well as the differences in the urge to smoke and withdrawal symptoms on Saturday versus weekdays in the Orthodox group.

Methods: The participants completed the Fagerstrom test for nicotine dependence, questionnaires on reasons for smoking and smoking patterns, as well as two brief questionnaires on the urge to smoke and withdrawal symptoms after overnight abstinence on a weekday and after the end of the Sabbath.

Results: Both groups were strongly addicted to nicotine and there were no differences in the reasons for smoking, withdrawal symptoms and nicotine craving after an overnight abstinence on weekdays. However, religious smokers had low levels of craving for nicotine and few withdrawal symptoms during Sabbath abstinence when compared to weekdays.

Conclusions: Although we found no difference in the baseline characteristics with regard to nicotine addiction, smoking motivation, urge to smoke and withdrawal symptoms between religious and non-religious groups, the former are able to abstain from smoking during 25 hours of the Sabbath every week with significantly fewer withdrawal symptoms compared to week days.

IMAJ 2017; 19: 25–29

KEY WORDS: cigarette smoking, nicotine addiction, reasons for smoking, abstinence, Jewish Orthodox smokers, Sabbath

before their military service [1]. About 14% of schoolchildren in 1996 were found to smoke, with the prevalence increasing to 36% after the age of 13 [2]. A recent survey by Kopel et al. [3] found that the prevalence of smoking was 23% in the general population and 13% among ultra-Orthodox men, with increased prevalence among men who were born in Israel or of North African origin [3]. However, there are no data on patterns of smoking, the starting age and the addiction profiles in this population.

Nicotine is the addictive principle in cigarette smoke [4]. Nicotine acts through nicotinic cholinergic receptors located in the brain, autonomic ganglia and the neuromuscular junction [5]. Nicotinic receptor activation causes the release of neurotransmitters, including acetylcholine, norepinephrine, dopamine, serotonin, beta-endorphin, glutamate and others. Nicotine also facilitates the release of growth hormone and ACTH [7]. Addiction to nicotine and its psychologically rewarding properties have been strongly linked to the release of dopamine, but release of other neurotransmitters probably also contributes [7].

Self-administration of nicotine by humans and animals is similar to other drugs of addiction. The mechanisms of drug addiction are complex, involving both positive and negative reinforcement, conditioning, and factors such as personality and social setting [4,8]. Recently, genetic factors (polymorphisms in the gene for nicotine-metabolizing enzyme) were implicated as contributing to nicotine addiction [9]. Positive reinforcement includes the pleasurable effects of nicotine, such as relaxation, enhanced concentration, reduced stress, and lower appetite and body weight. Negative reinforcement involves relief of withdrawal symptoms such as irritability, restlessness, impaired concentration, anxiety and weight gain, as well as craving [10]. Conditioning refers to the pattern of drug taking, so that the pleasurable effects of the drug are associated with certain situations such as meals, social gatherings, etc. Thus, certain situations, for example after meals or when drinking coffee, prompt an intense urge to smoke. Personality traits and sociologic factors (such as smoking in the peer group) also play an important role in smoking behavior [11].

Cigarette smoking is a widespread problem around the world and accounts for a large proportion of overall morbidity and mortality. In Israel, the prevalence of smoking in 1992 was 30–40%; about 80% of these smokers began smoking

The first publications on the affect-management model of smoking motivation appeared in the 1960s, and a few years later the Reasons for Smoking scale (RFS) was derived from this model [12]. The RFS is the most commonly used measure of psychological smoking motives. It includes 18 to 23 items that yield 6–7 factors for smoking behavior: automatic, addictive, sedative, stimulation, psychosocial, indulgent, and sensorimotor manipulation [11,13].

Consistent with nicotine dependence, most smokers maintain their plasma nicotine levels by regulating their intake of nicotine through the number of puffs and depth of inhalation, so that they derive similar nicotine levels from cigarettes with high and low nicotine content [14]. Thus, most smokers smoke 15 to 30 cigarettes a day at regular intervals. However, there are some exceptions. Between 5% and 10% of smokers smoke about 5 cigarettes a day consistently, though below 10 cigarettes/day nicotine titration becomes inefficient [15]. These smokers are called tobacco “chippers,” and although they smoke regularly they have little or no nicotine dependence [16].

Orthodox Jews may be another “anomalous” group of cigarette smokers. Since it is strictly prohibited to light fire on the Sabbath they regularly abstain from smoking throughout the Sabbath (i.e., from sundown on Friday to the appearance of the night stars on Saturday). It is not known if, and to what degree, the Sabbath-observing smokers experience withdrawal symptoms and smoking urges during the approximately 25 hours that smoking is forbidden. It is possible that they experience fewer withdrawal symptoms, or cope with them much better during those 25 hours because of the overriding social and religious constraints and behavioral conditioning that are in place when they begin to form the smoking habit. On the other hand, it is possible that the Sabbath-observing smokers differ from non-observant smokers even in their everyday smoking behavior and motivation, i.e., they may be less addicted, or the motivation behind the smoking behavior is psychosocial and indulgent rather than pharmacological.

The purpose of this study is to explore smoking patterns and motivation for smoking and the addiction to nicotine among Orthodox Jewish men, compared to non-observant men, as well as the differences in urge to smoke and withdrawal symptoms on Saturday versus weekdays in the observant group. Elucidating patterns of smoking behavior may promote our understanding of nicotine addiction and help in devising more effective strategies for smoking cessation.

SUBJECTS AND METHODS

Subjects were recruited through notices in the Yeshivas (Orthodox schools devoted to the study of Torah) and Orthodox neighborhoods. Inclusion criteria were: Orthodox men aged > 18 (by this age smoking patterns can be presumed to be stable), smoking at least 19 cigarettes per day, and not currently

attempting to quit smoking. Controls were age-matched men not observing the Sabbath and were recruited among college students. The study group consisted of 49 subjects and the control group 39. Participants were awarded 100 shekels (\$26) for completing the study.

At the initial interview subjects were asked to complete the following questionnaires: the Fagerstrom test for nicotine dependence (a modification of the Fagerstrom tolerance questionnaire, FGNST) [17]; and questionnaires on demographics, caffeine and alcohol consumption, reasons for smoking, and smoking patterns [11,18]. Another two brief questionnaires were administered, on the urge to smoke and on withdrawal symptoms [19,20], which they were asked to complete after overnight abstinence on a regular weekday, after the end of the Sabbath before smoking the first cigarette, and retrospectively for the Sabbath morning (since it is prohibited to write on Sabbath). All the questionnaires were translated to Hebrew from the original English version. For the combined Reasons for Smoking questionnaire, the internal consistency of the Reasons for Smoking, Motivations for Smoking and Weight Control scales were $\alpha = 0.69, 0.85, 0.67$, and for the questionnaire as a whole $\alpha = 0.89$. For the Reasons for Smoking questionnaire, the internal consistency of the scales were good ($0.59 < \alpha > 0.76$), except for the item indulgent smoking ($\alpha = 0.48$). The internal consistency for the Reasons for Smoking as a whole was $\alpha = 0.90$.

STATISTICAL ANALYSIS

In order to test significant differences between Orthodox and non-observant in the quantitative variables, Student's *t*-test was performed. To test for significant differences between Orthodox and non-observant in the qualitative variables, χ^2 or Fisher's exact test was performed. To test significant differences in withdrawal symptoms between the Sabbath and the rest of the week among the Orthodox, the Wilcoxon rank sum test was performed. $P < 0.05$ was considered statistically significant. All statistical analyses were done using SPSS version 20.

RESULTS

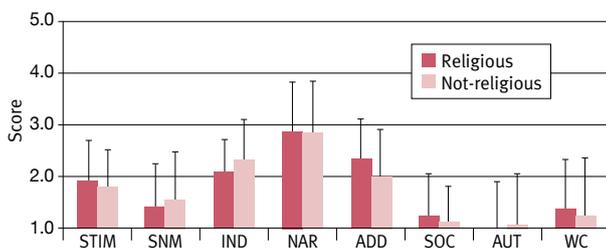
The Sabbath-observing smokers group comprised 49 men and the control (secular) group 39 men. The demographic data are summarized in Table 1.

Both groups of smokers were strongly addicted to nicotine; the average Fagerstrom score of the religious smokers was 7.3 ± 1.5 and of non-religious smokers 8.2 ± 1.6 ($P = 0.018$). There was no difference between the groups in the number of times they tried to quit smoking; however, the religious smokers expressed a significantly stronger wish to quit. There was no significant difference between religious and non-religious smokers regarding smoking behavior factors on the Reasons for Smoking, Motivations for Smoking and Weight Control scales [Figure 1]. The highest scores in both groups were for negative

Table 1. Comparison of religious and non-religious smokers

	Religious (n=49)	Non-religious (n=39)	P value
Age (yrs) (mean ± SD)	25 ± 6	30 ± 10	0.017
Married (%)	53	55	NS
Age of starting smoking (yrs) (mean ± SD)	16.6 ± 2.6	16.6 ± 4.2	NS
Started smoking ≤ 17 yrs (%)	79	58	0.0329
Duration of smoking (yrs) (mean ± SD)	8.2 ± 5.1	13.1 ± 8.5	0.016
No. of cigarettes per day (mean ± SD)	18.5 ± 5.8	20.2 ± 10	NS
Father smoked (%)	45	61	NS
Mother smoked (%)	11	55	< 0.001
Mild cigarettes (%)	71	55	NS

Figure 1. Reasons for smoking among religious and non-religious smokers (mean ± SD)



STIM = stimulation, SNM = sensory-motor manipulation, IND = indulgent, NAR = negative affect reduction, ADD = addictive, SOC = psychosocial, AUT = automatic, WC = weight control

affect reduction (2.90 ± 0.90 vs. 2.87 ± 0.99), addictive smoking (2.37 ± 0.77 vs. 2.05 ± 0.90) and indulgent smoking (2.13 ± 0.63 vs. 2.36 ± 0.77).

There was no significant difference between religious and non-religious smokers in most symptoms of withdrawal after an overnight abstinence on weekdays [Figure 2]. However, craving for cigarettes was more pronounced among religious smokers, with 73% reporting that they often or always crave a cigarette after abstinence as compared to 64% of non-religious smokers ($P < 0.05$).

The percentage of religious smokers experiencing any withdrawal symptoms on Saturday mornings (after abstinence starting Friday evening) was significantly lower than reported for other weekday mornings. The difference was statistically significant for all the symptoms except increased appetite [Figure 3]. Interestingly, on weekday mornings 73% of religious smokers said they often or always experienced craving for a cigarette compared to 35% on Saturday mornings. Most of the religious smokers reported that on Saturday morning they never or seldom felt withdrawal symptoms;

The religious and non-religious smokers did not differ in their Urge to Smoke scores during weekday mornings after a night's abstinence. On Saturday morning 76% of the religious

Figure 2. Withdrawal symptoms on weekday morning among religious and non-religious smokers (% often & always)

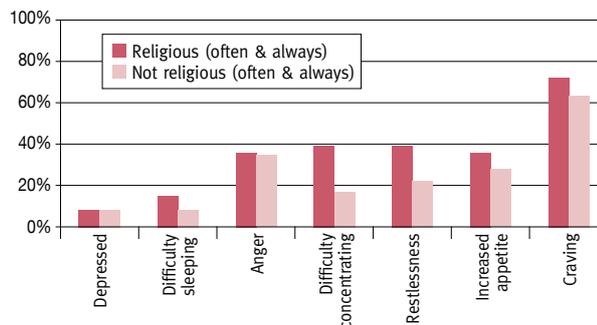
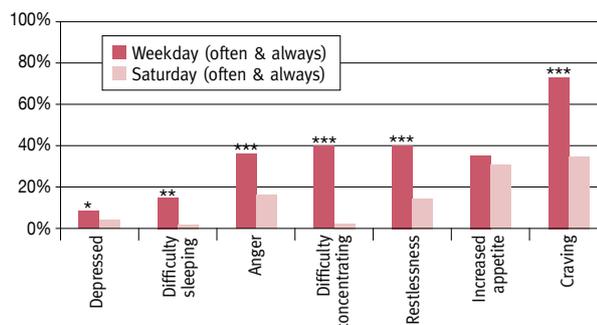


Figure 3. Withdrawal symptoms on weekday and Saturday morning among religious smokers (% often & always)



* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

smokers reported having no or little urge to smoke. Urge to smoke increased as the end of the Sabbath neared, and on Saturday evening, close to the time when smoking is permitted, 55% reported having a very strong urge to smoke.

DISCUSSION

The main finding in this study was that Orthodox Jewish smokers have low levels of craving for nicotine and few withdrawal symptoms during the abstinence on Sabbath when compared to weekdays. After weekday overnight abstinence, craving and withdrawal symptoms were similar between Orthodox Jewish and secular Jewish smokers, suggesting that the Sabbath was a real factor in the reduced craving in the religious group. Both groups were strongly addicted to nicotine, as determined by FGNST, giving more importance to the Sabbath findings.

To the best of our knowledge, this is the first study to characterize smoking patterns and motivation among Israeli smokers using the translated RSF (Reasons for Smoking) questionnaires. The translated questionnaires demonstrated high internal validity, making them suitable for use in further studies of Israeli smokers.

Smoking is absolutely forbidden on the Sabbath according to Jewish law. This prohibition starts at sunset of every Friday until the appearance of night stars after sunset on Saturday. Despite many cultural differences between the secular and the Orthodox community in Israel, reasons for smoking initiation and motivations for smoking were similar between the two groups. Craving for nicotine among the Sabbath observers increased during the day, probably because of the expectation of smoking after sunset.

The frequency of smoking among Israeli Jewish males is 23% while among Orthodox Jews it is around 13% [3]. The frequency of Orthodox females who smoke is around 3%; therefore, only males were selected for this study.

Dar et al. [21] studied craving to smoke in a group of 20 Orthodox Jewish males and females. Their main findings were that craving and withdrawal symptoms were lower during the Sabbath compared to a workday and to forced abstinence on a weekday. There are several strengths in our study compared to the study of Dar et al. Their study group comprised only 10 males who were young and had moderate nicotine dependence; our group was larger (39 Orthodox males) and had stronger nicotine dependence, as shown by the FGNST (5.6 vs. 7.3). Also, in our study a secular Jewish group was used as a control. The most important strength of our study is that complete validated questionnaires on reasons for smoking and motivations for smoking were filled by the participants.

The influence of religiosity on smoking habits and cessation is controversial. In other addictions, like alcohol, spiritual support plays a significant role [22]. According to Jewish law, although there is no specific prohibition against smoking, there is a positive commandment to protect one's life. Since smoking is recognized today as hazardous to health, some Jewish Rabbinical authorities have ruled that it is prohibited to smoke. Despite this, intensive smoking during weekdays is common among Orthodox Jews.

There are some models of forced smoking abstinence. The WISE study [23] investigated interventions to promote long-term smoking cessation in a group of prisoners who resided in a smoking-free jail. The participants underwent a motivational interview and cognitive behavioral therapy. Three months after discharge only 11% of the participants remained smoking free. Another model is smoking cessation for pregnant women. Stress perception is high in pregnant women who are dealing with smoking abstinence [24], and 4% to 24% quit smoking until delivery. However, the rate of abstinence after 3 months after delivery was even lower. Smoking cessation before and after surgery has also been studied [25]. The rate of perceived stress was similar in smokers compared to non-smokers. One of the reasons could be the patient's understanding that quitting smoking is necessary for surgical management. Only 10% of the patients remained free of smoking 6 months after surgery. High intensity behavioral interventions that begin during

a hospital stay and include at least one month of supportive contact after discharge promote smoking cessation among hospitalized patients, meaning that hospitalization alone is not enough for smoking cessation. The model of smoking cessation on the Sabbath is unique. Refraining from smoking on Saturday is an absolute Jewish-legal (*Halachic*) requirement which religious Jews accept unquestioningly. Thus, it is routine behavior for religious Jewish smokers to stop smoking once a week. It might be speculated that during the Sabbath there are fewer social cues for smoking that may contribute to the diminished withdrawal and craving. It might also be speculated that fulfilling a divine commandment in itself compensates for the craving and withdrawal. Although we found no difference in the baseline characteristics with regard to nicotine addiction, smoking motivation, urge to smoke and withdrawal symptoms between religious and non-religious groups, the former are able to abstain from smoking for 25 hours of the Sabbath every week with significantly fewer withdrawal symptoms compared to regular days.

Acknowledgments

This work was supported by the Mirski Research Fund, Shaare Zedek Medical Center, Jerusalem, Israel

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