

## Smoking Cessation Support Groups In Israel: A Long-Term Follow-Up

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### Abstract

**Background:** Smoking is the most important preventable cause of chronic disease in the western world. Many smokers want to quit, but have difficulty overcoming the addictive effect of nicotine.

**Objectives:** To assess the quitting rate of smokers who participated in smoking cessation groups and to characterize predictors of success or failure over a 1–3 year follow-up period.

**Methods:** We studied 89 participants in 7 groups. Questionnaires were completed at baseline and after a follow-up period of 1 to 3 years. Smoking cessation was determined by self-report and a carbon monoxide breath test.

**Results:** Of the 89 participants in the support groups 76 (85%) were located. An intention-to-treat analysis was done for these participants. At follow-up 25 (33%) were non-smokers. There was a 95% agreement rate between self-report of smoking status and CO breath analysis. There were no differences between quitters and non-quitters in education level, gender, age at initiation of smoking, previous quit attempts, extent of participation in group meetings, concern about gaining weight, Fagerstrom index, or the number of close friends or relatives who smoke. Belief in one's ability to quit, satisfaction with group meetings, and spouse support were significantly associated with success ( $P < 0.01$ ).

**Conclusions:** The quit rate was 33%. Self-report is a reliable method for assessing smoking status. Smokers' belief in their ability to quit must be reinforced. Spouse participation in some group meetings may be beneficial, as may the involvement of a dietician and an expert on exercise. Follow-up "booster" meetings may also help.

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Smoking is a major risk factor for many forms of cancer, chronic lung disease, and cardiovascular morbidity and

mortality [1,2]. Among the methods to resolve the problem, smoking cessation counseling and treatment has been termed the "gold standard" of prevention [3].

Smoking rates among adults have declined in many countries over the last decade. In Israel, approximately 28% of the adult population are active smokers. Results of a national survey conducted in 1992 showed that at the age of 18 (just prior to army conscription), smoking rates were similar to those in adults [4]. The critical age for smoking inception in Israel appears to be around 15 years of age for boys and 16 for girls. In the survey cited above, at age 14, 2% of boys and girls smoked. This figure jumped to 12% at age 16 (18% for boys and 6% for girls). By age 18 the smoking rates were similar to those of adults (29% overall, 32% for boys and 27% for girls).

Smoking rates among teenagers in the United States increased from 27.5% in 1991 to 36.4% in 1997 [5], and a major proportion of adolescents are already addicted to nicotine and at risk for its adverse health effects [6]. Most smokers begin during adolescence [7] and success in smoking cessation is inversely related to the age at initiation [8].

Addiction to nicotine can occur soon after smoking initiation and has three components: physiological, psychological and behavioral. Nicotine withdrawal involves craving for cigarettes, anxiety and irritability, gastrointestinal side effects and other difficulties, all of which make smoking cessation extremely difficult. Most smokers would like to quit [9], but only a small proportion are questioned about their habit [10] or receive counseling from health care professionals [11,12]. Some people can quit smoking on their own, but willpower is not enough for most people. Smoking cessation groups add the elements of professional help and peer support and increase the chances of long-term success.

The aims of the present study were to assess the quitting rate of smokers who participated in smoking cessation groups, and to characterize predictors of success or failure over a 1–3 year follow-up period. It also included a process analysis in which participants expressed the degree of satisfaction with the group process and the moderator, and proposed recommendations for changes in the group format. To our knowledge this is the first study of its type reported from Israel. The intention-to-treat design renders the

CO = carbon monoxide

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results credible, as does the long follow-up. Important participant-based recommendations for changes in the group format are evaluated.

## Materials and Methods

### Study design

The study was a prospective interventional study of smoking cessation support groups. The design was a before–after follow-up, with each participant serving as his or her own control and a follow-up period of at least one year and up to 3 years after the conclusion of the project. The analysis of success in quitting smoking used an intention-to-treat strategy, i.e., all smokers who began to participate in smoking cessation groups were asked to participate in the follow-up study whether or not their participation in the group was complete or even substantial.

### Smoking cessation groups

The smoking cessation groups met weekly for a total of 8–10 meetings that lasted for 1–2 hours each. Each group began with a minimum of 12 and a maximum of 15 participants. The groups were all moderated by one of the authors (A.D.S.), a physician with a master's degree in health education and health behavior. The meetings were based on behavior modification and peer support. Carbon monoxide breath tests were conducted at regular intervals to monitor success in smoking cessation. Participants were advised regarding the use of nicotine replacement on the basis of estimates of nicotine addiction using the modified Fagerstrom score [13], together with individualized advice based on the moderator's impression of the smoker's need for replacement therapy and each individual smoker's wishes.

### Study population

The study target population comprised 89 adults who enrolled in smoking cessation groups led by one of the authors (A.D.S.) in the years 1994–95 and participated in at least one meeting. Of these, 76 (85%) were located and agreed to participate in the follow-up, which consisted of the same questionnaire used at baseline and a CO breath test. Of the remaining 13, one had previously died of breast cancer (she was diagnosed months after conclusion of the group and was still abstaining from smoking), 5 could not be located, and 7 refused to participate.

### Instrument

The same questionnaire was used at baseline and follow-up. It consisted of sociodemographic and medical data, smoking behavior, reasons for wanting to quit smoking and belief in the ability to succeed, concerns related to smoking cessation (weight gain, etc.), barriers to quitting, previous attempts to quit (length of abstinence and reasons for relapse), source of counseling to quit smoking, and the modified Fagerstrom index.

In addition to the baseline questions, the follow-up questionnaire included questions on the group process, factors affecting success or failure to quit smoking, extent of

participation in the group, use of nicotine replacement therapy, weight gain, and general satisfaction with the group and its results.

### Breath tests

CO in the air was measured using the microlyzer instrument (Micro Smokerlyzer, Bedfont Technical Instruments, Ltd., Kent, UK), which requires the testee to expel air slowly into the analyzer after retaining inhaled air in the lungs for 15 seconds. A test score of 0–10 represents no smoking or exposure to environmental smoke, 11–20 indicates light to moderate smoking, and above 20 reflects heavy smoking. The breath test served to provide feedback with positive reinforcement in participants with reduced CO levels.

### Statistical analyses

Success rates were expressed as percentages. The predictor value of variables for success in quitting smoking was assessed by the  $\chi^2$  statistic or Fischer's exact test for non-continuous variables, and *t*-tests for continuous variables. A logistic regression analysis was conducted to test the relative contribution of variables that were significantly associated with smoking cessation in the univariate analyses. A *P* value <0.05 was used throughout to determine statistical significance.

## Results

The final study population numbered 76 (49 women and 27 men) with a mean age of 41.8±9.9 years. There were no significant differences between these 76 and the 13 who did not participate in the follow-up interview in terms of baseline mean age, gender, years of education, number of cigarettes smoked daily, age at initiation of smoking, or perception of capability of quitting. The shortest follow-up period was 12 months and the longest 36 months; it was 1–2 years for 27 (35.5%), 2–3 years for 19 (25%), and 3 years or more for 30 (39.5%).

A total of 25 (33%) reported that they did not smoke. The correlation between self-report and CO was 95% (most likely 100%, since the only non-correlated CO count was 11, which probably represents recent passive exposure rather than a true discordance between self-report and biochemical test). Of the 51 non-quitters, 10 (20%) did not stop smoking at all, 5 (10%) stopped for only 2 days, 21 (41%) stopped for a period of up to 3 months, and 15 (29%) stopped for over 3 months before relapsing.

The major reasons given for success in quitting were health considerations (68%), fairness to relatives and friends (48%), motivation and challenge (44%), and personal satisfaction (40%). The major reasons given for failure were habit (57%), tension (46%), and boredom (13%). The majority of those who did not quit blamed themselves (91%); the others blamed themselves and the support group program.

The mean weight gain among non-quitters was 0.47 kg compared to 3.0 kg among quitters. Women who quit gained

an average of 4.8 kg, while those who did not lost an average of 0.4 kg ( $P=0.06$ ).

### Variables associated with success or failure

- *Sociodemographic variables.* There were no significant differences between quitters and non-quitters in relation to gender, age, years of education, or smokers in the family, among friends or at work.
- *Personal variables.* Eleven of the 18 participants (61.1%) who expressed a belief in their ability to quit smoking succeeded compared to 13 of the 54 (24.1%) who were skeptical about their ability ( $P<0.01$ ). There was no difference in success between those who expressed a concern about gaining weight and those who did not.
- *Smoking habit and history.* There were no significant differences between quitters and non-quitters in relation to age at initiation of smoking, Fagerstrom index score, number of cigarettes smoked daily, previous attempts to quit, and use of nicotine replacement therapy.
- *Social support.* Among the quitters, 44% cited the support of a friend, compared to only 8% of the non-quitters ( $P<0.05$ ). The quitters also cited significantly more support from their spouse than the non-quitters ( $P<0.05$ ).
- *Smoking cessation group.* Significantly more quitters (95%) expressed satisfaction with the number of group meetings than the non-quitters (64%,  $P<0.01$ ). Many participants suggested that follow-up meetings would be helpful, as would the participation of a dietician, a psychologist, and an expert in physical exercising in at least one meeting.

### Logistic regression

The logistic regression analysis showed that two variables — belief in the ability to quit before the start of the program and active support of a spouse — contributed significantly to the variance in quit rates. These variables had a synergistic effect in that the presence of both variables together was more predictive of success than the sum of each of their contributions.

### Discussion

Addiction to nicotine has physiological, psychological and behavioral components. Contrary to "common wisdom," willpower is often not enough to quit smoking. Many smokers have made serious previous attempts to quit but have relapsed [9], and most smokers need counseling and help. Many smoking cessation aides are available, involving counselor expertise and varying degrees of investment of time and money. All types of interventions improve quit rates compared to self-help only [14,15]. Individual and group counseling are particularly effective, with estimated quit rates over 15% at follow-up of at least 6 months.

Group counseling is conducted by trained specialists. The treatment is intensive and of prolonged duration, thus

reaching a relatively small number of smokers. However, it may be particularly suited to smokers who find quitting especially difficult, or who have failed on previous occasions using other methods. The support group format meets many of the criteria for successful smoking cessation interventions, i.e., intense contact, counseling and psychosocial intervention, general problem solving, social support, often more than one counselor, prolonged treatment period, and often includes nicotine replacement therapy [14]. Despite its intensity and thus its increased cost, this method of intervention is still cost-effective [15].

We endeavored to assess factors affecting successful quitting among participants in smoking cessation support groups. The overall quitting rate of 33% at least 1 year and as much as 3 after completion of the intervention is relatively high, despite the use of an intention-to-treat method, which would be expected to introduce a conservative bias to the analysis. The results may reflect a particularly strong motivation on the part of the participants, but this was not a requirement for enrollment in the groups. Some of the groups met in kibbutzim (communal rural settlements), where the participants continued to see each other on a daily basis outside the framework of the intervention, and may theoretically have received more social support than other frameworks can provide. However, the quit rates were 30% for kibbutz members ( $n=40$ ) and 36.1% for city dwellers ( $n=36$ ), so this factor was not influential in this study. Another demographic factor that could theoretically affect quit results is the gender distribution. In our study there were 64% women and 36% men. Since there were no significant differences in quit rates between the sexes, this factor cannot be considered to bias the results. However, the small sample size must be kept in mind for all variables in which no significant difference was found between quitters and non-quitters, since a type II error is possible in this case.

Nicotine addiction, as measured by the number of cigarettes smoked daily and/or the Fagerstrom index of nicotine addiction, has been reported to be associated with quit rates in some studies [16,17] but not in others [18]. The results of our study agree with the latter, in that neither the amount of cigarettes smoked nor the Fagerstrom score were associated with success in quitting.

Two psychosocial variables were significantly associated with successful quitting on univariate analysis, with a reinforcing effect between them on multivariate analysis. These two factors were the participant's belief in his/her ability to quit as assessed before the first group session, and whether there was active support from the participant's spouse or friends. Participants who believed themselves capable of quitting and had spousal support had the best chance of quitting. These two factors are being integrated into future group methodology, where participants' perceptions of their ability to quit will be delved into more deeply and spouses will be encouraged to participate in at least some of the sessions.

Weight gain, especially among women, is a serious obstacle to successful quitting [19,20]. Most smokers who quit gain weight, women somewhat more than men [21]. The results of recently published studies, including studies conducted in Israel, provide evidence that weight gain following smoking cessation may be transient, at least in part [22–24]. We found that pre-intervention fears about gaining weight were not associated with success rates. However, quitters gained significantly more weight than non-quitters, with women who quit successfully gaining the most weight. The U.S. Agency for Health Care Policy and Research clinical guidelines recommend that smokers not take strong measures such as strict dieting to counteract weight gain during a quit attempt [14]. The gain in weight may be perceived as a trade-off of risk factors (smoking for potential overweight), but the relative risk of smoking for cardiovascular disease is substantially greater than that of the additional weight. Furthermore, the results of recent studies, including studies conducted in Israel, lend support to the contention that the weight gain, at least in part, is transient [23,24]. Participants in our study recommended that a dietician be included in the group staff and that physical exercise be further emphasized as a means to both improve health and counteract some of the weight gain associated with quitting.

The vast majority of the participants (92%) were satisfied with the group and the moderator. The non-quitters blamed themselves primarily for their failure to quit, and thought that the group framework was a useful one even though they did not succeed. Many participants recommended scheduling follow-up "booster" meetings at predetermined intervals over the first year. The reasons most frequently cited for failure to quit were habit (57%) and tension/pressure (46%), with boredom also cited by some. These obstacles should be emphasized in group discussions and solutions sought by the group and the individual participants.

Breath tests for CO content in expired air were used to verify the participants' self-report of smoking status at follow-up. There was no serious discrepancy between the results, and we believe that in a sophisticated group of participants as in this study, self-report is a reliable means of determining quitting rates. However, the breath tests served as a strong positive reinforcement during the group sessions, providing participants with concrete evidence of the fruit of their efforts. Participants stated that this was a very strong motivator and should be used in all future groups.

Almost none of the participants cited physician advice as a reason for quitting smoking. This well-known problem has been addressed in many studies. Smokers are not being counseled sufficiently by their family physicians or other health care providers to stop smoking, and ways must be found to change this situation. In contrast, many participants cited their feeling that smoking was unfair to their friends and particularly family as an important reason to quit smoking. Children should be taught and encouraged to serve

as change agents. They have considerable influence on their parents, as reflected in the participants' comments in this study.

In conclusion, the quit rate in this study was high, providing further confirmation that smoking cessation support groups are effective. Despite the effort required, this means of intervention is cost effective and may be the best chance for some smokers to quit. Factors, such as spousal support, improved self-efficacy, dietary counseling, and follow-up "booster" meetings may improve quit rates even further.

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