

The effectiveness of nationally implemented smoking interventions in Denmark

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Abstract

Objective. The present study aimed to investigate the effectiveness of smoking cessation interventions at a national level.

Method. A systematic follow-up was made of 3628 adults who participated in smoking cessation groups or in individual interventions in different settings in Denmark from January 2001 to March 2002.

Results. The rates of continued abstinence from smoking were estimated as 18% and 16% after 6 and 12 months, respectively, for the 3628 participants from 101 smoking cessation units. Among participants, who accomplished at least 75% of the intervention, the rates of non-smokers after six and twelve months were 23% and 19%, respectively. Five of the investigated factors influenced continued abstinence after 12 months: gender, age, degree of nicotine dependence, the format and the setting of the cessation service.

Conclusions. The study shows that it is possible to implement uniform smoking cessation interventions at a national level keeping the same abstinence rates as previously achieved in randomized clinical trials. The successful cessation interventions were run by nurses and equivalent staff that had received only 3 days of training and had no other particular therapeutic skills.

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Introduction

A tobacco control strategy based mainly on support for smoking cessation was chosen in Denmark ten years ago. Today, most smokers have access to both group and individual smoking cessation interventions at hospitals, pharmacies and other places. The overall effectiveness of these interventions has not been presented previously.

Smoking cessation interventions have been shown to be clinically effective and cost-effective in randomized clinical trials (Fiore, 2000). The aim of the present study was to investigate the effectiveness of standard smoking cessation interventions after implementation at a national level and to identify determinants of continued abstinence at one-year follow-up.

The cost-effectiveness of the Danish interventions has been presented (Olsen et al., 2006).

Methods

The investigation

In January 2001 the Danish National Smoking Cessation Database was established. Smoking cessation units in hospitals, pharmacies, counties and other settings could participate in an independent evaluation of their effectiveness. A total of 101 units chose to register before March 2002 and nearly all offered the same two standard interventions, a group and an individual format.

Smokers were enrolled from January 2001 to March 2002. The registration in the database was approved by the Danish Data Protection Agency.

Training of cessation counselors

The standard interventions in Denmark were run by nurses, midwives and personnel at pharmacies who participated in a 3-day course to become cessation counselors. The participants were trained in interviewing and advising smokers

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to quit assisted by a manual with guidelines for five sessions but had no other particular therapeutic skills.

Group intervention

Seventy-six percent ($N=2751$) of the smokers registered in the database followed a standard group format where 10 to 12 smokers met with the counselor for five sessions of two hours each during a month.

The first two sessions were spent on preparation and planning of the smoking cessation. Readiness, ambivalence and motivation were the main topics. After completing a Fagerström Test for Nicotine Dependence (FTND) (Heatherton et al., 1991) and being introduced to bupropion and nicotine replacement therapy (NRT) the participants decided whether they wanted to use medical therapies.

The last three sessions were typically scheduled 3 days, 10 days and 3 weeks after the quitting date. The group members shared experiences with coping strategies and with relapse prevention techniques. Weight problems and the importance of becoming completely free of nicotine were discussed.

Individual counseling

Twenty-one percent ($N=765$) of the participating smokers chose a standard format of five individual sessions. Usually, the first session was longer than the subsequent ones and the cumulated duration of the intervention was 1 to 2 hours during a month. The structure was the same as in the group format, but this intervention was more flexible with regard to the participants' readiness to stop: a less motivated smoker could spend more sessions on preparation.

Data collection and follow-up procedures

At the beginning of the intervention, all participants completed a registration form at the cessation unit with socio-economic data and smoking history. The counselor completed a form with information about the intervention. The exhaled carbon monoxide concentrations of the participants were measured (Bedfont Smokerlyzer) at every session. All follow-up was decentralized and data were collected by telephone or by mail 6 and 12 months after the quitting date using special follow-up forms.

Analyses

The cessation units were categorized as: pharmacies, hospitals, county service units and other units (general practices, workplaces, schools). The rate of continued abstinence was calculated after 6 and 12 months assuming that all participants without follow-up data had relapsed. Factors influencing the rate of continued abstinence after 12 months were analyzed by forward stepwise logistic regression analysis using SAS software version 8.2 and analyzed for clustering.

Results

Baseline characteristics and follow-up rates

Altogether 101 cessation units were included in the study, with pharmacies making up the majority, 62 units. Twenty-four units were hospital departments, seven were county services and finally there were eight other units including general practices, workplaces and schools. The hospitals recruited 1395 participants (38%), pharmacies recruited 1199 participants (33%), county services enrolled 963 participants (27%), while 71 persons (2%) joined other units.

A total of 3628 smokers were registered in the database and 2686 of these (74%) accomplished at least 75% of an intervention. Six months after stopping, 1979 participants (55%) answered the question about continued abstinence in a follow-up form and after 12 months 1877 participants (52%) completed the follow-up form (Table 1).

Effectiveness

The primary outcome parameters of the study were continued abstinence rates of 18% (95% CI: 17.2, 19.7) and 16% (95% CI: 14.4, 16.7) after 6 and 12 months, respectively, based on all enrolled participants and assuming that all participants without follow-up data had relapsed. Of the participants, who accomplished at least 75% of the intervention, 23% (95% CI: 21.1, 24.3) and 19% (95% CI: 17.6, 20.6), respectively, were non-smokers after 6 and 12 months. Among the persons who completed the follow-up forms, 34% (95% CI: 31.8, 35.9) and 30% (95% CI: 28.0, 32.1), respectively, were still abstaining after six and twelve months.

Predictors of success

Five of the investigated factors influenced continued abstinence after 12 months: gender, age, degree of nicotine dependence, the format and the setting of the cessation service. Men, older persons, persons with low nicotine dependence, participants

Table 1
Characteristics of the smokers in different settings in Denmark from January 2001 to March 2002 (95% confidence interval)

	All participants at the beginning of intervention $N=3628$ (100%)	Participants, who completed 6-months follow-up form $N=1979$ (55%)	Participants, who completed 12-months follow-up form $N=1877$ (52%)
Female (%)	63% (61.3–64.5)	63% (60.4–64.6)	62% (59.9–64.3)
Mean age	48.6 (48.3–49.0)	49.2 (48.7–49.6)	49.6 (49.2–50.1)
Employed (%)	69 (67.7–70.7)	69 (66.9–70.9)	70 (67.5–71.6)
Age of onset of smoking (mean, years)	16.2 (16.0–16.3)	16.1 (15.9–16.3)	16.3 (16.1–16.4)
Daily tobacco consumption (mean, gram)	19.6 (19.3–19.8)	19.3 (19.0–19.6)	19.0 (18.8–19.3)
Smoke during night (%)	16 (15.0–17.5)	16 (14.4–17.6)	15 (13.1–16.4)
Fagerström Test for Nicotine Dependence (mean)	5.5 (5.4–5.5)	5.4 (5.3–5.5)	5.4 (5.3–5.5)
Ever tried to quit (%)	84 (82.6–85.0)	84 (82.3–85.5)	84 (81.9–85.2)
Previous attempts to quit (mean)	3.6 (3.4–3.8)	3.6 (3.3–3.9)	3.7 (3.5–4.0)
Previous quit attempt with nicotine replacement therapy (%)	65 (63.5–67.4)	66 (63.3–68.4)	68 (65.6–70.7)
Previous quit attempt with group format (%)	17 (15.6–19.1)	16 (13.3–17.8)	15 (12.6–17.3)
Wish to quit because smoking is too expensive (%)	29 (27.9–30.8)	26 (24.2–28.1)	28 (26.2–30.2)
Cohabiting with smoker (%)	38 (36.9–40.1)	38 (36.0–40.3)	38 (35.9–40.3)

Table 2
Predictors of continued abstinence in different settings in Denmark from January 2001 to March 2002, 12 months follow-up (N=3628)

	Continued abstinence yes/no + no follow-up	Odds ratio	95% confidence interval
Gender			
Male	227/485+634	1	
Female	337/828+1117	0.78	0.64–0.95
Age	a)	1.02	1.01–1.03
Fagerström Test for Nicotine Dependence	b)	0.93	0.89–0.98
Format			
Individual	95/232+438	1	
Group	455/1032+1264	1.44	1.11–1.86
Other	14/49+47	1.18	0.61–2.28
Setting			
Hospital	200/353+842	1	
Pharmacy	222/667+310	1.30	1.04–1.62
County service	130/244+589	0.82	0.63–1.07
Other	12/49+10	0.92	0.44–1.91

a) The odds ratio is based on a continuous variable and calculated for at change of one year. When calculated using 10 year intervals, the odds ratio was 1.17.

b) The odds ratio is based on a continuous variable and calculated for a change score of one.

in group-based smoking cessation interventions and participants in smoking cessation interventions in pharmacies were most likely to stay abstinent for one year (Table 2). Analysis for clustering made minor changes to the result (not shown).

Discussion

The results suggest that it is possible to successfully implement smoking cessation interventions in a real-life setting, at a national level. A meta analysis of individual and group counseling interventions have found rates of continued abstinence after five months of 17% and 14%, respectively (Fiore, 2000). The rates of continued abstinence of 18% and 16% after 6 and 12 months are probably underestimated as they show a “worst-case-scenario”. There were no difference in the baseline characteristics of the responders and the non-responders.

The large sample size and the populations-based real-life setting are the strengths of this study. The weaknesses are the low rates at follow-up and the lack of control group. However, a large Danish study from 1999/2000 found 7% point abstinence after 12 month in a large control group of almost the same age and smoking history as in this paper (Pisinger et al., 2005b). It seems reasonable to assume that the smoking cessation intervention described in this paper approximately doubles the 1-year abstinence rates compared with no intervention. Others have found

similar results when comparing group and individual intervention with no intervention (Lancaster and Stead, 2005; Stead and Lancaster, 2005).

Predictors of continued abstinence should be interpreted with care as only half of the participants completed the 1-year follow-up. However, similar results have been found before (Ferguson et al., 2005; Kozlowski et al., 1994; Pisinger et al., 2005a).

Conclusion

The systematic follow-up of 3628 Danes shows that it is possible to implement uniform smoking cessation interventions at a national level keeping the same abstinence rates as previously achieved in randomized clinical trials. The successful cessation interventions were run by nurses and equivalent staff that had received only 3 days of training and had no other particular therapeutic skills.

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