



Short communication

Informing smokers on additives in cigarettes: A randomized trial

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Received 8 November 2006; received in revised form 1 December 2006; accepted 4 December 2006

Abstract

Objective: To test the acceptability and impact of a booklet on chemical additives in cigarettes.

Methods: In 2005, 2152 current (59%), former (38%), and never (3%) smokers were enrolled on the Internet and randomly assigned to an intervention group which immediately received a 48-page booklet on cigarette additives by postal mail ($n = 1074$), or to a control group ($n = 1078$). Four weeks later, 1965 people (91%) answered an online follow-up questionnaire on knowledge on additives and motivation to quit smoking. Participants lived in France, Belgium, and Switzerland.

Results: Most participants in the intervention group agreed with: “What I learned in this booklet is outrageous” (74%) and “alarming” (71%). Most daily smokers agreed with: “This booklet makes me want to quit smoking” (52%). The booklet increased correct answers to affirmations such as: “Additives increase the impact of nicotine” (intervention: 83% “true”, control: 61% “true”, $p < 0.001$) and: “Additives mask the smell and visibility of second-hand smoke” (74% versus 23%, $p < 0.001$). The booklet had no impact on motivation to quit, smoking cessation rates and relapse rates.

Conclusions: The booklet was appreciated, caused vivid reactions and enhanced knowledge on additives. It had, however, no impact on smoking behavior, but this was not its primary objective.

Practice implications: More intensive education campaigns on cigarette additives are necessary and will be appreciated by the public.

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Keywords: Smoking; Prevention and control; Patient education

1. Introduction

Chemical additives are used in cigarettes to enhance the taste of smoke, in order to make smoking easier for women and children [1–3] they also accelerate the “impact” of nicotine, thus making cigarettes more addictive [4,5] and finally, they mask the odor and visibility of environmental tobacco smoke, thus making it easier to smoke in public [6]. Many smokers are not aware of the purpose of chemical additives in cigarettes, probably because there have been few educational campaigns on these additives [7,8]. The U.K. Organization Action on Smoking and Health (ASH) developed a document intended for a general audience, which summarizes knowledge on tobacco additives [1]. The aim of this study was to test the acceptability and impact of this document in current and former smokers.

2. Methods

In October 2005, we sent an e-mail to 35,188 visitors of the smoking cessation website Stop-tabac.ch, inviting them to take part in the study [9]. Inclusion criteria included indication of a postal and e-mail address, commitment to reading the booklet, commitment to taking part in a follow-up survey and residence in Europe.

The original document is available at www.ash.org.uk (type “additives” in the search box). It was professionally translated into French (http://www.stop-tabac.ch/fr/Additifs/corr_brochure.pdf). The document explains how additives increase the “impact” and pharmacologic effects of cigarette smoke, how additives enhance the taste of smoke, and how they mask the odor and visibility of environmental tobacco smoke. Also, the cynicism and lack of transparency of the tobacco industry are emphasized.

Two weeks after baseline, we sent the 48-page booklet by postal mail to the intervention group. One week later, the

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Table 1

Opinions on a booklet on chemical additives in cigarettes, in 591 people who read 25% or more of the booklet

Did the booklet motivate you or help you quit smoking? (% "a lot")	32.6
Did you talk about this booklet to other people (% yes)	75.5
Would you recommend this booklet to a friend? (% yes)	88.0
Did you give the booklet to read to someone else? (% yes)	24.2
Did this booklet match your expectations (% yes)	71.7
In general, are you satisfied with this booklet? (% rather + very satisfied)	84.7
Do you intend to read this booklet again in the future? (% yes)	72.3
This booklet is very interesting (% agree)	81.8
This booklet is too long (% agree)	32.2
This booklet is too complicated and difficult (% agree)	39.0
I did not learn anything new in this booklet (% agree)	3.3
This booklet makes me worry (% agree)	64.5
I did NOT think there were so many additives in cigarettes (% agree)	67.0
What I learned in this booklet is outrageous (% agree)	74.3
What I learned in this booklet is disturbing (% agree)	76.3
What I learned in this booklet is alarming (% agree)	71.1
This booklet opened my eyes on the tobacco industry (% agree)	58.0
This booklet disgusts me of cigarettes (% agree)	49.4
This booklet makes me want to quit smoking (% agree)	53.6
This booklet reminds me of tobacco and makes me want to smoke (% agree)	4.7
This booklet causes me stress (% agree)	18.4

intervention group received an e-mail reminder to read the booklet and a link to download it if necessary. Four weeks after baseline, all participants received an e-mail invitation to answer the follow-up survey. Non-respondents received up to 12 reminder e-mails and thereafter, the 209 remaining non-respondents received the follow-up questionnaire once by postal mail. Participants in the control group had no access to the booklet, either on paper or online, and they were not contacted until it was time for the follow-up survey. They nevertheless received the booklet after the end of the study. At baseline and follow-up, all participants answered an online questionnaire on tobacco additives, smoking behavior, and motivation to quit (Tables 1 and 2). At follow-up, participants indicated whether they had read the booklet, or reasons why they had not read it. We used chi-square tests to compare proportions and *t*-tests to compare means. We made no imputations for missing data at follow-up. The study conformed to the principles embodied in the Declaration of Helsinki.

3. Results

3.1. Participation

Within 10 days, we obtained 2152 valid answers to the baseline survey (6% of 35,188). Participants were

Table 2

Impact of a booklet on chemical additives in cigarettes (French-language Internet, 2005)

	Intervention		Control		Between-group difference in before-after change <i>P</i> -value ^b
	Before	After ^a	Before	After ^a	
<i>N</i> participants	1074	961	1078	1004	
The list of all chemical additives in cigarettes is published by the tobacco industry (% false)	55.0	74.6***	56.2	56.3 ns	<0.001
The tobacco industry published the reasons why each additive is added to cigarettes (% false)	40.5	66.2***	40.7	46.5***	<0.001
The tobacco industry published the list of all the effects of additives on smokers (% false)	50.3	74.4***	50.0	55.8***	<0.001
Cigarettes are manufactured like medications intended at delivering a precise dose of nicotine (% true)	55.6	79.1***	53.2	62.1***	<0.001
Additives are added to cigarettes to... (% true)	58.6	87.6***	54.8	65.5***	<0.001
Improve the taste of cigarettes					
Mask the smell and visibility of second hand smoke	18.5	73.8***	16.8	22.8***	<0.001
Make cigarettes easier to smoke for women	33.1	65.8***	32.2	40.8***	<0.001
Make cigarettes easier to smoke for children	25.1	66.9***	24.6	30.6***	<0.001
Enlarge respiratory airways, making the smoke easier to inhale	31.6	79.5***	30.2	39.7***	<0.001
Accelerate the effect of nicotine	54.0	84.2***	50.7	59.1***	<0.001
Increase the impact of nicotine	57.3	82.6***	54.8	61.3***	<0.001
Increase the dependence of smokers	87.1	94.8***	85.7	86.9 ns	<0.001
What percentage of the weight of a cigarette is made of additives, excluding the filter and paper?	10	10**	10	15***	0.28

^a Change over time within groups, assessed by paired-samples *t*-tests for means and McNemar tests for proportions; ns: $p > 0.05$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

^b *P*-values on between-group differences (intervention vs. control) in before-after change, based on comparisons of change variables (follow-up minus baseline), assessed by independent-samples *t*-tests.

randomly assigned to the intervention group ($n = 1074$) or control group ($n = 1078$). After removing 8 records where different people answered the survey at baseline versus follow-up, 1965 participants (91% of 2152) took part in the follow-up survey, including 22 people (1% of 2152, 11% of 209) who answered the 4-week survey by postal mail. Participants lived in France (68%), Switzerland (20%), and Belgium (11%). Most participants (59%) were women, 53% smoked daily, 6% occasionally, 38% were former smokers and 3% had never smoked. One-third (34%) of daily smokers had decided to quit in the following 30 days. Study groups were similar at baseline (data not shown).

3.2. Utilization and opinion on the booklets

Almost all participants (94%) in the intervention group said they had received the booklet. Among those who had received it, most (88%) said they read at least some of the booklet (30% read it in full, 14% read three-fourths of it, 12% read half of it, 11% read one-fourth, 22% had a glance at it and 12% did not read it at all). The average quality rating of the booklet was 7.2 on a scale from 0 to 10 (Table 1). Among the 103 people who received the booklet but did not read it, the main reasons cited for not reading it were: “I did not have time to read it” (94%), “I can’t quit smoking anyway” (41% of smokers), “this booklet scares me” (38% of smokers), “the booklet is too long” (21%), “the text is too difficult and complicated” (13%) and “this booklet causes me stress” (12%).

3.3. Knowledge about additives

At baseline, many participants had erroneous opinions or answered “I don’t know” to questions on tobacco additives. At follow-up, knowledge on additives improved in both the intervention and the control group, but significantly more so in the intervention group. The between-group differences for change over time were statistically significant for answers to all knowledge questions on additives (Table 2).

3.4. Smoking behavior

There was no between-group difference in the proportion of baseline smokers who quit smoking at follow-up (intervention: 4.7%, control 4.4%, $p = 0.8$), nor in the proportion of baseline former smokers who relapsed to smoking (intervention 9.5%, control 6.0%, $p = 0.11$). Among smokers, motivation to quit smoking did not change significantly between baseline and follow-up, nor was there any change in the proportion of smokers who made an attempt at quitting smoking in the previous 4 weeks (intervention: 23%, control: 22%, between-group difference for change over time: $p = 0.34$).

4. Discussion and conclusion

4.1. Discussion

The booklet received high satisfaction ratings and it caused vivid reactions; most readers said that what they learned was outrageous and alarming. Confirming previous research [7,8] there were serious gaps in participants’ knowledge of tobacco additives. This is perhaps because this topic was neglected by prevention organizations, and because knowledge on additives was made publicly available only recently. The booklet substantially improved knowledge on additives, which was its main objective. This is to our knowledge the first published evaluation of an intervention aimed at informing the public on the nature and purpose of additives in cigarettes. Results suggest that information on additives is appreciated and useful. Interestingly, apart from its length, the main reason cited by smokers as to why they did not read the booklet were that it scared them. This concern should be taken into account in future educational campaigns.

The booklet had no impact on smoking behavior, but this was not its objective. It would have been unrealistic to expect that a booklet would be equivalent to a treatment of tobacco dependence. In addition, the booklet had no impact on motivation to quit smoking. This could be explained by a ceiling effect, since most smokers were already quite motivated to quit at baseline. It is also possible that more intensive and comprehensive interventions, with repeated contacts, are necessary to increase motivation to quit.

There was a substantial test effect, as knowledge on additives improved even in control participants. It is quite possible that our study triggered them to search for information on additives, which is easily available on the Internet.

The study was conducted in a self-selected sample of Internet users. All participants visited a smoking cessation website where they could find comprehensive information on how to quit smoking [9]. Thus, our results may not apply to the general population. However, the high response rate at follow-up increases the internal validity of the study.

4.2. Conclusion

Before the intervention, there were serious gaps in participants’ knowledge on cigarette additives. A booklet on chemical additives in cigarettes received high satisfaction ratings, caused vivid reactions and enhanced knowledge on additives. The booklet had, however, no impact on smoking behavior, but this was not its primary objective.

4.3. Practice implications

Larger education campaigns on chemical additives in cigarettes are necessary and will be appreciated by the public.

Conflict of interest

None.

Acknowledgements

Action on Smoking and Health, UK, generously authorized us to translate the booklet into French.

Vincent Baujard and Hamidul Huq, from the Health on the Net Foundation, developed the software for data collection.

Translation and printing of the booklets were paid for by a grant from the Geneva Health Administration.

References

- [1] Bates C, Jarvis M, Connolly G. Tobacco additives, cigarette engineering and nicotine addiction. London: Action on Smoking and Health; 1999
- [2] Cook BL, Wayne GF, Keithly L, Connolly G. One size does not fit all: how the tobacco industry has altered cigarette design to target consumer groups with specific psychological and psychosocial needs. *Addiction* 2003;98:1547–61.
- [3] Wayne GF, Connolly GN. How cigarette design can affect youth initiation into smoking: camel cigarettes 1983–93. *Tob Control* 2002;11:132–9.
- [4] Henningfield J, Pankow J, Garrett B. Ammonia and other chemical base tobacco additives and cigarette nicotine delivery: issues and research needs. *Nicotine Tob Res* 2004;6:199–205.
- [5] Willems EW, Rambali B, Vleeming W, Opperhuizen A, van Amsterdam JG. Significance of ammonium compounds on nicotine exposure to cigarette smokers. *Food Chem Toxicol* 2006;44:678–88.
- [6] Connolly GN, Wayne GD, Lymperis D, Doherty MC. How cigarette additives are used to mask environmental tobacco smoke. *Tob Control* 2000;9:283–91.
- [7] Bansal MA, Cummings KM, Hyland A, Bauer JE, Hastrup JL, Steger C. Do smokers want to know more about the cigarettes they smoke? Results from the Educate study. *Nicotine Tob Res* 2004;6:S289–302.
- [8] Cummings KM, Hyland A, Giovino GA, Hastrup JL, Bauer JE, Bansal MA. Are smokers adequately informed about the health risks of smoking and medicinal nicotine? *Nicotine Tob Res* 2004;6:S333–40.
- [9] Etter JF. Comparing the efficacy of two Internet-based, computer-tailored smoking cessation programs: a randomized trial. *J Med Internet Res* 2005;7:e2.