

Original Investigation

Association Between Willingness to Use Snus to Quit Smoking and Perception of Relative Risk Between Snus and Cigarettes

Karl Erik Lund, Ph.D.

Norwegian Institute for Alcohol and Drug Research, Oslo, Norway

Corresponding Author: Karl Erik Lund, Ph.D., Norwegian Institute for Alcohol and Drug Research, P.O. Box 565 Sentrum, 0105 Oslo, Norway. Telephone: +47-91-73-37-58; Fax: +47-22-34-04-01; E-mail: kel@sirus.no

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Abstract

Introduction: Smokers are often incorrect in their assessment of the relative risk of snus and cigarettes. We have studied how perception of risks of snus compared with cigarettes was associated with the willingness of trying snus as a quit-smoking method.

Methods: Fourteen thousand seven hundred and forty-four Norwegian men aged 20–50 years were selected at random from a national representative web panel and sent a questionnaire by e-mail. Of the 7,170 (48.6%) who responded, there were 1,155 former daily smokers who reported method for quitting smoking and 1,213 current daily smokers who stated their willingness to try different methods for quitting smoking. They were also asked to assess the relative risk between daily use of snus and cigarettes.

Results: Adjusted odds ratio (AOR) for reporting willingness to try snus in future quit attempts was significantly higher ($AOR = 4.82, p < .001$) for the 22.9% of the current smokers who, consistent with scientific evidence, believed that the health risks were “far lower” for snus than for cigarettes compared with the 39.8% who incorrectly perceived the health risks to be “equal or higher” for snus (reference $AOR = 1$). About 37.2% of the daily smokers believed that the risk was “somewhat lower” for snus than for cigarettes and had a significantly higher AOR of reporting willingness to try snus ($AOR = 2.31, p < .001$) compared with the reference group.

Conclusion: Devising a way to inform smokers about the risk continuum of tobacco products could be an important research priority in countries where snus is allowed to compete with cigarettes for market share.

Introduction

A growing number of studies and systematic reviews have concluded that use of snus is substantially less hazardous than

cigarette smoking (Levy et al., 2004; Royal College of Physicians, 2007; Scientific Committee on Emerging and Newly Identified Health Risks [SCENIHR], 2008). This conclusion was also reached by the only systematic review of the evidence from studies that allow direct comparison of relative risk of smoking and snus in the same populations (Roth, Roth, & Liu, 2005). The magnitude of the overall reduction in hazard is difficult to estimate but is at least 50% for cardiovascular disease, at least 30% for pancreatic cancer, at least 50% and probably more for oral and other gastrointestinal cancer, and possibly 100% for lung cancer and chronic obstructive pulmonary disease (SCENIHR, 2008). A study using a modified Delphi approach (judgment by a panel of experts) to estimate the relative hazard concluded that snus was likely to be approximately 90% less harmful than smoking (Levy et al., 2004).

However, smokers and nonsmokers have been found to overstate the health risk from snus compared with cigarettes (Biener & Bogen, 2009; Haddock, Lando, Kleges, Peterson, & Scarinci, 2004; Heavner, Rosenberg, & Philips, 2009; O'Connor et al., 2007; Øverland, Hetland, & Aarø, 2008; Pieper, Stone, van Zyl, & Rodu, 2010; Smith, Curbow, & Stillman, 2007; Tomar & Hatsukami, 2007; Wikmans & Ramström, 2010). In Norway, this misconception is widespread even among doctors (Lund & Scheffels, 2011). Some researchers have suggested that the ethical principle of the individual's right to receive accurate information should be sufficient to justify large-scale communication to correct these misconceptions (Gartner, Hall, Chapman, & Freeman, 2007; Kozlowski, 2002). Others have argued that an empowering of smokers with precise information of relative risk estimates might increase their willingness to substitute cigarettes with a tobacco product much lower on the risk continuum (Biener & Bogen, 2009; Lund, 2009).

However, the proportion of misinformed smokers has been relatively stable over time (Norsk Respons, 2005; Scheffels & Lund, 2010), leaving us with no direct empirical evidence of the effect such a correction possibly could have for the willingness to try snus in smoking cessation. In the absence of such data, we have studied differences in risk perceptions in a population of

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ever-smokers and compared their self-reported willingness to try snus in smoking cessation. More precisely, we have studied how perception of risks from snus use compared with cigarette smoking was associated with (a) having used snus as a quit method among former daily smokers and (b) the willingness to try snus as a method for a future quit attempt among current daily smokers. The implications for public health information are then discussed.

Methods

Response

The data were gathered during April–May 2007 by online interviews with a sample drawn from a web panel comprising more than 62,000 Norwegians. People were recruited to this web panel when they had participated in previous nationally representative population surveys, carried out by telephone, post, or personal interview, and had agreed to receive future invitations to participate in surveys by e-mail. Self-recruitment to the panel was not possible, and none of the panellists were paid for their participation. The response rates in the initial surveys from which invitation to participate in the web panel was sent typically ranged from 20% to 25%. The average proportion of respondents in these surveys who declared willingness to participate in future e-mail surveys was 50%. The panel was administrated by the international research agency Synovate.

An invitation to participate in our survey was sent to a sample within the web panel of 14,000 men aged 20–50 years. This sample corresponded to the distribution of population characteristics on key variables (five yearly age groups, education, region, and urbanity) for men in this age group (the study population). The sample distribution was monitored according to these variables, and if insufficient number of panellists responded in some groups, additional e-mails were continuously sent to new respondents in that group resulting in 744 extra invitations. Of the 14,744 men who were invited to participate, 7,170 (48.6%) responded. The final sample included 1,155 former daily smokers (16.1%) and 1,417 current daily smokers (19.8%) of whom 1,132 (79.9%) had tried to quit smoking. The remainders included nontobacco users and ever-smokers without a history of daily smoking.

Sampling

The final sample was compared with the official 2007 statistics for the study population, and the populations were generally very similar for key variables such as age, region, and urbanity. However, the sample had an underrepresentation of persons with compulsory school as highest completed education (16.5% vs. 24.1%) and an overrepresentation of persons with university exams (47.3% vs. 28.5%). As regards smoking status, the sample was compared with a 2005–2010 pool of nationally representative datasets collected annually by Statistics Norway—a governmental body responsible for official statistics. No significant differences between the sample and the study population were detected on the 5%-level neither for daily smokers (19.8% vs. 21.3%), occasional smokers (14.2% vs. 10.3%) nor never-smokers (66.1% vs. 68.4%).

Measures

The dependent variable was measured by asking (yes/no format) former daily smokers and current daily smokers who had tried

to quit smoking were asked in a yes/no format “Did you use some of these methods when you last tried to quit smoking?” The options were nicotine gum, nicotine patch, snus, inhaler, Zyban, Chantix, call the quit-line, attend a course or consulted health personnel, and read brochures/self-help material (multiple answers possible). With the same options, current smokers with intentions to quit ($N = 1,213$) were asked “How likely is it that you will use any of these aids when performing a quit-smoking attempt?” Response categories for each option were very likely, likely, unlikely, very unlikely, and don’t know.

All respondents were asked “Compared with daily cigarette smoking, how hazardous to health do you consider daily use of snus to be?” Response categories were far more risky, somewhat more risky, about the same risk, somewhat less risky, and far less risky. In the regression models (Table 4), the first three values were grouped and labeled “very inconsistent with scientific consensus,” while the categories somewhat less risky and far less risky were labeled respectively “inconsistent” and “consistent” with scientific consensus.

Current smokers with intentions to quit were asked when they intended to quit smoking with response categories being within 3 months, within 12 months, and sometime in the future. Interaction between willingness to try the different methods and action plans to quit smoking was calculated. Former smokers and current smokers who had tried to quit were asked to state the number of their quit attempts. Scores for age and number of attempts to quit were grouped into three values by splitting the sample at the values closest to the 33rd and 66th percentiles (age) and the 25th, 50th, and 75th percentiles (quit attempts).

The ORs for reporting having used snus when quitting smoking (former smokers) and for reporting a “very likely or likely” intention to use snus in a future quit attempt (current smokers) were calculated using logistic regression controlling for these independent variables: perception of relative risk snus/cigarettes, age, highest completed education, and number of previous attempts to quit smoking. For current smokers, we also controlled for action plans to quit smoking and history of snus use.

Results

Among former daily smokers, snus (31.6%) was the most common method to quit smoking followed by nicotine gum (13.9%). Among daily smokers who had tried (unsuccessfully) to quit smoking, nicotine gum (31.3%) and snus (30.4%) were approximately evenly used. A significantly higher proportion of the current smokers who had used snus (alone or in combination) at their last attempt to quit smoking were very likely or likely to use snus again (70.0%, 95% CI 64.9–75.1) compared with retrieval with nicotine gum (57.4%, 95% CI 52.0–62.8) and nicotine patch (51.3%, 95% CI 44.3–58.3). Intentions of retrieval with Zyban were significantly lower (32%, 95% CI 22.7–41.3) than retrieval with most other methods (Table 1).

Among daily smokers with intentions to quit, approximately one third were very likely or likely to use nicotine gum (32.5%) and self-help material (29.4%), followed by snus (27.5%) and nicotine patch (24.7%; Table 2). No interaction was observed

Table 1. Percentage of Former and Current Daily Smokers Who Used Different Methods to Quit Smoking at Last Quit Attempt, and Willingness Among Current Smokers to Retry the Same Method in a Future Attempt (Multiple Choice of Methods Possible)

	I. Former daily smokers (N = 1,155)	II. Current daily smokers (N = 1,132)	% of II who will retry same method		
				n/N ^a	95% CI
Nicotine chewing gum	13.9 (n = 160)	31.3 (n = 354)	57.4	187/326	52.0–62.8
Nicotine patch	7.0 (n = 81)	18.9 (n = 214)	51.3	100/195	44.3–58.3
Snus	31.6 (n = 365)	30.4 (n = 344)	70.0	217/310	64.9–75.1
Inhaler	1.4 (n = 16)	3.5 (n = 40)	–	–	–
Zyban	4.1 (n = 47)	9.5 (n = 107)	32.0	31/97	22.7–41.3
Champix	1.0 (n = 12)	1.8 (n = 20)	–	–	–
Telephone helpline	0.8 (n = 9)	2.4 (n = 27)	–	–	–
Consult health care personnel	3.1 (n = 36)	6.6 (n = 75)	38.9	28/72	27.6–50.2
Self-help material	10.4 (n = 120)	20.4 (n = 231)	63.7	137/215	57.3–70.1

Note. ^aThe difference in *n* in column II is in the number of individuals who do not intend to make another quit attempt and missing values.

between willingness to try the different methods and action plans to quit smoking.

Very few former or current smokers believed that use of snus implied more risk than smoking cigarettes, but many wrongly believed that harm from the two products was more or less equal or that use of snus was only somewhat less risky. Among former smokers, the proportions who correctly believed that daily snus use was “far less risky” than daily cigarette smoking were significantly higher for current (62.4%, 95% CI 57.3–67.5) and former (32.4%, 95% CI 26.5–38.3) snus users compared with persons without a history of snus use (12.9%, 95% CI 10.1–15.7). Likewise, among current smokers, dual users of cigarettes and snus (45.3%, 95% CI 40.2–50.4) and to a lesser degree former snus users (18.6%, 95% CI 13.5–23.7) believed snus to be far less risky than cigarettes compared with persons who smoked cigarettes only (11.5%, 95% CI 9.0–14.0; Table 3).

Among former smokers, the adjusted odds ratio (AOR) of having used snus to quit smoking was significantly higher (AOR = 10.72, *p* < .001) for the 31.8% who believed that snus was far

less risky than cigarettes compared with the 33.7% who incorrectly perceived the health risks to be “equal or higher” for snus (reference AOR = 1). About 34.5% of former smokers believed that the risk was “somewhat lower” for snus than for cigarettes and had a significantly higher OR of having used snus (AOR = 3.48, *p* < .001) compared with the reference group (Table 4).

Among current smokers, the OR of reporting willingness to try snus in a future quit attempt was significantly higher (AOR = 4.82, *p* < .001) for the 22.9% who, consistent with scientific evidence, believed that snus was far less risky than cigarettes compared with the 39.8% who incorrectly perceived the health risks to be equal or higher for snus (reference OR = 1). About 37.2% of daily smokers believed that the risk was somewhat lower for snus than for cigarettes and had a significantly higher OR of reporting willingness to try snus (AOR = 2.31, *p* < .001) compared with the reference group (Table 4).

Discussion

The main finding in our study was that correct perception of the relative risk between snus and cigarettes was positively correlated with having used snus when quitting smoking. Likewise, among current smokers, correct beliefs of differential risks between the two products were positively correlated with the willingness to use snus in future quit attempts (Table 4). Thus, providing accurate risk estimates to smokers may not only have an ethical justification, dissemination of such information might also result in increased quit rates for smoking.

There is growing evidence from Norway and Sweden that the availability of snus has played a significant role in smoking cessation (Furberg et al., 2008; Gilljam & Galanti, 2003; Lindström, 2007; Lund, 2009; Lund, McNeill, & Scheffels, 2010; Lund, Scheffels, & McNeill, 2011; Ramström & Foulds, 2006; Stegmayr, Eliasson, & Rodu, 2005; Stenbeck, Hagquist, & Rosén, 2009; Wium, Øverland, & Aarø, 2011). Our study reinforces this finding in two novel ways. First, the percentage among unsuccessful quitters planning to retry with the same method was higher for snus than for other methods, including medicinal

Table 2. Willingness to Use Different Methods in Future Quitting Attempts Among Current Daily Smokers (n = 1,213)

	Very likely/likely	Unlikely/very unlikely	Don't know
Nicotine chewing gum (%)	32.5	59.4	8.1
Nicotine patch (%)	24.6	65.7	9.6
Snus (%)	27.5	64.6	7.8
Inhaler (%)	7.2	78.8	14.0
Zyban (%)	9.4	66.7	23.9
Champix (%)	6.7	65.1	28.2
Telephone helpline (%)	8.9	78.0	13.1
Consult health care personnel (%)	14.8	72.3	13.0
Self-help material (%)	29.4	57.3	13.3

Table 3. Perceptions of Relative Risk Between Daily Use of Cigarettes and Snus Among Former Smokers, Current Smokers With Plans to Quit Smoking, Unique Snus Users and Never Users of Tobacco

Compared with cigarettes snus is:	Former daily smokers				Current daily smokers			
	No snus use (%)	Former snus use (%)	Current snus use (%)	All (%)	No snus use (%)	Former snus use (%)	Current snus use (%)	All (%)
Far/somewhat more risky	4.5	3.3	0.3	3.0	4.3	1.8	1.4	2.9
About the same risk	47.7	25.3	6.6	30.7	49.5	33.5	17.3	36.9
Somewhat less risky	34.9	39.0	30.6	34.5	34.7	46.2	36.6	37.2
Far less risky	12.9	32.4	62.4	31.8	11.5	18.6	45.3	22.9
N	568	241	346	1,155	628	221	364	1,213

nicotine (Table 1). Second, snus appears to be a highly relevant option among the remaining smokers intending to quit in the future (Table 2).

Moreover, our study also confirms previous findings (Biener & Bogen, 2009; Haddock et al., 2004; Heavner et al., 2009; O'Connor et al., 2007; Øverland et al., 2008; Pieper et al., 2010; Smith et al., 2007; Tomar & Hatsukami, 2007; Wikmans & Ramström, 2010) that large segments of former and current

smokers overstate the health risks from snus use compared with cigarette smoking (Table 3).

Do Risk Perceptions Guide Quit Behavior or Vice Versa?

Risk perceptions play a central role in theories that attempt to explain behavior, including substance use. For example, the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Theory

Table 4. (I) Percentage (Bivariate) and Adjusted Odds Ratios (AORs) for Having Used Snus When Quitting Smoking Among Male Former Daily Smokers Aged 20–50 Years. (II) Percentage (Bivariate) and AORs for Being Willing to Try Snus When Attempting to Quit Smoking Among Male Daily Smokers Aged 20–50 Years

	(I) Former daily smokers				(II) Current daily smokers			
	%	n/N	AOR	p Value	%	n/N	AOR	p Value
Perception of relative risk								
Very inconsistent with scientific consensus (ref)	10.0	39/390	1.00		10.7	52/484	1.00	
Inconsistent with scientific consensus	29.6	118/398	3.48	<.001	27.5	124/451	2.31	<.001
Consistent with scientific consensus	56.7	208/367	10.72	<.001	56.8	158/278	4.82	<.001
History of snus use								
No snus use (ref)					4.1	26/628	1.00	
Former snus use					18.1	40/221	4.41	<.001
Current snus use					73.6	268/364	49.6	<.001
Action plans to quit smoking								
Within 3 months (ref)					25.1	68/271	1.00	
Within 12 months					29.2	61/209	1.05	.875
Sometime in the future					28.0	205/733	1.33	.234
Previous attempts to quit								
Five or more (ref)	32.2	82/255	1.00		27.7	69/249	1.00	
3–4 attempts	34.6	90/260	0.85	.456	29.7	85/286	1.28	.373
2 attempts	33.5	90/269	0.70	.094	25.9	122/471	0.97	.891
1 attempt	27.8	103/371	0.62	.020	28.0	58/207	1.89	.045
Education								
University/college (ref)	36.4	212/583	1.00		29.3	140/478	1.00	
Upper secondary school	28.7	135/471	0.90	.470	26.7	160/599	1.20	.365
Compulsory school	17.8	18/101	0.57	.065	25.0	34/136	1.30	.413
Age								
44–50 years (ref)	20.0	89/446	1.00		17.2	66/384	1.00	
36–43 years	32.4	132/407	1.81	<.001	23.8	103/432	1.21	.441
20–35 years	52.3	144/302	3.33	<.001	41.6	165/397	1.26	.342

Note. AOR = Adjusted odds ratio. OR is adjusted for all variables in the model.

of Planned Behavior (Ajzen, 1991), Protection Motivation Theory (Rogers, 1975), and the Health Belief Model (Rosenstock, 1974) hold that belief about negative consequences of decision alternatives influence which course of action will be taken. High risk perceptions are assumed to decrease the likelihood that a particular behavior will be undertaken, whereas the inverse holds for low risk perceptions. Risk perception is generally also a strong predictor in decisions to stop smoking (Romer & Jamieson, 2001). The observed association between perception of relative risk and the use of snus when having quit smoking might therefore reflect a causal relationship.

However, as this was a cross-sectional study with a correlational design, we cannot exclude an inverse interpretation that the quit-smoking method has determined risk perceptions and not vice versa. Hence, smokers are likely not only to think themselves into action but also to act themselves into a way of thinking about risks. Evidence suggests that substance-experienced groups hold more differentiated beliefs about consequences from its use than those with less experience (Karlsson, 2011; Lenton, Boys, & Norcross, 1997), but there has been little research on the reciprocal nature of the relationship between health cognitions and health behavior (Gerrard, Gibbons, Benthin, & Hessling, 1996; Weinstein, Rothman, & Nicolich, 1998). It is quite possible that “former smokers” who have used snus to quit smoking have subsequently adjusted their risk perceptions to justify use of this controversial method in order to reduce internal discomfort (Cognitive Dissonance Theory; Festinger, 1957) or to appear consistent to others (Self-presentation Theory; Leary, Tchvidijan, & Kraxberg, 1994). Applying the theory of Selective Exposure and Selective Perception (Zillmann & Bryant, 1985), those who quit cigarettes by using snus might also have built their beliefs about the relative risks on information selected to support a preceding choice of quit-smoking method. A clarification of the reciprocal nature of the relationship between perceptions of relative risk and engagement in snus use to quit smoking requires a prospective design.

Preceding behavior might also guide perceptions in “current smokers,” where past or present experience with snus clearly increased the tendency to report more differentiated risk perceptions than smokers without a history of snus use. However, after adjustment for snus experience, a strong correlation was still evident between risk perception and willingness to try snus in a future attempt to quit smoking, lending support for a causal hypothesis in which beliefs influence the willingness to use snus to quit cigarettes.

Will Correction of Misperceptions Increase the Quit Rate for Smoking?

An answer to this question depends upon four factors. First, the observed correlation between risk perception and willingness to try snus must reflect a causal relationship in order to produce an effect on quit rates. Only if this is true, can we expect to alter smoking cessation methods through precise information about relative risk.

Second, willingness to try snus to quit smoking must be correlated to subsequent performed behavior and it usually is (Gibbons, Gerrard, & Lane, 2003). In the psychological literature of behavior change, the willingness construct, unlike intentions,

is more externally focused and thereby more malleable to situational opportunities (Gibbons et al., 2003). Thus, the cultural context in Norway and Sweden, where snus has been the most popular quit-smoking method for years (Gilljam & Galanti, 2003; Lund, 2009; Ramström & Foulds, 2006), will probably facilitate willingness to develop into action. However, the situation might be different in states where experience with snus is low, such as Australia, where snus is banned, or California, where prevalence of snus use is low at the moment. Even if half of the current Australian smokers (Gartner, Jimenez-Soto, Borland, O'Connor, & Hall, 2010) and 13% of the smokers in California (Timberlake, 2009) expressed an interest in trying snus after being briefly informed about its lower harm profile than that of cigarettes, this may differ substantially from what eventually would develop into behavior.

Third, quitting cigarettes by using snus has to produce a better effect than other methods for smoking cessation. Otherwise, snus—a carcinogenic and potentially addictive drug—appears as an unnecessary option in smoking cessation. Some recent short-term randomized studies have been inconsistent as to whether snus is superior to medicinal nicotine in reducing withdrawal symptoms (Barrett, Campbell, Temporale, & Good, 2011; Kotlyar et al., 2011). However, a large survey from Norway indicated that smokers were 2.7 times more likely to have abstained from cigarettes if they had used snus rather than nicotine gum or nicotine patch. Snus was also found to be 3 times more effective than nicotine gum in greatly reducing cigarette consumption among continuing smokers (Lund et al., 2010). Moreover, numerous observational studies from Scandinavia have shown that the experience of using snus is associated with an increased probability of being a former smoker (Furberg et al., 2008; Gilljam & Galanti, 2003; Lindström, 2007; Lund, Skretting, & Lund, 2007; Lund, Tefre, Amundsen, & Nordlund, 2008; Lund et al., 2010, 2011; Ramström & Foulds, 2006; Stegmayr et al., 2005; Stenbeck et al., 2009). The combination of usage and efficacy suggests a higher level of efficiency of snus than medicinal nicotine as a smoking cessation aid outside clinical settings. This is the context in which smoking cessation plays its major role as a public health tool (Chapman & MacKenzie, 2010).

Fourth, authoritative senders of health information have to be willing and able to systematically disseminate accurate information concerning the relative risk from snus and cigarettes. Despite the fact that misperceptions of health risks have been extensively reported in Scandinavia (Lund & Scheffels, 2011; Norsk Respons, 2005; Øverland et al., 2008; Scheffels & Lund, 2010; Wikmans & Ramström, 2010) and in North America (Biener & Bogen, 2009; Haddock et al., 2004; Heavner et al., 2009; O'Connor et al., 2007; Pieper et al., 2010; Smith et al., 2007), public health officials have been criticized for being reluctant to use the hazard posed by cigarettes as the basis for comparison of risk to snus (Capella, 2007; Phillips, Guenzel, & Bergen, 2006; Waterboy et al., 2004), not to mention to mass communicate such estimates to the population. The main message from the health authorities in the United States (Kozlowski & Edwards, 2005) and in Scandinavia (Lund, 2009) has been that snus is no safe alternative to cigarettes.

There is a concern that communication campaigns targeted at inveterate smokers suited to correct misconceptions of relative risk may lead to snus use among people who would not

otherwise have used a tobacco product or that such information may lead to snus use by smokers who would have managed to quit by other means (Tomar & Hatsukami, 2007; Twombly, 2010). However, any public health impact from this is likely to be more than offset if substantial numbers of smokers switch to snus (Gartner, Hall, Vos, et al., 2007; Kozlowski, Strasser, Giovino, Erickson, & Terza, 2001). This replacement of cigarettes by snus has been the most typical pattern of use in Norway (Lund et al., 2011) and Sweden (Foulds, Ramström, Burke, & Fagerström, 2003), and a comprehensive report from an expert committee appointed by the European Union Commission concluded: "Thus in Sweden, where there has apparently been substantial transfer from smoking to snus, the availability of snus may have been beneficial to public health" (SCENIHR, 2008; p. 117).

Limitations

The overall response rate in our study is low, as this will be based on the multiplicative function of the original response rate in the surveys from which an invitation to participate in the web panel was sent (22.5%), the rate of agreement to participate in subsequent studies (50%) and the 48.6% rate who answered our questions. This is likely to have introduced selection bias which may challenge the validity of the findings. Indeed, the underrepresentation of respondents with low education may suggest that the association between perceived harmfulness of willingness to use snus as a cessation aids only holds for more educated people. The underrepresentation of respondents with short education is caused by a combination of low response rate from this segment and an underrepresentation in the web panel.

In Norway (Lund, 2009), as in the United States (Biener, McCausland, Curry, & Cullen, 2011), use of smokeless tobacco has been a typical male phenomenon, and for this reason, women were not included in our study. However, as the prevalence of snus use among women is increasing, future studies should probably include women, and this could possibly have impact on the overall results.

As the sample and the study population were generally very similar on key variables such as age, region, urbanity, and smoking status, our results could possibly be representative for Norwegian males aged 20–50 years, but probably not for the whole population.

Conclusion

Lacking any compelling evidence of net harm to society from correcting misperceptions of the relative risk between cigarettes and snus, the human right for the individual to receive accurate information about options to reduce risk should prevail. Going beyond the no-safe-tobacco message to provide better information on the nature of relative risk from snus as compared with smoking is necessary to respect the individual right to health relevant information and smokers' autonomy and may also—as our study indicates—result in increased quit rates for cigarette smoking. Some have argued that failure to disseminate information about reduced risks for fear that population nicotine use may increase could be regarded as paternalism and create public mistrust of health messages about tobacco use (Gartner, Hall, Chapman, et al., 2007; Kozlowski, 2002). To prevent uptake of snus among youth, public health and tobacco control professionals

could use other methods than withholding information about relative risks, including taxation, restrictions, and information campaigns aiming to change the cultural symbolism of snus use. Likewise, to prevent snus use among smokers who otherwise are able to quit cigarettes, health professionals should not suppress accurate risk information but encourage uptake of behavioral therapy supported by nicotine replacement therapy or varenicline in accordance with established clinical guidelines (Britton, 2008). Devising a way to inform smokers about the risk continuum of tobacco products (without anyone decoding this information as snus being risk free) should be an important research priority in countries where snus is allowed to compete with cigarettes for market share. History shows that the tobacco industry cannot be trusted to market their products in a manner that prioritizes health over profits. Therefore, any promotion of switching from cigarettes to snus should be restricted to health departments.

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Declaration of Interests

None to declare.

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