Prevention of snus use: Attitudes and activities in the Public Dental Service in the south-eastern part of Norway

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Abstract
Dental health care professionals have the opportunity to play a key role in tobacco prevention and cessation among adolescents. Snus use has increased in Norway, especially in the age group 16–24, whereas there has been a decline in smoking. This study investigated attitudes and activities related to snus prevention among dental health care professionals working in the Public Dental Service (PDS) in south-eastern Norway. A web-based survey with a total of 557 dentists and dental hygienists in seven counties in Norway, with a response rate of 53.5%, was carried out in 2017. Dentists' and dental hygienists' activities regarding preventive snus use intervention were analysed using the chi-square test. Intervention was measured with a score (1–5) based on four questions. Bivariate and multivariate linear regression analyses were used to investigate the associations between the explanatory variables of attitudes/activities and the outcome intervention variable. Approximately 87% of the dentists and 58% of the dental hygienists were not familiar with the "minimum intervention method" for tobacco prevention and cessation. Dental hygienists were most active in informing and supporting their patients in prevention and cessation of snus use. The PDS is an underutilized arena for tobacco prevention and cessation among adolescents, and the intervention potential is particularly high among the dentists.

KEYWORDS
health promotion, Norway, oral health, Public Dental Service, snus cessation

1 | INTRODUCTION

The type of smokeless tobacco predominantly used in the Nordic countries is snus, and it is mostly produced in Sweden (Benowitz, 2014; Foulds, Ramstrom, Burke, & Fagerstrom, 2003). The sale of snus is allowed in the European countries of Norway, Belarus, and Russia, but it is illegal everywhere in the European Union except Sweden. Although it most likely has less adverse health effects than smoking, snus use still involves a range of adverse health effects that are not necessarily perceived (by the users). Snus is highly addictive due to its nicotine content; in addition, it contains genotoxic and carcinogenic tobacco-specific nitrosamines. The use of snus during pregnancy increases the risk of low birth weight, premature birth, and stillbirth (Wikstrom, Cnattingius, Galanti, Kieler, & Stephansson, 2010). Current data support that snus use increases the risk of diabe-tes type 2 in a dose-dependent way (Baba, Wikstrom, Stephansson,
Discontinuing use of snus after a heart attack or stroke of any cause has been shown to reduce mortality by approximately 50% (Arefalk et al., 2014). In addition, there is lack of knowledge regarding adverse health impacts associated with early initiation of snus use. For dentist and dental hygienists, it is noteworthy that snus also affects the oral mucosa, usually causing red or white areas, and wrinkled surfaces called hyperkeratotic lesions. Most often, these snus-induced lesions heal after cessation of snus use. However, snus may cause permanent retraction of gingiva at the areas where pinches of snus are placed (Roosaar, Johansson, Sandborgh-Englund, Nyren, & Axell, 2006).

In Norway, snus consumption has increased over the last 10–20 years, especially among young adults. In 2017, 32% of men and 22% of women aged 16–24 used snus on a daily or occasional basis. Concurrently smoking has decreased in the same age group, 3% smoked daily and 14% occasionally, with smaller gender differences than for snus use (Statistics Norway, 2018; Pedersen & von Soest, 2014). A similar increase in snus use among young adults, especially among men, has also been observed in Finland (Kinnunen et al., 2017; Tanner et al., 2014). Among 18-year-old Finnish men, 23% use snus daily or occasionally, whereas the corresponding figure among 18-year-old Finnish women is 4% (Kinnunen et al., 2017). The prevalence of daily or occasional snus use in Sweden in the age group 16–29 years is 21% for men and 9% for women, respectively (Public health agency Sweden, 2018). However, use of smokeless tobacco is not just a concern in Scandinavian countries; in the United States, 6.6% of men and 0.5% of women were currently smokeless tobacco users in 2016 (Centre of Disease Control, 2016).

Interventions for tobacco prevention and cessation have been studied worldwide (West et al., 2015). School tobacco intervention programmes that combine social competence and social influences to prevent the onset of smoking have shown considerable effects at 1-year follow-up and longer (Josendal, Aaro, Torsheim, & Rasbash, 2005; Thomas, McLellan, & Perera, 2015). In addition, both brief and extensive interventions in dental settings indicate positive outcomes on both smoking and snus cessation (Nohlert, Ohrvik, Tegelberg, Tilkgren, & Helgason, 2013; Virtanen, Zeebari, Rohyo, & Galanti, 2015; West et al., 2015). Interestingly, stronger intervention effects were observed among snus users compared with smokers in several of the studies (Carr & Ebbert, 2007; Virtanen et al., 2015). One brief method used by health professionals is the minimal intervention method, which is commonly used in tobacco cessation (Towns, DiFranza, Jayasuriya, Marshall, & Shah, 2017). The method consists of three steps: First, the patients are questioned about own tobacco use followed second by question about experience/reflections on own tobacco use and third by recommendation to quit and an offer of cessation support.

In Norway, children and youth up to the age of 18 are entitled to free dental care, whereas patients up to age 20 are offered treatment at a reduced price when visiting the Public Dental Service (PDS). Hence, the PDS could be an ideal arena for tobacco preventive and cessation initiatives among children and youth. According to a study nearly two decades back in time, tobacco intervention activity in Norwegian PDS was not performed on a regular basis (Lund, Lund, & Rise, 2004). Although snus use has increased markedly in several countries, few studies have since focused on snus use prevention activities in dental health care.

The high level of snus use among youth in Norway illustrates the need for preventive measures, as well as tobacco cessation interventions, aimed at this group. The aim of the present study was to investigate public dental health professionals' attitudes and activities regarding interventions towards young patients' snus use in southeastern Norway.

2 MATERIAL AND METHODS

2.1 Study population

Between March and June 2016, a precoded questionnaire was sent electronically to all dentists and dental hygienists in the PDS in seven counties in Norway (Østfold, Hedmark, Oslo, Oppland, Vestfold, Vest-Agder, and Aust-Agder). Two reminders were sent to all participants. The participants were asked not to respond more than once. The data were collected using web-based easy research, a questback product from https://www.questback.com/no/. Participation in the survey was voluntary, and the questionnaire software (easy research) ensured anonymity of the participants. The study population consisted of a gross sample of 388 dentists and 169 dental hygienists. The total response rate was 53.5% (298 participants). Due to missing values, the number of participants varied between 294 and 298 for the variables shown in the tables.

2.2 Questionnaire and measures

The questionnaire was composed of 19 questions, based on a questionnaire previously used in studies among dental professionals and general practitioners (Helgason & Lund, 2002; Helgason, Lund, Adolfsson, & Axelsson, 2003; Lund et al., 2004). The wording and answer categories of the questions used in the present study (17 of 19) are shown in Tables 1–3. Questions 1–4 (Q1–Q4) are about demographic data of dental health personnel, Q5 about the history of own snus use, and Q6 at which age do they start to ask their patients about snus use. Q7–Q10 are included as intervention variables (see Section 2.3), Q11–Q12 about the method of minimal intervention and Q13–Q17 about attitudes and activities in snus use prevention (see Section 2.3).

2.3 Statistical analysis

For bivariate crosstabs analyses, chi-square tests were used (P value = <0.05). A new intervention variable was constructed with factor analyses from four of the questions in Table 2 (Q7–Q10, with Cronbach's alpha 0.77), given a scale from 1 to 5, where score 1 indicates low and score 5 indicates high intervention. The 5-point scales for the variables of attitudes/activities (1 = completely agree to 5 = completely disagree) were collapsed to three categories in Table 3 (Q13–Q17) but treated as continuous scales in the regression analyses in Table 4 (Q13–Q17).
Multivariate linear regression analyses were conducted to find the association between the explanatory variables of attitudes/activities (Q13–Q17) and the outcome intervention variable, measuring the practices regarding preventive snus intervention among dental health personnel (Q7–Q10). The analyses were performed separately for dentists and dental hygienists. The results were expressed as unstandardized beta-coefficients (b) and their 95% confidence intervals.

All analyses were performed using the statistical program SPSS (Statistical Package of Social Sciences; SPSS Inc., Chicago, USA, version 23.0).

### 3 | ETHICAL ISSUES

The present study is part of a clinical study investigating oral manifestations of snus use among adolescents in south-eastern Norway, all approved by both the Norwegian Centre for Research Data (project...
number: 47365) and the Norwegian Regional Ethical Committee (project number 2015/445).

### RESULTS

A total of 204 dentists (52.6%) and 94 dental hygienists (55.6%) responded to the questionnaire after two reminders, with a total response rate of 53.4%. The dentists were younger than the dental hygienists; 50% of the dental hygienists and 70% of the dentists were between 26 and 45 years of age. More than one tenth of dentists and dental hygienists were snus users or former users (Table 1).

The distributions of snus use intervention activities for dentists and dental hygienists are shown in Table 3. Less than half of the dentists (41%) and dental hygienists (47%) perceived that they had sufficient knowledge about the effects of snus use on oral health. A majority (85%) of both professionals perceived discussing snus use with patients as part of their job (Table 3). More dentists than dental hygienists found a conversation about snus use too time-consuming and did not perceive snus use as a major cause of oral health problems (Table 3).

Table 4 shows the associations between attitudes and activities as explanatory variables, and the intervention variable as outcome variable, shown separately for dentists and dental hygienists. In the unadjusted (bivariate) analyses for dentists, all explanatory variables were negatively associated with the intervention factor. The only explanatory nonsignificant variable was the perceived lack of knowledge regarding snus use and dental health. In the corresponding multivariate analyses for dentists, three of the same variables were negatively associated with dentists’ intervention. These three were “it is not my job to discuss peoples’ snus habits,” “snus use is not a major cause of oral health problems,” and “I feel awkward asking patients about their snus habits.”

Among the dental hygienists, two explanatory variables were negatively associated with the intervention factor in the bivariate analyses: lack of knowledge about the effects of snus use and “it is not my job to discuss peoples’ snus habits.” In the multivariate analyses, only the question concerning occupational task remained negatively associated with preventive snus use intervention among the dental hygienists (Table 4). Mean intervention scores for dentists and dental hygienists were 3.71 (SD 0.67) and 4.09 (SD 0.65), respectively. Dental

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**TABLE 3** Dentists’ and dental hygienists’ attitudes and activities

|                                    | Dentists % (n) | Dental hygienists % (n) | Total % (n) | P value |
|------------------------------------|----------------|-------------------------|-------------|---------|
| I do not feel I know enough about the effects of snus use on dental health (Q13) |                |                         |             |         |
| Agree                              | 39.2 (80)      | 38.0 (35)               | 38.9 (115)  | 0.500   |
| Neutral                            | 20.1 (41)      | 15.2 (14)               | 18.6 (55)   |         |
| Disagree                           | 40.7 (83)      | 46.7 (43)               | 42.6 (126)  |         |
| I do not think it is my job to discuss peoples’ snus habits (Q14) |                |                         |             |         |
| Agree                              | 6.9 (14)       | 5.4 (5)                 | 6.4 (19)    | 0.820   |
| Neutral                            | 8.9 (18)       | 7.6 (7)                 | 8.5 (25)    |         |
| Disagree                           | 84.2 (171)     | 87.0 (80)               | 85.1 (251)  |         |
| A conversation about snus takes up too much time (Q15) |                |                         |             |         |
| Agree                              | 10.8 (22)      | 7.6 (7)                 | 9.8 (29)    | 0.020   |
| Neutral                            | 21.2 (43)      | 9.8 (9)                 | 17.6 (52)   |         |
| Disagree                           | 68.0 (138)     | 82.6 (76)               | 72.5 (214)  |         |
| Snus use is not a major cause of oral health problems (Q16) |                |                         |             |         |
| Agree                              | 12.8 (26)      | 4.3 (4)                 | 10.2 (30)   |         |
| Neutral                            | 19.7 (40)      | 16.3 (15)               | 18.6 (55)   |         |
| Disagree                           | 67.5 (137)     | 79.3 (73)               | 71.2 (210)  | 0.030   |
| I feel awkward about asking people about their snus habits (Q17) |                |                         |             |         |
| Agree                              | 18.3 (37)      | 12.0 (11)               | 16.3 (48)   | 0.370   |
| Neutral                            | 12.4 (25)      | 13.0 (12)               | 12.6 (37)   |         |
| Disagree                           | 69.3 (140)     | 75.0 (69)               | 71.1 (209)  |         |
### TABLE 4  Linear regression analyses with associations between attitudes/activities and preventive snus use intervention for dentists and dental hygienists

| Explanatory variables                                                                 | Dentists (n = 204) | Dental hygienists (n = 94) |
|---------------------------------------------------------------------------------------|--------------------|-----------------------------|
|                                                                                        | Intervention, unadjusted | Intervention, adjusted | Intervention, unadjusted | Intervention, adjusted |
|                                                                                        | b  | 95% CI       | P value   | b  | 95% CI       | P value   | b  | 95% CI       | P value   |
| I do not feel I know enough about the effects of snus use on dental health (Q13)     | -0.072 | [-0.146, 0.003] | 0.059 | -0.018 | [-0.091, 0.055] | 0.628 | -0.149 | [-0.251, -0.046] | 0.005 | -0.082 | [-0.198, 0.035] | 0.169 |
| I do not think it is my job to discuss peoples’ snus habits (Q14)                    | -0.230 | [-0.325, -0.134] | 0.001 | -0.163 | [-0.267, -0.060] | 0.002 | -0.242 | [-0.386, -0.098] | 0.001 | -0.205 | [-0.374, -0.036] | 0.018 |
| A conversation about snus takes up too much time (Q15)                                | -0.092 | [-0.180, -0.004] | 0.040 | 0.011 | [-0.078, 0.101] | 0.802 | -0.058 | [-0.199, 0.083] | 0.416 | 0.071 | [-0.085, 0.226] | 0.367 |
| Snus use is not a major cause of oral health problems (Q16)                           | -0.150 | [-0.236, -0.063] | 0.001 | -0.089 | [-0.176, -0.001] | 0.046 | -0.049 | [-0.206, 0.109] | 0.542 | -0.028 | [-0.179, 0.123] | 0.712 |
| I feel awkward about asking people about their snus habits (Q17)                      | -0.100 | [-0.176, -0.023] | 0.011 | -0.099 | [-0.174, -0.024] | 0.010 | -0.112 | [-0.236, 0.012] | 0.077 | -0.057 | [-0.194, 0.080] | 0.412 |

| Effect-measure (beta-coefficient). |
therefore important to provide information to oral health professionals about localized and general adverse health effects associated with snus use, especially when snus is perceived as a safe alternative to smoking. Changes in the oral mucosa appear frequently, which could make the cessation advice coming from dental professionals particularly relevant to snus users (Virtanen et al., 2015). Also, brief and structured counselling in dentistry was found to be associated with reduction of tobacco use, even when a statistical significant association was not found regarding total abstinence (Virtanen et al., 2015). These results should encourage dental health personnel to continue inform about snus use in the clinic setting.

According to the study by Lund et al. (2004), the most common barrier towards intervention among dentists and dental hygienists were the belief that discussing tobacco use (snus and smoking) was outside their field of responsibility. In addition, dentists also reported that discussing tobacco was too time-consuming, whereas approximately 1 of 5 of the dental hygienists felt awkward asking the patients about their smoking habits. Lund and co-workers also reported that dental hygienists intervened more often than dentists. This is in line with the findings of the present study, where more dental hygienists than dentists were familiar with the minimal intervention method and where dental hygienists had a higher intervention score for snus use, compared with dentists. One could speculate that one reason for this discrepancy is the last years education or updated courses of dental hygienists, where the high prevalence of snus use among young Norwegians has been emphasized, more so than in the education of dentists. Interestingly, we found a substantially higher percentage of dental personnel that regarded snus use as an oral health problem compared to the study from 2004 by Lund and co-workers. This could be due to increased focus and knowledge about snus and health in general. Brief intervention methods such as minimal intervention can be effective in reducing the prevalence of tobacco use when used by health professionals in general (Stead et al., 2013). Furthermore, interventions from multiple health professionals are believed to have a positive effect on tobacco prevention and cessation (World Health Organization, 2005). In our opinion, both professionals have an important responsibility in tobacco prevention and cessation and should share the opportunity to do this work, in a complementary manner.

Advantages of the present study included recent data collection (2016), the inclusion of public dental clinics in both urban and rural areas and almost 40% of the employed dentist and dental hygienists in the PDS in Norway were asked to participate. However, there may very well be differences regarding time allocated to preventive activities and tobacco preventive work by the PDS in the different counties in Norway. Because such differences cannot be excluded, the results may not be generalizable to the whole country. The response rate of 53.4% may have introduced some selection bias. Nonresponding dental professionals may be those who perceive the most time pressure and thus did not take the time to participate. Accordingly, the same nonresponders are perhaps more likely being inactive for the same reason regarding preventive snus use intervention. In both cases, our study may overestimate intervention activity in the PDS.

In overall, the present study shows two major findings: the minimal intervention method for tobacco prevention and cessation is little known among dental professionals in south-eastern Norway, and the PDS is an underutilized arena for prevention of snus use. Increased knowledge about brief intervention methods and the possibility to allocate time to tobacco preventive work is essential to achieve changes.

CONFLICT OF INTEREST

The authors have no conflict of interest to disclose.

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