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ORIGINAL ARTICLE

Dental patients' perceptions and motivation in smoking cessation activities

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ABSTRACT

Objective The aim of the present study was to investigate smokers' perceptions of and motivation for smoking cessation activities in dentistry. **Materials and methods** Patients who smoked were consecutively recruited from general as well as specialist dental care clinics in Sweden. After a dental visit the patients completed a questionnaire about self-perceived oral health, smoking habits, motivation, reasons to quit and not to quit smoking, support to quit, smoking cessation activities and questions about smoking asked by dentists and dental hygienists. **Results** The sample consisted of 167 adult patients ($\geq$ 20 years) who smoked daily. During the last 6 months, 81% of the patients had experienced oral health problems. The most common complaints were discolourations of the teeth, periodontal problems and dry mouth (38%, 36% and 33%, respectively). Improved general health was a major reason to quit smoking (89%). It was also stated that it was important to avoid oral health problems. 71% of the patients preferred to quit by themselves and 16% wanted support from dentistry. High motivation to quit smoking was reported by 20%. Occurrence of periodontitis during the last 6 months was significantly associated with being highly motivated to stop smoking ($OR = 3.0$, 95% $CI = 1.03–8.55$). **Conclusions** This study revealed that, although it was important to quit smoking to avoid oral health problems, the patients were not aware that tobacco cessation activities can be performed in dentistry. Periodontal problems seem to be the most motivating factor among the patients who were highly motivated to stop smoking.

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Introduction

Smoking is a major threat to general health as well as oral health. Smoking is implicated as a risk factor in general diseases, for example, cardiovascular diseases, lung diseases and cancer.[1,2] Periodontal diseases, peri-implantitis and changes in the mucous membrane have been reported to be associated with smoking.[3–6] Smoking cessation activities are, therefore, important in general as well as in dental care.[7]

A large proportion of people visit dentists and dental hygienists regularly and they, therefore, have a unique opportunity to provide smoking cessation activities.[8,9] Consequences of smoking are often visible in the oral cavity and can be used to motivate people to quit.[10] Smoking cessation is considered by dental personnel to be an important task [11,12] and activities in dentistry have been reported to be effective.[13] However, they are not frequently performed among dental personnel.[11,14] Earlier studies from our group [15,16] have shown that dental hygienists reported some barriers when working with tobacco cessation, such as lack of time, lack of knowledge and no support from the organization.

It has been reported that a large proportion of smokers in Canada, the US and Australia (71–78%) want to quit smoking, but the frequency is lower in the UK (63%).[17] A lot of smokers have tried to quit on their own without nicotine replacement therapy (NRT) or professional help.[18] However, Binnie et al. [19] reported that less than 5% of those who tried to quit on their own succeed in a long-term perspective ($>$ 12 months). In a group of smokers who were granted interventions (e.g. self-help material, counselling and/or NRT) the 12-month success rate was 15.2% compared to 7.0% ($p < 0.01$) among those who did not.[20]

To implement successful smoking cessation activities in dentistry, knowledge about patients' perspectives on how to quit smoking should be evaluated, e.g. patients' experience of smoking cessation and factors that motivate them to quit. Previous studies [21–23] were mostly focused on the patients' knowledge about smoking in relation to general and oral health and on their perception of the dentist's role in smoking cessation. The aim of the present study was to investigate smokers' perceptions and motivation in smoking cessation activities in dentistry.

Materials and methods

This study is based on a consecutive sample of patients who attended dental care clinics in southern Sweden and in Stockholm, the capital of Sweden, during a 12-month period in 2010/2011. The inclusion criteria of the study was adult patients ($\geq$ 20 years) using tobacco. General dental care patients were recruited from the Public Dental Service in southern Sweden, at Kristianstad University and Karolinska Institutet, Stockholm, in total four clinics. Patients were also

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recruited from a specialist clinic in Stockholm. The authors (PA or AJ) informed the dental personnel about the study and the distribution of the questionnaire to the patients using tobacco who agreed to participate in the study.

After a clinical examination and/or treatment, the patients were informed about the study verbally by the dental personnel, and also in writing, and their consent was obtained. They were then asked to complete a questionnaire concerning tobacco and at the same time they were assured that the answers would be kept confidential. The questionnaire was answered in the waiting room at the dental clinic after the visit and was returned in a sealed envelope at the reception or in a sealed box in the waiting room. The study was performed in accordance and with the Declaration of Helsinki and was approved by the Ethics Committee Lund, Sweden.

The questionnaire was completed by 237 patients. Four of these were aged under 20 and were, therefore, excluded, as well as those patients who smoked sporadically ($n = 14$) and smoked a pipe ($n = 2$). Snuff was used by 50 patients and the findings about them will be presented in another report.

The questionnaire

Most of the questions were modified from a previous study.[15] The questionnaire included questions about:

- Sociodemographic data: gender, age, educational level, marital status and country of origin, self-perceived general health and quality-of-life (the response choices were 'very good', 'good', 'less good' or 'bad') and perception of stress in general (stated on a VAS scale from 0–100 mm).
- Self-perceived oral health (response alternatives were 'very good', 'good', 'less good' or 'bad'), oral health complaints during the last 6 months ('yes' or 'no') and perceptions of the importance of smoking cessation with the aim of avoiding oral conditions (response choices were 'very important', 'important', 'quite important' or 'not important').
- Smoking characteristics: number of cigarettes daily, years of smoking and importance of smoking ('very important', 'important', 'quite important' or 'not important'), experience of quitting smoking (number and length of breaks), got help to quit and had used NRT and/or pharmacotherapy (response alternatives were 'yes' or 'no'), motivation to quit smoking (VAS scale as above), reasons to quit smoking and not to quit smoking and wanting support to quit smoking in the future. The response alternatives on these questions were 'yes' or 'no'.
- Furthermore, the questionnaire contained items about the extent to which the patients were asked by dental hygienists and dentists about smoking habits, quitting smoking and smoking cessation and were given information about the deleterious effects of tobacco, the benefits of quitting smoking and the intervention alternatives NRT and quitline. The response choices were 'always', 'often', 'seldom' or 'never'.

Statistical analyses

The data analysis was performed using SPSS 22.0 (Statistical Package for the Social Sciences). Descriptive statistics with numbers, percentages, mean and SD or median and range were calculated.

In the statistical analysis, the questions about self-perceived 'general health', 'quality-of-life' (Table 1) and 'oral health' (Table 2) with the response choices 'very good', 'good', 'less good' or 'bad' were consolidated into the two categories 'very good, good' and 'less good, bad'. In regard to questions about the importance of quitting smoking to avoid the oral conditions 'periodontitis', 'gingivitis', 'caries' and 'damage to the oral mucosa' (Table 2) and the question about 'the significance of smoking' (Table 3) and the response alternatives 'very important', 'important', 'quite important' or 'not important' were consolidated into 'very important, important' and 'quite important, not important'. The question about the degree of motivation to stop smoking (scale from 0–100 mm) was categorized as low (0–4 mm), moderate (5–7 mm) and high (8–10 mm) according to Bertholet et al. [24] (Table 3). Questions posed by dental hygienists and dentists to patients visiting the dentistry had the response alternatives 'always', 'often', 'seldom' and 'never' and were consolidated into 'always, often' and 'seldom, never' (Table 4).

Table 1. Sociodemographic and self-perceived general health characteristics of the study population.

Variable	*n* (%)[a]
Gender ($n = 167$)	
Female	103 (62)
Age (mean, SD) ($n = 163$)	50.5 (13.6)
Education ($n = 167$)	
≤ 9 years/> 9 years	52 (31) / 115 (6)
Marital status ($n = 167$)	
Married, co-habitant/unmarried, not co-habitant	101 (60) / 66 (40)
Country of origin ($n = 167$)	
Born in Sweden/born abroad	129 (77) / 38 (23)
General health ($n = 161$)	
Very good, good/less good, bad	139 (86) / 22 (14)
Quality-of-life ($n = 164$)	
Very good, good/less good, bad	146 (89) / 18 (11)
Stressed in general (mean, SD) ($n = 161$)	4.4 (2.8)

[a]Data are numbers and percentages unless otherwise indicated.

Table 2. Self-perceived oral health status, oral health complaints and importance to quit smoking in relation to oral conditions.

Variable	*n* (%)
Self-perceived oral health ($n = 165$)	
Very good, good/less good, bad	113 (68) / 52 (32)
Self-perceived oral health complaints ($n = 165$)	
Discolorations of teeth	63 (38)
Periodontal problems	59 (36)
Dry mouth	54 (33)
Bad breath	45 (27)
Withdrawal of the gingiva	39 (24)
Discoloration of the tongue	24 (14)
Caries	21 (13)
Importance to quit smoking	
To avoid periodontitis ($n = 162$)	
Very important, important/quite important, not important	135 (83) / 27 (17)
To avoid gingivitis ($n = 161$)	
Very important, important/quite important, not important	130 (81) / 31 (19)
To avoid caries ($n = 161$)	
Very important, important/quite important, not important	103 (64) / 58 (36)
To avoid damage on the oral mucosa ($n = 162$)	
Very important, important/quite important, not important	124 (77) / 38 (23)

Table 3. Smoking characteristics among the patients.

Characteristics	n (%)[a]
Number of cigarettes daily (mean, SD) ($n = 165$)	12.1 (5.6)
Minimum–maximum (n)	2–40
Years of smoking (mean, SD) ($n = 165$)	29.1 (13.8)
Minimum–maximum (n)	2–61
The importance of smoking ($n = 148$)	
Very important, important/quite important, not important	107 (72) / 41 (28)
Experience of quitting smoking ($n = 163$)	121 (74)
Number of quit smoking (mean, SD) ($n = 89$)	3.7 (3.7)
Length of quit smoking ($n = 118$)	
≤3 month	35 (30)
>3 month–1 year	41 (35)
>1 year	42 (35)
Received help to quit smoking ($n = 121$)	
Healthcare/dental care	18 (15) / 0 (0)
No help	92 (76)
Tobacco cessation group, quitline or other	11 (9)
Used nicotine replacement therapy during tobacco cessation ($n = 112$)	
NRT (e.g. gums, patch)/bupropion or varenicline	71 (63) / 16 (14)
Motivation to quit smoking (mean, SD) ($n = 158$)	4.7 (3.0)
Low motivation 0–4	74 (47)
Moderate motivation 5–7	52 (33)
High motivation 8–10	32 (20)
Reason to quit smoking ($n = 167$)	
To improve the general health	149 (89)
Pressure from the family and others	76 (45)
Avoid problems in the oral cavity	61 (36)
Reason to not quit smoking ($n = 165$)	
Stress	104 (63)
Weight problems	53 (32)
No problem with the general health	41 (25)
Family or social network are smoking	26 (16)
Other reasons	30 (18)
Want support to quit smoking in the future ($n = 164$)	
Try themselves	117 (71)
Healthcare	45 (27)
Tobacco cessation group/quit line	30 (18)
Dental care	27 (16)

[a]Data are numbers and percentages if nothing else is indicated.

Table 4. Questions asked by dental hygienist and dentist about issues related to smoking cessation.

	n	Dental Hygienist Always, often n (%)	Dentist Always, often n (%)	p-value
Questions about				
How much they smoke	120	81 (67)	50 (42)	0.001
How long they had smoked	111	43 (39)	37(33)	0.263
Thoughts about quitting smoking	116	67 (58)	42 (36)	0.001
If they wanted information about smoking cessation	110	21 (19)	16 (14)	0.302
Have been given information about				
Deleterious effects of smoking	121	66 (54)	52 (43)	0.009
Benefits of quitting smoking	116	52 (45)	37 (32)	0.004
Nicotine replacement therapy	114	22 (19)	18 (16)	0.219
The quitline	111	14 (13)	10 (9)	0.125

Significances were calculated with independent pairwise observations between the dental hygienist and dentist using McNemar test.

Categorical data (self-perceived oral health, oral health complaints and perceptions of the importance of smoking cessation to avoid oral conditions) were compared with chi-square test in relation to gender, country of origin, marital status and educational level and with *t*-test in relation to age. Motivation to quit smoking (low and moderate motivation vs high motivation) was compared with Chi-square test in relation to previous attempts to quit, self-perceived oral health, oral health complaints during the last 6 months and perceptions of the importance of smoking cessation to avoid oral conditions. The McNemar test was used to compare paired responses in questions posed by dental hygienists and dentists.

Multivariate logistic regression analyses were applied to explore associations between the independent variables self-perceived oral health, oral health complaints and perceptions of the importance of smoking cessation to avoid oral diseases in relation to the dependent variable high motivation to stop smoking. Adjustments were made for the possible confounding variables: age, gender, country of origin, marital status and education, and were all included in the final model. Odds ratios (OR) with 95% CI were estimated. Statistical significance was set at $p > 0.05$ for each test or when the 95% CI excluded 1.0.

Results

The final sample consisted of 167 patients who smoked daily. Descriptive sociodemographic and general health characteristics are given in Table 1. The mean age of the respondents was 50.5 years (±13.6) and ranged from 20–79. The general health was good among 86% of the patients and 89% reported that they perceived a high quality-of-life (Table 1).

One or more oral health complaints were reported by 81% (median = 2.0; range = 1–8) of the respondents. Discolourations of the teeth, periodontal problems and dry mouth (38%, 36% and 33%, respectively) were the most common complaints. The patients thought that it was very important or important to quit smoking to avoid periodontitis (83%) and gingivitis (81%) (Table 2).

Problems with caries during the last 6 months were reported by more women than men (18% and 5%, respectively; $p = 0.016$) and by more unmarried/not co-habitant individuals compared to married/co-habitant ones (20% and 8%, respectively; $p = 0.028$). Self-reported bad breath was significantly more reported by younger patients than older ones (43.7 ± 11.0 vs 52.8 ± 13.7 years; $p = 0.001$) and dry mouth was more pronounced in elderly patients (54.7 ± 13.9 vs 48.3 ± 13.1 years; $p = 0.005$).

The respondents had smoked a mean of 29.1 (±13.8) years (Table 3). Almost all (89%) had tried to quit smoking (mean = 3.7 times) and, of these, 76% had tried to quit by themselves. None of them had received support from dental staff. Improved general health was stated by 89% as a reason to quit smoking and 36% reported avoiding problems with oral health as a reason. Reasons for not quitting smoking were stress (63%) and risk of increase in weight (32%). Seventy-one per cent of the respondents stated that they wanted to try to quit smoking by themselves in the future, whilst 27% wanted support from general healthcare and 16% from dental care (Table 3).

High motivation to quit smoking was reported by 20% of the patients (Table 3). Almost all of these (97%) had previously attempted to quit smoking, in contrast to those with lower/moderate motivation (69%; $p = 0.002$). Among patients with periodontal complaints during the last 6 months, a difference was found between those who were highly motivated (50%) to quit smoking compared to patients with low/moderate motivation (31%; $p = 0.040$). Patients who had high motivation stated that it is important to quit smoking to avoid periodontal

diseases, (97% vs 80%; $p = 0.027$), caries (91% vs 57%; $p = 0.001$) and damage to the oral mucosa (94% vs 72%; $p = 0.010$) compared to patients with low/moderate motivation (no data shown in Table 3).

Questions regarding smoking and smoking cessation activities asked by the patients' dentists and dental hygienists are presented in Table 4.

The multivariate regression analysis showed that the patients' being highly motivated to quit smoking was significantly associated with problems with periodontitis (OR = 3.0, 95% CI = 1.03–8.55, p-value = 0.044). The proportion of explained variation in the dependent variable was 0.244 (Nagelkerke R^2).

Discussion

Work with health promotion in order to prevent oral diseases has been performed for many decades, such as controlling of the dental biofilm and smoking cessation activities. The use of tobacco products is increasing on a global scale, in low- and middle-income countries, although there is a clear trend toward a decrease in high-income countries.[25] Thus, it is important to find out the patients' awareness of the negative effects of cigarette smoking on general as well as oral health and perceptions and motivation to quit smoking, which was the aim of the present study. The results showed that the patients were aware of the damaging effects of smoking in relation to general and oral health conditions and a majority of them had tried to quit smoking earlier but had not succeeded. None of the patients had received support from the dental team. Furthermore, the patients reported that they preferred to quit by themselves and only 16% of them want support from dental professionals. This result is similar to Rikard-Bell et al.,[26] who found that 28% of the patients would appreciate support from the dentist to quit tobacco use. A possible explanation for our results might be that the patients were not aware that the dental care personnel can offer support with smoking cessation. It needs to be mentioned that support from specialist stop smoking clinics have been shown to be more successful with smoking cessation compared to general clinics.[27] However, in spite of this there is evidence that brief interventions in the dental setting increase the smoking cessation rate.[28] and a quit rate of 10–20% during a 1-year follow-up has been reported.[9] A European workshop highlighted the principles in the prevention of periodontal diseases and emphasized that the dental team has to assistant the patients to quit smoking.[29] Højgaard et al. [30] also suggested that smoking cessation interventions represent a cost-effective strategy in promoting good general health. This effect must not be neglected and also needs to be investigated in dentistry.

In the present study, 89% of the patients reported that the reason to quit smoking was to improve their general health. A 4-year follow-up study was shown that ~14% of the patients successfully stopped smoking [31] but these patients were over 65, had a diagnosis of cancer, cardiovascular disease or diabetes.

Stress was the main reason in our study for not stopping smoking, which has also been reported by Tsourtos et al.,[32] who concluded that there was an intimate relationship between stress and smoking. Torres and O'Dell [33] proposed that stress was a principal factor that promotes the use of tobacco and that stress more often plays a central role in tobacco use in women. Therefore, it is important to understand the interacting factors that can influence patients' resistance to quitting smoking.

In the current study, discoloured teeth and periodontal problems were the most common complaints from the patients, thus creating an opening towards a smoking cessation discussion between dental staff and patients. It is necessary to find a sustainable strategy for smoking cessation activities which will prevent patients from starting to smoke again, which was also highlighted by Rosseel et al.[34] Furthermore, it is important for the dental team to explore the inner motivation of the patient. One strategy is to use motivational counselling to explore patients' thoughts in order to create a plan for smoking cessation. A significant aspect of the present work is the importance of continuous support from the dental staff, especially in the relapse phase, since almost all patients had previously tried to quit smoking. Smoking cessation is a complex activity and a personalized approach to promote interventions is crucial in order to support the patients.[10] Confidence and self-efficacy are significant predictors and are linked to behavioural changes regarding smoking habits.[24,34]

Our results also showed that both dentists and dental hygienists asked the patients questions concerning smoking and that the dental hygienist asked to a greater extent about e.g. their thoughts about quitting smoking. This is similar to Brothwell and Gelskey,[12] who reported that dental hygienists more frequently provided assistance to quit smoking than dentists did. It is well known that dental hygienists work more with health promotion and are strong advocates for working with this issue.

The findings of the present study showed that the most motivated patients to quit smoking had periodontal problems. Smoking is a well-known risk factor for periodontitis, as well as for general health problems, including other chronic inflammatory diseases (see review).[35] A questionnaire study [15] reported that all of the 228 dental hygienists informed the patients about the association between smoking and periodontal problems. In our study, 64% of the patients found it important to quit smoking to avoid caries. Furthermore, a study from Finland reported that the association between smoking and dental caries was distinct. The need for restorative treatment by those who reported frequent smoking was more than 2-fold compared to non-smokers, which indicates more unhealthy behaviour among smokers.[36] The association between smoking and caries is, however, unclear.

NRT had been used by 63% of the patients included in our study during their smoking cessation. The use of NRT is effective in the attempt to quit smoking. In a consensus report regarding tobacco use prevention and cessation, NRT was reported to be the most effective activity in combination with intensive behavioural support.[37] A Cochrane report concluded that there was insufficient evidence to support the use of any specific behavioural activity including NRT to help smokers who have successfully quit for a short time to avoid

relapse.[38] They also highlighted that studies of extended treatment with nicotine replacement are needed. Although many of the patients included in our study have used NRT, they failed to quit smoking. One reason could be that the patients have not used NRT in an effective manner.

Pharmacotherapy (bupropion or varenicline) can only be prescribed by a physician and not by the dental team. This may explain that only 14% of the smoking patients in our study had used pharmacotherapy, although it has been reported to be more effective than NRT. A Cochrane report [39] showed, for example, that between 50–70% stopped smoking with help of varenicline compared to NRT. The dental team have the opportunity to work with NRT if this product is available at the pharmacy, but not with pharmacotherapy.

Some limitations of the study must be noted. The sample was consecutively chosen from various dental organizations, which may have different working strategies related to smoking cessation, which could influence the results. Further, it would have been beneficial to include more patients. On the other hand, they were recruited from different geographical areas, both from the countryside and from large communities and from general dental care clinics as well as specialists, in order to include several fields. Another limitation of the study is that we have no data about how many of the patients visited the clinics and the number of smokers who refused participation.

This study emphasized the importance of including knowledge and practical work with smoking cessation strategies in the curriculum in both dentist and dental hygiene education. It has been stated by Cowpe et al. [40] that smoking cessation should be part of the dentist and dental hygienist curriculum, as agreed in the European guidelines of professional competence.

In conclusion, although it was important to quit smoking to avoid oral health problems, the patients were not aware that tobacco cessation activities can be performed in dentistry. Periodontal problems seem to be the strongest motivation factor among patients who were highly motivated to stop smoking.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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