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Swedish dental hygienists' preferences for workplace improvement and continuing professional development

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Abstract: The present study examined factors for workplace improvement and continuing professional development (CPD) for Swedish dental hygienists. Seventy-one per cent of 577 randomly selected members of Sweden's Dental Hygienist Association responded to a questionnaire. The chi-square test, Spearman's rank correlation, and multiple stepwise logistic regression modelling were used in the statistical analysis. The results showed that dental hygienists having more than 10 sick days annually and with a strong commitment to their work increased the preference for workplace improvements, such as peer recognition of dental hygienists' professional qualifications, clinical process quality, and time for reading research articles and participating in projects. In addition, dental hygienists in the 41–52 age group were associated with workplace improvements. This is in contrast to the factors that decreased preferences for workplace improvements: clear work roles, a 1-year training programme, a male clinic manager, and working in the private sector. Practicing dental hygiene in the public sector and lifestyle factors were the most influential determinants for a strong interest in CPD. *Conclusion:* Workplaces should observe people that are obviously committed to their work, those with many sick days, and those in a specific age group, as they indicate different preferences for workplace improvements. CPD seems to be a lower priority than workplace improvements for Swedish dental hygienists.

Key words: lifestyle, peer recognition, role ambiguity, stress, work

Introduction

Professional obligations demand a continuous updating of skills and workplace improvements (1, 2). Workplace improvement is a process by professionals to create healthy workplace conditions resulting in a higher quality of care (3, 4). Continuing professional development (CPD) is a professional process that is required by dental hygienists and other professionals to update, broaden, and maintain their skills in ways that will best facilitate the delivery of high-quality care (3, 5, 6). Healthy workplace conditions affect caregivers' subjective health and influence their commitment to their jobs, which, in turn, relates to their perceptions of quality of care. In addition, a strong job commitment predicts better health, while clear roles and responsibilities and well-defined goals enhance team cohesiveness (3, 4, 7). Daily work experiences could influence preferences for CPD and workplace improvement (8, 9).

The dental hygiene profession is a rather new profession when it comes to creating scientific knowledge in oral health (10). As professionals, dental hygienists must acquire new skills and knowledge so they can deal with information technology, scientific advances, and new preventative and therapeutic services in order to deliver high quality care (3, 11). Expected changes in oral health care delivery influence dental hygienists' education, which includes more training in critical thinking, paediatric dentistry, geriatric dentistry, and health promotion (10). Dental hygienists implement two educational strategies, i.e. course attendance and reading professional journals (12). They seem to be committed to CPD, but their attitudes toward course attendance vary (12, 13).

Although work-related musculoskeletal disorders are a major health problem for dental hygienists, no studies have been found that have examined workplace improvement preferences or their predictors. Scaling work, work relations, and role conflicts were found to be common predictors of musculoskeletal disorders, while a supportive management, personal commitment, and active leisure pursuits predicted better health (14–17).

Workplace improvement and CPD preferences might, for example, reflect dental hygienists' health, lifestyle, attitude toward work (commitment and significance of work in their lives), workplace conditions, and, indirectly, their patients' perceived quality of care. The question is how different factors relate to desired workplace improvements and/or CPD, respectively. Based on a previous stress model (15, 17), this study used salutogenic and pathogenic stress reactions for suggested *adequate* and *inadequate* fits between a person's attitudes, behaviours, and needs that are related to environmental characteristics and demands to predict preferred workplace improvement and CPD.

Generally, it is hypothesized that perceived stress from work, stress reactions (musculoskeletal disorders and sick days), and/or a high level of commitment might be associated with workplace improvement and/or CPD preferences.

The aim of the present study was to examine how different factors such as background, work, lifestyle, and health are related to workplace improvement and CPD among dental hygienists.

Materials and methods

Subjects and procedure

In 2002, a questionnaire on work environments was mailed to 577 members (25%) of the Swedish Dental Hygienists' Association (SDHA). They were randomly sampled from the SDHA. The SDHA includes about 95% of all dental hygienists in Sweden. Inactive members, retirees, educators, unemployed members, and hygienists who work abroad were excluded from the sample. A self-reporting 300-item questionnaire was developed in 2002 from the results of pilots run in Sweden and from input from interviews with 10 dental hygienists in the Stockholm area. A questionnaire from a previous study was used as to the basis for developing the new one (17). The purpose of the interviews was to identify present work-related issues. The interviews resulted in some changes to the questionnaire, and also led to the addition of new questions as suggested by the interviewed dental hygienists. The questionnaire was tested by mailing it to a random sample of 60 subjects from the SDHA, of which 90% responded. Some improvements to the questionnaire were made before the main questionnaire was mailed. Each questionnaire was assigned an ID code, which the researchers destroyed when the questionnaires were returned. Non-respondents received two reminders.

The present study is the first part of a longitudinal study. Reference groups discussed in the present study were defined in the studies that collected data on Swedish dental hygienists in 1994 and 1998 (14, 17). The questions about dental hygienists' backgrounds, work, lifestyle and health are quite similar to the questions that were used in the previous questionnaires (14, 17). There are some general differences, however. Questions about the length of dental hygiene training programmes and continuing education were included in the background section. Information on lifestyles was expanded with several

questions about smoking and snuff habits. Questions about critical incidents in the workplace were added to the workplace conditions section. Questions about musculoskeletal disorders in the arms and fingers were placed in the health section. In the workplace improvement section, questions dealing with the availability of time for following and reviewing current research and participating in projects was included along with a question on ergonomics. In the CPD section, questions dealing with general medicine, implants, research project based work and evidence based care were included.

Assessments

The questionnaire measured aspects of work environments and health in dental hygienists. Respondents were asked to rank their perceptions of their work environments, lifestyles, and health on Likert-type scales. They were also asked to rate their preferences for workplace improvements and CPD on scales ranging from 1 (unimportant) to 4 (absolutely necessary). See Table 2.

The questionnaire covered these broad areas: background, physical and psychosocial workplace conditions, lifestyle, significance of work to their lives, work satisfaction, health, and areas concerning workplace improvement and CPD (shown in bold). The following lists show the variables in the present study and individual items that make up the variables (shown in italics) after factor analyses. The analyses were used to ensure that acceptable factor loadings and Cronbach alpha reliability coefficients were achieved, and to reduce the number of items. Scales from previous occupational research have been used in their original form or as revised by the authors (11, 14–18).

Background

- Age, years in profession, education, delivery system, male or female clinic manager, and geographic location. Geographic location was scored as big city (Stockholm, Göteborg and Malmö) (1), mid-size town (2), small town (3), or countryside (4, 14). Education was scored as 1-year (1), 2-year (2), or 3-year training programme (3).

Workplace conditions

- *Clear work roles (versus role ambiguity):* rankings of how dental hygienists felt about their supervisors, their knowledge about dental hygienists' work responsibilities, and work expectations (18). Minor revisions in wording were made to fit dental hygienists.
- *Applied skills/capabilities:* work role allows full use of professional skills/capabilities (18). Minor revisions in wording were made to fit dental hygienists.
- *Commitment to the workplace:* dental hygienists' willingness to improve processes and procedures, participate in innovative practices, and make the workplace successful (11, 17). One item was added to the scale: make the workplace successful.
- *Stress from scaling work:* mental and physical stress caused by scaling tools, long sitting sessions, and uncomfortable positions (15, 17). Original scale was used.

Lifestyle

- *Active leisure:* for example, walking, chi gong, and working out (15, 17). A general question on leisure activities was split into six items.
- *Reading and studying:* reading classical literature and professional dental hygiene magazines and attending courses (15, 17). A general question on leisure activities was split into six items.

Significance of work to life

- Respondents assigned 100 points and ranked the significance of work, family, leisure, community, and religion (18). Original scale.

Work satisfaction

- *Autonomy and work quality:* opportunities to make decisions and to use acquired knowledge and skills (15, 17). One item was added to the scale: use acquired knowledge and skills.

Health

- *Musculoskeletal disorders:* perceived pain in the musculoskeletal system (back of neck, shoulders, and upper back) in the last month (14–17). Original scale.
- *Self-reported sick days:* grouping ≤10 sick days annually and >10 sick days annually. Original question.

Areas for workplace improvement

- *Peer recognition of dental hygienists' qualifications:* promotion of dental hygienists' qualifications to patients, better support from clinic managers, and improvement of staffs' understanding of dental hygienists' roles (17). Original scale.

- *Clinical process quality in dental hygiene:* concrete goals might improve the quality of care, delegation of tasks should be promoted, and a physiotherapist should follow up on ergonomic issues (17). One item was added to the scale: a physiotherapist should follow up on ergonomic issues.
- *Project work and literature reviews:* include project work; follow and critically review current research on oral health care tasks. New question.

Areas for continuing professional development

- *Interpretation and diagnostics of dental disease:* periodontics, diagnosing caries, and interpreting X-rays (17). Original scale.
- *Paediatric dentistry:* pedodontics and orthodontics (17). Original scale.
- *Public health and geriatric dentistry:* public health promotion and geriatric dentistry (17). Original scale.
- *Research-driven care:* research project based work and evidence based care. New question.

Statistical methods

Descriptive statistics were used to describe the characteristics or background of the dental hygienists in terms of percentage, mean and SD. The SPSS 6.1 software statistical program for the PC was used for the data analyses. Factor analysis was used to reduce the number of variables by factor-based scores. Final scale scores were then calculated as the mean of the included items for each factor. Principal component analysis was the extraction method, and Varimax with Kaiser Normalization was the rotation method. Factor loading was set to ≥65 for high discrimination in scales. The Cronbach alpha reliability coefficient was ≥70 for high homogeneity in scales, and the intercorrelation (Pearson's r) was <0.60 for a reasonable degree of scale independence (19).

The Pearson chi-square test for analysing variables, measured on a nominal scale, was used to study group differences between geographic locations and preferences for workplace improvements. Studying Spearman's rank correlation coefficients identified prognostic variables for the logistic regressions. Stepwise logistic regression modelling was used to determine which variables were the best predictors of the preferred areas for workplace improvement and CPD. Several potential regression models based on rank correlations have been tested. The best models are presented in the results section. A P-value of 0.05 was taken as the level of statistical significance.

Ethical approval

The Karolinska Institutet and Uppsala University ethical regional committees approved the study (no. 02–092). The study protocol, the cover letter and the questionnaire were all approved.

Results

Characteristics of dental hygienists

A 71% ($n = 411$) response rate was obtained. No significant differences in geographic location between respondents and non-respondents could be determined. The study population consisted of 97.5% female and 2.5% male dental hygienists. Table 1 presents data on age and work characteristics.

Additionally, 58% of the hygienists worked in public sector practice, 31% in private sector practice, 5% as independent practitioners, and 6% provided other unspecified services. Sixty-four per cent had completed a 1-year training programme, 34% a 2-year programme, and 2% a 3-year programme. Of the services provided per week, 20% teach health care personnel, 18% do some public work (in schools and hospitals), 12% are involved in research or project work (the median for each activity was 1 h per week). Eighteen per cent reported more than 10 sick days per year (30% reported no sick days).

Table 2 shows dental hygienists' importance ratings of individual items that represent different areas, i.e. the dependent variables (shown in bold) for workplace improvements and CPD. A description of the individual items that make up the study's outcome variables is also presented in the assessment section. Of the items, dental hygienists' ranked promotion of dental hygienists qualifications to patients (63%) and CPD (37%) in periodontics as most important. The non-responses varied between 3.9 and 5.8% for the items representing desired workplace improvements and between 4.6 and 6.1%

Table 1. **Age and work characteristics of dental hygienists in Sweden, including results from the 1999 study (21)**

Age and work characteristics	2004*	1999**
Age	45 (10)	44 (09)
Years worked	14 (08)	12 (06)
Weeks worked during last year	42 (11)	43 (10)
Hours worked per week	34 (07)	32 (08)
Clinical patient hours worked/week	28 (08)	27 (08)
Patients per day	09 (04)	09 (04)

Values are given as mean (SD).
*Data collected in 2002; **Data collected in 1998.

Table 2. **Dental hygienists' importance ratings of items representing different areas for workplace improvements (WPI) and continuing professional development (CPD)**

Areas and individual items	Absolutely necessary	Very important	Not so important	Unimportant
Peer recognition of dental hygienists' qualifications (WPI)				
Promotion of hygienists' qualifications to patients	63 (247)	35 (139)	2 (7)	0 (1)
Better support from clinic manager	47 (183)	49 (192)	4 (16)	0 (0)
Staff's understanding of hygienists' roles	49 (190)	47 (185)	4 (15)	0 (1)
Clinical process quality in dental hygiene (WPI)				
Concrete goals might improve quality of care	46 (180)	50 (198)	4 (13)	0 (1)
Promote delegation of job tasks	30 (117)	56 (219)	13 (51)	1 (5)
A physiotherapist should follow up ergonomic issues	38 (150)	52 (207)	10 (38)	0 (0)
Project work and literature review (WPI)				
Include project work in job tasks	43 (168)	49 (193)	8 (29)	0 (2)
Include follow-up and critical review of Current research in job tasks	40 (153)	49 (189)	11 (43)	0 (2)
Interpretation and diagnostics of dental disease (CPD)				
Periodontics	37 (143)	46 (181)	17 (66)	0 (1)
Interpretation of X-rays	25 (97)	45 (175)	28 (111)	2 (7)
Diagnostics in cardiology	24 (93)	41 (162)	33 (130)	2 (7)
Paediatric dentistry (CPD)				
Pedodontics	10 (38)	36 (141)	47 (184)	7 (28)
Orthodontics	6 (25)	31 (122)	51 (198)	12 (46)
Public health and geriatric dentistry (CPD)				
Health promotion in public work	17 (64)	43 (166)	35 (137)	5 (20)
Geriatric dentistry	21 (79)	46 (179)	29 (112)	4 (16)
Research-driven care (CPD)				
Evidence-based care	9 (33)	39 (137)	45 (159)	7 (23)
Research-project-based work	13 (49)	34 (134)	43 (167)	10 (40)

Values are given as percentage and *n* given in parentheses.

for the items including desired CPD. Except for the item *evidence based care*, which had a non-response of 16%.

Background data and their influence on areas for workplace improvement and CPD

Big-city (Stockholm, Göteborg and Malmö) hygienists preferred increased peer recognition of their professional training and qualifications, and small-town hygienists preferred improved clinical processes and procedures ($P < 0.04$).

Predictors for workplace improvement and CPD

Table 3 shows the odds ratios (ORs) for prognostic variables for the workplace improvement preferences. In dental hygienists, a strong work commitment (OR 1.4), many sick days per year (OR 2.0), and belonging to the 41–52 age group (OR 2.3) were associated with an increased likelihood of improved peer *recognition of hygienists' professional training and qualifications*. Clear work roles decreased this likelihood. A strong work commitment (OR 1.4) and many sick days per year (OR 1.7) increased the likelihood of improved *clinical process quality*, while *private* sector practice decreased this likelihood. High work commitment (OR 1.5), age group 41–52 (OR 3.1), and many sick days per year (OR 1.8) were associated with an increased likelihood of improved *time for reading and projects*, while 1-year training programmes and male clinic managers decreased this likelihood.

Table 4 shows the ORs for prognostic variables for the preferred areas of importance for CPD. In dental hygienists, public sector practice (OR 2.5) and stress from scaling work (OR 1.1) were associated with an increased likelihood of further education in *paediatric dentistry*.

Lifestyle factors such as physically active leisure time (OR 2.8), reading and studying classic literature and professional publications, attending courses (OR 2.3), and public sector employment (OR 1.8) increased the likelihood of further education in *public health promotion* and *geriatric dentistry*.

Reading and studying (OR 2.4), job satisfaction because of autonomy and work quality (OR 1.5), and full use of professional skills (OR 1.2) increased the likelihood of further education in *research-driven care*.

Discussion

The present study examined factors for workplace improvement and CPD. The results support the hypothesis that sick days (in the present study identified to be more than 10 annually),

Table 3. **Stepwise logistic regression models**

Dependent variables/workplace improvement areas	Prognostic variables	Log odds coefficient	SE	OR	OR 95% CI	*P*-value
Peer recognition of dental hygienists' qualifications	Sick days >10 per year (reference ≤10 per year)	0.7	0.20	2.0	1.2–3.2	0.004
	Dental hygienists' commitment to workplace (high versus low)	0.3	0.10	1.4	1.1–1.8	0.008
	Age ≥41 and <53 years (reference groups <41 and ≥53 years)	0.8	0.30	2.3	1.2–4.3	0.008
	Clear work roles (versus role ambiguity)	–0.6	0.30	0.6	0.3–0.9	0.020
Correct predictions 69% (R^2 (Nagelkerke) 0.17)	*Constant*	*–3.3*				
Clinical process quality	Private-sector practice (reference public-sector practice)	–0.8	0.30	0.5	0.3–0.8	0.002
	Sick days >10 per year (reference ≤10 per year)	0.6	0.30	1.7	1.0–2.8	0.040
	Dental hygienists' commitment to workplace (high versus low)	0.3	0.10	1.4	1.1–1.7	0.004
Correct predictions 70% (R^2 (Nagelkerke) 0.17)	*Constant*	*–2.9*				
Projects and literature reviews	Sick days >10 per year (reference ≤10 per year)	0.5	0.20	1.8	1.1–2.9	0.020
	Dental hygienists' commitment to workplace (high versus low)	0.4	0.10	1.5	1.1–2.0	0.004
	Male clinic manager (reference female clinic manager)	–0.7	0.30	0.5	0.3–0.8	0.007
	Educational length 40 credit points (reference 80 credit points)	–0.8	0.30	0.5	0.2–0.9	0.020
	Age ≥41 and <53 years (reference groups <41 and ≥53 years)	1.1	0.40	3.1	1.3–7.2	0.020
Correct predictions 69% (R^2 (Nagelkerke) 0.24)	*Constant*	*–4.1*				

Notes: ORs and 95% CIs of personal and work environmental factors related to preferred areas for workplace improvement. The dependent variables were dichotomized at the median in the logistic regression analyses.

Table 4. **Stepwise logistic regression models**

Dependent variables/continuing professional development (CPD) areas	Prognostic variables	Log odds coefficient	SE	OR	OR 95% CI	*P*-value
Paediatric dentistry	Public-sector practice (reference private-sector practice)	0.90	0.20	2.5	1.6–3.9	0.000
	Importance of work (high versus low)	0.02	0.01	1.0	1.0–1.0	0.040
	Stress from scaling work (high versus low)	0.06	0.03	1.1	1.0–1.1	0.020
Correct predictions 64.1% (R^2 (Nagelkerke) 0.12)	*Constant*	*–1.9*				
Public health promotion and geriatric dentistry	Public-sector practice (reference private-sector practice)	0.60	0.20	1.8	1.2–2.6	0.002
	Active leisure (high versus low)	1.00	0.50	2.8	1.1–7.2	0.040
	Reading and studying (high versus low)	0.80	0.40	2.3	1.1–4.8	0.030
Correct predictions 64% (R^2 (Nagelkerke) 0.10)	*Constant*	*–2.9*				
Research-driven care	Satisfied with autonomy and quality of work (high versus low)	0.40	0.20	1.5	1.1–2.0	0.006
	Reading and studying (high versus low)	0.80	0.30	2.4	1.2–4.6	0.010
	Applied skills/capabilities (high versus low)	0.20	0.08	1.2	1.0–1.5	0.020
Correct predictions 64.1% (R^2 (Nagelkerke) 0.10)	*Constant*	*–5.5*				

Notes: ORs and 95% CIs of personal and work environmental factors related to preferred areas for CPD. The dependent variables were dichotomized at the median in the logistic regression analyses. No significant prognostic variables were found with regard to the respondents' importance ratings for more CPD in diagnostics and interpretation of X-rays in dental hygiene work.

a strong work commitment, and work stress, such as role ambiguity, are related to preferences for workplace improvements.

The regression models (Tables 3 and 4) indicate that a person's adaptation to the environment contributes to different stress reactions that are associated with how a person rates areas for workplace improvement and CPD. Professionals' ratings of workplace improvements and professional development seem to be important regardless of fit (commitment) or misfit (sick days or perceived stress from role ambiguity and scaling) between a person and her or his environment. CPD involves different learning activities that are built on practitioners' experiences and include enhancement of specialist skills in, for example, paediatric dentistry. CPD also involves such things as empowerment through research-driven work. Different learning activities within CPD are discussed, but there is no consensus on definitions (5, 20–21). While dental hygiene education serves as the knowledge and skills foundation, research results enable ongoing, leading edge CPD. This empowers and supports dental hygienists as they plan their work strategies. Learning is applied in workplaces that want to maintain high-quality care. The workplace-improvement concept is not rigorously researched despite research showing that workplace conditions relate to employees' health and the quality of care that they deliver (3, 4, 7, 22). In this study, workplace improvement and CPD might be considered elements in quality of care.

Age and work characteristics in Table 1 show nearly the same results, compared with 1999 (17). Working with clinical job tasks still seems to constitute the main scope of practice. Other tasks, such as teaching health care personnel, public health work (in schools and hospitals), and being involved in research or projects increased by 6–8% since 1999 (15). Professional changes, although small, are under way. The proportions of male dental hygienists, hygienists working in the public sector, and dental hygienists who completed a 2-year (or longer) training programme have increased compared with previous studies (14, 17). The number of sick days above 10 per year increased by 8%, and hygienists who reported no sick days during the last year decreased by 10%, compared with 1999 (17). These changes were not statistically significant.

No other studies enable comparisons to be made with regard to rating areas of importance for workplace improvements. Sick days, commitment, and age (Table 3) are key prognostic factors for predicting workplace improvements. It is interpreted that mainly hygienists who reported many sick days find it important to change their work situations because of work dissatisfaction, not because of health problems and workload. The present results suggest that more than 10 sick days per year should be taken notice of by management and raise questions about work conditions. Research for assessment of the reasons behind absenteeism is lacking (23).

The results indicate that hygienists with a strong commitment want to increase their efforts to improve their work conditions. Strong commitment to a workplace has been found to play a role with better self-rated health in dental hygienists (17) and quality of care in other health care professionals (3). Committed people seem to be needed to improve work and organizations. From that viewpoint, it could be important to understand what makes people committed to their work. It is noted that the relationship between commitment and absenteeism is unclear (24).

Role ambiguity was found to predict increased peer recognition of hygienist's training and qualifications (Table 3). It is obvious that demands and expectations of dental team members seem to be unclear when it comes to dental hygienists' preferred better recognition from other team members. Anxiety about unclear work roles with dentists and dental assistants has been found (16), and clear work roles and well-defined work goals enhance team cohesiveness (3, 4, 7, 25). It could be important to find out how dental hygienists as professionals clarify their own work role on the dental team.

Those in the 41–52 age group find it important to receive better peer recognition and time for projects and literature reviews. The explanation might be a shift of interest from family to work supported by their children growing older, thus leaving more freedom to pursue their own interests. Hygienists who have completed 2-year programmes received more basic training in research and paediatric dentistry than those with a programme background of 1 year (10). This might be an explanation for participating in projects and literature reviews and for pursuing further education and training (CPD) in paediatric dentistry (Tables 3 and 4).

Female supervisors seem more willing to allow dental hygienists to use work hours to develop their skills and capabilities than male supervisors – an aspect of CPD. Supportive, encouraging management has been found to result in better health, performance, job satisfaction, and quality of care (11, 17, 24, 26). Dental hygienists in the public sector seemed to be more willing to improve clinical process quality and to receive further education and training (CPD) in paediatric dentistry, health promotion and geriatric dentistry. More stress from financial constraints and physical work was found in the public sector compared with the private (16), and stress could exert a negative influence on hygienists' ambitions to maintain a high quality of work, while greater opportunities to practice in dif-

ferent fields might explain their preferences for CPD (27–28; Tables 3 and 4). Those who work in public service might also see opportunities for varied workloads, e.g. paediatric dentistry (Tables 2 and 4). Work improvement preferences varied depending on city size, which should be observed when working with workplace improvements.

Physically active hygienists and those who read and study for leisure find CPD in health promotion and disease prevention to be important. Dental hygienists who see themselves as important to disease prevention and as health promoters are physically active (29). It is suggested that hygienists who associate personal well-being with leisure activities will also influence others. In order to do so, they ask for more CPD. Another finding was that lifestyle, work satisfaction, and use of one's skills predicted CPD in research-driven care. Dental hygienists who have an active lifestyle and are satisfied with their work will probably be generally interested in research results as a basis for their daily work. Scaling work has been shown to influence the health of hygienists the most (15). Improved work conditions seem to be more important for the hygienists than receiving more training and education (CPD).

The present overall acceptable response rate of 71% and data from a randomized national sample of currently employed dental hygienists allow generalization of the results (14, 17). We still know little about the impact of non-respondents. However, no significant differences between respondents and non-respondents with regard to geographic location could be found. In a previous telephone interview that followed up a mail survey (the response rate was 53%), no significant differences were found between respondents and non-respondents with regard to gender, age, years in the profession, workload, and work-related fatigue (30). The internal non-responses are another possible problem. Sufficient completion of the questionnaire by the sample group might indicate success in target and design. For the outcome variables, non-responses varied in mean percentages between 4.7 and 5.2%, except for the evidence-based case (14%). This should, however, be acceptable. Several scales were used, and they were factor analysed independently. Factor analysis requires that subjects respond to all items on a scale or the unanswered items will be automatically dropped (31). Satisfied respondents may have been more likely to respond, yielding an overestimation of data, while dissatisfied respondents have responded to air their dissatisfaction. In all, self-ratings were found to be valid measures of health and well being (32). It is suggested that these factors might be sufficient to allow for non-responses and self-ratings to have minor effects on the results.

Use of stepwise multivariate logistic methods (which decrease the effect of third-variable controls) and logistic regression models of acceptable fit strengthened the study. The study's limitations are a fairly low percentage of correctly predicted cases in some logistic models. A low percentage could mean that additional variables that are not included in the models exert a limited influence on the results, and that few dental hygienists reported sufficient support. Finally, only associations can be discussed in this first part of the present longitudinal design (31).

Conclusion

Workplaces should observe those persons that are committed to their work, those with many sick days, and those in a specific age group, because they indicate different preferences for workplace improvements. CPD seems to be a lower priority than workplace improvements for Swedish dental hygienists.

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