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## Workplace health in dental care – a salutogenic approach

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**Abstract:** *Objective:* The purpose was to explore self-reported psychosocial health and work environments among different dental occupations and workplaces from a salutogenic perspective. A further purpose was to analyse possible associations between three salutogenic measurements: The Sense of Coherence questionnaire (SOC), the Salutogenic Health Indicator Scale (SHIS) and the Work Experience Measurement Scale (WEMS). *Methods:* Employees in the Public Dental Service in a Swedish county council ( $n = 486$ ) were invited to respond to a self-reported web survey including demographics, work-related factors, the SOC, the SHIS and the WEMS. *Results:* This study showed positive associations between employee characteristics and self-reported overall psychosocial health as well as experienced work environment. Autonomy was reported more among men than women ( $P < 0.000$ ) and to a higher degree by dentists and dental hygienists than dental nurses ( $P < 0.000$ ). Meaningfulness, happiness, job satisfaction, autonomy and positive to reorganization were reported by personnels aged less than 40 years ( $P \leq 0.047$ ). Clinical coordinators reported significant better health (SOC, SHIS) and experienced more autonomy, better management and more positive to reorganization than other dental professions. Dental hygienists and nurses experienced less time pressure than dentists ( $P \leq 0.007$ ). Better health and positive work experiences were also seen in smaller clinics ( $P \leq 0.29$ ). *Conclusion:* Dental professionals reported a high degree of overall psychosocial health as well as a positive work experience. Some variations could be seen between employee characteristics such as gender, years in dental care, professionals, managing position and workplace size. Identify resources and processes at each workplace are important and should be included in the employee's/employers dialogue.

**Key words:** dental staff; health promotion; psychosocial health; workplace

## Introduction

The dental organization is included in the so-called Human Services (1) and is considered as highly complex organizations depending on the interaction between the patient, the profession and the organization (2). This organization is characterized by the professional's responsibilities both towards health care and on the organizational rules, structures and finances that govern these complex organizations, which over time also changes. This, together with own personal values can generate a sense of obstacles and constraints to carry out their work in an optimal professional and qualitative manner.

Ongoing changes in Swedish public dental care are the number of professions and the need of dental care in the population. The dentist has the odontological responsibility for the patient and treats patient in all age groups. The dental nurse assists the dentist but also works with oral health prevention in children and with some other treatments delegated by the dentist, such as local anaesthesia, scaling of calculus and screening of oral health in children. The dental hygienist often works alone and is authorized to perform examinations, treat and prevent periodontal and caries diseases in all age groups (3). Regarding dental needs, better oral health in the population in general has been seen (4). However, there are groups in society that need treatment, for example, older sick people and immigrants, but also groups where the focus must be on oral health prevention and promotion. These professional changes and dental care needs will lead to a changed work situation for dental clinicians (dentists, dental hygienists and dental nurses), as well as for clinical coordinators, who administer and coordinate the daily work, and for managers with staff and economy responsibilities (2, 3, 5).

The National Swedish Board of Health and Welfare (5) suggest efforts to find effective alternative collaboration strategies for the dental team. Some efforts have been made at many clinics in Sweden, by strategically employing more dental hygienists compared to the number of dentists. However, changes to the proportions of different occupations in the dental care organization may also influence the work and responsibilities, such as integration, cooperation and delegation of different work tasks within the dental team. This may, in turn, influence the staff's health and work environment. To meet these changes, studies are needed to acquire the necessary knowledge about the potential health impacts of these changes.

Furthermore, evaluations of dental workplace environments have mostly been made from a pathogenic perspective, that is with the focus on disease and risk factors, and have primarily been based on the physical workload. These studies have shown a high degree of perceived physical load, especially among dentists (6–8) and dental hygienists (9, 10). However, Kuoppala *et al.* (11) have emphasized the importance to maintain and improve health in a workplace through health promotion.

### A salutogenic way to measure health

Workplace health promotion refers to strategies to improve the health and well-being of the employees (12). Studies using a salutogenic approach would provide a valuable complementary perspective on the health and work environment of dental staff. Salutogenesis searches for 'the origin of health', rather than focus on the cause of disease and risk factors. The philosophical 'salutogenic' question of what creates health was originally raised by the sociologist A. Antonovsky (13, 14) and is now an established key term in public health promotion (15, 16). The salutogenic theory is based on a holistic view of health, including a biopsychosocial perspective. The theory

has two key elements: focus on problem-solving and on the individual's capacity to use his/her resources in a healthy direction (17).

Antonovsky (17) also developed the concept of Sense of Coherence (SOC), which is included in the salutogenic theory. SOC is made up of three components: comprehensibility, manageability and meaningfulness, and, taken together, they all have an impact on health. An individual's SOC is built up of different experiences from life, that is general resistance resources. The amount of different available resources and the ability to use them make a difference for the strength of the SOC. A strong SOC is associated with adaptable health behaviour. The SOC has been shown to be positively related to health and quality of life (18, 19), and the distribution of the SOC in a Swedish randomized general population has been described in Lindmark *et al.* (20). The SOC has also been shown to have influence high-demand/low-control work environments, as an interactive effect of emotional job strain (21).

In addition to the SOC scale, the Salutogenic Health Indicator Scale (SHIS) has more recently been developed on the basis of the salutogenic theory and aims to estimate general health, well-being and quality of life in a broad sense among healthcare professionals (22). Moreover, Nilsson *et al.* (23) have also developed a questionnaire, the Work Experience Measurement Scale (WEMS), which also has a salutogenic approach and has been shown to be a useful health promotion instrument in workplaces. The WEMS identifies strengths and resources for health promotion work in the workplace. Nilsson *et al.* (23, 24) found that several salutogenic factors at a workplace promote employee health and are related to context-specific resources at the workplace, such as the capacity for reflection, open-mindedness, transparency, harmony, flexibility, accountability, encouragement and a good social climate. The SOC (25–30), SHIS and WEMS (22, 31) have been studied in relation to other professionals, such as nurses, physicians and medical technicians, and workplaces, such as hospitals (22, 25–30) and also offices (31). Also, salutogenic concepts, such as hardiness and self-efficacy, are also related to the SOC, have been studied in general health care and have been shown to be positively related to health in the workplace (32, 33). Some previous studies have also shown a positive relationship between work satisfaction and better control of the work situation, work relations, management support, development of job skills and optimal opportunities for dental hygienists to apply their full competence (34, 35).

Knowledge of work-related factors and health among dental care personnel is needed, due to the continuous changes in the proportions of the number of dental professionals and in relation to the requirement to meet the needs of oral health in the population. This may contribute to the identification of strategies for health promotion work directed to this group. However, so far, no study has been identified that applies a salutogenic approach to psychosocial health for staff *and* work environments in the dental health service. Neither have the three instruments, the SOC, SHIS and WEMS, been used

together in an attempt to identify different salutogenic approaches in this context.

The aim is therefore to explore self-reported psychosocial health and experienced work environment among different dental occupations and workplaces from a salutogenic perspective. A further aim is to analyse possible associations between the three salutogenic measurements.

## Material and methods

### Population

All personnel (dentists, dental hygienists, dental nurses and staff members with management positions) working in the Public Dental Service in one county council in southern Sweden were invited. Whether the participants had a position as manager and/or clinical coordinator was also asked for, as these positions involve management responsibilities, such as coordinating the daily work among different staff groups, ordering tools and equipment and handling staff and financial matters. In all, 486 staff members were invited to participate, which represented 26 clinics.

### Measures

The staff members completed a self-reported web survey (made with the esMaker NX3 software). The web survey included demographic questions (gender and age) and work-related factors of employment, such as profession, occupational years and number of staff at their clinic, that is clinic size.

Three instruments were used to analyse different aspects of health and workplace-related factors from a salutogenic perspective. Antonovsky's (17) the Sense of Coherence Questionnaire (SOC) and the Salutogenic Health Indicator Scale (SHIS) (22) were both used to explore self-rated health. The Work Experience Measurement Scale (WEMS) (36) was used to explore the experienced work environment.

#### **The Sense of Coherence Questionnaire (SOC)**

The SOC scale comprises 13 items and consists of three dimensions from an individual perspective, concerning comprehensibility (five items concerning cognitive ability), that is the ability to understand the situation/problem and have control (I know); manageability (four items concerning instrumental ability), that is the ability to have and use both internal and external resources to manage a situation/problem (I can); and meaningfulness (four items concerning emotional ability), that is the ability to feel motivated to change a behaviour (I want). Each item is scored on a Likert scale ranging from 1 to 7, where 1 could be 'have never had...', and 7 'have always had...'. Before calculating the total score, the scores from questions 1–3, 7 and 10 must be reversed to meet the criterion of 'the higher the score, the stronger the SOC', that is from 7 to 1. The total scores for the three dimensions are 35, 28 and 28, respectively. The sum of the scores for the total SOC

ranges from 13 to 91. A high score indicates a strong SOC (17). The SOC questionnaire has shown high validity and reliability (36).

#### **The Salutogenic Health Indicator Scale (SHIS)**

The SHIS includes 12 items considered to represent complexity and breadth and cover a cognitive, a physical and a psychosomatic dimension of health. All items are estimated as one index. The SHIS has one overall question: '*How have you been feeling during the past 4 weeks? The last 4 weeks I have...*'. The response format has a range from 1 to 6 for each item, where 1 is negative (unhealthy) and 6 is positive (healthy). Higher scores indicate better health with a min–max score of 12–72 points. The validity and reliability of the SHIS have been shown to be high (22).

#### **The Work Experience Measurement Scale (WEMS)**

The Work Experience Measurement Scale (WEMS) includes 32 statements divided into six dimensions: seven questions related to supportive work conditions (encouragement and support, atmosphere, routine, feedback, job satisfaction, health promotion, and advice and help when needed), six questions about internal work experience (meaningfulness, development, variation, satisfaction with work content, happiness and challenges), four questions about autonomy (how, when, what to do and time control), three about time experience (less time pressure, time to finish duties and overtime), six about management (availability, engagement, fairness, participation in decisions, ability to make decisions, and workplace goals and visions) and six questions about reorganization (open dialogue, responsiveness, meaningfulness, participation, safety and communication). The statements are rated on a six-degree Likert scale ranging from 1, 'agree completely', to 6, 'disagree completely', with a min–max score of 32–192. Higher scores indicate a positive direction in terms of work experience. The WEMS has shown high validity and reliability among personnel working at hospitals in Sweden (23, 37).

### Design

This cross-sectional study reports the baseline data collected in 2012 for a larger longitudinal project among dental personnel, the Dental Organisation in Transition (DOiT) project, aimed at measuring the physical and psychosocial health of employees working in dentistry in 2012, 2014 and 2016.

### Procedure

The survey was distributed in 2012, and two reminders were sent to those who did not respond to the questionnaire. The data were analysed statistically using SPSS Statistics, version 21 (IBM Corp, Armonk, New York, USA). Continuous variables were categorized into groups. Age was categorized into four groups: <40, 40–49, 50–59 and ≥60 years. Clinical

coordinator was analysed both as a single profession, as it is an increasingly common profession in the dental team (they may be dentists, dental hygienists or dental nurses) and included in the variable 'managerial position'. Years in the dental service were categorized into five groups: <10, 10–19, 20–29, 30–39 and ≥40 years. Clinic size, based on the number of employees, was categorized into three groups: ≤10, 11–20 and >20 persons, based on data from Statistics Sweden.

The total scales for the SOC and WEMS were used and calculated as three (SOC) and six (WEMS) subscales, respectively (based on their dimensions). The SHIS was calculated as one total scale as well as categorized into tertiles, with the aim to compare the lowest tertile (indicating ill health) and the highest tertile (indicating health). To analyse the internal consistency, the Cronbach alpha coefficients were calculated for all three instruments.

To analyse the strength and direction of the linear relationship between the total scores in the three instruments, the SOC, the SHIS and the WEMS, Spearman rank-order correlations were calculated. To compare groups, nonparametric tests were used as follows: the chi-square test, Fischer's exact test and the Mann–Whitney *U*-test for two groups and the Kruskal–Wallis test for more than two groups. The level of significance was set to  $\alpha = 0.05$  (\*). The results are presented as means and standard deviations, to allow comparison with the results of previous studies.

### Ethical considerations

The clinic manager informed the dental staff at each dental clinic about the study. Furthermore, the information sent out together with the web survey presented the purpose of the study and an assurance that the data would be treated confidentially. Personal data were replaced by a 'code'. The ethical rules for research described in the Helsinki Declaration (38) were followed throughout the study. The Swedish Personal Data Act, which stipulates that no unauthorized person will have access to the collected data or other materials related to a study, was also monitored. When the results from this study are published, individuals will not be identified.

The DOI:T project has been approved by the Regional Ethical Review Board in Linköping (Ref. no: 2012/186-31).

## Results

The web survey was completed by 321 (66%) individuals. Twenty employees were excluded because of missing data about their background variables. Of the non-respondents, 162 (60%) were women and 23 men (40%). No further data about the non-respondents were available. The study group therefore consisted of 301 employees (62% of the total sample). Of these, 272 were women and 29 men, within the age span of 21–68 years (mean 56 years). The number of participants in each age group, their profession, position as manager, years in the dental service and the clinic size are described in Table 1.

**Table 1. Description of the total sample ( $n = 301$ , %)**

Variables	N	%
Total sample	301	100
Gender ( $n = 301$ )		
Women	272	90
Men	29	10
Age ( $n = 300$ )		
<40	70	23
40–49	60	20
50–59	123	41
≥60	47	16
Professions ( $n = 301$ )		
Dental nurse	165	55
Dentist	78	26
Dental hygienist	42	14
Clinical coordinator	16	5
Managerial position ( $n = 301$ )		
Yes	38	13
No	263	87
Years in dental service (301)		
<10 years	91	30
10–19 years	58	19
20–29 years	57	19
30–39 years	77	26
≥40 years	18	6
Clinic size (number of staff) ( $n = 298$ )		
≤10 persons	41	15
11–20 persons	125	41
>20 persons	132	44

### Self-reported psychosocial health

In this study, the mean total SOC score was 70.0 (SD = 11.0) and the range was 34–91 points for the whole sample. The total mean SHIS score was 50.6 (SD = 12.1), and the range was 15–72 points for the whole sample. The results of the distribution of the SOC and the SHIS among different types of dental care employees and characteristics are presented in Tables 2 and 3, respectively.

### Participants and different characteristics

There was no statistically significant difference between women and men for the total SOC score. However, categorized into the three SOC dimensions, men had statistically significantly higher manageability than women [22.4; SD 4.0 and 20.9; SD 3.8, respectively (Table 2)]. No statistical significance between genders could be seen for the SHIS (Table 3).

There was no statistically significant difference between the different age groups for the total SOC score or the SHIS. However, an age trend could be seen, where the SOC increased with age (Table 2).

There were statistically significant differences between different professions, both for the total SOC scores and for the dimensions of meaningfulness and manageability, where clinical coordinators had a statistically significantly higher total SOC score (75.1; SD 10.0), compared with all other professions (Table 2). Dental hygienists had higher scores for meaningfulness (23.8; SD 3.3), and dentists had higher scores for

**Table 2. Description and analyses of total SOC and its three subcomponents in relation to dental employee gender, age and work-related factors (n = 301, mean and standard deviations, SD)**

Variables	SOC total		Meaningfulness		Manageability		Comprehensibility	
	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*
Total (n = 301)	70.0 (11.0)		22.9 (3.5)		21.1 (4.0)		26.0 (4.9)	
Gender (n = 301)								
Women	69.8 (10.8)		22.9 (4.2)		20.9 (4.0)		25.9 (4.8)	
Men	71.9 (12.3)	ns	23.0 (4.2)	ns	22.4 (3.8)	.039*	26.5 (5.8)	ns
Age (n = 300)								
<40	67.8 (12.0)		22.8 (3.9)		20.0 (4.5)		24.7 (5.1)	
40–49	70.2 (11.2)		22.9 (3.2)		21.0 (4.2)		26.2 (4.8)	
50–61	70.3 (10.5)		22.8 (3.4)		21.3 (3.6)		26.2 (4.9)	
≥60	72.1 (10.1)	ns	23.2 (3.5)	ns	21.8 (3.7)	ns	27.1 (4.2)	ns
Professions (n = 301)								
Dental nurse	68.4 (11.0)		22.5 (3.4)		20.3 (4.0)		25.5 (4.9)	
Dentist	71.2 (10.7)		22.8 (3.8)		22.1 (3.6)		26.2 (4.8)	
Dental hygienist	72.1 (11.0)		23.8 (3.3)		21.6 (4.1)		26.7 (4.7)	
Clinical coordinator	75.1 (10.0)	.010*	24.4 (3.1)	.021*	22.8 (3.0)	.002*	27.8 (5.1)	ns
Managerial position (n = 301)								
Yes	72.5 (9.8)		23.6 (3.4)		22.1 (3.3)		26.7 (4.7)	
No	69.6 (11.1)	ns	22.8 (3.5)	ns	20.9 (4.9)	ns	25.9 (4.9)	ns
Years in dental service (301)								
<10 years	69.1 (10.5)		23.1 (3.3)		20.8 (3.9)		25.2 (4.6)	
10–19 years	72.2 (12.0)		23.7 (3.7)		21.5 (4.2)		27.0 (5.3)	
20–29 years	68.2 (10.8)		22.3 (3.6)		20.5 (4.0)		25.4 (4.8)	
30–39 years	69.8 (11.1)		22.2 (3.5)		21.4 (4.0)		26.2 (4.9)	
≥40 years	73.7 (8.0)	.038*	24.0 (2.5)	.043*	22.0 (3.3)	ns	27.7 (3.5)	.030*
Clinic size (number of staff, n = 298)								
≤10 persons	73.8 (9.1)		24.0 (3.1)		22.4 (3.1)		27.3 (4.4)	
11–20 persons	70.0 (11.1)		23.0 (3.4)		20.8 (4.1)		26.1 (4.9)	
>20 persons	68.7 (11.2)	.018*	22.4 (3.6)	.015*	20.9 (4.0)	.049*	25.4 (4.9)	.039*

\*  $P < 0.05$  = Statistical significance for the whole variable (Kruskal–Wallis test).

] Indicates statistically significant differences within the groups (chi-square test and Mann–Whitney  $U$ -test) at  $P < 0.05$ ; ns = non-significant.

manageability (22.1; SD 3.6), compared with dental nurses (22.5; SD 3.4 and 20.3; SD 4.0, respectively). As shown in Table 3, clinical coordinators also reported better overall health, that is, SHIS (mean score 58.1; SD 11.1), compared with the dentists and dental nurses (49.4; SD 12.2 and 49.8; SD 11.8, respectively). The dental hygienists also reported statistically significantly better overall health than dental nurses. Dividing the SHIS results into low, medium and high scores, a statistically significant difference was seen between the professions with regard to the high and low scores, where more dental hygienists were found in the higher tertile (48%) than in the lower tertile (21%); however, no statistically significant difference was found here (Table 3).

Participants having worked 10–19 years had statistically significantly higher total scores (72.2; SD 12.0 for SOC and 54.2; SD 13.0 for SHIS) compared with those having worked 20–29 years (SOC), ≤10 years (SHIS) and 30–39 years (SHIS) (Tables 2 and 3). A higher total SOC score for those with 10–19 working years was seen for the dimension of meaningfulness. Also, employees working more than 40 years in dentistry had statistically significantly higher scores for comprehensibility compared with those working less than 10 years (27.7; SD

3.5 and 25.2; SD 4.6, respectively). Regarding the SHIS results, significantly fewer dental personnel having worked 30–39 years reported better overall health than personnel in the other age groups (Table 3).

Dental personnel working in smaller clinics showed a statistically significantly higher score for the total SOC (73.8; SD 9.1) and its three dimensions (Table 2). No statistically significant difference could be seen regarding clinic size and the SHIS (Table 3).

### Experienced work environment

The results of the distribution of the WEMS in relation to dental employee characteristics are presented in Table 4. The mean total score was 144.3 (SD 23.0) for the whole sample. Men had a statistically significantly higher total score compared to women (152.7; SD 18.4, and 143.4; SD 23.3, respectively) and also had a significantly higher score for autonomy (17.7; SD 3.6, and 13.8; SD 4.6). Those younger than 40 years of age (149.3; SD 24.8) compared with older individuals, as well as those who had worked less than 10 years (148.7; SD 19.7) compared to more years in the dental service, had

**Table 3. Description and analyses of total SHIS ( $n = 301$ ) and divided into lowest ( $n = 102$ ), middle ( $n = 101$ ) and highest ( $n = 98$ ) tertiles in relation to the dental employees' gender and age- and work-related factors (mean, SD and  $n$ , %)**

Variables	SHIS total		Lower tertile	(15–46)	Middle	Higher	Low versus
	(mean, SD)	$P$ value*	$n$ (%)	$P$ value*	tertile (47–57)	tertile (58–72)	high tertile
Total sample	50.6 (12.1)		102 (34)		101 (33)	98 (33)	
Gender ( $n = 301$ )							
Women	50.6 (12.0)		94 (34)	.051 <sup>□</sup>	89 (33)	89 (33)	ns
Men	50.2 (13.0)	ns	8 (28)		12 (41)	9 (31)	
Age ( $n = 300$ )							
<40	49.4 (12.3)		23 (33)		28 (40)	19 (27)	
40–49	51.0 (11.7)		19 (32)		17 (28)	24 (40)	
50–59	50.6 (12.3)		43 (35)		43 (35)	37 (30)	
≥60	51.5 (11.9)	ns	17 (36)	ns	13 (28)	17 (36)	ns
Professions ( $n = 301$ )							
Dental nurse	49.8 (11.8)	.014*	61 (37)	ns	54 (33)	50 (30)	.032*
Dentist	49.4 (12.2)		28 (36)		31 (40)	19 (24)	
Dental hygienist	53.0 (12.1)		9 (21)		13 (31)	20 (48) <sup>□</sup>	
Clinical coordinator	58.1 (11.1)		4 (25)		3 (19)	9 (56)	
Managerial position ( $n = 301$ )							
Yes	50.1 (12.1)		12 (32)		11 (29)	15 (39)	
No	53.6 (11.6)	ns	90 (34)	ns	90 (34)	83 (32)	ns
Years in dental service (301)							
<10 years	48.8 (11.2)	.020*	29 (32)	ns	38 (42)	24 (26)	.031*
10–19 years	54.2 (13.0)		15 (26)		15 (26)	28 (48) <sup>□</sup>	
20–29 years	50.0 (12.6)		20 (35)		17 (30)	20 (35)	
30–39 years	48.4 (11.8)		33 (43)		27 (35)	17 (22)*	
≥40 years	53.0 (12.0)		5 (28)		4 (22)	9 (50)	
Clinic size (number of staff) ( $n = 298$ )							
≤10 persons	53.2 (11.1)		12 (29)		13 (32)	16 (39)	
11–20 persons	49.6 (12.6)		43 (34)		42 (34)	40 (32)	
>20 persons	50.6 (11.8)	ns	46 (35)	ns	44 (33)	42 (32)	ns

\*  $P < 0.05$  = Statistical significance for the whole variable (Kruskal–Wallis test); <sup>□</sup>  $P < 0.1$  = Tendency towards statistical significance between groups (Mann–Whitney  $U$ -test).

] Indicates statistically significant differences within the groups (chi-square test and Mann–Whitney  $U$ -test) at  $P < 0.05$ ; ns = non-significant.

significantly higher total scores. These differences could be seen for the dimensions of internal work experience, autonomy and, for the 40-year group, also in the dimension of reorganization.

Clinical coordinators had a higher total score (156.1; SD 17.1), compared with all other dental professions. There was a statistically significant difference in the scores for the dimensions of internal work experience, where clinical coordinators had higher scores than nurses (32.0; SD 3.2, and 29.3; SD 4.8, respectively). With regard to autonomy, dentists and dental hygienists (17.0; SD 3.6, and 16.2; SD 4.4, respectively) had statistically significantly higher scores than dental nurses (12.1; SD 4.2). For time experience, dental nurses and hygienists (12.4; SD 2.3, and 12.6, respectively; SD 3.0) had significantly higher scores than dentists (10.8; SD 4.9). Among management staff, clinic coordinators had higher scores than dental hygienists (30.9; SD 4.5, and 27.3; SD 5.7, respectively), and for reorganization, clinical coordinators had higher scores than dental hygienists (28.9; SD 5.8, and 24.6; SD 7.1, respectively). Managers ( $n = 38$ ) had a statistically significantly higher total WEMS score (151.7; SD

16.5) compared with staff without a management position (143.2; SD 23.7), which was also seen for internal work experience, autonomy and reorganization (Table 4).

With regard to clinic size, working at a small clinic, that is ≤10 persons, was associated with a higher total WEMS score (149.1; SD 20.1) compared with working in medium size and larger clinics, 146.8; SD 21.4, and 140.2; SD 24.8, respectively. This trend could also be seen for the dimensions of internal work experience, time experience, management and reorganization (Table 4).

#### The association between the SOC, SHIS and WEMS scales

For this sample, all three scales had good internal consistency with a reported Cronbach alpha coefficient of .88 (SOC), .95 (SHIS) and .95 (WEMS). The correlations between the total scores of the three psychosocial and salutogenic measurements were positive and medium strong to strong;  $r = .433$  (SOC and WEMS),  $r = .663$  (SOC and SHIS),  $r = .452$  (SHIS and WEMS) and significant ( $P < .001$ ).

**Table 4. Description and analyses between total WEMS and its six dimensions in relation to dental employee gender, age and different working condition factors (n = 301, mean, SD)**

Variables	WEMS Tot			Supportive working conditions			Internal work experience			Autonomy			Time experience			Management			Reorganization		
	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	Mean (SD)	P value*	
Total (n = 301)	144.3 (23.0)		33.9 (5.9)		29.7 (4.9)		14.2 (4.6)		12.1 (3.3)		28.2 (5.9)		26.2 (6.8)								
Gender (n = 301)																					
Women	143.4 (23.3)		33.8 (6.0)		29.6 (5.0)		13.8 (4.6)		12.1 (3.3)		28.1 (6.0)		25.9 (6.9)	ns							
Men	152.7 (18.4)	.041*	35.7 (4.3)	ns	30.2 (4.3)	ns	17.7 (3.6)	.000*	11.6 (3.5)	ns	29.8 (4.4)	ns	28.2 (5.2)								
Age (n = 300)																					
<40	149.3 (24.8)		34.5 (6.3)		30.8 (4.7)		15.4 (4.3)		12.4 (3.3)		28.8 (6.2)		26.2 (6.8)								
40–49	142.1 (22.3)		33.8 (6.1)		29.4 (5.3)		14.2 (4.4)		12.5 (3.6)		27.3 (6.5)		26.0 (6.2)								
50–59	141.6 (22.8)		33.4 (5.8)		28.9 (4.6)		13.3 (4.5)		12.0 (3.1)		28.3 (5.8)		25.6 (6.7)								
≥60	146.3 (21.4)	.028*	34.6 (5.4)	ns	30.2 (5.2)	.014*	14.7 (5.3)	.017*	12.5 (3.3)	ns	28.5 (4.8)	ns	25.7 (7.6)	.015*							
Professions (n = 301)																					
Dental nurse	142.1 (23.5)		33.7 (6.3)		29.3 (4.8)		12.1 (4.2)		12.6 (3.0)		28.2 (5.8)		26.2 (6.8)								
Dentist	146.6 (23.0)		34.0 (5.5)		30.1 (5.3)		17.0 (3.6)		10.8 (4.0)		28.4 (6.4)		26.3 (6.8)								
Dental hygienist	143.9 (22.0)		33.8 (5.8)		29.5 (5.0)		16.2 (4.4)		12.4 (2.3)		27.3 (5.7)		24.6 (7.1)								
Clinical coordinator	156.1 (17.1)	.054 <sup>a</sup>	36.2 (4.1)	ns	32.0 (3.2)	.026*	16.6 (3.6)	.000*	11.9 (3.2)	.007*	30.9 (4.5)	.047*	28.9 (5.8)	.041*							
Managerial position (n = 301)																					
Yes	151.7 (16.5)		35.2 (4.7)		31.3 (3.3)		17.1 (3.1)		11.4 (3.2)		28.5 (5.3)		28.4 (6.8)								
No	143.2 (23.7)	.034*	33.8 (6.0)	ns	29.4 (5.1)	.047*	13.8 (4.7)	.000*	12.2 (3.3)	ns	28.2 (6.0)	ns	25.8 (6.8)	.025*							
Years in dental service (n = 301)																					
<10 years	148.7 (19.7)		34.6 (5.2)		30.9 (4.0)		15.2 (4.2)		12.1 (3.4)		29.0 (5.4)		26.8 (6.6)								
10–19 years	145.3 (25.5)		34.0 (6.4)		29.9 (5.0)		14.5 (5.0)		12.1 (3.0)		28.4 (6.0)		26.4 (6.8)								
20–29 years	139.0 (25.4)		33.1 (7.1)		28.4 (5.5)		13.4 (4.5)		11.6 (3.5)		27.0 (7.3)		25.4 (6.5)								
30–39 years	141.2 (22.3)		33.3 (5.5)		28.6 (5.2)		13.6 (4.9)		12.0 (3.2)		27.9 (5.4)		25.6 (6.9)								
≥40 years	145.1 (22.6)	.047*	35.3 (5.3)	ns	30.7 (4.1)	.021*	14.2 (4.0)	ns	13.5 (3.1)	ns	29.3 (4.9)	ns	26.7 (8.0)	ns							
Clinic size (number of staff) (n = 298)																					
≤10 persons	149.1 (20.1)		34.4 (5.3)		30.8 (4.0)		14.9 (4.8)		12.8 (3.1)		30.0 (4.4)		26.1 (7.3)								
11–20 persons	146.8 (21.4)		34.6 (5.1)		30.1 (4.8)		14.2 (4.6)		11.6 (3.4)		28.7 (5.6)		27.6 (6.8)								
>20 persons	140.2 (24.8)	.029*	33.1 (6.7)	ns	28.8 (5.2)	.017*	13.9 (4.7)	ns	12.3 (3.2)	.033*	27.2 (6.4)	.009*	24.8 (6.3)	.001*							

\*  $P < 0.05$  = Statistical significance for the whole variable (Kruskal–Wallis test);  $\square$   $P < 0.1$  = Tendency towards statistical significance between groups (Kruskal–Wallis test).

] Indicates statistically significant differences within the groups (chi-square test and Mann–Whitney  $U$ -test) at  $P < 0.05$ ; ns = non-significant.

## Discussion

The results, using a salutogenic perspective, showed several statistically significant associations between self-reported psychosocial health and experienced work environment among different types of dental employees and workplaces. The results also showed significant positive associations between the three measurements, indicating that these instruments together may provide a broader perspective and knowledge about different dimensions of work-related health.

### Self-reported health

This study, using a salutogenic perspective, indicates that dental personnel on the whole, and in the context of this county council, can be considered a healthy profession, albeit with some variation between different employee characteristics. Variations between different professionals, such as nurses, physicians and medical technicians, have also been seen in earlier studies using the SOC (26, 28, 29) and the SHIS (22, 31) and between workplaces, such as hospitals and offices. For the SOC, the mean has varied from 56.7 to 75.06 in these studies. A study including employees working as administrative staff (31) showed similar mean SHIS scores as our study. However, Bringsen *et al.* (22) showed a lower mean SHIS score in their study including different groups of employees working at a Swedish hospital.

Men had higher scores for manageability than women, interpreted as the feeling that they have both the tools and the ability to use them to solve problems. In earlier studies (20, 38), men had slightly higher SOC scores than women. Being male and having a managerial position may be related and may constitute a healthy resource. However, a potential relationship has not been sought in the current study.

Working as a clinical coordinator also appeared to be a healthy position. This was also the case for being a dentist or a dental hygienist compared with being a dental nurse. This can be explained through the dimensions of meaningfulness and manageability, interpreted in this study as dentists having more tools to perform their work and dental hygienists having a stronger feeling of usefulness and participation compared with nurses. In an earlier study, carried out in a nursing practice context, Reid Ponte *et al.* (30) described that strong SOC was related to the feeling of 'I know my job', that is comprehensibility, and 'my manager gives me the tools I need to do my job', that is manageability'. Interprofessional relationships within the healthcare service, such as understanding, values and support for one's profession, as well as values of professional development, have been described earlier as important health promotion factors in a workplace (30, 39). However, Hoge and Bussing (26) have emphasized that SOC and position are not necessarily the only relationship, as other work-related factors, such as work stressors and strain, also have an influence on the SOC. A feeling of participation and motivation (i.e. meaningfulness) and having control and access to resources (i.e. manageability) may both be associated with the

profession and the work position. Also, working conditions, such as the content and perceived meaning of the work, may be influencing factors. Moreover, Takeuchi and Yamazaki (28) stresses that an individual's perception of health and ability to cope is also influenced by the person's whole life situation, including both work and private life. This aspect must also be considered when analysing health, working conditions and work tasks.

A divergent result and small differences in terms of general health and working years were shown, which must be taken into account when interpreting the results. However, having worked for 10–19 years in dentistry you may feel safe and motivated to work with your profession. Furthermore, considerable experience within dentistry may explain the higher score for the feeling of comprehensibility after 40 working years.

In this study, the employees in smaller clinics reported better health. Even if there are organizational changes and problems, the employees seem to have the resources and the ability to use them in a healthy way. The resources for health may not only be within the workplace but also within a person's character and life context. Although the results say nothing about causality, this result may be important to consider before implementing restructuring into larger clinics.

### Experienced work environment

In this study, the mean WEMS score indicate a fairly high score. Regarding the six dimensions, the figures are similar to those from Bergstrom *et al.* (31). According to Nilsson *et al.* (23), the WEMS is a tool that identifies strengths and resources in the health promotion work at a workplace. In the current study, several healthy resources were identified as important in relation to the dental employees' characteristics and the workplace. Younger employees and those working fewer years seemed to have a more positive feeling with regard to internal work experience, autonomy and reorganization. Moreover, the fact that most of the men are dentists and have managerial positions may explain the differences between men and women regarding autonomy. There were also differences between the professions with regard to the six dimensions. Nilsson *et al.* (22) describe that all the dimensions are important health resources for all professions and, thus, the feeling of impaired internal working conditions and autonomy for nurses and the negative time experience for dentists must be included in health promotion work at the workplace. Nilsson *et al.* (23) also found relationships between the WEMS and age, different professions within the health service and managerial position. As previous shown by Whitehead (40) and Ylipaa *et al.* (10, 35), this indicates the importance of identifying resources and processes in each professional and in each work context.

With regard to clinic size, the results indicate the importance of working with healthy resources at the workplace, as shown in the results, also when restructuring into larger clinics.



### The SOC, SHIS and WEMS are related

Our results showed positive medium-to-strong correlations between all three salutogenic measurements. However, even if there were positive correlations between the instruments at group level, there were also individual variations within them. This indicates the importance of an awareness of individual variations in experienced health and work when working with workplace reorganization and health promotion combined.

Applying a salutogenic approach to a workplace within the human service (1) as dentistry, where there are demands for restructuring (as happens now in the dental service), has been shown to be a way to maintain and/or improve employee health, specifically mental health (11, 23, 24, 41). In a further step, and as Reid Ponte *et al.* (30) have pointed out, a salutogenic approach and health among the staff may also have a positive influence on patient outcomes. From a dental care perspective, we believe that dental personnel who work in a salutogenic workplace may be a better resource for their patients.

### Methodological considerations

Some considerations about the method should be mentioned. Few men were included, which may have influenced the results. However, the percentage of men is consistent with the proportion of men to women within dentistry in the studied county council. A strength of the study is that all dental employees working in the public dental service during the study period were invited to participate (respondents, 66%). The data are based solely on one Swedish county council and included dental employees working in the public dental service and not in private dental care. For this reason, the generalization of the results may be an issue. However, when planning for future dentistry, these results may still be of value.

Furthermore, the entire material provides satisfactory power (80% or more). However, in the subgroup analyses, with two-sided chi-square test and Fischer test, the power was reduced to 50–70% in the groups. Thus, when comparing subgroups, these results must be considered, even if the statistically significant differences may not make a difference in practice.

Another weakness to consider, when many analyses are examined at the same time, is the risk of mass significance and, thus, the increased risk of type I errors. For this reason, the overall alpha level should be lowered to compensate for this risk, but the methods available for such corrections are usually too conservative and will instead increase the statistical type II error. Therefore, no correction has been made in the material. In this study, significant results should be considered only when they occur in logical patterns and comply with the established knowledge in the area.

Finally, the high Cronbach alpha values in all instruments indicated high internal reliability, which is in line with earlier studies (22, 36, 37).

To achieve full understanding of the health and risks in the dental workplace, we and as also Kuoppala *et al.* (11)

recommend that the salutogenic perspective be added to the risk perspective in order to achieve a more complete, holistic view of health. As Whitehead (40) stresses, identifying health-related and work-related factors and processes, such as those shown in this study, is important when it comes to developing workplace health promotion efforts and strategies, that is working with resource-focused methods within dentistry.

As current study is a cross-sectional study, further research using longitudinal design is needed to find out more about causality. Moreover, studies with a qualitative approach would give a deeper knowledge about underlying healthy factors and processes at a workplace. In future evaluations of dental workplace health and environment aiming to understand health and risks in the dental workplace, we recommend that the salutogenic perspective is added to the risk assessment.

## Conclusions

This study, with a salutogenic approach to the dental care workplace, showed that dental professionals reported a high degree of overall psychosocial health as well as a positive work experience. However, some variations could be seen between employee characteristics such as gender, years in dental care, professionals, managing position and workplace size. Our study indicates that, as each workplace organization is unique and with different professional skills and responsibilities, it is important to identify resources and processes in the health promotion work at each workplace. Thus, health and healthy resources should be included in the dialogue between employees and employers.

## Clinical relevance

### Scientific rationales

This study provides new insights complementary to a risk perspective, which is important for a holistic view on workplace health promotion.

### Principal findings

Thus, in healthy dental employees in general, there are differences in psychosocial health and workplace health between employee characteristics such as gender, years in dental care, professionals, managing position and workplace size. High SOC, that is meaningfulness and manageability, and autonomy, positive internal work experience and less time pressure are important health resources for employees in dental care.

### Practical implication

Identified healthy resources found in this study are important in health promotion work at dental workplaces and should be included in the dialogue between employees and employers.

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## Conflict of interest

The authors declare that they have no conflict of interest.

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