Self-perceived oral health among 19-year-olds in two Swedish counties

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Abstract

◉ The primary purpose of the present study, which focused on a census of 19-year-olds (2006) attending dental clinics in two Swedish counties, was to describe the frequency distribution of clinically- and self-perceived oral health indicators in terms of DSa (Decayed Surfaces approximal), four global dimensions of oral health and one 'all-embracing' oral health measure, according to county of residence and gender. A second purpose was to examine to what extent the clinical indicator of oral health and the global dimensions of self-perceived oral health contribute to the explainable variance of the global single-item indicator. Finally, the study examined whether or not the association of clinically- and self-perceived oral health indicators with the single global oral health indicator varied as a function of gender and place of residence. The study base was 46.5% (n=3658) of all children attending for dental checks (n=7866). The questionnaire included thirteen questions, divided into four global dimensions. These were Knowledge, Quality of life, Social and Function. There was also one 'all-embracing' oral health question, one question about gender and finally information about clinically-registered disease. The findings of this study were that females reported more serious problems than males in the Social and Quality of life dimensions and there were differences between counties in knowledge about oral diseases. The group with poor self-reported oral health in the 'all-embracing' oral health question had significantly more problems with all global dimensions, especially Quality of life and Social dimensions. Statistically-significant two-way interactions occurred between county and Knowledge and between county and Quality of life. This study supports the idea of one or several questions concerning self-perceived oral health to be used as a complement to the traditional epidemiological clinical registration of oral diseases.

Key words

Perceived oral health, questionnaire, dimension of oral health, all embracing oral health question, adolescents

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Oral hälsa hos 19-åringar i två svenska landsting

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Sammanfattning

◎ Utifrån en totalpopulation av 19-åringar i två landsting var ett syfte med följande studie att beskriva oral hälsa uppdelat på landsting och kön dels utifrån ett sammanfattande perspektiv (sammanfattande tandhälsofråga), dels från ett självupplevt perspektiv (enkätfrågor) och slutligen ifrån ett traditionellt perspektiv med användande av en kariessjukdoms-indikator (DSa). Nästa syfte var att undersöka till vilken grad oral hälsa utifrån dels från ett självupplevt perspektiv dels ett sjukdomsperspektiv bidrog till att förklara den sammanfattnad tandhälsofrågan. Slutligen var även syftet att undersöka om samband mellan oral hälsa (självupplevt perspektiv och sjukdoms-perspektiv) och oral hälsa (sammanfattande perspektiv) varierar som en funktion av kön och landsting. Studiepopulationen bestod av samtliga 19-åringar i Örebro och i Östergötlands län. Andel ingående i studiebasen (n=3658) var 46.5% av alla barn som kom till undersökning hos de tandläkare som deltog i studien (n=7866). Enkäten bestod av 13 frågor kring självupplevd munhälsa uppdelat på fyra globala dimensioner. Dessa var Kunskap, Livskvalitet, Funktion, och Social. Dessutom fanns en sammanfattande tandhälsofråga, en fråga om kön samt en av behandlande tandläkare ifylld ruta med aktuellt Dsa-värde. Samtliga enkäter fylldes i anonymt. Ett fynd i denna studie var att en signifikant skillnad i kunskap fanns mellan landstingen. Ett annat fynd var den stora skillnad som fanns mellan män och kvinnor när det gällde den självupplevda tandhälsan och då specifikt inom de globala dimensionerna Livskvalitet och Social. Andel kvinnor som var missnöjda med sin oralt relaterade livskvalitet var 37.0% medan motsvarande siffra för män var 23.8%. Kunskapsmässigt fanns det också en stor skillnad mellan kunskap om karies och kunskap om parodontit. Av dem som besvarat den övergripande frågan fanns den starkaste samvariationen med den självupplevda hälsan och specifikt inom de globala dimensionerna Livskvalitet och Social. Signifikanta interaktioner fanns mellan landsting och Kunskap samt landsting och Livskvalitet. Resultatet stödjer en fortsatt utveckling mot att systematiskt uppvärdera värdet av att ställa samt registrera svaren på någon eller några frågor om tandhälsa som komplement till den kliniska registreringen.

Introduction

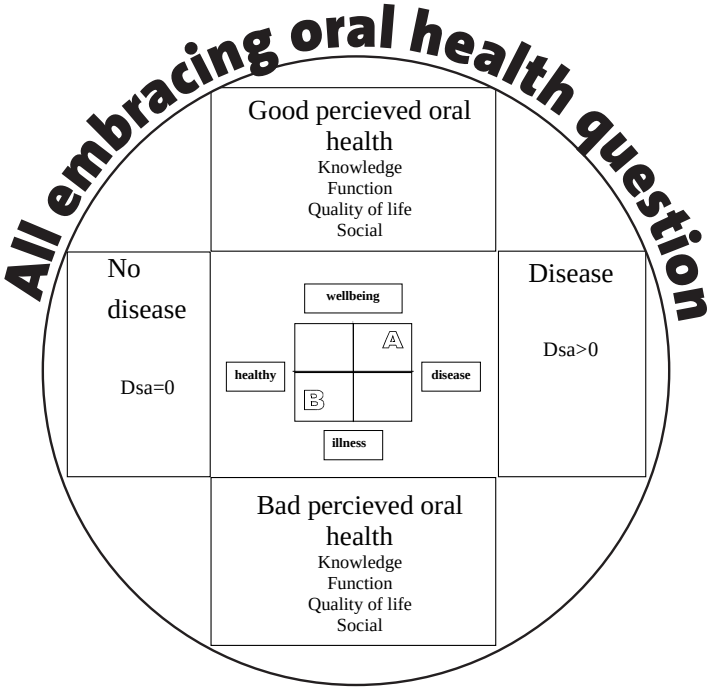
Dental care for children and adolescents in the Nordic countries has a long tradition of universality, right to service and equitable financing (14). Since 1938 the Public Dental Health Services (PDHS) in Sweden have had a responsibility to provide dental care (including specialist care) free of charge for children and adolescents 0-19 years of age (31). The counties are responsible for financing and providing this service, and several allow a free choice of caregivers, including both public and private practitioners (23). Epidemiological data have routinely been collected by the PDHS and private practitioners in terms of clinical measures for the purpose of estimating oral health status and treatment needs.

Clinical data are important for the identification of diseases and rely on dental professionals' judgement. Based on a biomedical approach, such data have traditionally been utilised in the assessment of individuals' oral health status (8). This approach has been criticised because of its restricted focus and for not taking into consideration functional, psychological and social consequences of oral diseases (5). Thus, a biopsychosocial approach has been increasingly recognised, suggesting that in addition to clinical indicators, functional, social and psychological outcomes and self-perceived measures of oral health should be considered in the evaluation of oral health status and need for dental care (4). As oral health is fundamental to general health and well-being, documenting variations in clinically-assessed as well as self-reported aspects of oral health will provide important information for the planning and evaluation of oral health care services (10). In Sweden, the first attempt to define and create a consensual definition of oral health based on a psychosocial rather than a strictly biomedical approach was made in 2003 (15).

A number of socio-dental indicators have been developed and validated to assess functional, psychological and social outcomes of oral problems, ranging from single-item global indicators such as satisfaction/dissatisfaction with oral health status to complex inventories and scoring systems, such as the Oral Health Impact Profile (OHIP) and Oral Impacts on Daily Performance (OIDP) (1, 26). These instruments have almost entirely been used for scientific purposes. There are a few examples where they have been applied as part of a routine procedure in oral healthcare services. Alongside the multi-item scales, single-item global indicators have been shown to be advantageous and have been widely used in oral health research (20). When operational costs tend to increase, single-item indicators might be appropriate and even practical for regular use. Evidence suggests strong correlations between single- and multi-item scales (7).

A Swedish questionnaire to assess self-perceived oral health was recently developed and validated in 19-year-olds for use as a tool to assess the quality of dental care provided for this age group (2). The 19-year-olds were chosen because they are the oldest age group to be offered comprehensive and free dental care. The questionnaire should assist resource allocation and decision-making within the oral healthcare services in Sweden. It aimed to assess oral health using self-perceived oral health indicators (i.e. four global dimensions) and one single-item overall oral health indicator ('all-embracing' oral health question'), in addition to clinically-assessed dental caries mainly based on x-rays in terms of DSa (Decayed Surfaces approximal). This particular instrument (used with the 19-year-olds) for measuring oral health is based on a (modified) conceptual model from Statens folkhälsoinstitut (2004) (30) (Fig. 1). The validation process for the questionnaire has been described in detail elsewhere (2, 32).

Figure 1. Conceptual model of oral health



The aim of this study was to investigate clinically- and self-perceived oral health indicators among 19-year-olds attending dental clinics in the Swedish counties of Örebro and Östergötland.

Materials and methods

Sample and procedures

The ethical considerations employed in this study were in accordance with the principles of the declaration of Helsinki and all respondents were informed that participation was voluntary, and they were free to withdraw from the study without prejudice to their future treatment (33). All counties in Sweden have a responsibility to monitor the oral health of the inhabitants (31). The study population comprised all 19-year-olds who were invited for routine check-ups in Östergötland County and all 19-year-olds who were invited by the PDHS to receive dental care in Örebro County in 2006. Data were collected during 2006. The total populations of 19-year-old dental attendees, eligible sample and the study base are presented in Table 1.

Clinical examination and questionnaire survey

Clinical examination was conducted in fully-equipped dental surgeries by dentists using x-ray (bitewing) after individual indicators, which means that x-rays were not used if there was no clear advantage in doing so (18, 25). In the clinical examination caries was defined as manifest caries reaching the dentin (27).

To enable analysis of self-reported and clinical oral health indicators pertaining to the same individual, a decision was made to mark the value of the decayed surface approximal (DSa-values) on each questionnaire form before it was handed to the participant for completion. After anonymous completion of the structured questionnaire containing thirteen oral health-related questions in addition to one 'all-embracing' oral health question and one questions about gender, subjects left the forms in a box at the clinic. The personnel in the dental clinics were given written instructions with respect to the questionnaire in order to ensure a high participation rate and a standardised collection of data.

DSa was coded between 0 and 12 and the cut-off point for dichotomisation was set between (0) 'free of caries' and (>0) 'with caries experience'. In order to decrease the risk of incorrectly-registered DSa-values, extreme values (1.9% of all completed forms with clinical data) were excluded from the analysis. The limit for extreme values was set to the same level as the highest value for DSa observed in the official statistics in Örebro County (DSa=12).

Measures

Perceived oral health (four global dimensions)

Four sub-scales (global dimensions) were applied to assess self-perceived oral health. Knowledge was assessed by five questions, Function by three questions, Quality of life by two questions and Social by three questions. The various items (questions), their response categories and the cut-off point for

Table 1. Number of 19-year -olds attending dental care in Örebro and Östergötland county council, participating in the clinical examination, respondents of the questionnaire survey and the number of participants in both.

	Total		Örebro		Östergötland	
	n	%	n	%	n	%
Number of 19 yr olds invited to routine check up (study population)	9,089		3,544 (9,089)	39.0	5,545 (9,089)	61.0
Number of 19 yr olds invited for routine checkup by dentists participating in the study	8,854 (9,089)	97.4	3,309 (8,854)	37.4	5,545 (8,854)	62.6
Number of 19 yr olds invited to participate in the study (eligible sample)	7,866 (8,854)	88.8	3,077 (7,866)	39.1	4,789 (7,866)	60.9
Number of examined with filled out forms	4,382 (7,866)	55.7	1,796 (4,382)	41.0	2,586 (4,382)	59.0
Number of examined with filled out forms and clinical data (study base)	3,658 (7,866)	46.5	1,584 (3,658)	43.3	2,074 (3,658)	56.7

dichotomisation of each item are shown in Table 2. Four combined scores were constructed from the respective single items and labelled Knowledge (Cronbach's alpha 0.66), Function (Cronbach's alpha 0.44), Quality of life (Cronbach's alpha 0.70) and Social (Cronbach's alpha 0.65). The combined scores were constructed by use of the median category for the relevant questions for every single respondent in a step 1 and by creating frequency tables for each dimension in a step 2. The global dimension score of Knowledge was dichotomised into (0) 'some or good knowledge' and (1) 'no knowledge'. Function and Quality of life were dichotomised as (0) 'never problems' and (1) 'problems once or twice/several times a week'.

The global dimension Social needed a different scale as it contained questions considering both time and quantity. Thus it was necessary to construct a new global scale from a contingency-table with one aspect on the X-axis and the other aspect on Y-axis. From this table an optional pattern was constructed. The result was a customised scale, created from a cross-tabulation between a question with time dimension and a question with quantity dimension. This new scale measured the dimension with a six-grade scale, with a cut-off point for dichotomisation between two and three. The global dimension Social was dichotomised into (0) 'No problems or small problems' and (1) 'Rather bad problems or very bad problems'. The scoring method was based on the theory and procedure described by *Svensson* (32).

Single global indicator 'All-embracing' oral health measure

'All-embracing' oral health was assessed by the question 'How satisfied are you with your teeth and mouth in general?' with the response categories: (1) completely satisfied, (2) satisfied in general,

Table 2. The 13 questions covering the four global dimensions and the respectively cut points for dichotomization.

Global dimensions: Question	Categories of answers	Dichotomized cut points and values
Knowledge	No (a)	No knowledge (1)
Do you know the mechanism behind cavities?	Yes, in part perhaps (b)	Some or good knowledge (0)
Do you know how to avoid cavities?	Yes, (c)	
Do you know the mechanisms behind tooth loss/ periodontal disease?		
Do you know how to avoid tooth loss/ periodontal disease?		
Do you know that it is important to use fluoridated toothpaste?		
Function	No never (a)	No problems (0)
Difficulties chewing food due to problems with mouth?	Yes, once or twice (b)	Problems once, twice or your teeth or several times a week (1)
Headache due to problems with your teeth or mouth?	Yes, sometimes every month (c)	
Shooting pain from warm or cold food or drink?	Yes, sometimes every week (d)	
	Yes, several times every week (e)	
Quality of life	No never (a)	No problems (0)
Have you ever felt badly or been ashamed of your mouth?	Yes once or twice (b)	Problems once, twice or teeth or several times a week (1)
Have you ever felt depressed due to your teeth or mouth?	Yes sometimes every month (c)	
	Yes sometimes every week (d)	
	Yes several times every week (e)	
Social	No never (a)	No problems or small problems (0)
Have you ever avoided laughing due to your teeth or your mouth?	Yes once or twice (b)	
	Yes sometimes every month (c)	Rather bad problems or ver y bad problems (1)
Have you ever avoided normal socializing due to your teeth or mouth?	Yes sometimes every week (d)	
	Yes several times every week (e)	
Social	No I have not at all (a)	No problems or small problems (0)
Have you ever felt embarrassed due to your teeth or your mouth?	I have felt a bit embarrassed (b)	
	I have felt embarrassed rather a lot (c)	Rather bad problems or very bad problems (1)
	I have felt very embarrassed (d)	

(3) satisfied, (4) somewhat dissatisfied, (5) dissatisfied and (6) extremely dissatisfied. For analysis, this measure was dichotomised into (0) 'satisfied' (including the original categories 1, 2, 3) and (1) 'not satisfied' (including the original categories 4, 5 and 6).

Gender and County

Gender had respond category female (0) and male (1). County had respond category Östergötland County (0) and Örebro County (1).

Statistical analyses

Bivariate analyses were performed with the Chi Square test, Spearman's correlation coefficient and binary logistic regression analysis. Multiple logistic regression analysis was carried out to assess the effect of each independent variable after adjustment for the effect of all other variables in the model. All analyses were performed in Excel and the Statistical Package for Social Sciences (SPSS Inc., Chicago, USA, version 14.0 for PC). The level of statistical significance was set at 5%, i.e. P≤ 0.05.

Table 3. Results on question level. Percentage distribution of each item of the global oral health by gender and county Gender: Male (M), female (F). Counties: Östergötland county council (E), Örebro county council (T).

Questions	Category of answers	% Total	% Gender		% Counties	
			M	F	T	E
	All embracing oral health question					
In general, how satisfied are you with your mouth and teeth?	Satisfied	87.5	88.0	87.0	86.3	88.5
	Global dimension:					
	Function					
Difficulties chewing food due to problems with your teeth or mouth?	No never (a)	58.7	59.6	57.7	58.5	58.6
Headache due to problems with your teeth or mouth?	No never (a)	82.2	89.6	74.2	81.4	82.8
Shooting pain from warm or cold food or drink?	No never (a)	14.8	16.2	13.2	14.9	14.5
	Knowledge					
Do you know the mechanism behind cavities?	Some or good knowledge (b, c)	96.3	95.6	96.9	94.8	97.4
Do you know how to avoid cavities?	Some or good knowledge (b, c)	98.6	98.6	98.6	98.0	99.1
Do you know the mechanisms behind tooth loss/ periodontal disease?	Some or good knowledge (b, c)	51.0	52.3	49.6	46.2	54.8
Do you know how to avoid tooth loss/ periodontal disease?	Some or good knowledge (b, c)	51.4	56.1	46.4	47.2	54.7
Do you know that it is important to use fluoridated toothpaste?	Some or good knowledge (b, c)	90.9	88.1	93.8	88.6	92.6
	Quality of life					
Have you ever felt badly or been ashamed of your mouth?	No never (a)	77.0	83.3	70.4	75.3	78.4
Have you ever felt depressed due to your teeth or mouth?	No never (a)	80.1	84.0	75.9	79.3	80.7
	Social					
Have you ever avoided laughing due to your teeth or your mouth?	No never (a)	74.9	79.4	70.1	72.7	76.6
Have you ever felt embarrassed due to your teeth or your mouth?	No I have not at all (a)	74.0	79.7	67.9	71.7	75.8
Have you ever avoided normal socializing due to your teeth or mouth?	No never (a)	97.9	97.8	98.0	97.8	97.9

Results

Analysis of non-response

All data were collected during 2006. Of the total population of 19-year-olds from Östergötland County and all 19-year-olds who were attending the PDHS in Örebro County (N=9,089), 51.3% were males and 61.0% were residents of Östergötland County. In the group who formed the basis for analyses in the present study (n=3,685), the corresponding figures were 51.7% and 56.7%.

Consequently there was an underrepresentation of participants from Östergötland County in the study sample (Chi-square= 51.32, P=0.00). Nevertheless, the gender distribution of the participants in this study was similar to the corresponding distribution in the populations, which implies that they were representative of the population of 19-year-olds attending dental care in Örebro and Östergötland with respect to gender.

In Örebro County there was a chance to compare prevalence of caries in the study participants (DSa=0 = 83,5%) with that of the 19-year-olds in official statistics (DSa=0 = 85,4%), including 92,8% of all 19-year-olds in Örebro County. There was a difference in excluded DSa-values (>12) between Östergötland County (2,8%) and Örebro County (0,7%). This indicates a more correct use of DSa among the dentists in Örebro compared with their colleagues' in Östergötland and could be one explanation of the differences in DSa between the counties.

There was only one reason for the difference between the study population and the eligible sample. They did not answer the invitation to come for a check-up even after a reminder. The bigger difference between the eligible sample and the number of those examined with completed questionnaire forms is more difficult to analyse because there were at least two reasons for that. Either the participants did not answer the questions or the dentists did not remember to give the form to the 19-year-olds.

Table 3 shows the percentage distribution of the 'all-embracing' oral health question and each item constituting the four global oral health dimensions (Knowledge, Function, Quality of life and Social) by gender and county of residence. Substantial, but varying, proportions of 19-year-olds reported 'no, never', when asked about oral health-related problems with function, quality of life and social concerns.

Table 4. Percentage distribution and number (n) of the four global oral health dimensions and the "all embracing oral health question" by gender and county.

Dichotomized variables and their codes	Total N=3,658		Gender% (n)			County % (n)		
	%	n	Male	Female	p-value	Örebro	Östergötland	p-value
Knowledge								
Some or good knowledge (0)	92.6	3,381	91.2	94.0		90.1	94.4	
No knowledge (1)	7.4	272	8.8	6.0	0.002	9.9	5.6	0.000
Function								
Never problems (0)	55.1	2,001	59.3	50.5		56.4	54.1	
Problems once, twice or several times a week (1)	44.9	1,633	40.7	49.5	0.000	43.6	45.9	0.160
Quality of life								
Never problems (0)	69.8	2,547	76.2	63.0		67.7	71.5	
Problems once, twice or several times a week (1)	30.2	1,100	23.8	37.0	0.000	32.3	28.5	0.013
Social								
No problems or small problems, 1-2 in a scale of 6 (0)	93.4	3,394	94.5	92.3		92.4	94.2	
Rather bad problems or very bad problems, 3-6 in a scale of 6 (1)	6.6	238	5.5	7.7	0.008	7.6	5.8	0.033
All embracing question								
Satisfaction with oral health (0)	87.5	3,167	88.0	87.0		86.3	88.5	
Dissatisfaction with oral health (1)	12.5	451	12.0	13.0	0.359	13.7	11.5	0.05
Clinical dental indicator								
Dsa=0 (0)	78.0	2,836	76.3	79.9		83.5	73.8	
Dsa>0 (1)	22.0	798	23.7	20.1	0.01	16.5	26.2	0.000

Larger proportions of males than females and larger proportions of Östergötland than Örebro County residents reported no problems across items related to function, quality of life and social concerns dimensions.

Table 4 shows the percentage distribution of the sum scores of the four global oral health dimensions, the 'all-embracing' oral health question and caries experience (DSa-values) by gender and county. The majority of the respondents demonstrated good oral knowledge (92.6%), reported no functional problems (55.1%), no problems with quality of life (69.8%), no problems with social concerns (93.4%) and were satisfied with oral health (87.5%) ('all-embracing' oral health question). Females and participants from Östergötland County reported good knowledge more frequently than males and participants from Örebro County. On the other hand, a larger proportion of males than females reported no problems regarding function, quality of life and social concerns. A majority of the 19-year-olds investigated was without caries experience (78%). Females and participants from Örebro County were more frequently without caries experience compared with their male and Östergötland County counterparts. The 'all-embracing' oral health question correlated statistically significantly with the four global oral health dimensions and with DSa-values (Spearman's rho in the range 0.09 to 0.48). In addition, Quality of life correlated relatively strongly with Social (Spearman's rho 0.63).

Table 5 shows the unadjusted and adjusted odds ratios (ORs) for self-reported satisfaction with oral health ('all-embracing' oral health question) according to sociodemographics (gender and county), the four global oral health dimensions and dental caries (DSa) in the total sample and separately for participants in Örebro and Östergötland County. Sociodemographics were entered in the first step, providing a model fit of Nagelkerke's R2=0.002, model

Table 5. Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) of having satisfaction with oral health (the all embracing oral health question) according to gender, four global dimension and clinical dental indicator in the total sample and separately for Örebro and Östergötland counties.

Variables	Total		Örebro	Östergötland
	OR unadjusted (95% CI)	OR adjusted (95% CI)	OR adjusted (95% CI)	OR adjusted (95% CI)
Gender				
Female (0)	0.9 (0.7-1.1)	1.3 (1.0-1.6)	0.94-1.85	0.90-1.67
Male (1)	1			
County				
Östergötland (0)	0.8 (0.7-1.0)	1.3 (1.0-1.6)		
Örebro (1)	1			
Knowledge				
Some or good knowledge (0)	1.5 (1.0-2.1)	1.6 (1.1-2.3)	0.64-1.94	1.36-3.98
No knowledge (1)	1			
Function				
No problems (0)	1.8 (1.0-2.1)	1.4 (1.1-1.8)	1.15-2.26	0.96-1.78
Problems once, twice (1) or several times a week	1			
Quality of life				
No problems (0)	7.2 (5.8-9.1)	4.8 (3.8-6.2)	4.64-9.78	2.66-5.19
Problems once, twice or several times a week (1)	1			
Social				
No problems or small problems (0)	13.1 (10.5-18.4)	6.8 (4.9-9.2)	4.37-10.6	4.46-10.9
Rather bad problems or very bad problems (1)	1			
Clinical dental indicator (1)				
Dsa=0 (0)	1.9 (1.5-2.4)	2.3 (1.8-2.9)	1.61-3.61	1.64-3.09
Dsa>0 (1)	1			

chi-square = 4.51, df=2, p=0.105. Entering the four self-perceived global oral health indicators in the second step improved the model fit to Nagelkerke's R2= 0.25, model chi square= 513.67df=5, p<0.000. Entering the clinical indicator of dental caries in the final third step improved the fit of the model to Nagelkerke's R2= 0.27, model chi square= 546.77df=6, p<0.000. In the final model, Knowledge, Function, Quality of life, Social concern, dental caries experience, gender and county varied systematically with satisfaction scores.

Statistically-significant two-way interactions occurred between county and knowledge, model chi square =550.83, df=8, p<0.000, and between county and quality of life, model chi square =553.52, df=8, p<0.000. In Östergötland, knowledge varied systematically with satisfaction, whereas function did not. In Örebro, function varied systematically with satisfaction, whereas knowledge did not (Table 5). Thus, knowledge was statistically-significantly more strongly associated with satisfaction in Östergötland than in Örebro, whereas function was most strongly associated with satisfaction in Örebro.

Discussion

The present population-based study investigated the association of dental caries and various indicators of self-reported oral health with a single-item indicator of overall self-reported oral health status in young Swedish adults. The study provides evidence regarding the concepts that Swedish 19-year-olds incorporate self-perceived oral health in their overall rating of oral health and the extent to which clinically- and self-perceived oral health indicators affect this overall 'all-embracing' oral health measure (22). The oral health instrument employed was developed for use among Swedish 19-year-olds through teamwork between statisticians and dentists, with suggestions as to what kind of analyses should be used. The instrument has been validated among Swedish 19-year-olds previously and has demonstrated satisfactory psychometric properties (2).

Örebro and Östergötland represent two Swedish counties with universities, industries and service industries covering both cities and rural areas. Owing to the relatively low response rate obtained in this study and the limited possibility of conducting a detailed non-response analysis, generalisation of the present results to the whole population of 19-year-olds should be made with caution. On the other hand, from the findings of non-response analyses, it might be assumed that the participants investigated are fairly representative of 19-year-olds in Östergötland and Örebro Counties and might also reflect the variety of characteristics of 19-year-olds in similar Swedish counties. The prevalence of caries experience (22% with DSa >0) registered in the respondents seems to be in accordance with that obtained for the age group in Sweden generally as well as in other Nordic countries. Evidently, adolescents and young adults in Sweden and other Nordic countries have a low caries prevalence (29).

Although the 19-year-olds investigated had relatively good oral health, as evidenced by their clinical dentition status (78.0% DSa=0), the global oral health dimensions were still adversely affected owing to problems with teeth and mouth. With few exceptions, however, a majority demonstrated good oral health-related knowledge and reported no experience with problems related to the global oral health dimensions. Differences regarding knowledge of various oral diseases were noted, with participants being better informed about dental caries than about periodontal disease. This might be attributed to their lack of experience of periodontal disease. Only 0.5% of children and young adults in Sweden have some problem with serious periodontal disease (21). Compared with their experience with dental caries, with only 59% of 19-year-olds with DFSa=0, this is a low exposure (27). Interestingly, the participants seemed to be better informed with respect to the origins of, and how to avoid, caries than they were regarding the importance of using fluoridated toothpaste. This might be attributed to the fact that fluoridated toothpaste is commonly used in Sweden by 19-year-olds.

That females were less knowledgeable than males on how to avoid periodontal disease, and more knowledgeable than males about the importance of using fluoridated toothpaste is in accordance with previous findings in Swedish adolescents (13). Information as to the level and distribution of oral health-related knowledge has implications for the planning and implementation of caries-preventative strategies in Sweden. In spite of being significantly more knowledgeable about oral health and having less experience with dental caries than their male counterparts, females felt more ashamed and depressed because of problems with mouth and teeth and reported problems with social concerns more often (Tables 3 and 4). For instance, females reported most frequently that they had avoided laughing and that they had felt embarrassed owing to teeth problems. This is in accordance with similar studies

conducted previously in Sweden (28). In general sociodemographic differences in perceived health and oral health have received mixed support in the literature (11, 24). Age and sex differences in perceived oral health might be attributed to differences in expectations, with problems occurring whenever the actuality falls short of expectations regarding oral health (6).

In spite of Östergötland participants having better knowledge, less experience with problems related to social concerns and quality of life, and a greater probability of being satisfied with overall oral health, compared with Örebro residents, they had the greatest prevalence of dental caries (Table 4). Regional differences in perceived oral health reflect variations in severity of oral diseases but also variations in socioeconomic and cultural factors. The associations between dental caries and the various indicators of self-perceived oral health identified in this study were relatively modest and in line with other studies (19).

It should be noted that the four self-reported global dimensions measure problems with mouth and teeth in general and were not restricted to the social and psychological consequences resulting from dental caries. Thus the present discrepancy observed between normatively judged and self-perceived oral health might be attributed, among other things, to problems such as erosion (16). Moreover, in Sweden caries is addressed at an early stage and very few children perceive problems from caries before they receive treatment (22). This situation could make the relevance of assessing social and psychological consequences of dental caries in children, adolescents and young adults questionable (9). Results demonstrating relatively weak associations between professionally- and self-defined oral health status have been reported earlier (3, 22).

By examination of the relationships between all-embracing oral health and clinical and non-clinical variables in a multiple logistic regression model, it was possible to obtain a better understanding of the combined effect of those variables and to compare the influence of each. Although the amount of explained variance was low (27%), suggesting a possible omission of important variables, social variables and those related to the four global oral health dimensions explained 25% of the variance in all-embracing oral health, whereas clinical indicators of dental caries alone accounted for 2% explained variance. Whatever the explanation, these relationships support the theoretical propositions inherent in contemporary oral health models, that people's overall evaluation of oral health is likely to be shaped by perceived functional, social and quality of life concerns with mouth and teeth, and by their cultural, behavioural and socioeconomic status, as well as by clinically-assessed oral diseases (12). In accordance with similar studies conducted in different sociocultural contexts, the present results suggest that 19-year-olds view their overall oral health status as a multidimensional construct (17).

Conclusions

Four self-perceived global oral health indicators and one clinical indicator of caries status were found to account for the variability in the responses to the overarching oral health indicator, suggesting that at this age social and emotional concerns seem to be important components of overall oral health perceptions. Males and females from different counties emphasised different preferences in this overall oral health perception. From the results of the present study it might be concluded that both clinically- and self-perceived oral health indicators should be considered in comprehensive assessments of the oral health status of 19-year-olds in Sweden.

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