

Dental treatment need among 20 to 25-year-old Swedes: discrepancy between subjective and objective need

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Our aim was to analyze variables from a questionnaire sent to 20 to 25-year-old Swedes to determine how they perceive their oral treatment need, and to determine which variables affect this perception. The questionnaire was sent to 650 individuals randomly selected from the database of the National Social Insurance Board of Sweden. The response rate was 78%. Another questionnaire was sent to the dentists of these young adults in order to collect clinical information. The response rate was 66%. The respondent's answer to the question 'How do you rate your dental treatment need today?' was dichotomized and used as a dependent variable in a multivariate logistic regression model. Each increase in number of decayed-filled teeth led to a 13% increased treatment need, bad oral hygiene a 2.24-fold increase, and no periodontal disease an 80% reduction in treatment need. A higher education beyond comprehensive school increased the perceived treatment need 7.16 times; a poorer dental health than one's contemporaries led to a 14.47-fold increase. When dentist and patient assessments were combined, variables related to the patients' self-assessments were the only significant contributors to the statistical model. A lack of concordance between patients' and dentists' assessments of treatment need was found which highlighted the differences between patients' and dentists' views on treatment need. This study shows the importance of communication between dentist and patient. □ *Perceived need; questionnaires; treatment need; young adults*

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In recent years the study of patients' self-reported health has received increasing attention in medicine and dentistry. A review on the subject in a medical report states that the concept is useful for the purpose of research, preventive medicine, and clinical practice (1). In dentistry, Locker (2) finds political, theoretical, and practical applications for subjective oral health indicators. Patients' perceived health can help when evaluating the organization or financing of health services, oral health promotion interventions, and assessment of population health needs, as well as in identifying target populations. In research, it can help to measure the effectiveness of health services against the stated objectives of the services and provide a basis for reorientation of the activities towards health where the patient's function and well-being are focused upon (3). Yet another motive has developed from a conception that disease is not just a patho-physiological process but also something that people experience. While medicine and dentistry have focused on the biological aspects of health and disease, a humanistic interpretation holds up patient's global health, which underlines the meaning and coherence in an individual's life. Patients are also critically important partners in preventing disease, complying with treatment recommendations, and in deciding on whether or not to use a certain health service (4).

Oral diseases often progress without obvious symptoms to the patient. When, at the same time, prevalence and incidence are low, as the situation is among young adults, experience and subjective perception of health or ill-health can be ambiguous.

In a previous study, based on a questionnaire to 650 randomly selected individuals, the authors found that a high percentage of young adults (33%) consider their dental treatment need as high or very high (5). This finding was surprising, since these young individuals are unlikely to exhibit high levels of pathological findings. However, the result has to be interpreted in the light of the enhancement in dental health among young adults. Since the number of risk patients among these generations in Sweden is estimated to be less than 10%, our study points to a cognitive problem in dental health care.

Studies show that the patient's and the dentist's perception of oral health rarely coincide (6–8).

The discrepancy between the patient's and the dentist's perception of dental treatment need can present a problem when it comes to treatment planning and the patient's cooperation. To understand what factors determine young adults' perceptions of dental health would therefore be of interest and would help improve communication between patient and dentist.

The aim of this study was to analyze variables from a questionnaire, to determine how young adults perceive their dental treatment need, and to compare the subjective and objective treatment needs of these individuals.

Materials and methods

In 1996, a mail questionnaire with 70 questions was sent to a randomly selected, national sample of 650, 20 to 25-

year-old, individuals in Sweden. Their names were obtained from the database of the National Social Insurance Board of Sweden. Variables such as the subject's gender, age, place of residence and income were acquired from the database background. Of the original sample, 11 individuals who were living abroad and 28 who could not be reached because of unknown address were excluded, thus leaving 611 individuals who made up the final sample. The final response rate was 476 persons (78%), comprising 246 women (52%) and 230 men (48%). A more detailed description of the questionnaire has been published elsewhere (5). Another questionnaire was sent to the dentists of the young adults after permission had been received from the respondents. The aim was to collect clinical information on each subject's dental health, i.e. dental status, oral hygiene, treatment need, etc. Permission was received from 377, i.e. 79% of the subjects. Answers were received from 250 dentists (66%).

Statistical methods

All data were handled in the SPSS format. A statistical modeling procedure was performed.

Categorical variables with three or more categories were reclassified as dummy variables. One variable ('Do you care about the appearance of your teeth?') consisted of answers to a combination of six questions, resulting in an index based on principal components analysis. A high value (>2) denotes a high appreciation of appearance, with a mean value of 0 and a standard distribution of 1.

Dependent variable

The patient's answer to the question 'How do you rate

your dental treatment need today?' was chosen from the questionnaire and dichotomized and used as a dependent variable in a multivariate logistic regression model. The original response options to how the patients assessed their dental treatment need were: very high, rather high, rather low, very low, or no treatment need. The responses were dichotomized so that very high and rather high treatment need were categorized as high treatment need. Rather low, very low, and no treatment need were categorized as low treatment need.

This variable was perceived as assessing the aim as presented in this study.

Dentists' opinions of patients' oral health

Seven items from the questionnaire were chosen to represent the dentist's opinions of the patient's oral health. Dentists assessed decayed-filled teeth, filled teeth, previous experience of orthodontic treatment, need for orthodontic treatment, oral hygiene, presence of periodontal pockets, marginal bone loss, and dental treatment need (Table 1). The response options to the dentists' assessment of the patients' dental treatment need were the same as for the patients' self-assessment of dental treatment need. The responses were also categorized in the same manner. In a further analysis, these variables were inserted as independent variables in a multivariate logistic regression analysis using the patient's self-assessed dental treatment need as a dependent variable (Table 1). The purpose of this analysis was to select those variables that were to be included in a final analysis encompassing both dentist and patient assessments related to patients' subjective need for treatment.

Table 1. Description of and logistic multivariate regression analysis for patients' self-assessed dental treatment need today, used as a dependent variable, in relation to dentists' assessments of patients' oral health used as independent variables. Dependent variable is categorized as either low (0) or high (1), 68.7% and 31.3%, respectively

Independent variable—numerical	Level of measurement	<i>n</i>	Min-Max	Mean/ <i>s</i>	Odds ratio	<i>P</i> value	95% CI
Model 1:							
Patients' number of decayed-filled teeth	Numerical	321	0–29	6.02/4.11	1.13	0.001	1.05–1.22
Patients' number of filled teeth	Numerical	319	0–14	0.88/1.76	0.97	0.73	0.82–1.15
Independent variable—categories	Level of measurement	<i>n</i>		Percent	Odds ratio	<i>P</i> value	95% CI
Has the patient received any orthodontic treatment?	1 = yes 2 = no/do not know	311		31.2 68.8	Ref.cat 1.42	0.29	0.74–2.74
Has the patient any orthodontic treatment need?	1 = yes 2 = no	277		4.7 95.3	Ref.cat 1.21	0.77	0.33–4.51
Patients' oral hygiene	1 = good 2 = bad	300		82.7 17.3	Ref.cat 2.07	0.08	0.93–4.60
Pathological periodontal pockets and/or marginal bone loss present at the latest visit	1 = yes 2 = no	303		5.6 94.4	Ref.cat 0.20	0.02	0.05–0.86
Patients' dental treatment need	1 = high 2 = low	301		23.9 76.1	Ref.cat 0.83	0.64	0.39–1.79
Model 2:							
Patients' number of decayed-filled teeth	Numerical	321			1.13	0.001	1.05–1.21
Patients' oral hygiene	1 = good 2 = bad	300		82.7 17.3	Ref.cat 2.24	0.03	1.09–4.64
Pathological periodontal pockets and/or marginal bone loss present at the latest visit	1 = yes 2 = no	303		5.6 94.4	Ref.cat 0.22	0.03	0.05–0.91

s = standard deviation.

In the first model investigated, all background variables were inserted into the model. Coefficient plots were investigated and the contribution of each variable to the model was tested with a likelihood-ratio test. The second model investigated the same dependent variable, but with only those three variables that the likelihood test identified as making significant explanatory contributions.

Patient's self-assessed socio-economic, general health, and dental attitudes

Questions regarding patients' self-assessed socio-economic, general health, and attitudinal variables were mainly chosen from studies by Söderfeldt (9), Unell (6), and from Statistics Sweden (Statistiska Centralbyrån) in their yearly investigations of living conditions in Sweden (ULF studies). These questions have all been validated and used in several previous publications. Some questions were new for this particular population, and were constructed from a theoretical position close to that taken by the World Health Organisation in their discrimination of concepts of disease, illness, and impairment. Independent variables in this model were gender, age, socio-economic factors, general health and health-related factors, and dental attitudes (Table 2). Educational level, place of residence, income, and social support were attributed as socio-economic factors. Variables described as general health and health-related factors were: self-assessment of general health compared to persons of one's own age, tobacco consumption, alcohol consumption, taking exercise. Dental attitude variables included cognitive, affective, and behavioral aspects. Cognitive dimensions were: how many teeth have fillings?, how many teeth have cavities that do not need to be filled at present?, self-assessment of dental health compared to persons of one's own age, and having been told by a dentist that gums were bleeding at the latest visit. Eight questions were chosen to illustrate the affective dimension: being satisfied with function of teeth, the need to have beautiful and perfect teeth, being afraid of going to a dentist, feeling discomfort when going to the dentist, having confidence in the dentist, having the opinion that cavities and bleeding gums are something to be concerned about, and being concerned about dental health. Lastly, three questions concerning dental health behavior were brought together into one variable: making use of fluoride lozenges, dental floss, and toothpicks. Variable characteristics and categories of coding are presented in Table 2.

These independent variables were then inserted into a multivariate logistic regression model (Table 2) with the same dependent variable as used before—the subjective dental treatment need of the patient (model 1). The purpose of this analysis was to select the variables that were to be included in a final analysis encompassing both dentist and patient assessments related to the patient's subjective need for treatment. Thereafter, the contribution of the significant variables was asserted in a likelihood ratio test (Table 2).

In model 2, only those independent variables that made

a significant contribution in model 1: educational level, how you assess your dental health compared to contemporaries, and whether you worry about your dental health, were inserted into the model.

In the final analysis, independent variables relating to both dentist (Table 1) and patient (Table 2) assessments were introduced using the same dependent variable as in previous analyses.

Results

Three assessments of the dentists appeared as significant in predicting the patient's self-assessed treatment needs (Table 1, model 2). Each increase in number of decayed-filled teeth was related to an increased treatment need of 13%; when the patient's oral hygiene was considered bad, this was related to a 2.24 increased treatment need; if no periodontal pockets or inflammation were discernible at the latest visit, this was related to a reduced treatment need of 80%.

Three self-assessments of the patient's socio-economic, general health and health-related factors, and dental attitudes appeared as significant in predicting the patient's self-assessed dental treatment need (Table 2, model 2). Higher educational level was related to an increased treatment need. Those with an upper secondary education had a 7.16 times increased treatment need compared to those with comprehensive education.

When the patient assessed her dental health as equal compared to persons of her own age, this was related to a 3.07-fold increased treatment need. Having poorer dental health was related to a 14.47-fold increased treatment need. When the patient was less concerned about her own dental health, the treatment need was also lower. When the level of concern was medium, this was related to about 80% less treatment need compared to a patient with a high concern.

When combining dentist and patient assessments as explanatory variables in a regression model using treatment need as dependent variable, the variables related to the patient's self-assessment were the only significant contributors to the statistical model.

Discussion

The subjects studied in this age interval are representative of the population in general regarding their self-rated health as well as tobacco and alcohol consumption. The characteristics of the reference population in this regard are derived from the Public Health Questionnaire in Scania 2000, an investigation performed by the Social Insurance Organization in the Region of Scania, Sweden. The distribution between male and female subjects was even. The response rate to the questionnaire sent to the young adults must be considered as high and that of the dentists as acceptable. However, the response rate limits

Table 2. Description of and logistic multivariate regression analysis for patients' self-assessed dental treatment need today, used as a dependent variable, in relation to patients' self-assessed socio-economic, general health and health-related factors, and dental attitudes used as independent variables. Dependent variable is categorized as either low (0) or high (1), 68.7% and 31.3%, respectively

Independent variable—numerical	Level of measurement	<i>n</i>	Min–max	Mean/ <i>s</i>	Odds ratio	<i>P</i> value	95% CI
Model 1:							
Age		466	18–26	22.3/1.78	0.89	0.32	0.70–1.13
Income		650	0–274 000	62 452/70 212	1.00	0.56	0.99–1.00
To have beautiful and perfect teeth (index) ¹		464	–2.15–2.68	0/1	1.06	0.77	0.73–1.52
Independent variable—categories	Level of measurement	<i>n</i>		Percent	Odds ratio	<i>P</i> value	95% CI
Gender	1 = female			51.7	Ref.cat.		
	2 = male	476		48.3	1.22	0.62	0.57–2.62
Socio-economic factors							
Educational level	1 = comprehensive school			7.3	Ref.cat.		
	2 = upper secondary school			60.7	5.91	0.05	1.04–33.6
	3 = third level education	463		32.0	4.34	0.13	0.65–28.8
Place of residence	1 = three main cities of Sweden			29.5	Ref.cat.		
	2 = other large communities			27.5	1.40	0.46	0.57–3.42
	3 = rural area	650		42.9	1.13	0.77	0.50–2.57
Social support	0 = no			80.3	Ref.cat.		
	1 = yes	468		19.7	0.52	0.17	0.21–1.33
General health and health-related factors							
General health compared to contemporaries	1 = better			25.2	Ref.cat.		
	2 = equal			63.0	0.84	0.68	0.37–1.90
	3 = worse	441		11.8	0.83	0.76	0.25–2.76
Tobacco consumption	0 = no			62.8	Ref.cat.		
	1 = yes	462		37.2	1.15	0.70	0.56–2.35
Alcohol consumption	0 = never			10.2	Ref.cat.		
	1 = less than once a week			60.1	2.26	0.20	0.65–7.89
	2 = once a week or more	461		29.7	4.37	0.03	1.12–17.1
Exercising	0 = never			10.0	Ref.cat.		
	1 = every month	462		90.0	3.00	0.11	0.77–11.71
Dental attitudes							
Cognitive dimension							
How many teeth with fillings?	1 = none			10.2	Ref.cat.		
	2 = 1–4			31.0	1.77	0.48	0.36–8.80
	3 = 5			37.1	2.80	0.22	0.54–14.6
	4 = Some, but I don't know how many	461		21.7	2.86	0.23	0.52–15.8
Cavities that do not need filling right now?	1 = none			44.9	Ref.cat.		
	2 = 1–2			28.7	0.54	0.14	0.23–1.23
	3 = 3			10.5	1.77	0.30	0.60–5.22
	4 = Some, but I don't know how many	401		10.5	1.35	0.57	0.47–3.87
Self-assessed dental health compared to contemporaries	1 = better			24.4	Ref.cat.		
	2 = equal			56.3	2.74	0.08	0.90–8.35
	3 = worse	435		19.3	15.00	<0.001	3.67–61.4
Did the dentist tell you that your gums were bleeding at your latest visit?	1 = no			57.1	Ref.cat.		
	2 = yes			29.9	0.78	0.54	0.36–1.70
	3 = I don't know	468		13.0	1.24	0.68	0.44–3.55
Affective dimension							
Satisfied with function of teeth (Visual-Analog-Scale)	1 = 0–33			88.3	Ref.cat.		
	2 = 34–66			10.4	0.82	0.72	0.27–2.48
	3 = 67–100	469		1.3	0.79	0.90	0.09–27.3
Afraid of going to a dentist (Visual-Analog-Scale)	1 = 0–33			17.7	Ref.cat.		
	2 = 34–66			13.2	0.57	0.42	0.14–2.23
	3 = 67–100	468		69.0	1.36	0.66	0.34–5.42
Discomfort going to dentist (Visual-Analog-Scale)	1 = 0–33			26.9	Ref.cat.		
	2 = 34–66			18.8	0.88	0.85	0.24–3.27
	3 = 67–100	468		54.3	0.58	0.44	0.14–2.34
Confidence in dentist (Visual-Analog-Scale)	1 = 0–33			70.4	Ref.cat.		
	2 = 34–66			25.3	0.91	0.82	0.41–2.04
	3 = 67–100	466		4.3	4.14	0.13	0.66–26.2
Concern about dental health	1 = large			23.5	Ref.cat.		
	2 = some			34.2	0.16	<0.001	0.07–0.40
	3 = small	468		42.3	0.06	<0.001	0.02–0.16

Table 2. *Continued.*

Independent variable—categories	Level of measurement	<i>n</i>	Percent	Odds ratio	<i>P</i> value	95% CI
Worry much about cavities and bleeding gums	1 = no 2 = yes	470	67.4 32.6	Ref.cat. 0.88	0.75	0.48–1.90
Behavioral dimension						
Making use of fluoride lozenges, dental floss or tooth pics	0 = no 1 = yes	466	17.6 82.4	Ref.cat. 0.91	0.84	0.36–2.30
Model 2:						
Educational level	1 = comprehensive school 2 = upper secondary school 3 = third level education	463	7.3 60.7 32.0	Ref.cat. 7.16 5.05	0.008 0.03	1.69–30.3 1.15–22.2
Self-assessed dental health compared to contemporaries	1 = better 2 = equal 3 = worse	435	24.4 56.3 19.3	Ref.cat. 3.07 14.47	0.02 <0.001	1.19–7.91 4.69–44.7
Concern about dental health	1 = large 2 = some 3 = small	468	23.5 34.2 42.3	Ref.cat. 0.23 0.09	<0.001 <0.001	0.11–0.46 0.04–0.22

¹ This is a combined index of answers to six alternatives of one question arrived at after a principal components analysis, i.e. the combination of variables that best describes their internal relationships. The index has a mean of 0 and a standard deviation of 1. A high positive value (>2) indicates that you care a lot about having beautiful and perfect teeth.

the extent to which inference can be drawn about the source population, although it does not impinge upon the internal validity of the study (10). The results may be specific for the 20 to 25-year-old age group and could prove to be different if the same questionnaire were sent to older subjects, since young individuals may have a habit of expressing their opinions and therefore answer with a greater diversity than older individuals.

In studies of adolescents, strong associations are found between attitudes and self-perceived oral health (11). The results from this study indicate that self-perceived dental health seems to involve two dimensions connected to the definition of attitudes. The first is related to the affective aspect of attitudes, where two questions from the questionnaire similar in character are related to each other. The second points to a logic relation for a high likelihood between assessing one's treatment need as high and feeling worried about one's dental health. This is also true for the feeling of having poorer dental health than one's contemporaries.

If the analysis is focused on the cognitive aspect of a person's attitudes, which is related to conscious thinking and decision-making (12) and knowledge from experience, the results turn out differently. Cognition in the dental treatment context means information on health given by the dentist, such as having caries or gingival pockets, or from actual experience of the dental treatment. In this study, some clinical aspects are shown to influence the picture of oneself.

In this study, subjects with an educational level higher than comprehensive school tended to have a higher self-rated dental treatment need than the subjects with only a comprehensive school education. Most of the young adults have an education level that is higher than comprehensive school, which implies that most 20 to 25-year-olds rate their treatment need as high or very high. The majority of previous studies (two-thirds) have shown that education is associated with rating one's health better (1).

It is therefore important to separate the terms 'self-rated

health' and 'self-rated treatment need'. A highly rated treatment need does not necessarily mean that you rate your health as bad. A majority of the subjects rated their treatment need as high or very high, at the same time as they rated their health as better compared to their contemporaries. When you rate your treatment need as high, it may mean that you are aware of the need for regular dental examinations and treatment of, for example, caries and periodontal diseases before they progress. This increased awareness is probably related to educational level. A factor that may contribute to increased awareness and the feeling of a high treatment need can be previous experiences of regular visits to the dentist for examinations and prophylaxis. Preventive dentistry has played an important part in the care of children and adolescents in Sweden over recent decades. This has often resulted in more than one visit a year to the National Dental Health Service for the children and adolescents. The childhood and adolescent years may thus form a behavioral pattern concerning frequency of examinations. An important factor for predicting subjective treatment need in subjects 60 to 65 years old is a healthy visiting pattern, which includes frequent asymptomatic visits to the dentist. Patients displaying such behavior were six times more likely to perceive a treatment need than those who visited the dentist when in pain or in need of acute care (13). This is in contrast to the current health care policy of most Swedish Health Care boards who wish to expand the interval between examinations for patients.

In the end, the likelihood that dentist and patient share the same understanding of future treatment needs is weak at the individual level. The experience of dental treatment at any given moment leads to an interpretation such as over- or underestimation or, at best, a sound estimation of risk for further morbidity. At the same time there is a variation in both the patient's and the dentist's evaluation of risk. Few studies report on patient variation in evaluating health risk. Several studies show that patients' self-reported health is more reproducible than dentists' clinical findings (14).

The assessment of dental treatment need has conventionally been the 'objective' need assessed by the dentist. Agreement between dentists in decision-making concerning restorative treatment (15), treatment of periapical lesions (16), and removal of mandibular third molars (17) is low. The functional and social dimensions of oral disorders as measured by subjective indicators are themselves indicators of need and should be included in assessments of needs (18). The correlation between subjective and objective oral health indicators, such as number of decayed and filled teeth, bleeding gums and periodontal attachment loss, is low (2, 19, 20). The clinical indicators commonly used in oral health surveys measure cumulative disease experience, and since these are quite different from measures of current treatment need there is merit in assessing the relationship between subjective indicators and clinically defined needs (13). In this study we have shown that the relation between dentists' and patients' judgments is weak.

The results point to the character and quality of communication in dental health services. In Sweden, great efforts have been made in recent decades to give dental health information to children and young adults, both at the dental clinic and at school. Dental health education has been given at both group and individual levels, and although the benefits of such a policy have not been scientifically evaluated, the education engages dentists, hygienists, and nurses in their everyday work. We should try to further investigate educational or cognitive aspects of health information, and a model for such a study should focus on interpretation of information and how it is related to personality traits such as knowledge and self-reliance in the patient.

In conclusion, the statistical model using dentist assessments as explanatory variables, three clinical conditions well validated in relation to caries and periodontitis appeared as significant: number of decayed-missing teeth, oral hygiene, and presence of periodontal pockets or marginal bone loss. The statistical model combining dentist and patient assessment as explanatory variables resulted in an interesting finding: the patient's self-assessment and concern with dental health, in combination with educational level of the patient, were of greater importance than the dentist assessment in predicting the self-assessed treatment need of the patient. This indicates a lack of concordance between dentists' and patients' understanding of the patient's disease and illness. Also, this lends credibility to the use of questionnaires as assessments of clinical conditions.

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