

Association between adolescents' self-perceived oral health and self-reported experiences of abuse

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This study investigated the association between self-perceived oral health and self-reported exposure to different types of child abuse. It was hypothesized that self-perceived oral health is compromised in exposed adolescents. All Grade-9 compulsory school and second-year high-school pupils in Södermanland County, Sweden ($n = 7,262$) were invited to take part in a population-based survey; 5,940 adolescents responded. Survey items on health and social wellbeing included self-perceived oral health and exposure to abuse. The results showed that poor self-perceived oral health was associated with self-reported experience of physical abuse, intimate partner violence, forced sex, and bullying (adjusted OR = 2.3–14.7). The likelihood of reporting poor oral health increased from an adjusted OR of 2.1 for a single incident of abuse to an adjusted OR of 23.3 for multiple abuses. In conclusion, poor self-perceived oral health and previous exposure to child physical abuse, intimate partner violence, bullying, and forced sex is associated. It is important that dental professionals recognize adolescents with poor subjective oral health and take into consideration child abuse as a possible cause in order to prevent these adolescents from further victimization. These results further strengthen that dental professionals are an important resource in child protection.

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Poor health outcomes and health-compromising behaviors are often found in children exposed to child physical abuse (CPA) (1, 2). The dental profession, who meet children and adolescents on a regular basis, are an important resource for detection and prevention of child abuse, and are expected to recognize suspected cases of child abuse and to act accordingly when suspicion occurs. CAIRNES *et al.* (3) found injuries such as fractures, contusions, bruises, burns, and other lesions in the head and neck area after physical abuse but there are also associations with untreated caries (4). Other types of abuse, such as forced sex (FS) and intimate partner violence (IPV), are associated with dental fear and behavioral management problems in the dental situation (5–8). The burden and consequences after child abuse are, among others, depression, eating disorders, self-destructive behaviors, and other health-compromising behaviors (1, 9), factors that are also associated with poor oral health (1, 2, 10). ANNERBÄCK *et al.* (11) found, in a population-based youth survey in Sweden, that 15% of the adolescents reported that a parent or other caretaker had hit them. The same study found 7% reporting IPV in the family, often co-occurring with CPA. The association with poor health outcomes was stronger with repeated and multiple abuse,

including FS and exposure to peer-victimization (bullying) (2).

Until now, the oral and dental health among abused children and adolescents in Sweden was unknown. Subjective oral health can be evaluated by asking an individual to rate their oral health. THOMSON *et al.* (12) showed that the question: 'How would you describe the health of your teeth or mouth?' provides an adequate summary of how people view their oral health. It is suggested that self-perceived oral health (SPOH) could be used as a supplemental measure to epidemiological indices among adolescents (13). Adolescents describe good oral health as having no caries, no pain, and white, clean, and well-shaped teeth, and it is also associated with positive experiences and regular dental appointments. On the other hand, poor oral health is associated with untreated caries, negative experiences such as dental pain or unpleasant dental visits, and poor subjective esthetics, and those adolescents are more likely to only seek care when having a problem (14–18).

The objective was to study the association of SPOH and self-reported experience of physical abuse, IPV, FS, and bullying. It was hypothesized that SPOH is compromised in abused adolescents.

Material and methods

Study population

All grade-9 compulsory school pupils and all second-year high-school pupils (in a 3-yr high-school system) in Södermanland County, Sweden, were invited in 2008 to take part in a population-based study ($n = 7,262$). The Center of Public Health conducted the study in collaboration with the Center for Clinical Research at Södermanland County Council. School nurses and teachers managed questionnaire distribution and collection. The pupils answered the questionnaire in the classrooms. All answers were anonymous and were returned in sealed envelopes.

The pupils were informed about the purpose of the study and were told that all information collected would remain confidential. The parents were not informed because, in Sweden, adolescents over 15 yr of age are allowed to decide for themselves concerning participation.

The questionnaire

The County Council of Södermanland constructed the questionnaires. The questionnaire administered to the grade-9 pupils comprised 96 items, and the questionnaire administered to the second-year high-school pupils comprised 98 items. This study focused on the following items, which were equal for both grades: sociodemographic variables, abuse, and SPOH (the variables are described in Table 1). Sociodemographic variables were coded and merged into two groups: boy or girl; ≥ 1 parent born in Sweden or both parents foreign born; live in a purchased house or live in a rented apartment; and live with both biological parents or parents are separated. Status of employment was categorized into: both parents employed; one parent unemployed/on sick leave; or both parents unemployed/on sick leave. Three of the abuse variables were divided into three groups (no abuse; abuse once; or abuse more than once) and FS was divided into two groups (FS was indicated when the response was 'Yes'). Questions regarding oral health had five alternatives; in multivariate logistic regressions these five groups were dichotomized by merging 'Very good; Good; Neither good nor poor' into 'Good' and 'Poor' and 'Very poor' into 'Poor'.

Response rates were 84% in the younger group (grade 9), 78% in the older group (second-year high school), and 82% overall. The internal response rate for 'How do you perceive your oral health?' was 99%, which, in a final sample of 5,890 pupils, represents an internal dropout of 43 persons. Non-respondents were given a second chance to fill out the questionnaire. Reasons for non-participation were illness, away from school on an internship, or unknown. Seven individuals were withdrawn for suspected hyper-response (i.e. the worst alternative of every question was consistently selected).

Ethical considerations

Because questions on violence, particularly concerning violence within the immediate family, could cause distress, all pupils received written information on counseling opportunities. The regional Ethics Review Board of Linköping approved this study [Daybook no. (Dnr) M180-08].

Statistical analyses

Fisher's exact test analyzed response distribution and comparisons between groups. The multiple logistic regression analyses were carried out in a forward stepwise model in order to identify sociodemographic factors that were independently associated with SPOH.

To estimate associations between abuse and SPOH, multivariate logistic regression analysis was used and the independent variables were entered simultaneously in the model. Results are presented as adjusted OR with 95% CI; $P < 0.05$ was considered significant. Data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 19.0; SPSS, Chicago, IL, USA).

Results

Of the 5,890 respondents, 29.4% ($n = 1,729$) rated their SPOH as very good, 54.9% ($n = 3,232$) as good, 12.7% ($n = 750$) as neither good nor poor, 2.3% ($n = 137$) as poor, and 0.7% ($n = 42$) as very poor. Table 2 presents sociodemographic background variables in the population. A forward stepwise regression analysis found that three variables were independently and significantly related to poor SPOH: parents separated ($P < 0.001$); both parents foreign born ($P = 0.017$); and one parent unemployed or on sick leave ($P < 0.0009$). Boys rated their SPOH as poor or very poor significantly more often (3.5%) than did girls (2.5%) ($P = 0.027$). In total, including internal dropouts, 1,239 (21.4%) reported lifetime experiences of CPA ($n = 5,788$), and 738 (12.8%) reported violence between adults in the family ($n = 5,767$) (Table 3).

Compared with non-abused adolescents, a trend of increasingly poor SPOH was observed among those who reported experience of CPA, IPV, FS, and bullying (Table 4).

When controlling for the confounding factors parents separated, both parents foreign born, and one parent unemployed or on sick leave, all variables were entered simultaneously into a multiple logistic regression analysis and showed significant associations between poor SPOH and all abuse types. Experiences of repeated abuse further increased the likelihood of poor SPOH. The strongest increase in poor SPOH was among adolescents who had been bullied once or more each week (adjusted OR = 14.7; 95% CI: 8.0–27.0) (Table 4).

The impact of various combinations of abuse appeared to be cumulative; the more types of abuse an adolescent experienced, the more likely that a lower SPOH would be reported. In the four groups of abuse, the lowest SPOH occurred when CPA and the other three types of abuse – IPV, FS, and bullying – all occurred; the adjusted OR increased to 23.3 (95% CI: 8.5–63.6) (Table 4).

Discussion

This study is the first to describe an association between SPOH and previous experience of abuse. A

Table 1
Selected items from the questionnaire and eligible response options

Item	Response options	Coded responses*
Sociodemographic variables		
Are you a boy or a girl	Boy Girl	Boy Girl
What do your mother/father do for a living? ^{†,‡}	Employed Student Unemployed On sick leave <6 months On sick leave >6 months Other	Both parents employed One parent unemployed/on sick leave Both parents unemployed/on sick leave
Where are you and your parents born? [†]	In Sweden In Norway, Denmark, Finland, Iceland Other country in Europe Other country, not Europe	≥1 parent born in Sweden Both parents foreign born
How do you live?*	In a leasehold flat In a condominium In a row-house/town-house In a house/villa On a farm/countryhouse At a boarding school Other	Live in a purchased house Live in a rented apartment
Who/m do you live together with?*	Both of my parents My mother My father My mother and her partner My father and his partner At a family home Other	Live with both biological parents Parents are separated
Abuse		
Have you been boxed on the ear/been hit by an adult who is a parent or another caretaker?	Yes, once Yes, several times	CPA 1 CPA 2
Have you been bullied by someone?	Yes, once this semester [§] Yes, once a month Yes, once a week Almost every day	Bullying 1 Bullying 2
Has violence occurred between the adults in your family?	Yes, once or twice Yes, several times	IPV 1 IPV 2
Have you been forced to engage in sexual acts?	Yes, by a peer Yes, by an adult	FS FS
Dental health		
How do you perceive your dental health?	Very good Good Neither nor Poor Very poor	Good Poor Poor

*Dichotomized coded items, with the exception of parental occupation where responses were divided into three groups.

†Response options are multiple choice.

‡Responses are eligible at individual level: you; mother; father.

§In the preceding 2 months since the questionnaire was administered at the end of February.

strong association was found between poor SPOH and self-reported exposure to CPA, IPV, FS, and bullying. This result expands previously described associations between child abuse and oral health (3–8).

The majority of the adolescents were satisfied with their oral health, which is in agreement with previous studies in Sweden (13, 18). Three per cent (179 adolescents) reported poor or very poor oral health. This represents a small portion of the cohort, but leads to an important discussion regarding the characteristics of this group. Most adolescents who reported previous exposure to abuse stated a subjective good oral health.

However, among the individuals who stated that they had poor or very poor oral health it was significantly more common to have been exposed to any kind of abuse. A poor SPOH was found significantly more often among adolescents who lived with separated parents, with both parents foreign born, or with one parent unemployed or on sick leave. These sociodemographic variables are associated with dental caries (19, 20) and risk for exposure to CPA and IPV (11, 21, 22) and are also shown to affect SPOH (23). Because the analysis controlled for these confounders, a previous experience of abuse seems to affect SPOH,

Table 2

Self-perceived oral health (SPOH) according to sociodemographic background factors, presented as number and percentage

Variables	Good SPOH* n (%)	Poor SPOH* n (%)	P-value†	Adjusted OR (95% CI)	P-value‡
School year					
Grade 9 (15 yr of age) (n = 3113)	3019 (97.0)	94 (3.0)			
Second-year high school (17 yr of age) (n = 2777)	2692 (96.9)	85 (3.1)	0.940		
Gender					
Boys (n = 2970)	2866 (96.5)	104 (3.5)			
Girls (n = 2912)	2839 (97.5)	73 (2.5)	0.027		
Parents' employment					
Both parents employed (n = 4625)	4521 (97.8)	104 (2.2)		1.0	
One parent unemployed/on sick leave (n = 811)	768 (94.7)	43 (5.3)		1.8 (1.2–2.8)	0.009
Both parents unemployed/on sick leave (n = 93)	82 (88.2)	11 (11.8)	0.000	1.6 (0.5–5.4)	0.423
Parents foreign born					
≥1 parent born in Sweden (n = 5089)	4958 (97.4)	131 (2.6)		1.0	
Both parents foreign born (n = 689)	655 (95.1)	34 (4.9)	0.001	1.8 (1.1–3.0)	0.017
Housing accommodation					
Living in a purchased house (n = 4738)	4611 (97.3)	127 (2.7)			
Living in rented apartment (n = 1099)	1061 (96.5)	38 (3.5)	0.158		
Family situation, living with:					
Both biological parents (n = 3415)	3352 (98.2)	63 (1.8)		1.0	
Separated parents (n = 2048)	1972 (96.3)	76 (3.7)	0.000	1.9 (1.3–2.7)	0.001

Independent associations between poor SPOH and sociodemographic variables were identified by forward stepwise logistic regression analysis.

*Dichotomized as 'Good' (response = very good, good, or neither good nor bad) or 'Poor' (response = poor or very poor).

†Fisher's exact test.

‡Forward stepwise regression analysis.

Table 3

Cross-tabulation of self-perceived oral health among adolescents reporting exposure to child physical abuse (n = 1,239) or intimate partner violence (n = 738)

Exposure	Self-perceived oral health				
	Very good	Good	Neither good nor bad	Poor	Very poor
Has violence ever occurred between adults in your family?					
Never	90.3	87.2	83.5	78.9	52.5
Once	7.4	8.3	10.5	12	15
Once or more	2.4	4.5	6.1	9	32.5
Have you ever been boxed on the ear/been hit by a parent or a caregiver?					
Never	84.0	78.4	72.8	55.6	47.5
Once	10.5	13.0	15.2	25.9	10.0
Once or more	5.6	8.5	11.9	18.5	42.5

Values are given as a percentage.

regardless of sociodemographic variables. Other confounding factors, such as the frequency of dental appointments, dietary habits, or oral hygiene habits, were not included in the study. Nevertheless, other studies have found poor SPOH among adolescents with untreated caries, previous dental pain, and mainly emergency visits (14–18).

The reported prevalence of CPA and IPV in this study was slightly higher compared with that in another

study performed recently in Sweden (24). One plausible explanation for this is the older age of participating adolescents in our study (11). The adolescents in who reported being frequently bullied were 14 times more likely to report poor SPOH. Bullying is considered as a risk factor for development of depression and psychosomatic conditions (25) that, in turn, can affect oral health (9). Sexual abuse is related to dental fear and dental anxiety (5, 8) and this lends support to our findings that self-reports on FS increased the likelihood, by about fivefold, of reporting poor SPOH.

The cumulative impact of multiple forms of abuse on poor SPOH is another interesting result. When CPA co-occurred with all other types of abuse, the likelihood of self-reported poor SPOH increased by 23-fold. The cumulative effect of poor health outcomes after multiple and repeated abuse is known (1, 4, 10), and this study indicates the same pattern on SPOH. Future ill-health and social problems are described in a study by LAMERS-WINKELMAN *et al.* (26), who found a variety of everyday, unexplainable complaints such as problems with eating habits, sleep, stomach pain, headache, and self-destructive thoughts among children in families with IPV and exposure to physical abuse. Multiple psychosomatic problems of this kind have been found to be indicative of CPA among Swedish children (27) and our results add the importance of recognizing subjective poor oral health as indicative of poor wellbeing.

The statistical power and the overall response rate were high in this study. The large study group enabled us to determine associations between SPOH and all types of abuse in small subgroups. The catchment area

Table 4

Association between self-perceived oral health (SPOH) and child physical abuse (CPA), bullying, intimate partner violence (IPV), and forced sex

Variables	Good SPOH* n (%)	Poor SPOH* n (%)	Adjusted OR ^{†,‡} (95% CI)	P-value
Abuse variables				
No abuse	3752 (98.3)	65 (1.7)		
CPA, once	520 (95.1)	27 (4.9)	2.3 (1.3–4.1)	0.004
CPA, more than once	384 (92.1)	33 (7.9)	3.6 (2.1–6.3)	0.000
Bullying once a month or less	400 (95.9)	17 (4.1)	2.3 (1.2–4.4)	0.009
Bullying once a week or more	100 (75.8)	32 (24.2)	14.7 (8.0–27.0)	0.000
IPV 1–2 times	463 (95.5)	22 (4.5)	2.4 (1.3–4.3)	0.005
IPV >3 times	228 (90.1)	25 (9.9)	3.1 (1.5–6.4)	0.003
Forced sex	292 (89.3)	35 (10.7)	5.4 (3.0–9.6)	0.000
Combinations of abuse				
No abuse	3752 (98.3)	65 (1.7)		
CPA	404 (96.0)	17 (4.0)	2.1 (1.1–4.1)	0.022
CPA + one other type of abuse	367 (95.6)	17 (4.4)	2.1 (1.1–4.1)	0.035
CPA + two other types of abuse	112 (91.1)	11 (8.9)	5.0 (2.2–11.6)	0.000
CPA + three other types of abuse	21 (58.3)	15 (41.7)	23.3 (8.5–63.6)	0.000

Results are given as n (%) of children in the respective abuse group or OR and 95% CI adjusted for sociodemographic variables.

*Dichotomized as 'Good' (response = very good, good, or neither good nor bad) and 'Poor' (response = poor or very poor).

†Adjusted for the sociodemographic variables family situation, foreign-born parents, and parent's employment.

‡Multiple regression analysis, enter model.

is considered as representative of Sweden, with its similar sociodemographic structure to the country as a whole and also a similar caries prevalence (28). One limitation with cross-sectional designs is that we cannot address any causality between abuse and oral health. However, the association of self-rated health to morbidity and mortality has been shown in longitudinal studies (29); also, self-reports on both general health and SPOH are associated with current dental status (30), although this has not been confirmed among adolescents (13).

Questions on a sensitive matter, such as abuse, can reduce the validity of the answers and it is also difficult to remember what happened during the early years in childhood. One source of bias in connection with questionnaire-based studies is that the personality traits of the participants involves that they tend consistently to report the most 'negative' alternatives, whereas others score the most 'positive' (31). In this study it may be assumed that the pupils who tended to 'over-report' or 'under-report' the items of abuse would probably also choose to do this for SPOH and that skewness would not arise. Measuring abuse and neglect is difficult; the frequency is based either on self-reports or on official statistics, and self-reports are more likely to be true as a result of the large number of unrevealed cases (1) and the fact that self-reports tend to be stable over time (32). Future clinical research is required to study the oral health needs in abused children and adolescents with focus on the association of actual dental treatment need, SPOH, and experiences of child abuse.

In conclusion, this study showed a strong association between poor SPOH and exposure to CPA, IPV, bullying, and FS. The study adds that SPOH is a measure that can be used to recognize adolescents in vulnerable situations. This result leads to two major clinical implications for dental professionals and other professionals

around children and adolescents. First, dental professionals should ask young people to rate their oral health, both on regular visits and on emergency visits, in order to complement their clinical examination. Child abuse may be a possible cause of poor SPOH, and, in order to prevent these adolescents from further victimization, dental professionals should recognize adolescents with subjective poor oral health, and a thorough medical and social history should be considered. Second, it is a simple measure for non-dental professionals to ask in order to make specific referrals to pediatric dental specialists. These results further strengthen that dental professionals are an important resource in child protection.

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