

ORIGINAL ARTICLE

Association between self-reported dental fear and exposure to violence among adolescents—A population-based study

Emmanuelle Noirrit-Esclassan^{1,2,3}  | Eva-Maria Annerbäck^{4,5} |
Fernanda Cuhna Soares¹ | Göran Dahllöf^{1,6,7}  | Therese Kvist^{1,6,8} 

¹Division of Pediatric Dentistry,
Department of Dental Medicine,
Karolinska Institutet, Huddinge,
Sweden

²Université de Toulouse III, Toulouse,
France

³Pediatric Dentistry Unit, CHU
Toulouse, Toulouse, France

⁴Child and Adolescent Psychiatry,
Department of Clinical and
Experimental Medicine, Linköping
University, Linköping, Sweden

⁵Center for Clinical Research Sörmland,
Uppsala University, Eskilstuna, Sweden

⁶Center for Pediatric Oral Health
Research, Stockholm, Sweden

⁷Center for Oral Health Services
and Research, Mid-Norway, TkMidt,
Trondheim, Norway

⁸Astrid Lindgren Children's Hospital,
Karolinska University Hospital,
Stockholm, Sweden

Correspondence

Emmanuelle Noirrit-Esclassan,
Pediatric Dentistry Unit, Université de
Toulouse III, CHU Toulouse, Toulouse,
France.

Email: noirrit.e@odonto-tlse.eu

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Abstract

Background: The etiology of dental fear (DF) is multifactorial and involves other contributing factors than dental traumatic experiences.

Aim: To study, among adolescents, associations between DF and exposure to child physical abuse (CPA), intimate partner violence (IPV), and bullying.

Design: We extracted data from a population-based survey of 4977 adolescents who were 15–17 years old in 2017. The questionnaire queried socioeconomic background factors, DF, self-perceived oral health, general health, and exposure to child abuse. To estimate associations between DF and exposure to child abuse, we used multivariate logistic regression analysis.

Results: Overall, 8.2% reported DF, girls (10.5%) reported DF significantly more often than boys (5%), and adolescents not identifying themselves as girl or boy reported the highest prevalence of DF (25.5%; $p < .001$). 15.3% had been exposed to child physical abuse; 11.1%, to IPV; and 11.2%, to bullying. Experiences of IPV and bullying, but not physical abuse, were statistically significantly associated with DF. The odds of developing DF for adolescents exposed to any type of violence was 1.9 times the odds for adolescents with no exposure to child abuse.

Conclusion: Exposure to violence is associated with dental fear in adolescents.

KEYWORDS

bullying, child physical abuse, dental fear, intimate partner violence

1 | INTRODUCTION

Dental fear (DF) is a persistent and excessive fear of dental stimuli and procedures that often results in avoidance or significant distress.¹ The etiology is multifactorial and

involves traumatic dental experiences combined with the feeling of loss of control and endogenous factors such as generalized anxiety syndrome, general and specific fears, and temperament.^{2,3} The prevalence of DF is high, affecting up to 22% of adolescent populations.^{3,4}

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Exposure to child abuse from a caregiver—as in physical, sexual, and psychological abuse, and intimate partner violence (IPV)—or between peers, as in bullying, is common among adolescents. Swedish studies show that 19% of Swedish adolescents aged 15 years and 16% aged 17 report having been hit by a parent or caretaker, 10% reported IPV,⁵ and 20% reported experiences of bullying.⁶ Exposure to child abuse may induce persistent hypersensitivity of the neuroendocrine stress response system.⁷ In turn, this heightened stress response via increased corticotropin-releasing hormone concentration could lead to significantly higher risks of chronic health conditions and mental health problems such as depression and anxiety.⁷

Child abuse is associated with poor self-perceived oral health among adolescents. Studies show a higher frequency of toothache, dental neglect, signs and symptoms of temporomandibular disorders,⁸ as well as difficulties coping with dental treatment, and dental healthcare avoidance among child victims.^{9,10} Poor oral health in children and adolescents is independently related to DF¹¹ and to child abuse and neglect.¹²

A previous study shows an association between dental fear and anxiety and past exposure to sexual abuse in adults,¹³ although associations between child abuse and dental fear have not been explored in adolescents. As dental fear combined with psychological distress and general fearfulness are contributors to DF¹⁴ and negative psychosocial consequences,¹⁵ we aimed to study the association between DF and exposure to violence among adolescents. This study examined associations between DF and exposure to child physical abuse, IPV, and bullying among 15- to 17-year-old adolescents. Our hypothesis was that DF in adolescents is associated with exposure to violence.

2 | MATERIALS AND METHODS

2.1 | Study population

In 2017, all grade 9 compulsory school pupils (aged 15 years) and all second-year high school pupils (aged 17) in Södermanland County, Sweden, were invited to participate in a population-based study ($n = 5015$). Södermanland County is the fifth largest county in Sweden with regard to population and consists of both rural and urban areas with a socioeconomic structure similar to the Swedish national average.

2.2 | Questionnaire

The main purpose of the population surveys was to explore the health and living conditions of adolescents. The

Why this paper is important to paediatric dentists

- Both exposure to violence and dental fear are common among adolescents.
- Adolescents exposed to abuse, and particularly to multiple forms, have an increased odds of reporting dental fear.
- Clinicians who treat adolescents are encouraged to have a holistic view of their patients and consider exposure to abuse as an explanation for dental fear when other factors fail to explain.

questionnaire administered to grade 9 pupils was comprised of 96 items, and the questionnaire to the second-year high school pupils, 98 items. This study focused on the items for these topics, which were similar for both grades: sociodemographic variables, DF, self-perceived oral health, general health, and exposure to violence.

2.3 | Ethical considerations

The Center for Public Health conducted the study in collaboration with the Center for Clinical Research at the 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 returned in sealed envelopes. The pupils were informed about the purpose of the study and told that all collected information would remain confidential. Parents were not informed because, in Sweden, adolescents older than 15 years can decide for themselves concerning participation. No consent form was signed, but adolescents were free to refuse to be involved in the survey.

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. 2016/258-32).

2.4 | Measures

Dental fear was assessed with the question “Are you afraid of visiting the dentist?” DF was dichotomized as present when the adolescent answered “yes, very afraid” or “yes quite a bit” and as not present with the responses “yes, a little” or “no.”

Gender was classified as boy, girl, or no gender identification.

Family situation was dichotomized into living with both biological parents and not living with both biological parents (eg, parent living with a new partner, single-parent families, and living in foster care).

Parental employment was divided into at least one parent employed or both parents unemployed/on sick leave.

Foreign background was dichotomized into (1) Swedish background, if ≥ 1 parent was born in Sweden; and (2) foreign background, if the respondent was born abroad and/or both parents were born abroad.

Self-perceived oral health was assessed as good when the adolescent responded “very good,” “good,” or “neither good nor bad” and as poor for the responses “bad” or “very bad.”

Abuse, the exposure variable, was built using the variables below:

Child physical abuse was indicated if the child responded “Yes, once” or “Yes, more than once” to the question “Have you been slapped on the ear/been beaten by an adult?” and if they reported that they had been exposed by a parent or other caretaker on the following question “By whom have you been slapped on the ear/been beaten?”

Intimate partner violence was indicated if the child responded “yes” to the question “Has violence occurred between adults in your family?”

Bullying is a form of violence between adolescents defined as various types of physical and verbal abuse, either in a closed environment or on social media. Bullying was classified as (a) never; (b) yes, sometimes during the school term or once a month; or (c) yes, once a week or almost every day.

The abuse variable was classified into eight categories: (a) no abuse; (b) physical abuse, once; (c) physical abuse, more than once; (d) IPV; (e) bullying, once a month; (f) bullying, more than once a month; and (g) more than one type of abuse.

2.5 | Final sample

Response rates were 91% among grade 9 students, 93% in second-year high school students, and 92% overall. The internal response rate for “Are you afraid of going to the dentist?” was 99%, which in the final sample of 4977 pupils is an internal dropout of 41 individuals. Nonrespondents were given a second chance to fill out the questionnaire. The nonparticipating adolescents were identified because

of their absence in the classroom on the day of the survey, either by illness, truancy, or unknown reason. These adolescents were offered to participate anonymously in the survey at a later time point. Seven individuals were excluded due to an extreme response style where the most negative response was consistently selected.

2.6 | Statistical analyses

The chi-square test was used to analyze response distribution and compare differences between the groups. The univariate analysis showed that gender, family situation, parental employment, and self-perceived oral health were significantly associated with DF. To estimate associations between DF and exposure to violence, a logistic regression analysis was used. Results are presented as adjusted odds ratios (ORs) with 95% confidence intervals (CIs); $p < .05$ was considered significant. We used the fitted model to estimate the impact of each type of violence and calculated the predicted cumulative odds based on the logistic regression analysis. Data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 19.0; SPSS Inc) and STATA, version 14.0 (StataCorp LP).

3 | RESULTS

Table 1 presents the characteristics among those reporting DF. Of the 4270 respondents, 8.2% ($n = 348$) reported DF. Girls reported DF significantly more often (10%; $n = 196$) than boys (5.6%; $n = 122$). Adolescents not identifying themselves as girl or boy reported the highest prevalence of DF (25.5%; $n = 25$; $p < .001$). Furthermore, adolescents with both parents unemployed or on sick leave and adolescents not living with both parents reported DF significantly more often than those who had at least one parent employed and those who lived with both parents, respectively. Poor self-perceived oral health was reported significantly more often among adolescents with DF than those not reporting DF (**Table 1**). Of the entire study cohort, 15.3% ($n = 655$) had been exposed to child physical abuse; 11.1% ($n = 474$) had experienced IPV in their families; and 11.2% ($n = 476$) reported bullying.

Table 2 shows the proportion of violence form suffered by adolescents reporting DF and those not reporting DF. The univariate analysis found that IPV and bullying once a month were significantly more often reported by those with DF than by those without DF.

Multivariate analyses using DF as the dependent variable and adjusted for gender, family situation, parental employment, and self-perceived oral health found that all types of abuse, except child physical abuse, were statistically significantly associated with DF.

TABLE 1 Descriptive characteristics of the study population in association with self-reported dental fear (DF)

Descriptive characteristics	No DF n (%)	DF n (%)	p-value ^a
School year			
Grade 9 (age 15 years)	2057 (91.0)	203 (9.0)	.065
Second-year high school (age 17 years)	1865 (92.8)	145 (7.2)	
Gender			
Boys	2045 (94.4)	122 (5.6)	<.001
Girls	1769 (90.3)	196 (10.0)	
No gender identification	73 (74.5)	25 (25.5)	
Family situation			
Living with both biological parents	2254 (93.0)	171 (7.1)	.002
Not living with both biological parents	1633 (90.3)	175 (9.7)	
Parental employment			
One or both parents employed	3550 (92.2)	300 (7.8)	.005
Both parents unemployed/on sick leave	279 (87.7)	39 (12.3)	
Foreign background			
One or both parents born in Sweden	2964 (92.4)	244 (7.6)	.252
Respondent born abroad or both parents born abroad	800 (91.2)	77 (8.8)	
Self-perceived oral health			
Good	3740 (92.6)	297 (7.4)	<.001
Poor	160 (74.9)	47 (25.1)	

^aChi-squared test; significance level, $p < .05$.

Bold values are statistically significant.

TABLE 2 Self-reported exposure to violence in relation to dental fear (DF)

Abuse variable	No DF n (%)	DF n (%)	Crude OR (95% CI)	p-value
No abuse	2873 (93.1)	213 (6.9)	1	
Physical abuse, once	199 (94.3)	12 (5.7)	0.81 (0.45–1.48)	.499
Physical abuse, more than once	119 (86.3)	14 (10.5)	1.59 (0.90–2.81)	.113
Intimate partner violence	169 (87.6)	24 (12.4)	1.92 (1.22–3.00)	.005
Bullying, once a month ^a	175 (83.7)	34 (16.3)	2.62 (1.77–3.88)	<.001
Bullying, more than once a week ^a	80 (91.9)	11 (12.1)	1.85 (0.97–3.54)	.061
More than one abuse	307 (88.5)	40 (11.5)	1.76 (1.23–2.51)	.002

^aYes, sometimes during the school term or once a month.

^bYes, once a week or almost every day.

Bold values are statistically significant.

Adolescents who had experienced IPV (OR: 1.71; 95% CI: 1.07:2.74) and bullying once a month (OR: 2.52; 95% CI: 1.68–3.78) had a significantly increased odds of reporting DF, and adolescents exposed to more than one abuse had a 33% (95% CI: 1.01:1.97) increased odds of reporting DF (Table 3).

The logistic regression analysis was used to estimate the predicted probability of DF among adolescents who

reported multiple exposures to violence (Figure 1). In the absence of all forms of violence, the estimated probability of DF was 8.1%. When all forms of violence were present, the predicted probability increased to 14.2%. For adolescents exposed to both bullying and IPV, the odds of developing DF was 1.9 times the odds for adolescents who had never been exposed to violence.

Abuse variable	Adjusted OR (95% CI)	p-value
No abuse	1	
Physical abuse, once	0.89 (0.48 – 1.64)	.709
Physical abuse, more than once	1.53 (0.85 – 2.77)	.158
Intimate partner violence	1.71 (1.07 – 2.74)	.025
Bullying, once a month ^b	2.52 (1.68 – 3.78)	<.001
Bullying, more than once a week ^a	1.38 (0.69 – 2.76)	.366
More than one abuse	1.33 (1.01 – 1.97)	.047

Notes: All values adjusted for gender, family situation, parental employment, and self-perceived oral health.

^aYes, sometimes during the school term or once a month.

^bYes, once a week or almost every day.

Bold values are statistically significant.

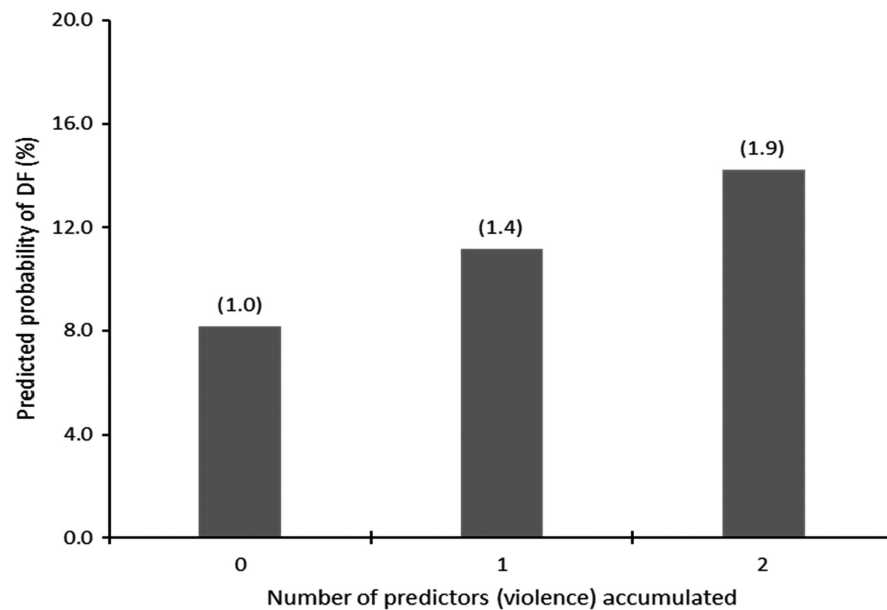


TABLE 3 Logistic regression model for dental fear (DF)

FIGURE 1 Predicted probability of dental fear (DF) for greater numbers of forms of abuse. Adjusted cumulative odds ratio is in parentheses at the top of each column. The odds ratio of no violence was set to 1. Forms of violence: 1 = bullying and 2 = bullying + intimate partner violence

4 | DISCUSSION

The present study found that adolescents who report exposure to IPV and bullying were significantly more likely to also report DF.

In this population, 8.2% of adolescents reported DF. This is somewhat lower than the 14.5% measured in a Finnish adolescent population,¹⁶ but within the range of other studies on Scandinavian adolescents, irrespective of the anxiety scale used.¹⁷ As did other studies, we found a significantly higher proportion of DF in girls than in boys.¹⁸ The highest prevalence was found among adolescents not identifying themselves as boy or girl. Transgender and nonbinary youth are at an increased risk of suffering cyberbullying, and verbal and physical attacks. Heima et al.¹⁹ reported a high level of dental fear in a group of transgender adults and suggested an association with previous experiences of discrimination.

When we controlled for confounding factors, adolescents who reported bullying once a month and IPV were

more likely to report DF. According to Oosterink et al.² (2009), the acquisition of high levels of dental anxiety might be the result of several cumulative exposures to distressing events over a longer period of time, rather than of a one-trial learning experience. Individuals with high levels of dental anxiety are more likely than individuals with low dental anxiety to have ever experienced a traumatic event resulting in post-traumatic stress disorder.²⁰ Intimate partner violence has previously been associated with children exhibiting behavioral management problems in the dental clinic, known to be associated and combined with DF.^{1,21} Moreover, adolescents exposed to child abuse have been reported to have unmet dental treatment needs and avoidance of dental health care, factors also known to correlate with higher levels of DF.^{9,11}

In this study, we did not find an association between DF and physical abuse. There may be several reasons for this; we measure lifetime exposure to CPA, so the timing of the exposure may affect our results. Furthermore, there may be protective factors such as other supportive

relationships surrounding the child, which were not included in this study. Child abuse is best understood by analyzing complex interactions of several risk factors at different levels, and similarly, DF has a complex etiology dependent on personal traits and experiences of dental treatment.

As a form of negative chronic social stress, bullying may be particularly damaging in adolescence during important phases of social and emotional development. Bullying is associated with both poor self-perceived general health²² and poor self-perceived oral health.⁹ Silveira et al.²³ demonstrated how the occurrence of bullying episodes in school increased the prevalence of dental anxiety. We found an association between bullying and DF, but were not able to show a gradient, where those exposed more frequently reported a higher prevalence of DF. The negative effects of bullying on DF may be alleviated by having a safe home environment and an adult to confide in.²² When exposure to other adverse and traumatic experiences co-occurs, bullying may have negative effects on mental health.²⁴ A graded relationship exists between adverse childhood experiences and any health problem.²⁵ Levels of traumatic stress symptoms are higher when multiple types of abuse co-occur, compared with only one type of abuse.²⁶ In this study, we found that the odds ratio of DF increased from 1.4 when one form of abuse was present to 1.9 when two forms of abuse were involved.

Among the strengths of this study are the large sample of a general adolescent population and a high response rate. Data were collected using an anonymous questionnaire with validated questions in the school setting, investigating both direct (bullying and physical abuse) and indirect (IPV) experiences of abuse. The socioeconomic conditions in Södermanland are similar to the Swedish national average. Another strength was that we measured child physical abuse from a lifetime perspective to show the burden of experienced violence while growing up. Among the limitations are that we did not explore potential resiliency factors other than family situation and parental employment, and the use of a single question, rather than a validated psychometric tool, to assess DF. We considered this justified since the questionnaire for post hoc analysis contained almost 100 questions. The validity of the single-item question has been evaluated in the context of finding a tool to assess dental fear in dental clinic settings or in prevalence studies on a population basis where more extensive questioning about dental anxiety is not possible.^{27,28} In adolescents, Honkala et al found that the single-item question of DF well correlated to both MDAS and the modified child dental anxiety scale.²⁹ We did not have access to dental records, so dental health and experiences of dental treatment were not recorded. Particularly

when reporting lifetime exposure to events, there is a risk of finding a lower prevalence due to recall bias. Finally, we did not explore fears other than dental fear. As exposure to maltreatment leads to a poor threat–safety discrimination, dental fear might be associated with enhanced fear generalization.³⁰

This study shows that exposure to IPV and bullying is associated with dental fear. All dental clinicians dealing with adolescents should always strive to understand the whole anamnestic background of the oral health problem and the manifestation of dental fear, to be able to provide an individual treatment plan for the child. This study shows that the experience of IPV and/or bullying could be queried for when other factors cannot explain the dental fear. Further research using a psychometric instrument should explore mediating and moderating parameters involved in the association between exposure to violence and medical and dental fear.

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CONFLICT OF INTEREST

The authors declare no conflict of interest concerning the authorship and publication of this article.

AUTHOR CONTRIBUTIONS

TK, AEM, and GD were responsible for designing and planning of the study; ENE, EMA, and FCS handled the data; FCS performed the statistical analysis; and ENE and TK wrote the first draft of the manuscript. All authors contributed to and approved the final manuscript.

DATA AVAILABILITY STATEMENT

The Centre for Clinical Research at Södermanland County Council manages data from the Life and Health studies. The data that support the findings of this study can be made available from author Therese Kvist, upon reasonable request.

ORCID

Emmanuelle Noirrit-Esclassan  <https://orcid.org/0000-0002-7039-6405>

Göran Dahllöf  <https://orcid.org/0000-0001-8536-5292>

Therese Kvist  <https://orcid.org/0000-0003-4863-3598>

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