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Family Environment and Traumatic Dental Injuries in Adolescents

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest in relation to this work.

ABSTRACT

Background/Aims: No comprehensive assessment of the influence of the home environment on traumatic dental injuries (TDI) has been conducted to date. The aim of this study was to explore the relationship between family environment and TDI among adolescents from East London.

Materials and Method: This cross-sectional study used data from 646 adolescents who participated in Phase III of the Research with East London Adolescents Community Health Survey (RELACHS). Family environment was measured with four indicators (non-nuclear family, discordant parental relationship and levels of parental support and parental punishment) measured through a self-administered questionnaire. Clinical examinations were performed for TDI, overjet and lip coverage. Logistic regression was used to test the crude and adjusted (controlling for sociodemographic and clinical factors) association of each family environment characteristic with TDI prevalence.

Results: Twenty-nine percent of adolescents were from non-nuclear families and 52.3% reported a discordant parental relationship. The mean score for parental support was -0.01 (Standard Deviation: 0.90, range: -0.11 to 0.08) and the mean parental punishment score was 0.03 (SD: 0.86, range: -0.04 to 0.10). Adolescents from non-nuclear families had 1.63 (95% Confidence Interval: 1.06-2.53) greater odds of having TDI than those from nuclear families. However, this association was fully attenuated after adjusting for sociodemographic and clinical factors. The other three indicators of family were not associated with TDI either in crude or adjusted regression models.

Conclusion: This study found weak evidence of an association between family environment and TDI.

INTRODUCTION

Traumatic dental injuries (TDI) are the result of the complex interplay between environmental determinants (such as area deprivation and safety), human behaviour (such as contact sports, risk-taking and inappropriate use of teeth) and oral predisposing factors (such as overjet and lip coverage).^{1,2} A better understanding of the mechanisms underlying broader environmental influences on TDI is currently needed. Psychosocial factors – those related to stressful events or environments – have not been explored fully in relation to TDI.

Family environment is defined as the quality of interactions and relationships between family members, and the ways in which individuals within the family unit perceive those interactions and relationships.³ Several aspects of the family environment (such as family structure, parental relationship and parenting styles) have been linked with child health.⁴⁻⁶ In addition, family environment can influence the experience of injuries in children. Specifically, the degree to which the caregiver is sensitive and responsive to the child's needs directly impacts on the occurrence of accidents.⁷ Family structure has also been related to accidents, with greater incidence of injuries among children in single-parent and reconstituted families.⁸ On the other hand, non-nurturing relationships are correlated with child abuse, which could lead to injuries directly via physical abuse, or indirectly via child engagement in aggressive behaviour, rendering them vulnerable to injuries.^{9,10}

The influence of the family environment on TDI among adolescents has not been adequately explored. Family structure is the indicator that has been mostly used to date. However, evidence is still conflicting. Some studies have showed an association between family structure and TDI^{11,12} while other studies have not reported any association.^{13,14} A study among 652 13-year-olds in Brazil showed an interaction between father's punishment and living in a reconstituted family. Adolescents with higher levels of father's punishment and living in a reconstituted or lone-parent family had greater odds of having TDI (Odds Ratio=8.44, 95% Confidence Interval: 3.35-21.5) than those in nuclear families with lower levels of father's punishment, after controlling for father's support, school grade and gender. Mother's levels of punishment and support were not associated with TDI.¹¹ Another study among 531 13-16-year-old adolescents in Greece showed that adolescents with high emotional support from the father were 13% (OR: 0.87; 95% CI: 0.76-0.99) less likely to have TDI, after accounting for gender and schoolmate complaints. Father's punishment and mother's support and punishment were not associated with TDI.¹⁵

Further studies are needed in this area. Hence, the aim of this study was to explore the relationship between family environment and TDI among 15-16-year-old adolescents.

MATERIAL AND METHODS

This study used data from phase III of The Research with East London Adolescents Community Health Survey (RELACHS), which is a longitudinal, school-based study of a representative, ethnically diverse sample of adolescents from 28 state secondary schools in East London, UK. There have been three cross-sectional RELACHS surveys to date. Phase I took place in 2001 (when pupils were in year 7 and aged 11-12 years), phase II took place in 2003 (year 9, 13-14 years) and phase III took place in 2005 (year 11, 15-16 years). Adolescents were selected using stratified two-stage cluster sampling in 2001. All 42 eligible schools in the boroughs of Hackney, Tower Hamlets and Newham were initially stratified by borough and school type (comprehensive, voluntary or other). Thirty schools were selected randomly and balanced to ensure representation by single-gender and mixed-gender ones. In each of the 28 schools that agreed to participate, two representative mixed ability classes of year 7 pupils were selected. Ethical approval for RELACHS was obtained from the East London and City Local Research Ethics Committees. Parents and adolescents were fully informed about the study and students were given the opportunity to opt out.

A power calculation based on a previous study, where 22% of adolescents from non-nuclear families had TDI and the odds ratio for the association between family structure and TDI was 2.3,¹¹ indicated that a sample of 522 adolescents was the minimum size required to identify a difference in TDI between adolescents from nuclear and non-nuclear families, assuming 80% statistical power, 95% confidence level and a ratio of 7-to-1 for adolescents from nuclear and non-nuclear families.

RELACHS Phase III data were collected through self-completed questionnaires and oral examinations. Each student completed the questionnaire individually in the classroom under the supervision of trained researchers, who addressed adolescents' queries and checked the questionnaires for missing data. The questionnaire included items on adolescents' demographic factors (age, gender and ethnicity) and family characteristics. Ethnicity was self-assigned using an adaptation of the 2001 UK census categories, including 24 ethnic subcategories under five main groups (White, Black, Asian, Mixed and Others). Socioeconomic measures included parental employment (both employed, one employed, both unemployed), household overcrowding (>1.5 persons/room) and car ownership. In addition,

adolescents' eligibility for free school meals was obtained from school records. It has been shown that parental employment was the most sensitive socioeconomic indicator of the four indicators assessed in this sample.¹⁶ Therefore, only this measure was chosen for analysis.

Family environment was assessed with four indicators. Family structure was defined as nuclear when adolescents reported living with both natural parents or non-nuclear if they reported living in single-parent, reconstituted (one parent living with a new partner) or foster care/families.^{17,18} Parental relationship was assessed with a single item on whether parents often argued or fought, and it was classified as concordant or discordant. Parental levels of emotional support and punishment were assessed with 12 items (six for each parent/caregiver) taken from the MIDUS study.^{19,20} For each parent/caregiver, four items assessed the level of support ("how much does she/he understand your problems and worries?", "how much love and affection does she/he give you?", "how much time and attention does she/he give you when you need it?", and "how much can you talk to her/him about things that are bothering you?") and two items assessed the level of punishment (how strict are her/his rules for you?, and how harsh is she/he when she/he punishes you?). All responses were provided on four-point ordinal scales (not at all=1, a little=2, quite a lot=3 and a lot=4). In line with previous studies using the same items,^{11,21} the four set of items were reduced to four factors (i.e. maternal support, paternal support, maternal punishment and paternal punishment) by extracting the first factor from exploratory factor analysis (varimax rotation) using the corresponding set of items. Parental support and punishment scores were calculated as the average of the corresponding paternal and maternal factor scores. Factor scores were standardised (mean of 0 and SD of 1), with negative [positive] values indicating lower [higher] levels of parental support/punishment than the group average [zero value], respectively. When only one parent/caregiver was available, the available factor score was used.

Oral clinical examinations were conducted according to the World Health Organization methodology.²² Two examiners (GS and PE) carried out the oral clinical examinations with participants seated on an adjustable chair. Participants' teeth were neither brushed nor professionally cleaned before examination. Teeth were dried with cotton pellets and examined with plane mouth mirrors under illumination by Daray light lamps (Daray® Medical, Derbyshire, UK). Diagnosis was visual, and no radiographs were taken. TDI were recorded using the Glendor et al.²³ classification. Both examiners were trained and calibrated before the main study. Training on the criteria for TDI assessment was carried out through the WHO oral health surveys manual and computer-based practical exercises. At

the end of this exercise, Kappa values for intra-examiner reliability were 0.87 and 0.91 for the two examiners, and 0.80 for inter-examiner reliability. Lip coverage and overjet were also measured during oral clinical examinations. Overjet was recorded as increased when it was greater than 6 mm¹⁶ and lip coverage was recorded as inadequate if the lips were not in contact during resting position.²⁴

All analyses took into account sampling weights to compensate for unequal probabilities of selection and the complex survey design to produce appropriate standard errors. Analyses were carried out in the Statistical Package for Social Sciences (SPSS) version 22 (IBM®, Armonk, New York).

Initially the composition of the study sample in terms of demographic (gender, age and ethnicity), socioeconomic (parental employment), family environment (family structure, parental relationship, parental support and parental punishment) and clinical characteristics (lip coverage, overjet and TDI) were assessed and compared against that of participants excluded from analysis because of missing values. The latter group consisted of all adolescents who participated in the RELACHS phase III but had missing data in one or more of the variables selected for analysis. Chi-squared and t-tests were used with categorical and numerical variables respectively.

Then, the four family environment indicators were compared according to demographic and socioeconomic factors. The proportion of adolescents in non-nuclear families and with discordant parental relationships was compared by gender, age, ethnicity and parental employment with the Chi-squared test. Parental support and punishment scores were compared by gender, age, and parental employment with the t-test and by ethnicity using analysis of variance (ANOVA). Correlation coefficients were used to assess the pairwise associations among the four family environment indicators.

The crude and adjusted association of each family environment indicator with the prevalence of TDI was assessed using binary logistic regression models because the outcome was a dichotomous variable. Therefore, the measure of association between variables reported was odds ratios (OR). The adjusted model controlled for socioeconomic, demographic and clinical factors as well as the other indicators of family environment.

RESULTS

From the 1451 adolescents aged 15-16-years who were invited to participate in Phase III of RELACHS, 1030 (71%) successfully completed the questionnaire and 965 (66.5%) participated in the oral examination. From these, 646 (62.7%) were included in the study sample. The remaining 384

adolescents were excluded because they had missing data in one or more of the variables selected for analysis (family structure = 192, overjet = 149, lip coverage = 149, TDI = 144, parental employment = 115, parental punishment = 57, parental support = 54, parental relationship = 53, gender = 7, age = 7, ethnicity = 7). The characteristics of the study sample are presented in Table 1. No differences were found between the study sample and those excluded because of missing values (all $p > 0.05$). The prevalence of TDI in the study sample was 17.2%. Twelve adolescents showed increased overjet and two adolescents had inadequate lip coverage. Regarding family environment indicators, 29.1% of adolescents were in non-nuclear families and 52.3% reported a discordant parental relationship. The mean score for parental support was -0.01 (standard deviation: 0.90, range: -0.11 to 0.08) and the mean parental punishment score was 0.03 (SD: 0.86, range: -0.04 to 0.10). Correlations between the four indicators of family environment were weak, ranging from -0.30 to 0.15. Only the correlations of discordant parental relationship with parental support and non-nuclear family were significant (-0.30 and 0.15, respectively).

Table 2 describes variations in the four indicators of family environment according to sociodemographic characteristics. Family structure was associated with ethnicity and parental employment whereas parental support was associated with adolescents' gender. Specifically, the prevalence of non-nuclear family was lower among Asian adolescents (12.3%) than among adolescents from other ethnic groups (45.6% for black, 39.6% for white and 37.9% for mixed/other). In addition, living in a non-nuclear family was more common among adolescents with both parents unemployed (39.3%) than those with one or both parents employed (24.2%). As for parental support, male adolescents reported higher scores than female adolescents (0.09 and -0.09, respectively).

Table 3 shows the results from the regression models between family environment indicators and TDI. Lip coverage was excluded from this part of the analysis due to the limited number of adolescents with inadequate lip coverage in the study sample. Of the four family environment indicators, only family structure was associated with TDI, with adolescents from non-nuclear families being 1.63 (95% CI: 1.06-2.53) times more likely to experience TDI than adolescents from nuclear families. However, this association was fully attenuated when adjusting for sociodemographic, clinical and other family environment indicators (OR: 1.40, 95% CI: 0.84-2.34). Parental relationship, emotional support and parental punishment were not associated with TDI in the unadjusted or adjusted models. Only gender and parental employment were significantly associated with TDI in the adjusted model.

DISCUSSION

This study provided weak evidence about the association between features of the family environment and TDI in adolescents. TDI were more common among adolescents from non-nuclear than nuclear families. However, this association became non-significant after sociodemographic and clinical factors were taken into account. No other indicator of family environment was associated with TDI.

Some limitations of this study need to be addressed before interpreting the results. Firstly, the cross-sectional design restricts any possibility of establishing a causal relationship between variables. Secondly, excluding participants from the analysis because of missing values on relevant variables reduced the study sample to 62.7% of those who participated in RELACHS Phase III. However, there were no differences between those excluded because of missing information and the study sample. Hence, the results are still applicable to the full study population. Thirdly, family environment characteristics were measured through self-reports. In sensitive topics such as the environment in the family, adolescents might not wish to disclose this information or may not feel confident about reporting the truth. RELACHS attempted to mitigate this potential bias by reminding participants that responses were strictly confidential during classroom discussions before the survey and reminders on each questionnaire page. Furthermore, self-reported questionnaires are a valid and standardised way of measuring the family environment²⁵ and were used in all previous dental studies.¹¹⁻¹⁵

Of the four family environment indicators evaluated in this study, only family structure was significant (at least at bivariate level). Family structure plays a role in the occurrence of bodily injuries, which could be partly explained by the inadequate presence of caregivers when they take place.²⁶ This could also be due to the impact that a divorce has on a child's emotional stability. The parental conflict experienced during the divorce process might cause emotional insecurity to the child, which often leads to problem behaviour that could cause injuries.²⁷ Moreover, non-nuclear families have been reported to have a higher incidence of child maltreatment, which could also be a potential pathway leading to injuries. This could be due to the more stressful parenting and worse parental relationships taking place in lone-parent and reconstituted families.²⁸ The non-significant findings for family structure are consistent with previous studies^{13,14} but they also contradict others.^{11,12} One reason for this conflicting evidence may be differences in the definition of family structure. While some define a nuclear family as having two parents or guardians, others define it as having two biological parents only. However, similar results were found when using the former definition (e.g. considering reconstituted families as nuclear families).

Despite using the same set of items on parental support and punishment, the results disagree with previous studies.^{11,15} Although factor analysis was used as in the original Brazilian study,¹¹ maternal and paternal factor scores were averaged to produce overall parental scores for each psychological trait. That said, similar conclusions were found when maternal and paternal factor scores were analysed separately. An alternative explanation is the role of confounders. The two previous studies did not control for family socioeconomic circumstances. The fact that the association was fully attenuated in multivariable models suggests that other factors, particularly family social position, may be more relevant. Given that this study was based on cross-sectional data, it is unclear whether it is the family socioeconomic position that affects the home environment or vice versa (i.e. living standards drop after a family breakup). Furthermore, the link between socioeconomic position and TDI is still controversial.²⁹ Even though national survey data show no social gradient in TDI among British children,³⁰ an earlier study carried out in the same area of London found a significant association between area deprivation and TDI.³¹

It is possible that the age of the adolescents in this study might have played a role. Adolescent-parents relationships change over time. During late adolescence, adolescents need less emotional support from the family and turn to their peers.^{32,33} Hence, parental support might be important at earlier stages of development in relation to TDI, as was demonstrated in a previous study of 13-year-old-children,¹¹ but not in the present age group. Moreover, the relationship between parents and adolescents becomes more equal, which could explain why less punishment takes place. Cultural differences between the current sample and the Brazilian sample could also explain differences in the results, as family environment and family values are highly influenced by ethnicity.³⁴

Even though family environment has been associated with various types of bodily injuries,⁸⁻¹⁰ there is not yet enough evidence in relation to its effect on TDI. Hence, no clear policy recommendations can be stated at this stage. The only family characteristic associated with TDI in this study was parental employment, which suggests that family socioeconomic position could be more relevant to TDI than the family environment. The lack of significant findings should direct future research towards other psychological (such as Sense of Coherence¹⁵) as well as socio-demographic characteristics (such as socioeconomic position²⁹ or overcrowding³¹) of the family environment that might be associated with the occurrence of TDI. However, further longitudinal studies are required including multiple assessments of the variables mentioned above and repeated dental examinations from a young age.

Children's self-reports on those family characteristics should be validated with reports from parents and/or teachers collected simultaneously.

In conclusion, this study offered weak support for the relationship between family environment and TDI among 15-16 year old adolescents in East London. Adolescents in non-nuclear families were more likely to have TDI than those in nuclear families. However, this association was fully accounted for by adolescents' sociodemographic and clinical factors. Family relationship, and levels of parental support and punishment were not associated with TDI in these adolescents.

REFERENCES

1. Glendor U. Aetiology and risk factors related to traumatic dental injuries--a review of the literature. *Dent Traumatol* 2009;25: 19-31.
2. Feldens CA, Borges TS, Vargas-Ferreira F, Kramer PF. Risk factors for traumatic dental injuries in the primary dentition: concepts, interpretation, and evidence. *Dent Traumatol* 2016;32: 429-37.
3. Ketelaar M, Bogossian A, Saini M, Visser-Meily A, Lach L. Assessment of the family environment in pediatric neurodisability: a state-of-the-art review. *Dev Med Child Neurol* 2017;59: 259-69.
4. Waldfogel J, Craigie TA, Brooks-Gunn J. Fragile families and child wellbeing. *Future Child* 2010;20: 87-112.
5. Schwartz OS, Sheeber LB, Dudgeon P, Allen NB. Emotion socialization within the family environment and adolescent depression. *Clin Psychol Rev* 2012;32: 447-53.
6. Bates CR, Buscemi J, Nicholson LM, Cory M, Jagpal A, Bohnert AM. Links between the organization of the family home environment and child obesity: a systematic review. *Obes Rev* 2018;19: 716-27.
7. Peterson L, Stern BL. Family processes and child risk for injury. *Behav Res Ther* 1997;35: 179-90.
8. Morrongiello BA, Lasenby-Lessard J. Psychological determinants of risk taking by children: an integrative model and implications for interventions. *Inj Prev* 2007;13: 20-5.
9. Jackson AM, Kissoon N, Greene C. Aspects of abuse: recognizing and responding to child maltreatment. *Curr Probl Pediatr Adolesc Health Care* 2015;45: 58-70.
10. Renzaho AM, Karantzas G. Effects of parental perception of neighbourhood deprivation and family environment characteristics on pro-social behaviours among 4-12 year old children. *Aust N Z J Public Health* 2010;34: 405-11.
11. Nicolau B, Marcenes W, Sheiham A. The relationship between traumatic dental injuries and adolescents' development along the life course. *Community Dent Oral Epidemiol* 2003;31: 306-13.
12. Oyedele TA, Jegede AT, Folayan MO. Prevalence and family structures related factors associated with crown trauma in school children resident in suburban Nigeria. *BMC Oral Health* 2016;16: 116.
13. Kramer PF, Feldens EG, Bruch CM, Ferreira SH, Feldens CA. Clarifying the effect of behavioral and clinical factors on traumatic dental injuries in childhood: a hierarchical approach. *Dent Traumatol* 2015;31: 177-83.
14. Oldin A, Lundgren J, Noren JG, Robertson A. Temperamental and socioeconomic factors associated with traumatic dental injuries among children aged 0-17 years in the Swedish BITA study. *Dent Traumatol* 2015.
15. Baxevasanos K, Topitsoglou V, Menexes G, Kalfas S. Psychosocial factors and traumatic dental injuries among adolescents. *Community Dent Oral Epidemiol* 2017;45: 449-57.
16. Aswathikutty A, Marcenes W, Stansfeld SA, Bernabe E. Obesity, physical activity and traumatic dental injuries in adolescents from East London. *Dent Traumatol* 2017;33: 137-42.
17. Fagg J, Curtis S, Stansfeld S, Congdon P. Psychological distress among adolescents, and its relationship to individual, family and area characteristics in East London. *Soc Sci Med* 2006;63: 636-48.
18. Viner RM, Haines MM, Head JA, Bhui K, Taylor S, Stansfeld SA, et al. Variations in associations of health risk behaviors among ethnic minority early adolescents. *J Adolesc Health* 2006;38: 55.

19. Shaw BA, Krause N, Chatters LM, Connell CM, Ingersoll-Dayton B. Emotional support from parents early in life, aging, and health. *Psychol Aging* 2004;19: 4-12.
20. Rothrauff TC, Cooney TM, An JS. Remembered parenting styles and adjustment in middle and late adulthood. *J Gerontol B Psychol Sci Soc Sci* 2009;64: 137-46.
21. Stansfeld S, Head J, Bartley M, Fonagy P. Social position, early deprivation and the development of attachment. *Soc Psychiatry Psychiatr Epidemiol* 2008;43: 516-26.
22. WHO W. Oral health surveys : basic methods. 4th edition. Geneva, 1997.
23. Glendor U, Marcenes W, Andreasen JO. *Classification, epidemiology and etiology*. 4th edn. Oxford: Blackwell Munksgaard; 2007.
24. Damarasingh M, Marcenes W, Stansfeld SA, Bernabe E. Illicit drug use and traumatic dental injuries in adolescents. *Acta Odontol Scand* 2018: 1-5.
25. Hamilton E, Carr A. Systematic Review of Self-Report Family Assessment Measures. *Fam Process* 2016;55: 16-30.
26. Morrongiello B, Schwebel D. Gaps in Childhood Injury Research and Prevention: What Can Developmental Scientists Contribute? *Child Development Perspectives* 2008.
27. Cummings EM, Davies PT. Effects of marital conflict on children: recent advances and emerging themes in process-oriented research. *J Child Psychol Psychiatry* 2002;43: 31-63.
28. Guterman NB, Lee Y, Lee SJ, Waldfogel J, Rathouz PJ. Fathers and maternal risk for physical child abuse. *Child Maltreat* 2009;14: 277-90.
29. Correa-Faria P, Martins CC, Bonecker M, Paiva SM, Ramos-Jorge ML, Pordeus IA. Absence of an association between socioeconomic indicators and traumatic dental injury: a systematic review and meta-analysis. *Dent Traumatol* 2015;31: 255-66.
30. Blokland A, Watt RG, Tsakos G, Heilmann A. Traumatic dental injuries and socioeconomic position - findings from the Children's Dental Health Survey 2013. *Community Dent Oral Epidemiol* 2016;44: 586-91.
31. Marcenes W, Murray S. Social deprivation and traumatic dental injuries among 14-year-old schoolchildren in Newham, London. *Dent Traumatol* 2001;17: 17-21.
32. De Goede IH, Branje SJ, Meeus WH. Developmental changes in adolescents' perceptions of relationships with their parents. *J Youth Adolesc* 2009;38: 75-88.
33. Helsen M, Vollebergh W, Meeus WH. Social support from parents and friends and emotional problems in adolescence. *J Youth Adolesc* 2000;29: 319-35.
34. Maynard MJ, Harding S. Ethnic differences in psychological well-being in adolescence in the context of time spent in family activities. *Soc Psychiatry Psychiatr Epidemiol* 2010;45: 115-23.

Table 1. Characteristics of the study sample and comparison against participants excluded because of missing values on covariates

Explanatory variables	Excluded (n=384)		Study sample (n=646)	
<i>Gender, n^a %</i>				
Male	193	45.9	294	43.9
Female	184	54.1	352	56.1
<i>Age, n^a %</i>				
15 years old	156	42.5	275	42.9
16 years old	221	57.5	371	57.1
<i>Ethnicity, n^a %</i>				
White	82	20.3	166	27.3
Asian	161	42.5	278	42.1
Black	96	27.0	121	19.3
Mixed/others	38	10.2	81	11.3
<i>Parental employment, n^a %</i>				
One/both employed	161	61.5	436	67.8
Both unemployed	108	38.6	210	32.2
<i>Family structure, n^a %</i>				
Nuclear	61	28.1	465	70.9
Non-nuclear	131	71.9	181	29.1
<i>Parental relationship, n^a %</i>				
Concordant	183	54.7	308	47.7
Discordant	148	45.3	338	52.3
<i>Parental support score, Mean (SD)</i>	0.03	(0.93)	-0.01	(0.90)
<i>Parental punishment score, Mean (SD)</i>	-0.08	(0.90)	0.03	(0.86)
<i>Incisors overjet, n^a %</i>				
Up to 6 mm	231	98.2	634	98.4
More than 6 mm	4	1.8	12	1.6
<i>Lip coverage, n^a %</i>				
Adequate	234	99.8	644	99.8
Inadequate	1	0.2	2	0.2
<i>Traumatic dental injuries, n^a %</i>				
Absent	205	85.8	536	82.8
Present	35	14.2	110	17.2

^a Counts are unweighted

Table 2. Prevalence of family environment indicators by sociodemographic characteristics

Explanatory variables	Non-nuclear family		Discordant parental relationship		Parental support score		Parental punishment score	
	n ^a	%	n ^a	%	Mean	(SD)	Mean	(SD)
<i>Gender</i>								
Male	82	28.5	140	48.0	0.09	(0.88)	0.11	(0.89)
Female	99	29.6	198	55.6	-0.09	(0.90)	-0.03	(0.83)
<i>p value^b</i>	0.840		0.117		0.024		0.130	
<i>Age</i>								
15 years old	77	28.6	153	54.4	-0.01	(0.89)	0.02	(0.81)
16 years old	104	29.4	185	50.7	-0.01	(0.90)	0.03	(0.89)
<i>p value^b</i>	0.830		0.360		0.930		0.833	
<i>Ethnicity</i>								
White	62	39.6	99	60.1	0.00	(0.85)	-0.05	(0.84)
Asian	36	12.3	132	47.6	-0.02	(0.91)	0.06	(0.84)
Black	53	45.6	66	51.6	-0.06	(0.92)	0.04	(0.91)
Mixed/Other	30	37.9	41	51.9	0.08	(0.91)	0.08	(0.86)
<i>p value^b</i>	<0.001		0.099		0.726		0.721	
<i>Parental employment</i>								
One/both employed	102	24.2	232	53.1	-0.01	(0.89)	0.02	(0.83)
Both unemployed	79	39.3	106	50.6	-0.03	(0.91)	0.05	(0.91)
<i>p value^b</i>	<0.001		0.585		0.689		0.693	

^a Counts are unweighted^b Chi-squared and t-tests were used for comparison of categorical and numerical variables respectively

Table 3. Regression models for the association between family environment indicators and Traumatic Dental Injuries (n=646)

Explanatory variables	% with TDI		Unadjusted associations			Adjusted associations		
	n ^a	%	OR ^b	[95% CI]	p value	OR ^b	[95%CI]	p value
<i>Gender</i>					0.019			0.010
Male	60	21.0	1.00	[Reference]		1.00	[Reference]	
Female	50	14.1	0.62	[0.42-0.92]		0.57	[0.38-0.86]	
<i>Age</i>					0.203			0.269
15 years old	41	15.0	1.00	[Reference]		1.00	[Reference]	
16 years old	69	18.8	1.31	[0.86-1.98]		1.28	[0.82-2.01]	
<i>Ethnicity</i>					0.212			0.198
White	30	20.0	1.00	[Reference]		1.00	[Reference]	
Asian	43	15.4	0.73	[0.46-1.15]		0.69	[0.41-0.13]	
Black	19	14.3	0.67	[0.36-1.23]		0.67	[0.37-1.22]	
Mixed/Others	18	21.9	1.12	[0.64-1.97]		1.10	[0.62-1.95]	
<i>Parental employment</i>					0.022			0.025
one/both employed	64	15.0	1.00	[Reference]		1.00	[Reference]	
both unemployed	46	21.7	1.57	[1.07-2.31]		1.72	[1.08-2.76]	
<i>Overjet</i>					0.788			0.832
Up to 6 mm	108	17.1	1.00	[Reference]		1.00	[Reference]	
More than 6mm	2	19.9	1.20	[0.31-4.73]		1.25	[0.39-3.99]	
<i>Family structure</i>					0.029			0.194
Nuclear	69	15	1.00	[Reference]		1.00	[Reference]	
Non-nuclear	41	22.4	1.63	[1.06-2.53]		1.40	[0.84-2.34]	
<i>Parental relationship</i>					0.324			0.336
Concordant	50	15.8	1.00	[Reference]		1.00	[Reference]	
Discordant	60	18.4	1.20	[0.83-1.73]		1.24	[0.80-1.95]	
<i>Parental support score^c</i>	---	---	1.07		0.582	1.08	[0.81-1.44]	0.585
<i>Parental punishment score^c</i>	---	---	1.01	[0.78-1.31]	0.918	0.98	[0.77-1.24]	0.869

^a Counts are unweighted

^b Logistic regression was fitted and Odds Ratios (OR) reported. Adjusted associations are derived from a regression model including all variables in the table.

^c Reported as 1-SD deviation change in scores