

Dental Neglect - A Nemesis in Deteriorating Dental Health Status Among Children in West Bengal - A Cross Sectional Study

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Keywords

Dental neglect scale, Socioeconomic status, Children, OHIS index, DMFT index, PUFA index

Abstract

Background: Dental neglect occurs whenever a parent disregard seeking the necessary dental care for their child in order to preserve their oral health and keep them free from pain and illness. **Aim:** Determining the association between dental neglect with a child's oral health, dental caries experience, and socioeconomic status using appropriate indices, scales, and questionnaires. **Materials and Methods:** This is cross-sectional research including 373 pairs of parents and children. In this study, a scale called the "dental neglect scale" and a questionnaire were utilized to assess the level of dental neglect among the parents of the children. Children's oral health status was clinically examined using the oral hygiene index, decayed, extracted, filled teeth (dmft), pulp, ulcers, fistula, abscess (pufa), decaying, missing, filled teeth (DMFT), PUFA as defined by the World Health Organization. The Modified Kuppaswamy Scale (2019), was used to determine socioeconomic class. Using IBM SPSS statistics 24.0, Tuckey post hoc test and one way ANOVA were applied correctly for statistical analysis (IBM Corporation, Armonk, NY, USA). **Results:** Dental neglect was seen to be higher among the urban population (Mean=26.39), among the females (24.03), among the income group 13,161-23,354, highest among the High school certificate group and among Clerical, shop- owner/farm group. High dental neglect group shows poor oral hygiene status and increased caries status. **Conclusion:** Child dental neglect was more prevalent among parents with a secondary education and who lived in an urban area. Children's oral health was negatively impacted because of dental neglect.

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1. Introduction

Oral health is the doorway to a person's overall health and well-being. A healthy mouth allows a person to talk, eat, and socialize without fear of infection, discomfort, or humiliation. Oral disease is one of the most expensive diseases associated with a person's diet and lifestyle. The expenses associated with treating caries alone could quickly deplete a country's whole national healthcare budget for children. However, the expense of dental neglect is quite substantial in regard to its monetary, societal, and personal consequences.¹ The World Health Organization (WHO) has emphasized that neglect should be separated from poverty, suggesting that dental negligence can only occur when the family or caregivers has acceptable means yet fails to provide the kid with urgently needed treatment.² Assessments of the severity and frequency of dental neglect are highly uncertain around the world. Dental neglect is frequent among all socioeconomic, ethnic, religious, and professional groups.³ Further investigations on dental neglect may result in a better understanding of the contributions made by individual behaviour, environment, and structural factors towards the occurrence of dental illnesses.⁴

Children confronting negligence (in total) and dental negligence (in specific) are the most common sorts of abuse, despite being just the least understood and identified type of abuse.⁵ Dental neglect is defined by the American Academy of Pediatric Dentistry as the parent's failure to pursue the necessary dental treatment required to maintain the child's oral health and to ensure their freedom from pain and infection as dental neglect.

Although neglect can have a variety of reasons, studies have indicated associations with parental poor health, resource misuse, domestic abuse, unemployment, and poverty, with neglectful households frequently facing a combination of these negative circumstances. According to studies, neglectful families are unable to plan, lack confidence in the future, struggle with money management, are emotionally immature, lack knowledge of children's needs, have a big number of children, face significant levels of stress, and live in poor socioeconomic situations.

The dental neglect scale (DNS) seems like an appropriate approach for objectively measuring dental neglect. It has a good health index, is easy to measure, seems unchanged by the observation method, and must be measured statistically. DNS is a "behavioural audit" in which the second, third, and fourth statements seek answers on respondents' professional dental services behaviour, while the first, fifth, and sixth statements investigate home care behaviour, and the final statement seeks a worldwide rank of an importance placed on dentition.

There are several case reports, case-control studies, and cohort studies on dental neglect in children in the literature. These studies, however, have not examined the association between dental neglect in children and parental educational level, income, and occupation. As a result, the purpose of this study was to look into dental neglect among children in West Bengal and explore its relationship with important demographic characteristics and dental health status.

2. Materials and Methods

The Institutional Review Board granted ethical approval for the project. Subjects were chosen from Guru Nanak Institute of Dental Science and Research's outpatient Department of Pediatric and Preventive Dentistry and many oral hygiene camps held in Kolkata, South 24 Parganas, North 24 Parganas, Nadia district, and Hooghly district. Using empirical data and G Power software (version 3.1), the predicted sample size was 258. With dropouts taken into account, the total sample size taken was 373.

The participants included 373 children aged 6 to 12 years along with their parents. The participating parents provided informed consent. The parents were requested to complete a detailed questionnaire that included demographic information, dental visits, and seven DNS questions. Children were examined orally using a mouth mirror and a No. 23 explorer (Shepard's Crook) probe. To determine the dental neglect score in children, a dental neglect scale was used. The OHI-S index was used to assess oral hygiene level, the DMFT/dmft index and the PUFA/pufa index were used to measure dental caries experience, and the Modified

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Kuppuswamy Socioeconomic Scale was used to examine family socioeconomic position.

Microsoft Excel was used to tabulate the data and generate graphs and tables. IBM SPSS statistics 24.0 was used for the statistical analysis (IBM Corporation, Armonk, NY, USA). We computed descriptive statistics such as frequency, percentage, and mean with standard deviation. The population was divided into two groups based on the median split of the DN score: high (DNS ≥ 24) and low (DNS ≤ 23). The one-way ANOVA and Tuckey's post hoc test were used to compare the groups. To assess the link between two quantitative variables, Pearson's correlation coefficient was used. The Chi square test was developed to assess the relationship between two independent groups. The threshold for statistical significance was set at $p=0.05$, and any result less than or equal to 0.05 was deemed statistically significant.

3. Results

This research was built upon the need of understanding of the association of OHI-S/ohis index, DMFT/dmft index, PUFA/pufa index and socioeconomic status with dental neglect in children using suitable scales, indices and questionnaires. 373 healthy children between the age group of 6 – 12 years along with their parents participated in the study. Among the study population, **151** were males and **222** were females. The mean (SD) age was **8.5** years (Table 1). The mean age of males was **7.4** and females was **9.2**. **121** participants reported to live in urban area while **252** participants lived in suburban area. Most of the participants were intermediate or post high school degree holder, the most reported profession was found to be clerical/shop owner and most of the participants belonged to income group of **13,161-23,354**. **59.5%** of the participants belonged to lower middle socioeconomic background.

Table 1: Demographic data of the study population

Variables	N(%)
Age	
6-7	86 (23.1%)
8-10	287 (76.9%)
Gender	
Male	151 (40.5%)
Female	222 (59.5%)
Residential Status	
Urban	121 (32.4%)
Suburban	252 (67.6%)
Income of guardian	
26,355-52,733	29 (7.8%)
19,759-23,354	106 (28.4%)
13,161-23,354	151 (40.5%)
7,887-13,160	58 (15.5%)
2,641-7,886	29 (7.8%)
Educational status of guardian	

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Illiterate	29 (7.8%)
Primary school certificate	63 (16.9%)
Middle school certificate	70 (18.8%)
High school certificate	64 (17.2%)
Intermediate or post high school diploma	89 (23.9%)
Graduate or postgraduate	29 (7.8%)

Dental neglect was seen to be higher among the urban population (**26.39**) as compared to the sub-urban population (**22.72**). OHIS score was more in the urban population (**2.16**) depicting poor oral hygiene. DMFT (**5.25**) and PUFA scores (**1.60**) were found to be higher among the sub-urban population. Mean DNS score is seen to be higher

among the females (**24.03**) as compared to males (**23.79**). Mean OHIS score was higher among males (**1.74**) depicting poor oral hygiene, whereas mean DMFT (**5.15**) and mean PUFA scores (**1.51**) were found to be higher among the females (Table 2).

Table 2: Comparison of the Mean DNS, PUFA, DMFT, OHIS w.r.t demographic details (one-way ANOVA)

Demographic variables	N	Mean DNS	p- value	Mean DMFT	p- value	Mean PUFA	p- value	Mean OHIS	p- value
Gender									
Male	151	23.78	0.538	2.82	0.000*	0.63	0.000*	1.73	0.187
Female	222	24.03		5.14		1.51		1.6	
Age group (Years)									
6-7	86	23.62	0.389	2.66	0.000*	0.43	0.000*	1.82	0.059
8-10	287	24.02		4.67		1.37		1.6	
Residential status									
Urban	121	26.38	0.000*	2.03	0.000*	0.24	0.000*	2.15	0.000*
Suburban	252	22.75		5.25		1.59		1.41	
Socio-economic Status (Modified Kuppaswamy Scale, 2019)(SES)									
Upper	29	25	0.000*	4	0.000*	1	0.000*	1	0.000*
Upper	29	23		5		2		2	
Middle									
Lower	222	24		2.6		0.46		1.81	
Middle									
Upper	91	22		7.86		2.63		1.31	
Lower									
Lower	2	32	4	0	4				

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*Statistically significant at p-value<0.05. DNS: Dental neglect scale, deft: Decayed, extracted, filled teeth, PUFA: Pulp, ulcers, fistula, abscess, OHIS: oral hygiene index

Significant difference (p- value<0.05) was found in the mean dental score (DNS) with respect to education of the guardian, monthly income, and profession of the guardian (**Table 3**). Mean DNS was the highest among the income group 13,161-23,354, the **High school certificate group** and the **Clerical, shop owner/farm group**. Tuckey's Post Hoc test also revealed statistically significant differences in mean DNS among the various groups.

The mean DMFT score with respect to education, monthly income, and profession of the guardian

show significant difference (p-value<0.05). Mean DMFT was the highest among the income group **13,161-23,354, primary school certificate group** and **unskilled workers**.

Tuckey's Post Hoc test revealed statistically significant (p-value<0.05) differences in mean PUFA among the various groups.

Mean PUFA was the highest among the income group **13,161-23,354, the primary school certificate group** and **semi-professional workers**.

A significant difference (p-value<0.05) was found in the mean OHIS score with respect to education of the guardian, monthly income, and profession of the guardian. Mean OHIS was the highest among the income group **26,355-52,733, the high school certificate group** and the **skilled workers**

Table 3: Comparison of the Mean DNS, PUFA, DMFT, OHIS w.r.t socio- economic variables (one-way ANOVA)

Demographic Variables	N	Mean DNS	p- value	Mean DMFT	p- value	Mean PUFA	p- value	Mean OHIS	p- value
Income of guardian									
26,355-52,733	29	27	0.000*	4	0.000*	1	0.002*	2	0.000*
19,759-23,354	106	21.7		4.5		1.13		1	
13,161-23,354	151	25.6		5.6		1.53		1.98	
7,887-13,160	58	21.65		2.09		0.69		1.64	
2,641-7,886	29	25		4		1		1	
Educational status of guardian									
Illiterate	29	24	0.000*	4	0.000*	0	0.000*	2	0.000*
Primary school Certificate	63	25.5		6.9		2.76		2.07	
Middle school Certificate	70	21.5		5.52		2		1	
High school Certificate	64	27.7		2.4		0		2.4	
Intermediate or post high school diploma	89	21.8		2.42		0.32		1.32	

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Graduate or Postgraduate	29	23		5		2		2	
Professional Degree	29	25		4		1		1	
Profession of the guardian									
Unskilled worker	58	24.5	0.000*	9.5	0.000*	3	0.000*	1.5	0.000*
Semi-skilled worker	70	21.6		5.52		2		1	
Skilled worker	65	23.3		1.84		0		2.38	
Clerical, shop-owner/farm	88	25.7		2.45		0.32		2.10	
Semi-profession al	63	23.5		2.84		0.92		1.46	
Professional (white collar)	29	25		4		1		1	

*Statistically significant at p-value<0.05. DNS: Dental neglect scale, deflt: Decayed, extracted, filled teeth, PUFA: Pulp, ulcers, fistula, abscess, OHIS: oral hygiene index

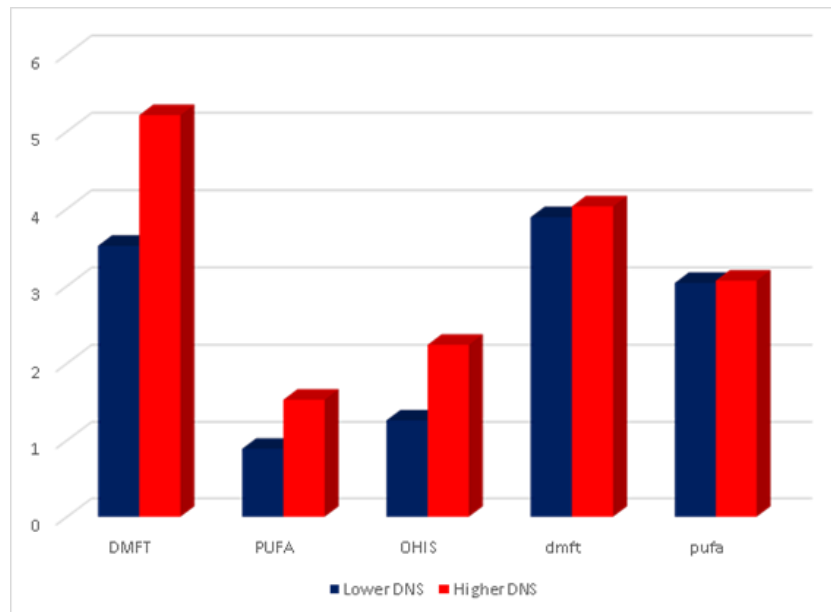
Table 4 and **Graph 1** represents the comparison between mean DMFT, PUFA and OHIS scores among high and low DNS. Higher values of mean DMFT (5.21), mean PUFA (1.53), mean OHIS

(2.24), mean dmft (4.03) and mean pufa (3.07) was found in high DNS group as compared to low DNS group.

Table 4. Comparison between mean DMFT, PUFA and OHIS scores among high and low DNS

DNS	N	Mean DMFT	p- value	Mean PUFA	np- value	Mean OHIS	np- value	Mean dmft	np- value	Mean pufa	p- value
Low	22	3.5	0.000	0.89	0.000	1.2	0.000	3.8	0.28	3.0	0.32
	2	2	*		*	6	*	9	5	4	1
High	15	5.2		1.53		2.2		4.0		3.0	
	1	1				4		3		7	

*Statistically significant at p-value<0.05. DNS: Dental neglect scale, DMFT: Decayed, missing, filled teeth, PUFA: Pulp, ulcers, fistula, abscess, OHIS: oral hygiene index

Graph 1: Comparison between mean DMFT, PUFA and OHIS scores among high and low DNS

4. Discussion

The majority of the caretakers who replied to the questions were mother of the children. As a result, we were able to learn about the child's comprehensive home and professional dental care because the child stays largely with the mother during preschool and even after the child starts school. In the current study, DNS was utilised to link numerous elements that potentially influence dental care and a child's oral health. DNS is a useful diagnostic tool for population surveys aimed at identifying vulnerable groups to dental treatment.

The mean dental neglect score in this study was determined to be 23.93. These were, however, greater than those recorded by **Ajagannanavar et al.**⁷ in Virajpet, India (10.18), **Bhattarai R et al.** in Nepal (18.4), **Cooligde et al.**⁹ in the Seattle-Tacoma area (13.2), **McGrath et al.** in Hong Kong (14.81), and **Jamieson and Thomson**⁸ in Dunedin, New Zealand (12.4). Oral health requirements are viewed as secondary compared to general health needs in developing nations such as India for a variety of reasons such as lack of knowledge, high treatment costs, lack of insurance, and inaccessibility to dental care, which might be the cause of increased dental neglect. They fail to seek preventive dental treatment, which has resulted in an increase in the number of dental illnesses, and patients frequently go to the hospital whenever

these untreated diseases result in pain and suffering.

Dental neglect was shown to be more prevalent in females than in boys, resulting in significant DNS score discrepancies. The OHIS score was greater in males, indicating poor oral hygiene, whereas the DMFT and PUFA levels were higher in females. This finding is consistent with the findings of a study conducted by **Mathur A et al.**¹⁰, who indicated that females must be more hesitant towards dental treatment, as they are more apprehensive and fearful of it.

Until now, **Barnard PD**¹¹ and **Hunter PBV**¹² discovered that males had high neglect ratings in earlier investigations. According to research by **Coolidge T et al.**⁹ and **McGrath C et al.**¹³, no gender difference in mean DNS score was discovered, and gender has no impact on dental neglect score.

In the current study, greater dental neglect scores were detected among urban parents compared to suburban parents, which contradicts the findings of **Gurunathan et al.**¹⁴, who found that dental neglect was more prevalent in the suburban population. Nonetheless, DMFT and PUFA scores were found to be higher in the suburban population, which was consistent with the study of **Gurunathan et al.**¹⁴. This is mostly due to a lack of understanding about oral health, as well as the availability and use of dental treatments.

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The literature on the relationship of DNS with family income, educational qualification of the head of the family, and profession of the head of the family is extremely limited. To the best of our knowledge, this is the first study to evaluate these relationships.

In the current study, a significant difference (p-value 0.05) was discovered in the mean dental score (DNS) with respect to the guardian's education, monthly income, and profession. The income group that belongs to the lower middle class, rather than the lower or upper lower classes, had the greatest mean DNS. As a result, according to the current study, family income has no significant influence on dental neglect in children, indicating that other criteria such as parental awareness, knowledge, and interest are more major causes of dental neglect. The findings of **AlGahnim et al.**¹⁸ and **Asaka et al.**¹⁵ are consistent with our findings, however the findings of our study contradict those of **Freeman et al.**¹⁶ and **Williams et al.**¹⁷.

In the current study, the mean DNS was highest amongst High school certificate group in terms of academic qualifications of the guardians. Parent's lack of interest and awareness can be attributed to the fact that they do not bring their children for regular dental examinations. According to a study conducted by **Sharma et al.**¹⁹, women who completed high school and fathers who had a post-secondary level had a positive relationship with dental neglect. **Freeman et al.**¹⁶, 1997, **Williams et al.**¹⁷, 2002, and **Gurunathan D et al.**¹⁴ discovered similar results.

In terms of guardian's occupations, the greatest mean DNS related to the **Clerical, store owner/farm group**. It may be inferred that the causes for the increased dental neglect in this population include a lack of knowledge, high treatment costs, and inaccessibility to dental care.

The current study discovered a statistically significant strong positive association between dental neglect score and OHIS. As a result, children with higher OHIS scores will experience more dental neglect. **Montecchi et al.**²⁰ discovered considerably higher amounts of plaque in neglected children.

Similarly, there is a statistically significant positive link between dental neglect score and DMFT,

implying that children with higher DMFT would have high dental neglect.

In our study, the high DNS group had greater mean PUFA/pufa values than the low DNS group.

5. Conclusion

The Dental Neglect Scale appears to be an adequate diagnostic tool for objectifying dental neglect. It has many of the characteristics of a good health index: it is easily assessed, appears unaffected by the observation method, and can be measured statistically.

Due to other fundamental necessities such as food, clothes, housing, and medical facilities, oral health is given less importance, particularly in developing nations such as India. On the other hand, being one of the most densely populated nation, the accessibility of dental treatments among all children become a real challenge. In such a country, use of Dental Neglect Scale as a screening tool, offers a method of pinpointing children on whom health promotion efforts should be focused. Since, the scale involves only questionnaire, data can be collected by telephonic interviews as well as through mailed questionnaires, omitting the need of physical meetings. The questionnaire can also be distributed among the school authorities, primary health centre workers, etc to reach out to maximum number of children. In this way parents and children with high DNS scores can be identified, who are at risk of lesser oral care and awareness can be created and measures can be taken targeted to their needs.

Further studies with larger sample size are recommended including other parameters which affect dental neglect like information regarding last dental visit of the child, in between meal snacking habit of child, brushing habit of child, etc along with the use of radiographs which might be helpful to establish DNS and dental caries experience.

References

- [1] Kwan SY, Petersen PE, Pine CM, Borutta A. Health-promoting schools: an opportunity for oral health promotion. Bull World Health Organ. 2005 ;83(9):677- 85.
- [2] Bhatia SK, Maguire SA, Chadwick BL, Hunter ML, Harris JC, Tempest V et al.

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- Characteristics of child dental neglect: a systematic review. *J Dent*. 2014;42 (3):229-39.
- [3] Ivanoff CS, Hottel TL. Comprehensive training in suspected child abuse and neglect for dental students: a hybrid curriculum. *J Dent Educ*. 2013;77(6):695-705.
- [4] Thomson WM, Spencer AJ, Gaughwin A. Testing a child dental neglect scale in South Australia. *Community Dent Oral Epidemiol* 1996;24:351-6
- [5] Kiran K. Child abuse and neglect. *J Indian Soc PedodPrev Dent*. 2011;29 (6):79- 82
- [6] Simons D, Pearson N, Evans P. A pilot of a school-based dental treatment programme for vulnerable children with possible dental neglect: the Back2School programme. *Br Dent J*. 2013;215(8):E15
- [7] Ajagannavar SL, Sequeira PS, Jain J, Battur H. Dental neglect among college going adolescents in Virajpet, India. *J Indian Assoc Public Health Dent* 2014;12:215-8.
- [8] Jamieson LM, Thomson M. Dental health, dental neglect, and use of services in an adult Dunedin population sample. *N Z Dent J*. 2002;98(431):4-8.
- [9] Coolidge T, Heima M, Johnson EK, Weinstein P. The Dental Neglect Scale in adolescents. *BMC Oral Health*. 2009;9(1):1-7
- [10] Mathur A, Mathur A, Aggarwal VP (2016) Dental Neglect Affecting Oral Health Status in India. *Int J Pediatr Res* 2:016
- [11] Barnard PD (1993) National oral health survey Australia 1987-88. Canberra: Department of Health. Housing local Government and community services.
- [12] Hunter PBV, Kirk R, DE Liefde B (1992) The study of oral health outcomes. Department of Health, Wellington, New Zealand.
- [13] McGrath C, Sham AS, Ho DK, Wong JH. The impact of dental neglect on oral health: a population-based study in Hong Kong. *Int Dent J*. 2007;57(1):3-8.
- [14] Gurunathan D, Shanmugaavel AK. Dental neglect among children in Chennai. *J Indian Soc PedodPrev Dent* 2016;34:364-9.
- [15] Asaka et al. Environmental Health and Preventive Medicine (2020) 25:73 <https://doi.org/10.1186/s12199-020-00916-y>
- [16] Freeman R, Breistein B, McQueen A, Stewart M. The dental health status of five-year-old children in north and west Belfast. *Community Dent Health* 1997;14:253-7.
- [17] Williams NJ, Whittle JG, Gatrell AC. The relationship between socio-demographic characteristics and dental health knowledge and attitudes of parents with young children. *Br Dent J* 2002;193:651-4
- [18] Al Ghanim NA, Adenubi JO, Wyne AA, Khan NB. Caries prediction model in pre-school children in Riyadh, Saudi Arabia. *Int J Paediatr Dent* 1998;8:115-22.
- [19] Sharma I, Chauhan P, Galhotra V, Duhan H, Kaur M, Sharma S. Knowledge and Experience about Medical Emergencies among Dental Interns in Bangalore City. *Int Healthc Res J*.
- [20] Montecchi PP, Di Trani M, SarziAmade D, Bufacchi C, Montecchi F, Polimeni A. The dentist's role in recognizing childhood abuses: study on the dental health of children victims of abuse and witnesses to violence. *European Journal of Paediatric Dentistry* 2009;10:185-7.