Effects of Child Abuse and Neglect on Oral Hygiene and Nutrition in North Indian School Students: A Cohort Study

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Abstract

This study investigated the relationship between dental hygiene and child maltreatment, malnutrition, and overall development. The researchers examined 900 students aged 5 to 15 years from government schools in Lucknow district, Uttar Pradesh. The study observed nutritional status by assessment of the physiological status of the body based on its height and weight and signs of abuse/neglect. The results showed that 260 abused students had poor dental hygiene, and 236 of them were mild to moderately malnourished. In comparison, 362 non-abused students had dental neglect, and 232 were moderately malnourished. These findings highlight a significant association between dental care neglect, child maltreatment, and malnutrition. It is crucial to address the social stigma surrounding this issue, normalize discussions, and encourage dentists to identify signs of abuse and inform relevant authorities about potential discrepancies.

Keywords: Child, Students, Schools, Malnutrition, Government, Dentists, Hygiene.

INTRODUCTION

Child abuse and neglect (CAN) is a pressing social problem that affects children regardless of cultural, geographic, educational, or socioeconomic boundaries. It is a problem that occurs in both rural and urban areas, among rich and poor, educated and uneducated.[1,2] Child abuse includes various forms of physical and emotional maltreatment, sexual abuse, neglect, and exploitation that harm the child's health, development, and dignity in the context of relationships of responsibility, trust, or power.[3] A systematic review conducted by Choudhry *et al.* found that the prevalence of child sexual abuse (CSA) in 24 countries ranged from 3 to 17% for men and 8 to 31% for women. The consequences of child abuse and neglect are both physical and psychological, resulting in complex developmental problems and long-lasting effects on the child's well-being.[4] Addressing this problem effectively will require a collaborative effort among the community, agencies, health professionals, and practitioners at all levels. It is critical that action be taken at the grassroots level and those children, parents, and teachers be made aware.

Aims and Objectives

The aim is to identify oral and dental aspects of physical and sexual abuse and dental neglect in childhood, contributing to the precocious identification and diagnosis.

MATERIALS AND METHODS

Sample Size and Sampling Technique

This cross-sectional study was conducted in government schools (age 5–15 years) in Uttar Pradesh, Lucknow district, to screen children for child abuse/neglect while assessing their nutritional status during the 1-year period (January 2019 - January 2020). A total of 3019 children (1520 females and 1499 males) were screened and interviewed using a pre-tested and designed questionnaire in Hindi and English to obtain information on family characteristics, socio-demographic profile, feeding

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habits and child maltreatment- sexual abuse, physical abuse, dental neglect and emotional abuse. Study participants were then examined intraorally and extra-orally.

Method of Data Collection

A questionnaire was used for data collection. The researcher personally handed out the questionnaire to the respondents in the selected schools. The study was conducted in schools to ensure a safe place where children could be comparatively free and talk easily about incidents of maltreatment.

The extra-oral and intraoral examination was conducted according to the recommendations of M. Costacurta *et al.* in 2016.[5]

Data Analysis

For 900 samples were selected using stratified random sampling from a student population of around 3,000. Oral examinations assessed dental neglect using a 6-point scale. The simplified oral hygiene index and WHO criteria were used to evaluate dental caries and oral hygiene. Anthropometric data were collected for weight, height, and BMI. Data were recorded in MS Excel and analyzed using SPSS version 23, including descriptive statistics and multivariate logistic regression analysis.

RESULTS

Child Abuse/Neglect using Odontology

In this study, we reported gender-based differences (0.3%) as a form of child abuse/neglect. Unwilling to compromise on their studies and being forcibly made to do household work was reported by almost 1/3 girls.

- In a dental neglect study, 600 participants (58.5% females, mean age 10.33) completed the questionnaire. Age-related differences in neglect scores were significant (p = 0.0007). Males had a higher mean score (10.12%) than females (9.52%) (p = 0.042). Family income, dental check-ups, and neglect prevalence were noted.
- Participants' responses to dental neglect items were analyzed. Majority exhibited good brushing habits (78.2%), controlled snacks (35.7%), received dental care (50.7%), delayed care (59%), maintained dental care (62.7%), and considered dental health important (59.2%) (Table 1).
- DN groups (DNS score ≤ 10 vs. ≥ 11) showed significant differences in DMFT and OHI-S scores, indicating a positive relationship between dental neglect, dental caries, and oral hygiene (Figure 1).
- Younger children (5–6 years) had higher dental neglect scores. DN scores decreased with age, and males had higher scores than females.
- Negative association was observed between dental neglect and family income.
- Physical and mental abuse observed, with 4.7% of males and 5.6% of females experiencing physical abuse, and 3.1% of males and 7.03% of females experiencing mental abuse.

Table 1: Distribution of study subjects according to age, sex, family income and dental attendance

Age (Years)			
Age (yrs)	Number	MeanDe	p-value
5	80	10.85	0.0007
6	69	10.05	
7	65	10.05	
8	70	10.2	
9	72	9.51	
10	62	9.2	
11	62	9.49	
12	49	9.8	
13	36	9.6	
14	19	10.075	
15	16	9.15	
Sex			
Male	249(41.5	10.12	0.042
female	351(58.5	9.52	
Family income (INR)			
1 lakh orless	97(16.2)	12.98(1.8	0.039
1-2 lakh	456 (76)	9.80 (2.85)	
2 lakh ormor	47 (7.8)	8.08 (1.89)	
Dental attendance pattern			
Past 3 yrs dental check up			
yes	341(56.8	9.52	0.049
no	259(43.2	10.12	
Currently visiting to dentist			
yes	195(32.5	8.7	0.041
no	405(67.5	10.9	

- Students who suffered abuse showed poor dental hygiene (76%) and mild to moderate malnutrition (69%). Other students had 65% dental neglect prevalence, with 57.9% being moderately malnourished. General counseling conducted for parents, guardians, and teachers to promote child well-being.

Malnutrition Assessment

- The study analyzed Z-score modification among different age groups using Fisher's exact test and one-way ANOVA.
- Body mass index: Among 900 subjects (469 females and 439 males), 4.1% were overweight, 0.7% were obese, 14.6% were thin, 9.5% were severely thin, and 71.1% were normal.
- Difference in mean BMI: Females had a higher mean BMI (2.7) compared to males (2.4) (p < 0.001).
- Statistically significant difference in mean BAC between genders (p = 0.0237).
- Stunting prevalence: 6.6% severe stunting, 22% stunting, and 70.9% normal height based on height-for-age Z-scores.

**Table 2:** Distribution of Weight for age Z- Score Gender wise

Severe (< -3sd) Underweight (-3sd to -2sd)			Weight_z score				Total
			Normal (-2sd to +2 sd)	Overweight (>+2sd to +3sd)			
G E N D E R	MALE	Count	24	79	195	7	305
		% within GENDER	7.9%	25.9%	63.9%	2.3%	100.0%
		% within WEIGHT_ZSCORE	42.1%	45.7%	50.4%	100.0%	48.9%
	FEMALE	Count	33	94	192	0	319
		% within GENDER	10.3%	29.5%	60.2%	0.0%	100.0%
		% within WEIGHT_ZSCORE	57.9%	54.3%	49.6%	0.0%	51.1%
Total		Count	57	173	387	7	624
		% within GENDER	9.1%	27.7%	62.0%	1.1%	100.0%
		% within WEIGHT_ZSCORE	100.0%	100.0%	100.0%	100.0%	100.0%

- Mean body size and stunting: Females had higher rates of stunting (76.7%) and severe stunting (66%) compared to males (23.3% and 34% respectively). The difference in height-for-age Z-score categories between genders was statistically significant (p < 0.001).
- Weight prevalence: 9.1% severely underweight, 27.7% underweight, 62% normal, and 1.1% overweight based on weight-for-age Z-scores.
- Weight: Severe underweight prevalence higher in females (54.3 and 57.9%) compared to males (50.4 and 42.1%). Equal overweight distribution (2.3%). Statistically significant difference in weight-for-age Z-score categories between genders (p = 0.018).
- Overall mean weight for age was 20.6712. Significant differences in mean weight between age groups (p < 0.001), and statistically significant difference in mean weight-for-age Z-score between genders (p = 0.045).
- Correlation between height, weight, and BMI: Significant positive correlations between BMI and height (Pearson coefficient = 0.601, p = 0.01) and between BMI and weight (Pearson coefficient = 0.846, p = 0.01) (Table 2).
- Nutrition: Higher prevalence of malnutrition in females, based on BMI, weight-for-age, and height-for-age, particularly in rural areas, indicating a gender disadvantage.

DISCUSSION

To prevent child maltreatment, efforts can be focused on three levels: domestic, societal, and administrative. At the household level, education about body boundaries and dental care is important. Community-level initiatives can include neighbor associations and support groups. Policy-level actions involve collaboration with NGOs and implementing school-based outreach programs.

- To reduce malnourishment in children.
- Train public healthcare workers to provide effective nutrition programs.
- Provide nutrition education to families, considering cultural practices and attitudes.
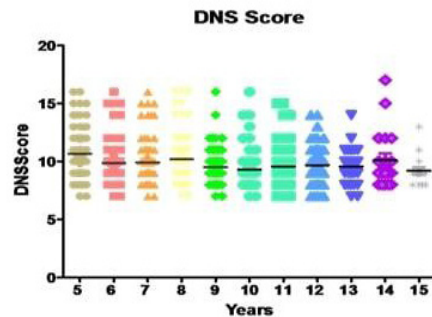
Figure 1: Distribution of DNS scores age wise

- Deliver integrated programs by collaborating across sectors, including schools.
- Strengthen food items through surveys, dental hygiene camps, and monitoring by dentists to identify abused children and support their well-being.

CONCLUSION

The results of this study conclusively determine the association of malnutrition, poor dental hygiene, and neglect with child abuse. Results of the study infer that, 76% of the students who suffered some or the other form of abuse had poor dental hygiene and 69% of such students were mild to moderate malnourished. So we can say, dental neglect and malnourishment was higher in children who suffered abuse as compared to general cases of malnutrition and neglect.

Dentists have an ability to distinguish between trauma from accident and abuse, so it is their moral obligation to report if found any case/s of child abuse, despite which many dentists fail to do/are unaware of their duties towards such cases of abuse and neglect. In such a way we can prevent child abuse and neglect, thus paving a better and safe environment for our children.

LIMITATION

Limitations of this study are that only north Indian students as subjects were included. Larger sample size involving more parameters and follow-up for a longer period.

Relevance

The study is based on the scientific rationale that recognizes child maltreatment as a social pathology, encompassing physical abuse, psychological abuse, sexual abuse, and neglect. Previous studies have shown a significant association between physical abuse and oral or facial trauma in children. Dental neglect has also been linked to child abuse and neglect, as evidenced by studies reporting oral injuries in cases of suspected child abuse.

Principal Findings

Physical and mental abuse, particularly pressuring women for marriage or hindering their education, were observed in children. A total of 142 males (4.7%) and 169 females (5.6%) experienced physical abuse related to alcohol and domestic violence. High percentages of these cases were associated with significant malnutrition.

Mental abuse, such as abusive parenting and pressure to marry or drop out of school, affected 93 males (3.1%) and 211 females (7.03%). Counseling was provided to parents in these cases, as the severity was not extreme, and follow-up was conducted for a year to ensure the safety of the children.

The study examined the dental hygiene and nutrition levels of the students. Among the students who experienced some form of abuse, 260 (76%) had poor dental hygiene, and 236 (69%) were mildly to moderately malnourished (74.2% male and 25.8% female). In comparison, among the students who did not experience abuse, 65% (362) had dental neglect, and 57.9% (323) were moderately malnourished (70.98% male and 29.1% female).

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