ORAL PATHOLOGY

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ORIGINAL ARTICLE

COMPARATIVE STUDY OF ORAL ANOMALIES, DECAYED, MISSING, FILLED TEETH (DMFT), ORAL HYGIENE INDEX-SIMPLIFIED (OHI-S) AND PARA-FUNCTIONAL HABITS (PFH) AMONG SCHOOL AND STREET CHILDREN OF ISLAMABAD

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ABSTRACT

Due to modern eating habits and subsequent increase in sugar intake, the pediatric population seeking dental care has shown significant increase among children attending schools in comparison to street children. The purpose of this study was to compare prevalence of congenital anomalies, decayed, missing, filled teeth (DMFT) scores, oral hygiene index (OHI-S) and parafunctional habits (PFH), and oral anomalies among school and street children. A cross-sectional study design was used to record data from 250 children in the out-patient clinics at Islamic International Dental College (group A) and from 250 children kept out of schools (group B). The children were between 5 to 15 years (mean=11.17+/-3.14). The information was recorded on pre-drafted proformas following consent, history and oral examination. Results were analyzed using SPSS version 23.0. Chi-square test and independent T-test were used to compare the two populations ($p<0.05$). Significant statistical differences were noted between the DMFT and OHI-S indices of school and street children ($p=0.02$ and $p<0.01$, respectively). A higher prevalence of PFH was noted in school children while anomalies were noted in both groups. Differences in DMFT scores, OHI-S, PFH and oral anomalies was noted between children going to school and street children.

KEYWORDS: *Dental caries, congenital anomalies, DMFT, parafunctional habits.*

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INTRODUCTION

Oral health influences overall general health and hence contributes markedly in overall quality and well-being of an individual.[1] Impact of oral diseases among children cannot be overemphasized owing to their long-term effects extending beyond individual to community at large.[2,3]

School children have shelter, access to healthy food, clean environment and presence of guardians to provide them with basic necessities of life. Street children for whom street becomes habitual abode and source of livelihood remain inadequately protected, lack of family support remain challenging global social problem in particular in developing countries. This marginalized, malnourished and vulnerable population are most deprived. With inadequate access to healthcare or education with an increased risk for specific health problems including dental problems, the rights of this population are often not realized.[3,4] Furthermore, street children lack formal representation, placing them outside the arena of policy development.

Congenital anomalies also known as birth defects, congenital disorders or congenital malformations are results of perturbations in developmental stages of tissues which may be influenced by genetic and/or environmental factors.[5] Congenital oral conditions

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are broadly classified into two categories: Hard tissue anomalies and soft tissue anomalies. Dental Hard tissue anomalies: Developmental dental hard tissue anomalies cover a range of anomalies including microdontia, macrodontia, hyperdontia, hypodontia, amelogenesis imperfecta, dentinogenesis imperfecta, accessory cusp and tori.[5] Soft tissue anomalies involve the oral mucosa including cleft palate, cleft lip, bifid uvula, double lip, Fordyce's granules, macroglossia, macroglossia, fissured tongue, leukoedema and ankylosis.[5]

Dental caries, also known as tooth decay, is a dynamic process of irreversible destruction of susceptible dental hard tissues due to intake of dietary carbohydrates and acid production by bacterial glycolysis. Main predisposing factors are plaque accumulation and oral microorganisms.[6] Caries may lead to pain, inflammation, gingival bleeding, and subsequent tooth loss affecting arch space, halitosis, poor nutritional status and hence overall quality of life.[7] Decayed, missed, filled, tooth respectively (DMFT) is used as a major tool to assess the trends of dental caries where primary cause as dental caries is acceptable index and missing teeth for reasons other than caries are excluded.[7] Considering the difference in the level of awareness about following oral hygiene habits among the two groups, oral hygiene habits including brushing frequency and presence/ absence of plaque and calculus deposits needs to be taken into account. Owing to the recent trend of increasing levels of dental caries in most of the developing countries,[4] this variable is also assessed in our research between school and street children to evaluate the impact of socioeconomic gap on the prevalence of this disease among the two groups.

Parafunctional habits (PFH) defined as unusual habitual exercise, abnormal behaviour or exercise of body in its unintended use include but are not limited to tongue thrusting, thumbs sucking, mouth breathing, bruxism, clenching, non-nutritive suckling as pacifiers and nail biting.[2] Delay in diagnosis and management of such PFH is associated with development of malocclusion, bone deformation and dentoalveolar skeletal deformation[2] Parafunctional behaviors may lead to local tissue damage with harmful effects on development of maxillofacial complex hence they were also observed among both study groups in this study.

The condition of teeth, periodontium and oral mucosa determines directly and indirectly overall general health of an individual hence needs monitoring.[8] Only a few international; however, no local studies have been conducted to compare prevalence of oral conditions, PFH and hygiene indices among the two groups. The objective of this study is to draw attention to oral health disparity among the two population groups of comparable ages but different backgrounds by comparing DMFT/dmft index, OHI-S, para-functional habits (PFH) and congenital anomalies among street children and school children.[1] This study would help the dentists become aware of the need to take necessary measures to improve oral health services among the children population that falls below poverty line in order to improve oral and general health and maximize benefit to these children.

MATERIAL AND METHODS

It was a cross-sectional comparative study, conducted at Islamic International Dental College, Riphah International University, Islamabad with the aim of comparing oral anomalies and conditions between school and street children. Ethical approval was obtained from Riphah International University Ethical Review Board with ref # IIDC/IRC/2020/003/009. Written consent was obtained and research forms were approved from the stakeholders. Random sampling was done and sample size was calculated using WHO calculator. The sample size was 500 subjects. Data collection was completed over a period of 5 months, and it was entered in SPSS system version 23.0 and various tests were applied on it to obtain appropriate results.

Children aged between 5-15 years were examined divided into 2 groups: Group A: 250 School Children (Army public school, IMCG, OPF and Convent school), Group B: 250 Street Children (F-10, F-11, E-11, G-10, G-11, G-9 and H-9 areas). Both males and females were included. Subjects below the age of 5 and above the age of 15, or those with congenital defects affecting their physical and mental health were excluded from the study.

A detailed history and thorough clinical examination of 500 subjects was done by five students at Islamic international Dental college, Islamabad. The examination of subjects for presence of oral anomalies, DMFT scores and OHIS was done using disposable dental examination sets consisting of mouth mirrors, probes and tongue depressors. The findings were recorded on pre-drafted proforma and pictures were taken for required anomalies. The study variables include congenital oral anomalies: Hard and soft tissue anomalies, age, gender, oral hygiene index, tooth brushing habits, DMFT/dmft, parafunctional habits, dietary habits and oral lesions as recorded in both the groups.

Statistical package for the social sciences (SPSS for windows version 23.0 was used for data analysis. An independent t-test was used to compare the DMFT between the group A and group B. A Pearson Chi-Square test was used to determine statistical differences in congenital anomalies, OHI-S, and parafunctional habits. P value <0.05 was considered significant.

RESULTS

Our study sample was of a total 500 children, consisting of 275 (55%) boys and 225 (45%) girls with age group of 5-15 years (11.17+/-3.14) (Table 1). There were 250 children taken in each group A and group B. There was only a single participant with a significant medical history.

The results showed a mean DMFT/dmft of 1.052 in group A and 1.496 in group B. There were 139 (27.8%) school children and 106 (21.2%) street children without caries, missing or filled teeth. When the means of DMFT/dmft was compared between group A and group B using an independent t-test, a statistically significant difference was found (p=0.02). (Figure 1)

Brushing habits were more prevalent in group A, 216 (86.4%) in comparison to 4 (1.6%) in group B. Group A exhibited staining of teeth in 92 (36.8%) children, plaque in 138 (55.2%) and calculus in 77 (30.8%), in comparison to group B, where staining was seen in 30 (12%), plaque in 16 (6%) and calculus in 7 (2%). Statistically significant difference between the two groups was noted using Pearson's Chi square, p <0.01 in all three cases (Table 2).

Parafunctional habits were more common in group A. Pencil biting in 45 (18%), nail biting in 17 (6%), cheek biting 46 (18%), thumb sucking in 6 (2.4%), mouth

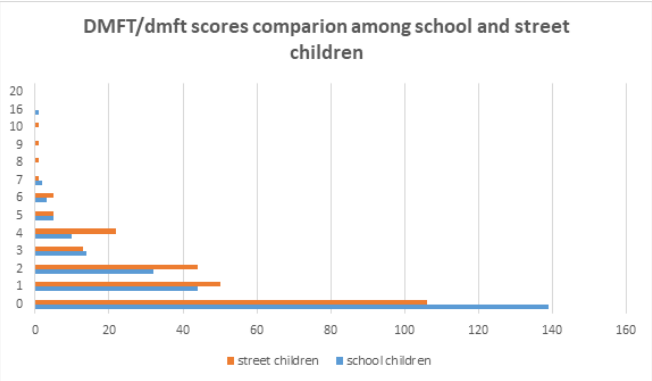

Fig 1: DMFT/dmft among school and street children

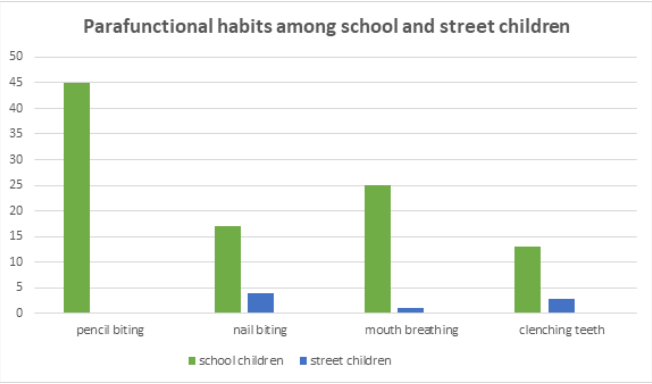

Fig 2: PFH among school and street children

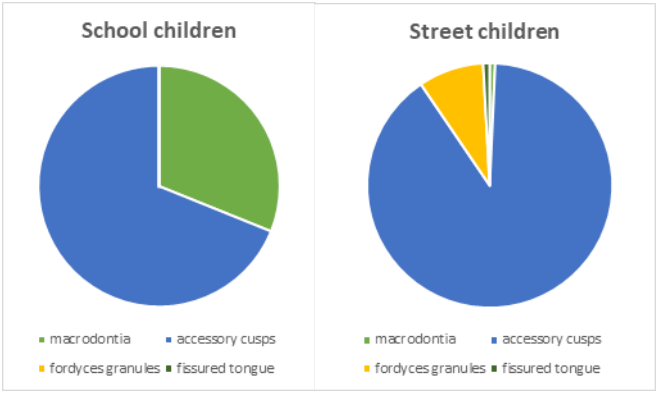

Fig 3: Statistically significant hard and soft tissue anomalies among the school and street children

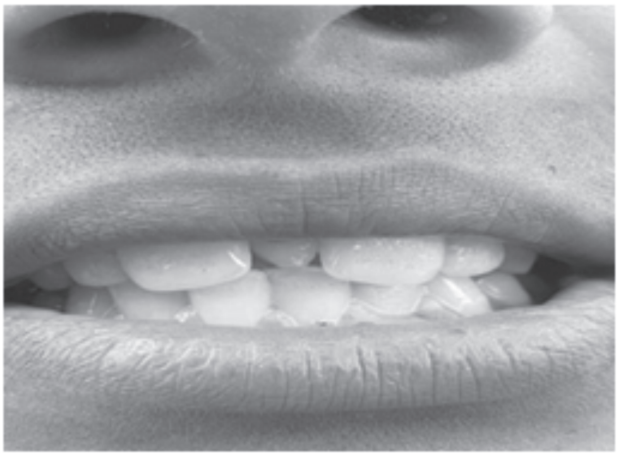

Fig 4: Mesiodens

Fig 5: Macroglossia

TABLE 1: DISTRIBUTION OF PARTICIPANTS (N=500)

	No.	%
Group A (school children)	250	50
Group B (street children)	250	50
Age (years)		
Min – Max	5-15 years	
Mean ±SD	10 (11.17+/-3.14)	

TABLE 2: TABLE SHOWING ORAL HYGIENE HABITS AND INDEX AMONG STREET AND SCHOOL CHILDREN WHEREAS, OHI (A: ABSENT/ NONE, L: LOCALIZED, G: GENERALIZED)

1. Oral hygiene habits									
	Toothbrushing			Frequency (times)			Time		
	Regular	Infrequent	Never	0	1-2	2-3	Before breakfast	After breakfast	Before bed
School children	216	23	11	14	225	11	168	40	31
Street children	4	16	230	232	18	0	17	1	0
2. Oral hygiene index									
	Staining			Plaque			Calculus		
	A	L	G	A	L	G	A	L	G
School children	158	36	56	112	52	86	173	54	23
Street children	220	8	22	234	6	10	243	4	3

TABLE 3: SHOWS PARAFUNCTIONAL HABITS IN GROUP A (SCHOOL CHILDREN) AND GROUP B (STREET CHILDREN).

Parafunctional Habits	School children		Street children		Significance	
	%age	n/250	%age	n/250	Yes/no	P value
Pencil biting	18	45	0	0	Yes	0.000
Nail biting	6	17	1.6	4	Yes	0.000
Cheek biting	18	46	12.8	32	No	>0.005
Thumb sucking	2.4	6	0	0	No	>0.005
Mouth breathing	10	25	0.4	1	Yes	0.000
Clenching teeth	5.2	13	0	0	Yes	0.000
Miscellaneous (Attrition)	0	0	2	5	no	>0.005

breathing in 25 (10%) and clenching in 13 (5.2%). These results are summarized in table 3 and figure 2.

The most frequently encountered soft and hard tissue anomalies in group A included macrodontia in 14 (5.6%), macroglossia in 36 (12.8%) and accessory cusps in 31 (12.1%) (Figures 3, 4, 5). The rest are summarized in Table 4. Common anomalies in group B included accessory cusp in 125 (50%), Fordyce granules in 12 (4.8%) and fissured tongue in 20 (8%).

DISCUSSION

The effects of dental anomalies can lead to significant esthetical, functional and occlusal problems. Our study findings focus on various dental anomalies, parafunctional habits and oral hygiene habits as a comparative analysis among the two groups of the same age range. Dental caries is the most common oral disease prevalent in all age groups, more so in the socially disadvantaged population. According to the World Health Organization (WHO), 60-90% of school-aged children have dental caries at some point in their life span.[9] Dental caries and oral habits strongly relate to malocclusion and management in early childhood minimizes undesired effects of these in permanent dentition.[10] Our study findings show that tooth-brushing was more frequent and regular in school children than street children as confirmed by Mishra et al which can be attributed to increased awareness and oral care

TABLE 4: SHOWS OVERALL HARD AND SOFT TISSUE ANOMALIES AMONG SCHOOL AND STREET CHILDREN WITH SIGNIFICANT P-VALUES AS HIGHLIGHTED IN RED

Congenital Oral Anomalies	School children		Street children		Significance	
	%age	n/250	%age	n/250	Yes/No	P-Value
Macrodontia	5.6	14	0.4	1	Yes	0.001
Microdontia	0.8	2	0.4	1	No	>0.005
Hyperdontia	0	0	0.4	1	No	>0.005
Hypodontia	0	0	0	0	No	>0.005
Accessory cusp	12.4	31	50	125	Yes	<0.01
Tori	0	0	0	0	No	>0.005
Amelogenesis imperfecta	0	0	0	0	No	>0.005
Dentinogenesis imperfecta	0.8	2	0	0	No	>0.005
Cleft lip	0	0	0	0	No	>0.005
Cleft palate	0	0	0	0	No	>0.005
Bifid uvula	0	0	0.4	1	No	>0.005
Double lip	0	0	0	0	No	>0.005
Fordyces granules	0	0	4.8	12	Yes	<0.01
Microglossia	0.8	2	0.4	1	No	>0.005
Macroglossia	12.8	32	10	25	No	>0.005
Fissured tongue	0	0	8	20	Yes	0.005
Leukoedema	0	0	0	0	No	>0.005
Ankylosis	0	0	0	0	No	>0.005

access among this population. Staining and plaque deposits were more common in school children.[9] Our study also shows similar findings. Studies show higher incidence of filled teeth among girls owing to influence of behavioral, environmental and physiological factors. Mean DMFT/dmft is more in younger age frame due to eating habits and lack of awareness to oral hygiene and preventive measures.[7] High incidence of dental caries among children can be attributed to low awareness regarding oral health maintenance.[1] In present study, school children had better oral hygiene habits, street children and showed statistically significant DMFT/dmft scores. These could be due to the dietary habits of school children, consumption of processed food and refined sugars owing to more access to junk food all of which are highly cariogenic. Moreover, children of less aware and educated parents often report with toothache, infrequent brushing and dental appointments signifying awareness of parents regarding oral care plays a crucial role in determining oral health of children.[9] As per literature, poor hygiene habits, lack of parental guidance and adequate dental awareness with frequent exposure to cariogenic food in addition to socio-economic demographics are main risk factors for dental decay among students.[10] In our study, examination was done by five dental students to avoid bias. The disparity in findings in particular brushing habits and oral hygiene index among street and school children is likely due to the difference in socio-economic backgrounds, dietary habits, status of education and environmental factors.[11] PUFA index which assesses presence of oral conditions occurring as a result of untreated caries were not taken into consideration in our study. This index when used as an adjunct to classical caries indices can address neglected problems of untreated caries and its manifestations.[11]

A cross-sectional study done in 12-year-old school children among urban and rural areas in Indian districts indicates oral health promotion strategies need implementation for prevention of dental caries and improvement in oral hygiene among primary school children.[12]

Kahabuka et al., observed dental caries among street children concluded optimum awareness level but inadequate knowledge on preventive measures owing to poor health habits. Underlying factors as identified from various studies include but are not limited to extreme poverty, illiteracy, lack of facilities, environmental factors and lack of knowledge (13). Present study findings are in line with their findings with increased intake of cariogenic food and poor oral hygiene practices among street children.[13] Frequency of tooth brushing is related to dental caries experience. Children with untreated caries also show a low proportion of filled teeth.[7] These findings are consistent with our findings. A local study conducted among primary school children in private schools indicates that among the low-income population, caries management should be considered to improve overall health quality of life which is in line with our study findings.[14]

Findings of our study are similar to a local study where OHI-S index and habits as observed among school children show adequate brushing habits, but plaque and calculus deposits were observed. This could be due to improper brushing habits, lack of replacing tooth brush, irregular brushing patterns, type of toothpaste and brushing technique. Moreover, sugar intake among the age groups studied in our study and the local study show higher energy requirements and hence high sugar consumption.[15]

Studies indicate that children who often engage in unconscious oral habits due to prepotential reflexes, lack of feeding or unpleasant feeling, apprehension etc causing parafunctional habits may lead to malocclusion with significant effect on cranial maxillofacial growth and development.[16,17] According to a local study done on children conducted by Mahdi et al., habits such as bruxism, mouth breathing, and thumb sucking were common PFH habits among children and being a neglected topic requires awareness and dental education among health care providers.[18]

Our study findings show pencil biting, mouth breathing, nail biting and clenching teeth as significant habits among school children compared to street children with a statistically significant p value (p= 0.000). Both groups had equal cheek biting habits with slightly more among school children while attrition being prevalent in street children. A study conducted in 2018 in Saudi Arabia showed tongue thrusting and thumb sucking to be most prevalent PFH among school children.[13] An epidemiological study among school children showed digital sucking and mouth breathing as common PFH which is in line with our findings (14). Studies show increased prevalence of PFH among school children with tongue thrusting and thumbs sucking as most prevalent and mouth breathing being the least common oral habits with thumb sucking being prevalent among males as compared to females.[13,15] PFH being more prevalent among school children as indicated in our study could be the result of a stressful environment in educational institutes as opposed to perhaps more carefree environment of street children.[10]

Among hard and soft tissue anomalies, macrodontia was more significant in school children whereas, statistically significant prevalence of accessory cusps, fordyce's granules and fissured tongue among street children. The latter two were absent among school children. Another local study reported a rare case of multiple anomalies of developing dentition where generalized macrodontia was observed. Our study in contrast reported localized macrodontia of anterior region.[10]

A local study done to identify prevalence of fordyce's granules in Pakistani population showed high prevalence in elderly population particularly in their 2nd decade onwards whereas, our findings showed high prevalence among street children aged 5-15 years.[10] Study done in Saudi Arabia in 2016 showed hypodontia as the most prevalent condition which was absent among both groups in our study and dentinogenesis imperfecta (DI) found as rare dental anomaly as similar to our study findings (n=2 in school children and n=0 in street children).[10] Continuous exposure to harsh environment and lifestyle among street children threatens their social, spiritual, mental and physical well-being.[19]

Ineffective oral health preventive programs at national level combined with lack of educational programs and advanced therapeutic methods contribute to increased caries incidence.[7] Oral health programs can be incorporated in curriculum with the aim to improve oral health behaviour and dental caries prevalence among school children.[1] Prevalence of such oral conditions as highlighted by our study findings call for additional effort to reduce burden of oral diseases among school and street children.[3]

Our research did not include children with special needs and those with orofacial syndromes. Street children were unaware of their exact age and it was calculated based on the status of dentition. Sample size of study was small and sampling was limited to Islamabad. Moreover, negligence and history of any kind of abuse was not taken into consideration. Parental involvement was not considered regarding hygiene and notice parafunctional habits such as Lip biting/peeling and tongue thrusting. There was no medical or family history taken nor a history of previous trauma.

CONCLUSION

There is an increase in prevalence of oral afflic-

tions which can be avoided with rigorous campaigns focused on simple preventive measures. Priority should be given to control factors that result in occurrence of dental problems in permanent dentition especially in more vulnerable groups such as street children. This study highlighted socioeconomic and lifestyle contrast between school and street children affecting their oral health as indicated by our study findings. Further studies should be done keeping in account the impact of deciduous dentition on permanent dentition and hygiene habits children develop to raise awareness levels among children. Introduction of advanced preventive procedures, educational awareness programs, health promotion campaigns and modern therapeutic methods are advised in particular in children who belong to families with lower socioeconomic position in order to improve oral health status among children (7). Integrated programs involving addressing issues of school and street children with early parental guidance, habit breaking appliances and regular dental visits can improve overall health (15). Exploratory studies with increased sample size and inclusion of children with special needs from various demographic locations can be conducted to validate study findings.

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