Original Article

Oral health status and treatment needs among 10126 school children in West Godavari district, Andhra Pradesh, India

M. Ghanashyam Prasad, A. Naga Radhakrishna, Halaswamy V. Kambalimath[1], Shalini Chandrasekhar, B. Deepthi, J. Ramakrishna

Department of Pedodontics and Preventive Dentistry, St. Joseph Dental College and Hospital, Andhra Pradesh, [1]Department of Pedodontics and Preventive Dentistry, Rishiraj College of Dental Science and Research Center, Bhopal, Madhya Pradesh, India

Corresponding author (email: <drghanasyam@gmail.com>)
Dr. M. Ghanashyam Prasad, Department of Pedodontics and Preventive Dentistry, St. Joseph Dental College and Hospital, Duggirala, Eluru, Andhra Pradesh, India.

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Abstract

Objectives: Oral diseases are affecting a large percentage of children worldwide. This study with Indian Society of Pedodontics and Preventive Dentistry collaboration was taken up with the aim to evaluate the oral health status and treatment needs in school-going children of the West Godavari district, Andhra Pradesh, India. **Materials and Methods:** This cross-sectional study was conducted among 10126 school children who were randomly selected from 32 schools in West Godavari district. To find the significance of the obtained number of cases for different age groups, Chi-square test of significance was used. **Results:** The prevalence of dental conditions are as follows: Dental caries 63.5%, periodontal diseases 13.6%, dental anomalies 3.6%, dental trauma 3.2%, and orthodontic treatment 25.1%. Among the different age groups, 11–14 years age group has the highest prevalence of oral health problems. Females were more affected with dental caries (P = 0.17), orthodontic treatment needs (P = 0.12), and dental anomalies (P = 0.86) compared to males which was statistically insignificant. The highest prevalence of dental conditions in the case of females was observed during the age of 11–14 years, and in males, the peak was seen in the 15–18 years age group. **Conclusions:** This study demonstrated that school-going children in West Godavari district suffer from a high prevalence of dental conditions and have higher treatment needs.

Key words: *Dental anomalies, dental caries, dental trauma, orthodontic conditions, periodontal disease, survey*

INTRODUCTION

Oral health is a critically overlooked component of overall health and well-being among children. It has a significant impact on the quality of life, appearance, and self-esteem. Dental disease restricts activities in school, work, and home, and often significantly diminishes the quality of life for many children and adults, especially those who are of low-income or are uninsured.[1]

During the 1940s, caries prevalence in India was 50.8% in 5–6-year old children in northern India. During 1960–70, caries prevalence was reported to be around

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50–68%. There was an increase in the caries prevalence during 1940–70 in 15-year-old children of different urban and rural areas of North India. Over the last 25 years, researchers have reported that the dental caries prevalence has been declining on a global basis.[2]

The National Health Survey conducted in 2004 throughout India showed dental caries prevalence as follows: 51.9% in 5-year-old children, 53.8% in 12-year-old children, and 63.1% in 15-year-old teenagers. The report concluded that a preventive program, such as water fluoridation, should be started to address this national crisis in dental caries.[3]

Knowledge of dental health and treatment needs of school-going children is important for developing appropriate preventive approaches and planning effectively for the organization and financing of dental resources. To achieve this, first school dental health program was conducted in collaboration with the Indian Society of Pedodontics and Preventive Dentistry (ISPPD) by the Department of Pedodontics and Preventive Dentistry, St. Joseph Dental College, Eluru, Andhra Pradesh.

MATERIALS AND METHODS

This community-based, observational, cross-sectional study was conducted over a period of 9 months (January–September 2015) with prior permission from the concerned authorities. Ethical clearance was obtained from the Institutional Ethical Committee of St. Joseph Dental College, Eluru. All the 32 schools in and around Eluru were targeted and the authorities of the schools were contacted for the record of the children studying in the respective schools; survey was planned accordingly to include all the school-going children. Informed written consent for the participation of the children in the study was obtained from the principals of the concerned schools before conducting the study. Children who were residents of the West Godavari district and attending the government and private schools were included; medically compromised children were excluded from the study.

Study area

The study area was distributed over a land area of 1010 km. In total, 32 schools comprising both boys and girls were selected. All children in the classrooms were targeted. A total of 10126 children were examined. Children of age 3–18 years were included in the study and were categorized based on the study classes into groups.

Children were made to sit on an ordinary chair facing natural light in well-illuminated classrooms and were examined using a tongue depressor (ADA survey type 4). Information regarding demographic details, chief complaint, aids used for oral care, and oral hygiene habits were recorded by multiple trained professionals in the specially designed structured format. Kappa statistic was used to assess the intraexaminer reliability, which was in the range of 0.90-0.92. Findings included dental caries, periodontal disease, dental trauma, dental anomalies, and malocclusion. Caries was recorded based on the presence of frank cavitation, abscess, and swelling with associated pain were considered to determine the severity of caries. To assess the periodontal status, gingival and oral hygiene indices were considered for both primary and permanent teeth. In the case of orthodontic problems, signs of malocclusion including class I with anterior or posterior crossbites, rotations, and class II and class III malocclusions were recorded. Pain and dental trauma were considered as emergency and children requiring specialized treatments were immediately informed to the authorities and were referred to the Department of Pedodontics and Preventive Dentistry, St. Joseph Dental College. To find the significance of the obtained number of cases for different age groups, Chi-square test of significance was used.

RESULTS

Among 10126 children, 5502 children presented with oral findings, and among them, 299 were eliminated due to inappropriate records. Among the oral diseases surveyed, dental caries was the most prevalent, followed by orthodontic treatment needs, periodontal conditions, dental anomalies, and dental trauma in a descending order [Table 1]. The Chi-square test of significance showed that the difference in the periodontal disease and dental trauma prevalence observed between males and females (males > females) is statistically significant with $P < 0.001$ [Table 2]. The Chi-square test of significance showed that the difference in the oral health status observed across different age groups was statistically significant with $P < 0.001$ [Table 3].

Dental caries

The prevalence of dental caries varied among the different age groups. Overall, the prevalence of caries in the study population was 63.5% (3308) among all the dental conditions identified [Table 1]. Higher caries cases were found among females (53.4%) as compared to males (46.6%) [Table 2]. High caries prevalence was

Table 1: Total prevalence belonging to different dental conditions

	Total number	Dental caries	Periodontal diseases	Orthodontic treatment needs	Dental anomalies	Dental trauma
Total	5675	3308	707	1306	187	167

Tables 2: Chi-square test for all the conditions in males and females

Gender	Dental caries		Periodontal diseases		Orthodontic treatment needs		Dental anomalies		Dental trauma	
	Y	N	Y	N	Y	N	Y	N	Y	N
Males (2464)	1543	921	379	2085	594	1870	85	2379	102	2362
Females (2739)	1765	974	328	2411	712	2027	97	2642	65	2674
Total (5203)	3308	1895	707	4496	1306	3897	182	5021	167	5036
P values	0.17		0.0003*		0.12		0.86		0.0003*	

**P<0.001; Y=Yes, N=No*

Table 3: Chi-square test for all conditions across different age groups

Age groups (years)	Dental caries		Periodontal diseases		Orthodontic treatment needs		Dental anomalies		Dental trauma		Total
	Y	N	Y	N	Y	N	Y	N	Y	N	
3 to 6	338	41	16	363	17	362	5	374	8	371	379
7 to 10	1039	337	160	1216	207	1169	30	1346	13	1363	1376
11 to 14	1457	1062	422	2097	732	1787	102	2417	103	2416	2519
15 to 18	474	455	109	820	350	579	45	884	43	886	929
Total	3308	1895	707	4496	1306	3897	182	5021	167	5036	5203
P values	<0.001*		<0.001*		<0.001*		<0.001*		<0.001*		

**P < 0.001; Y=Yes; N=No*

seen in the age group of 11–14 years (44.04%) and the least in the age group of 3–6 years (10.2%) [Table 3].

Periodontal disease status

A total number of 707 (13.6%) children had periodontal problems [Table 1]. In the above assessment, it was noted that affected females and males were 328 (46.3%) and 379 (53.6%), respectively, with females showing significantly better oral hygiene compared to males [Table 2]. The highest prevalence of periodontal conditions was seen in the age group of 11–14 years (59.7%) and the least in the age group of 3–6 years (2.3%) [Table 3].

Orthodontic treatment needs

Upon teeth examination, 1306 (25.1%) children had orthodontic problems [Table 1], and among them 712 (54.5%) were females and 594 (45.5%) were males [Table 2]. In this survey, the highest prevalence was seen in the age group of 11–14 years (56%) and least in the age group of 3–6 years (1.3%) [Table 3].

Dental anomalies

When inspecting possible changes in the oral cavity, anomalies were observed in 177 (3.6%) children, which included enamel hypoplasia, fluorosis, and fusion [Table 1]. Females (53.3%) were presenting with more dental anomalies as compared to males (46.7%) [Table 2]. The highest prevalence was seen in the age group of 11–14 years (56%) and the least in the age group of 3–6 years (2.7%) [Table 3].

Dental trauma

A total of 167 (3.2%) children presented with traumatic injuries to the teeth [Table 1]. Males (61.1%) showed a higher prevalence of traumatic dental injuries compared to females (38.9%) [Table 2]. The highest prevalence was seen in the age group of 11–14 years (61.7%) and the least in the age group of 3–6 years (4.8%) [Table 3].

DISCUSSION

This study was carried out to provide information about the oral health condition and treatment needs among children in West Godavari district. The present study sample consisted of school children from both private and government schools in order to have a representation of children from all the socioeconomic and cultural communities. The study population was randomly selected from 32 schools, and the sample

is, therefore, representative of school children in the district.

Shingare *et al.* reported a caries prevalence of 80.92%, whereas Damle and Patel (Dharavi, Mumbai) and Grewal *et al.* (Nainital, Uttranchal) reported a caries prevalence of 77.7% and 80%, respectively.[4] In the present study, the prevalence of caries is 63.5%, which is less than the observations from other surveys, which state that children living in West Godavari district comparatively have a better awareness regarding dental health.

In the present study, the prevalence of dental caries was higher in the age group of 11–14 years (44%) as compared with other age groups. This is in accordance with a study conducted by Mandal *et al.*[5] where the highest prevalence of dental caries was seen during mixed dentition. The caries prevalence in this study increased with age, which is in accordance with a study conducted by Adhikari *et al*.[6] who evaluated the prevalence and treatment needs of dental caries in school-going children in the western region of Nepal. This may be due to the fact that dental caries is an irreversible continuous disease, high variance in food habits, and improper oral hygiene habits.

In this study, females (53.4%) exhibited a greater prevalence of dental caries when compared with males (46.6%). A similar survey was conducted among school children of age 3–14 years in Uran, Raigad, Maharashtra, and the study showed that the peak prevalence of dental caries is at 7–10 years;[7] however, in our study peak prevalence of dental caries was during 11–14 years (57.8%). This is in accordance with a study conducted by Shailee *et al*.[8] This may be due to the fact that teeth erupt earlier in females, which leads to the prolonged exposure of the teeth to the oral environment. Another study which was conducted among school-going children of ages 5–14 years in Udaipur, Rajasthan reported no gender predilection and the highest peak was at 11–14 years.[9]

Caries prevalence and treatment needs have been surveyed in Chidambaram taluk where a higher prevalence of caries was noted in the primary dentition than permanent dentition.[10] In our study, higher prevalence of caries was observed in permanent dentition, which is in accordance with Damle and Ghonmode who reported a prevalence of 83.33% in 12 years age group, whereas Bhowate *et al.* reported a prevalence of 61%. Similar studies conducted in other parts of Maharashtra showed an increasing trend of dental caries.[4]

Malocclusion has a negative impact on the oral health-related quality of life in children.[11] Orthodontic treatment is more effective if diagnosed and intercepted in early stages of life; hence, this study was conducted to meet such needs. The prevalence of malocclusion in this study is 25.1%, which is similar to 28.8% in a study conducted by Rao *et al.* in Udupi region and is higher than a study conducted by Shivakumar *et al.* (20%) in Davangere.[11] In our study, malocclusion was shown to increase with age, which is in accordance with a study by Diwan *et al*.[12]

In our study, the prevalence of malocclusion was more in females compared to males, which is in accordance with a study conducted by Gupta *et al*.[13] Malocclusion, being the second most prevalent disease after dental caries, was assessed in the study, and it was found that the prevalence of malocclusion is more in permanent dentition.

In the present study, the overall prevalence of children presenting with periodontal conditions is 13.6%, which is much less compared to other studies reported in the literature. Sharma *et al.*[14] evaluated the oral health status and treatment needs among primary school-going children in the Nagrota Bagwan block of Kangra, Himachal Pradesh and noted that, among the age group of 5–8 years, the females had significantly higher gingival bleeding as compared to males. In 9–12 years age group, males had significantly higher gingival bleeding as compared to females. They further reported that 5–8 years age group exhibited significantly more gingival bleeding as compared to 9–12 years of age group. In contrary to this, in the present study, children in age group of 11–14 presented with more periodontal problems.

Dental trauma is a significant problem in children, which can be debilitating, and requires immediate attention. Prasad *et al.*[15] conducted a cross-sectional survey among 12 and 15-year-old school-going children and reported a prevalence of 12.8%, which is more when compared to the present study. In this study, the prevalence of traumatic injuries is seen to be increasing with age, which is in accordance with a study conducted by Gupta *et al*.[16] This can be attributed to the fact that there is more outdoor activity in children with increasing age. The prevalence of injuries is more in males (61.1%) when compared to females (38.9%), which is in accordance with studies conducted by Dua and Sharma *et al*.[17] This can be attributed to the fact that males are more likely to be involved in contact sports than females. Among 8–13-year-old children,

traumatic dental injuries prevalence estimated by Patel and Sujan was 8.79% and the ratio of prevalence in boys:girls was 1.28:1.[18]

In this study, 3.6% children presented with dental anomalies, which is much lower than the prevalence in other studies conducted by Gupta *et al.* (29.8%)[19] and Javali *et al.* (15.9%).[20]

In this study, highest prevalence of dental anomalies was seen during 11–14 years (56.04%) of age. In a study conducted in the Panchkula district of Haryana among 14–17-year-old it was observed that 29.8% of the study population had, at least, one dental anomaly. They found an increased prevalence of hypoplasia followed by microdontia.[19] A study was conducted by Patil *et al*. in 13–38-years aged individuals to estimate the prevalence of anomalies in Indian population. They noted that congenitally missing teeth had the highest prevalence followed by impacted teeth, and then supernumerary and microdontia.[21] In this study, females had higher prevalence of dental anomalies than males which is in accordance with a study conducted by Gupta *et al*.[13]

The strength of the present study is the large sample size and the first ever research collaboration with ISPPD, which is a National society concerned with the oral health of children in India, to meet the dental needs of children in West Godavari district, which is also another asset to the study. The limitations of the study are that predicting variables, such as patterns of sugar consumptions, oral health knowledge and attitudes, and fluoride intake, have not been included in the study that may influence the oral health of the individual.

CONCLUSION

Following conclusions were drawn from the study:

- Among the oral health diseases surveyed in West Godavari, dental caries was the most prevalent disease (63.5%) and was more prevalent in the age group of 11–14 year age group
- Malocclusion (25.1%) was the second most prevalent disease next to dental caries, and it was found to be more in permanent dentition
- Periodontal diseases (13.6%) was the third most prevalent condition followed by dental anomalies (3.6%) and dental trauma (3.2%)
- The highest prevalence of dental conditions in the case of females was observed during the age of 11–14 years, and in males, the peak can be seen in the 15–18 year age group.

In the present study, it has been shown that, with increasing age, the dental problems are increasing. Hence, an attempt must be made to intercept these problems at an early age to protect the children from debilitating conditions.

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Conflicts of interest

There are no conflicts of interest.

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