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Research Paper

Prevalence of Malocclusion in School Children of Karnataka Based on the Socio-Economic Backgrounds – A Cross-Sectional Survey

Medical Science

KEYWORDS : Prevalence, Malocclusion, School children, Socio-economic status.

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ABSTRACT

Aims: To estimate the prevalence of malocclusion in School children of Karnataka based on different socio-economic backgrounds.

Settings and Design: School settings and Descriptive cross-sectional survey

Methods and Material: A cross-sectional epidemiological survey was conducted in all the 30 districts of Karnataka. School children in the age group of 10-16 years were the target population. Population proportionate technique was employed for the sample size estimation. A total sample of 9505 was randomly selected from 102 schools all over Karnataka. Modified Kuppuswamy's scale for grading the Socio-economic status of the children was used.

Statistical analysis used: Simple Descriptive statistics.

Results and Conclusion: Prevalence of malocclusion was found to be equally distributed among the school children of Low, Middle and High socio-economic status.

Introduction:
The malocclusion can be defined as an occlusion in which there is mal-relationship

between the arches in any of the planes or there are anomalies in tooth position beyond normal limits. The etiology of malocclusion can be genetic or environmental and/ or a combination of both along with various local factors such as oral habits, tooth anomalies etc. The malocclusion has been shown to affect oral health, increase prevalence of caries and can cause temporomandibular disorders. The benefits of orthodontic treatment are prevention of tissue damage, improvement in aesthetics and physical function.

Health is multi-factorial and multi-dimensional influenced by factors such as genetics, lifestyle, environment, socio-economic status and many others.[1] Health has improved significantly over the last century, but this improvement, has not been experienced equally across the No studies have been done in the past to investigate the relation between SES and the prevalence of malocclusion among the school children of different SES backgrounds.

Objective of the study:
To estimate the Prevalence of Malocclusion in School children of Karnataka based on the socio-economic backgrounds.

Methodology:
A cross-sectional epidemiological survey was conducted in the State of Karnataka, with prior permission from the Ministry of Higher Primary and Secondary Education Board of Karnataka. The survey was carried out in selected schools in all the district head quarters. Children in the age group of 10-16 years were included in the study and constituted the study population. Population proportionate technique was employed for sample size estimation. According to the population census 2011, the total population in Karnataka is 6,11,30,704, out of which 10-16 years old children constitute 29% (According to National Family Health Survey-2, India [1998-99], child population in the age group of 10-16 years was taken as a reference). With 95% confidence level, the estimated sample size was 9505. In the first stage of sampling, three categories of schools, namely, Government schools, Aided schools, and Private schools in each district were selected from a list of schools provided by the Karnataka Higher Primary and Secondary Education Board by lottery method. In the second stage, 102 schools all over Karnataka were surveyed during the year 2011-2012. All children in the age group of 10-16 years, from the selected schools in each district all over Karnataka and children who obtained written informed consent from parents to participate in the study were included. Exclusion criteria used were- history of previous orthodontic treatment, rampant caries, multiple missing teeth, mutilated malocclusion and other craniofacial anomalies like cleft lip and palate, facial hemiatropy, cleidocranial dysplasia etc.

Ethical clearance to conduct the survey was obtained from the Vokkaligara Sangha Dental College and Hospital Review and Ethical Committee. Prior permission to conduct the survey was taken from the concerned school authorities.

The oral examination was done in day light using mouth mirror and dental probe. The observations were recorded in the assessment form and later transferred to the PC. Few modifications were done to Ackermann-Proffit classification of malocclusion which was used to record the malocclusion. The Dental Health check-up was done for the remaining children and an oral health education lecture was given to all the children in the school to create awareness about Dental health and Orthodontic treatment.

Ackermann-Proffit system of classification of Malocclusion [Modified version] 2

The description of the criterias in each of these categories are as follows:

1. Alignment –
i. Midline ---
0 –Midlines coinciding,
1- < half the lower incisor width,
2- > half the lower incisor width.

ii. Spacing---
1- Absent,
2- Midline diastema,
3- Anterior spacing ,
4- Generalized spacing

iii. Crowding---
1- Absent,
2- Anterior crowding [a] Mild ,[b] Moderate, [c] Severe,

3- Posterior crowding

iv. Protrusion of teeth---
1- Absent
2- Protrusion of upper teeth,
3- Protrusion of lower teeth,
4- Protrusion of both upper and lower teeth

v. Retrusion of teeth---
1- Absent
1-Retrusion of upper teeth,
2- Retrusion of lower teeth,
3- Retrusion of both upper and lower teeth.
2. Skeletal deviations –

i. Profile---
1-Straight profile,
2-Anterior divergent,
3-Posterior divergent,
4-Convex profile,
5-Concave profile

ii. Maxillary position---
0-Normal maxilla,
1-Prognathic maxilla,
2-Retrognathic maxilla

iii. Mandibular position---
0-Normal mandible,
1-Prognathic mandible,
2-Retrognathic mandible.
3. Transverse deviation-

i. Crossbite---
0-No crossbite,
1-Single tooth crossbite,
2-Two or more teeth crossbite,
3-Anterior teeth crossbite,
4-Posterior Unilateral crossbite,
5-Posterior Bilateral crossbite.

4. Anteroposterior deviations-
i. Molar
relation---1-Class I,
2-Class II [a] div1 [b] div2 [c]subdivision,
3- Class III [a]sub division.

5. Overjet---
1-Normal overjet[1-3mm],
2-Moderate overjet[3-5mm],
3-Increased overjet[>6mm],
4-Reduced overjet[<1mm],
5-Reverse overjet.

6. Vertical deviations-
i. Overbite---1- 1/3rd of lower incisor overlap,
2- 2/3rd of lower incisor overlap,
3- Completely locked lower incisors,
4-Edge to edge bite.

i. Openbite--- 0-Openbite absent ,
1-Open bite < 2mm,
2- Open bite > 4mm.

ii. Oral habits-
0-Absent
1-Thumb sucking
2-Tongue thrusting
3-Lip biting
4-Nail biting
5-Mouth breathing.

Result:
Table1 – Prevalence of midline deviation

SOCIO-ECONOMIC STATUS		MIDLINE			Total
		Co-inciding	<1/2 Lower Incisor width	>1/2 Lower Incisor width	
Low	F&%	2310(64.8%)	1018(28.6%)	236(6.6%)	3564(100.0%)
Middle	F&%	3520(67.9%)	1314(25.3%)	353(6.8%)	5187(100.0%)
High	F&%	508(67.4%)	205(27.2%)	41(5.4%)	754(100.0%)
Total	F&%	6338(66.7%)	2537(26.7%)	630(6.6%)	9505(100.0%)

Contingency Coefficent =.037; P=.010

Table2 – Prevalence of spacing

SOCIO-ECONOMIC STATUS		SPACING				Total
		Absent	Diastema	Anterior spacing	Generalized spacing	
Low	F&%	3027(84.9%)	223(6.3%)	284(8.0%)	30(.8%)	3564(100.0%)
Middle	F&%	4443(85.7%)	307(5.9%)	387(7.5%)	50(1.0%)	5187(100.0%)
High	F&%	637(84.5%)	57(7.6%)	55(7.3%)	5(.7%)	754(100.0%)
Total	F&%	8107(85.3%)	587(6.2%)	726(7.6%)	85(.9%)	9505(100.0%)

Contingency Coefficent =.022; P=.569

Table3 – Prevalence of crowding

SOCIO-ECONOMIC STATUS		CROWDING					Total
		Absent	Mild	Moderate	Severe	Posterior	
Low	F&%	1788(50.2%)	710(19.9%)	596(16.7%)	239(6.7%)	231(6.5%)	3564(100.0%)
Middle	F&%	2497(48.1%)	1053(20.3%)	876(16.9%)	408(7.9%)	353(6.8%)	5187(100.0%)
High	F&%	383(50.8%)	120(15.9%)	136(18.0%)	55(7.3%)	60(8.0%)	754(100.0%)
Total	F&%	4668(49.1%)	1883(16.9%)	1608(16.9%)	702(7.4%)	644(6.8%)	9505(100.0%)

Contingency Coefficent =.040; P=.056

Table4 – Prevalence of protrusion of teeth

SOCIO-ECONOMIC STATUS		PROTRUSION				Total
		Absent	Upper teeth	Lower teeth	Both	
Low	F&%	1791(50.3%)	1033(29.0%)	16(.4%)	724(20.3%)	3564(100.0%)
Middle	F&%	2732(52.7%)	1427(27.5%)	26(.5%)	1002(19.3%	5187(100.0%)
High	F&%	412(54.6%)	189(25.1%)	3(.4%	150(19.9%)	754(100.0%)
Total	F&%	4935(51.9%)	2649(27.9%)	45(.5%)	1876(19.7%)	9505(100.0%)

Contingency Coefficent=.030; P=.185

Table5 – Prevalence of retrusion of teeth

SOCIO-ECONOMIC STATUS		RETRUSION				Total
		Absent	Upper teeth	Lower teeth	Both	
Low	F&%	3170(88.9%)	351(9.8%)	14(.4%)	29(.8%)	3564(100.0%)
Middle	F&%	4567(88.0%)	571(11.0%)	15(.3%)	34(.7%)	5187(100.0%)
High	F&%	660(87.5%)	92(12.2%)	1(.1%)	1(.1%)	754(100.0%)
Total	F&%	8397(88.3%)	1014(10.7%)	30(.3%)	64(.7%)	9505(100.0%)

Contingency Coefficent=.033; P=.100

Table6- Prevalence of profile

SOCIO-ECONOMIC STATUS		PROFILE					Total
		Straight	Anterior divergent	Posterior divergent	Convex	Concave	
Low	F&%	1153(32.4%)	2(.1%)	1(.0%)	2395(67.2%)	13(.4%)	3564(100.0%)
Middle	F&%	1705(32.9%)	1(.0%)	1(.0%)	3445(66.4%)	35(.7%)	5187(100.0%)
High	F&%	231(30.6%)	1(.1%)	0(.0%)	518(68.7%)	4(.5%)	754(100.0%)
Total	F&%	3089(32.5%)	4(.0%)	2(.0%)	6358(66.9%)	52(.5%)	9505(100.0%)

Contingency Coefficent =.029; P=.445

Table7- Prevalence of crossbite

SOCIO-ECONOMIC STATUS		CROSSBITE						Total
		Absent	Single tooth	Two or more teeth	Anterior teeth	Posterior unilateral	Posterior bilateral	
Low	F&%	2941(82.5%)	431(12.1%)	123(3.5%)	35(1.0%)	25(.7%)	9(.3%)	3564(100.0%)
Middle	F&%	4224(81.4%)	655(12.6%)	179(3.5%)	72(1.4%)	41(.8%)	16(.3%)	5187(100.0%)
High	F&%	632(83.8%)	87(11.5%)	19(2.5%)	10(1.3%)	5(.7%)	1(.1%)	754(100.0%)
Total	F&%	7797(82.0%)	1173(12.3%)	321(3.4%)	117(1.2%)	71(.7%)	26(.3%)	9505(100.0%)

Contingency Coefficent =.028; P=.692

Table8- Prevalence of molar relation

SOCIO-ECONOMIC STATUS		ANGLE'S MOLAR RELATION					Total
		ClassI	ClassII Division1	ClassII Division2	ClassII Subdivision	ClassIII	
Low	F&%	2811(78.9%)	489(13.7%)	143(4.0%)	120(3.4%)	1(.0%)	3564(100.0%)
Middle	F&%	4117(79.4%)	677(13.1%)	197(3.8%)	192(3.7%)	4(.1%)	5187(100.0%)
High	F&%	602(79.8%)	98(13.0%)	35(4.6%)	19(2.5%)	0(.0%)	754(100.0%)
Total	F&%	7530(79.2%)	1264(13.3%)	375(3.9%)	331(3.5%)	5(.1%)	9505(100.0%)

Contingency Coefficent=.026; P=.605

Table8- Prevalence of overjet

SOCIO-ECONOMIC STATUS		OVERJET					Total
		Normal	Moderate	Increased	Reduced	Reverse	
Low	F&%	2173(61.0%)	771(21.6%)	209(5.9%)	382(10.7%)	29(.8%)	3564(100.0%)
Middle	F&%	3109(59.9%)	1057(20.4%)	342(6.6%)	610(11.8%)	69(1.3%)	5187(100.0%)
High	F&%	474(62.9%)	133(17.6%)	47(6.2%)	90(11.9%)	10(1.3%)	754(100.0%)
Total	F&%	5756(60.6%)	1961(20.6%)	598(6.3%)	1082(11.4%)	108(1.1%)	9505(100.0%)

Contingency Coefficent =.040; P=.050

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Table9- Prevalence of overbite

SOCIO-ECONOMIC STATUS		OVERBITE				Total
		Overlapping 1/3 the Lower Incisor	Overlapping 2/3 the Lower Incisor	Complete overlap	Edge to Edge	
Low	F&%	1373(38.5%)	1448(40.6%)	502(14.1%)	241(6.8%)	3564(100.0%)
Middle	F&%	1860(35.9%)	2193(42.3%)	784(15.1%)	350(6.7%)	5187(100.0%)
High	F&%	269(35.7%)	299(39.7%)	136(18.0%)	50(6.6%)	754(100.0%)
Total	F&%	3502(36.8%)	3940(41.5%)	1422(15.0%)	641(6.7%)	9505(100.0%)

Contingency Coefficent= .037; P=.042

Table9- Prevalence of openbite

SOCIO-ECONOMIC STATUS		OPENBITE			Total
		Absent	<2mm	>4mm	
Low	F&%	3440(96.5%)	68(1.9%)	56(1.6%)	3564(100.0%)
Middle	F&%	5031(97.0%)	79(1.5%)	77(1.5%)	5187(100.0%)
High	F&%	743(98.5%)	3(.4%)	8(1.1%)	754(100.0%)
Total	F&%	9214(96.9%)	150(1.6%)	141(1.5%)	9505(100.0%)

Contingency Coefficent=033; P=.032

Table10- Prevalence of skeletal deviations of maxilla

SOCIO-ECONOMIC STATUS		MAXILLA			Total
		Normal	Prognathic	Retrognathic	
Low	F&%	3304(92.7%)	216(6.1%)	44(1.2%)	3564(100.0%)
Middle	F&%	4883(94.1%)	226(4.4%)	78(1.5%)	5187(100.0%)
High	F&%	718(95.2%)	31(4.1%)	5(.7%)	754(100.0%)
Total	F&%	8905(93.7%)	473(5.0%)	127(1.3%)	9505(100.0%)

Contingency Coefficent=.044; P=.001

Table11- Prevalence of skeletal deviations of mandible

SOCIO-ECONOMIC STATUS		MANDIBLE			Total
		Normal	Prognathic	Retrognathic	
Low	F&%	1605(45.0%)	27(.8%)	1932(54.2%)	3564(100.0%)
Middle	F&%	2444(47.1%)	32(.6%)	2711(52.3%)	5187(100.0%)
High	F&%	347(46.0%)	5(.7%)	402(53.3%)	754(100.0%)
Total	F&%	4396(46.2%)	64(.7%)	5045(53.1%)	9505(100.0%)

Contingency Coefficent=.021; P=.389

Table12- Prevalence of oral habits

SOCIO-ECONOMIC STATUS		HABITS						Total
		Absent	Thumb sucking	Tongue thrusting	Lip biting	Nail biting	Mouth breathing	
Low	F&%	3341(93.7%)	7(.2%)	140(3.9%)	11(.3%)	9(.3%)	56(1.6%)	3564(100.0%)
Middle	F&%	4928(95.0%)	9(.2%)	164(3.2%)	4(.1%)	21(.4%)	61(1.2%)	5187(100.0%)
High	F&%	717(95.1%)	0(.0%)	21(2.8%)	0(.0%)	6(.8%)	10(1.3%)	754(100.0%)
Total	F&%	8986(94.5%)	16(.2%)	325(3.4%)	15(.2%)	36(.4%)	127(1.3%)	9505(100.0%)

Contingency Coefficent=.049; P=.013

Discussion:

The socio-economic situation plays a major role as the parents' financial situation determines the need for treatment of malocclusion. It was also thought earlier that the prevalence of malocclusion was more in school children with low and middle SES than when compared to the children with high SES. This was attributed to the concept that children with high SES could easily afford for orthodontic treatment than when compared to children from low and middle SES. But the trend has changed now which might be due to the increase in the literacy rate and better job opportunities which would have people to lead a better life and meet their basic requirements. In our study the malocclusion prevalence is almost equally distributed in children of high, middle and low SES.

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