Section: Community Medicine

Original Research Article

MORBIDITY PATTERN AND SOCIO-DEMOGRAPHIC PROFILE OF ADOLESCENTS ATTENDING PUBLIC AND PRIVATE SCHOOLS IN AGRA CITY

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ABSTRACT

Background: India has the largest number of school-going children in the world. Morbidities among adolescents of both government and private school may differ and so need to be studied simultaneously. Therefore the present study was conducted to identify pattern of morbidities among adolescents attending public and private schools in Agra city of Uttar Pradesh.

Materials and Methods: An observation cross-sectional study was conducted among 480 school-going adolescents in age group of 10-19 years studying in selected government and private schools in urban Agra. A multistage random sampling technique was applied to draw the required sample size. Appropriate statistical tests were applied.

Results: Only 30.8% of school-going adolescents have no morbidity at present; while rest 69.2% has one or more morbidities. Mean number of morbidities among study participants was 1.30±1.18 with a range of 0-6. Anemia (43.33%), dental caries (18.54%), refractive errors (11.04%), acne (9.37%), upper and lower respiratory tract infection (6.87% and 4.58% respectively), gingivitis (6.04%), allergic rhinitis (5.83%), Chronic Supportive Otitis Media (5.62%) and fungal infection of skin (4.58%) were common morbidities.

Conclusion: Regular health check-up of school-going adolescent is the need of the hour as more than 2/3rd of them have at least one or more morbidities at present. Anemia (43.33%), dental caries (18.54%), and refractive errors (11.04%) are top three morbidities; and if detected earlier through school-health services, can easily be managed by effective preventive and curative services.

Keywords: School-going adolescent, morbidity, public school, private school.

INTRODUCTION

Adolescence is a period; signify by rapid growth and maturation. It is the period of transition from childhood to adulthood and is characterized by human growth and development; physically, psychologically as well as socially. World Health Organization (WHO) defines adolescent as the period of life between 10 to 19 years of age, and classified into three stages: early adolescent 10-13 years, mid-adolescent 14-16 years and late adolescent 17-19 years.[1] Worldwide; over 2.3 billion school age children spend one third of their time in schools. Schools therefore constitute a unique setting to help children and adolescents to develop a positive outlook on life and help them establish healthy lifestyles and holistic health approach. On the other hand; health is a key factor in effective learning and performance in school.[2]

Global mortality and morbidity estimates in children and adolescents suggest that school-aged adolescents have significant health morbidities and there is a constant need for promotive, preventive,

and curative services in schools.3 In India, numerous studies have been conducted among school going adolescent and common morbid conditions were identified as anemia (23%-78%), dental problems (10%-80%), refractive errors (6%-23%), skin disease (5%-19%), respiratory tract infection (5%-17%) including others.4-26 Though different studies showing morbidity pattern among adolescents are available for pupils of public and private schools separately; very few have studies them together. Such combined studies are in rarity in the northern Indian state of Uttar Pradesh, at least in the recent past. With this background, a combined study was planned to identify pattern of morbidities among adolescents attending public and private schools in Agra city of Uttar Pradesh.

MATERIALS AND METHODS

A school-based descriptive type of cross-sectional study was carried out in randomly selected public and private schools of Agra district in Uttar Pradesh of northern India. All adolescents of randomly selected schools, in the age group of 10-19 years from class VI to class XI, formed the study population. This was a non-interventional and descriptive type of study. The duration of study was 2 years, i.e. from October 2020 to September 2022; but actual data was collected in the month of first 6 month of the year 2022.

Sample size: For valid inferences, a minimum sample size is required to be studied. The sample size of the study group was calculated by using the formula, $N=Z^2\times(pq)/d^2$; where Z is standard normal deviate, p is prevalence of disease under study, q is 100-p, and d is allowable error, which is taken as 5% of p for the present study. According to a study conducted by Bhattacharya A et al (2015)[4], 88.2% school-going adolescents in Burdwan district in West Bengal were found to be suffering from one or more illnesses at the time of examination[31]. So; for Z=1.96 at level of confidence, p=88.2, q=100-88.2=11.8, and d=5% of p=4.41, a sample size n=3.84×88.2×11.8/19.45=205 was calculated. For an effect size of 2; sample size doubled to 410. To compensate non-responders and for ensuring equal representation from public and private schools, boys and girls, and students from class 6th to 11th standard, a final tally of 480 was decided as the sample size of present study.

Sampling Technique: A multistage stratified random sampling was used for selection of subjects. In first stage separate lists of public and private schools was obtained from the district education department. In next stage; two public schools – one boy's and one girl's school was selected randomly. This was done to ensure equal participation of both male and female in the study. Among private schools; as boy's and girl's schools were not mentioned separately in the list, one co-educational school was selected. In third stage; a stratification technique was used to select equal number of students from class 6th to 11th standard. Desired number of students from a class was selected by a simple random sampling using a random number table. Students of class 12th were excluded due to their board examination and age group restriction among many of the pupils.

Inclusion Criteria

All the randomly selected school-going adolescents, studying in 6th to 11th class and willing to participate, were included in the study.

Exclusion Criteria

1. Children who were less than 10 years or more than 19 years of age, and
2. Children who were absent due to any reason on the day of data collection.

Methodology

Informed written consent was taken from the principal of the selected school. Verbal consent/accent was also taken from the students at the time of data collection. A pre-designed and pre-tested, semi-structured, self-administered anonymous questionnaire was administered. General and systemic examination was done; while confidentiality was maintained throughout the study. Ethical approval was taken from institutional ethical committee of S. N. Medical College, Agra before commencing the study. Data thus collected was entered into Microsoft excel and transferred to SPSS software for analysis. Appropriate statistical tests were used in the study.

RESULTS

This cross-sectional study was undertaken to find the morbidity profile among school going adolescents of urban Agra in the age group of 10 to 19 years. Out of 480 students, equal proportion was selected from public and private schools (50% each); from each class i.e. from 6th to 11th standard (16.67% each); and of both the sexes (50% each). Thus, 20 male as well as 20 female students were randomly selected from each class of both public as well as private schools.

Majority (52.5%) subjects were in early adolescent age group i.e. between 10 to 13 years of age while (41.25%) were in mid adolescent and (6.25%) were in late adolescent age group. Mean age of study participants was 13.36±1.96 years with a range of 10-18 (in completed years). Most of the study subject belonged to nuclear family (68.9%) while; 22.7% belonged to joint family. Fathers of almost half (48.54%) of the study subjects were graduates but 15.62% were illiterate. Similarly, mothers of 40.42% study subjects were graduates but 23.54% were illiterate. Maximum number of participants either belonged to Upper-Middle (45.62%) or Upper-Lower class (40.83%) while very few study subjects belonged to upper (2.70%) and lower (2.70%) socio economic class.

The table 2 shows that majority of the study participants were having anemia (43.33%) followed by dental caries (18.54%), refractive errors (11.04%) and acne (9.37%). Other common morbidity included upper and lower respiratory tract infection (6.87% and 4.58% respectively), gingivitis (6.04%), allergic rhinitis (5.83%), Chronic Supportive Otitis Media (5.62%) and fungal infection of skin (4.58%). The table 3 shows that among all the morbidities; prevalence was highest for hematological morbidities (45%) followed by oral cavity (24.8%), skin (13.1%), respiratory tract (12.3%), Eye (11.7%) and Ear, Nose & Throat or ENT (10.6%) morbidities. The figure 1 shows that maximum 30.8% school-going adolescents had no morbidity at present; whereas 30% had single morbidity, 23.1% had two morbidities, 11.7% had three morbidities and rest has four or more morbidities. Mean number of morbidities among study participants was 1.30±1.18 with a range of 0-6.

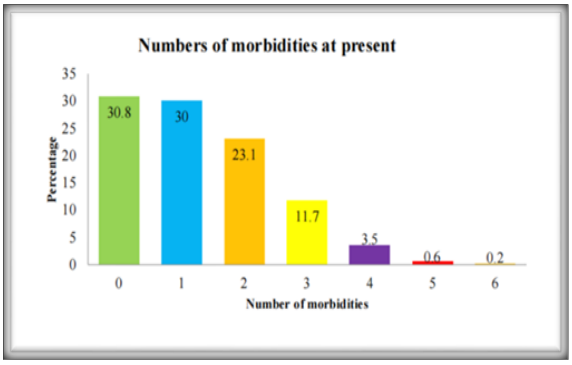

Figure 1: Numbers of morbidities at present

Table 1: Distribution of socio-demographic characteristics, dietary habits and life style factors among study participants (N=480)

Variables	Category	Number	Percentage
Age Group (in years)	10 To 13	252	52.5
	14 To 16	198	41.25
	17 To 19	30	6.25
Type of Family	Nuclear	331	68.9
	Joint	109	22.7
	Three generation	40	8.4
Father's education	Illiterate	75	15.62
	Primary School	35	7.29
	Middle School	40	8.34
	High School	70	14.58
	Intermediate	27	5.63
	Graduate/Post-graduate	233	48.54
Mother's education	Illiterate	113	23.54
	Primary School	61	12.71
	Middle School	38	7.92
	High School	41	8.54
	Intermediate	33	6.87
	Graduate/Post-graduate	194	40.42
Socio-Economic Class* *As permodified Kuppuswamy's classification (for year 2022)	Upper	13	2.91
	Upper Middle	216	45.62
	Lower Middle	42	7.91
	Upper Lower	196	40.83
	Lower	13	2.70
Number of meals	>5 per day	29	6.04
	5 per day	118	24.58
	<5 per day	333	69.37
Daily fruits and vegetables intake ≥ 400 gm	Yes	342	71.25
	No	138	28.75
Daily breakfast	Yes	377	78.54
	No	103	21.45
Consumption of cold drink	Yes	296	61.66
	No	184	38.33
Eating while watching TV/ mobile	Yes	252	52.5
	No	228	47.5
Daily moderate to vigorous physical activity	<60 minutes	219	45.62
	≥60 minutes	261	54.38
Mode of transport to school	Walking	154	31.87
	Cycling	74	15.20
	Automobile	252	52.91
Daily sleeping hours	<8 hours	177	36.88
	8-10 hours	296	61.67
	>10 hours	7	1.45
Daily screen time	<2 hours	249	51.87
	≥2 hours	231	48.13
Smoking cigarette	Yes	14	2.91
	No	466	97.09
Alcohol consumption	Yes	8	1.66

	No	472	98.34
Total		**480**	**100**

*According to Modified Kuppuswamy's Socio-economic classification (for 2022)

Table 2: Morbidity at present among study participants (N=480)

Morbidity (in chronological order)	Number	Percentage
Anemia	208	43.33
Dental caries	89	18.54
Refractive error	53	11.04
Acne	43	9.37
Upper respiratory tract infection (URTI)	33	6.87
Gingivitis	29	6.04
Allergic rhinitis	28	5.83
Chronic Supportive Otitis Media (CSOM)	27	5.62
Lower Respiratory tract infection (LRTI)	22	4.58
Fungal infection of skin	22	4.58
Worm infestation or h/o passing worm	18	3.75
Urinary tract infection (UTI)	13	2.70
Dental fluorosis with dental mottling	12	2.50
Conjunctivitis	6	1.25
Deviated nasal septum (DNS)	6	1.25
Hypertension	6	1.25
Asthma	5	1.02
Seizure	3	0.62
Jaundice	3	0.62
Vitiligo	2	0.41

Table 3: System-wise morbidities among school-going adolescents (N=480)

System involved	Morbidity	
	Present Number (%)	Absent Number (%)
Hematological (Anemia, Thalassemia etc.)	209 (43.5%)	271 (56.5%)
Oral cavity (Dental caries, fluorosis, Gingivitis etc.)	119 (24.8%)	361 (75.2%)
Skin (Acne, fungal infection, Vitiligo, Scabies)	63 (13.1%)	417 (86.9%)
Respiratory (URTI & LRTI, Asthma,)	59 (12.3%)	421 (87.7%)
Eye (Refractory error, Conjunctivitis)	56 (11.7%)	424 (88.3%)
ENT (CSOM, DNS)	51 (10.6%)	429 (89.4%)

DISCUSSION

The present cross-sectional study was conducted to find the morbidity profile of school going adolescents residing in urban Agra. The study found that 30.8% school-going adolescents had no morbidity at present while 30% had one morbidity, 23.1% had two morbidities and 11.7% had 3 morbidities at present. Mean number of morbidities among study participants was 1.30±1.18 with a range of 0-6. Prevalence of morbidities was highest for hematological system (45%) followed by oral cavity (24.8%), skin (13.1%), respiratory tract (12.3%), Eye (11.7%) and ENT (10.6%). Anemia (43.33%), dental caries (18.54%), refractive errors (11.04%), and acne (9.37%) were four most common morbidities found among school-going adolescents of Agra city.

Anemia: In the present study, the prevalence of anemia was found to be 43.3%, which is almost similar to the study by ErrayyaDowrula et al (2021),[5] among school-going children in rural and urban areas of Visakhapatnam (47.12%), by NFHS-5 (2019-2021),[6] among 15-19 years age group of male (31.1%) and female (59.1%) in India, and by Kakkar et al (2012),[7] among school going children in Doiwala block of Dehradun (40.4%). On the contrary; Mahajan N et al (2019),[8] found a higher prevalence of anemia among adolescents in Gujarat, India (61.5%), while; Varma A et al (2022),[9] Scott S et al (2022),[10] and Yerpude PN et al (2018),[11] found a lower prevalence of anaemia in rural area of Maharashtra (37%), in India (28.5%) and in southern India (36.19%) respectively. This difference may be due to differences in geographical location, food habits and different settings of these studies.

Dental caries: In the present study, the prevalence of dental caries was found to be 18.4%, which is almost similar to the study by Malvania EA et al (2014),[12] among school-going children in Vadodara City, Gujarat, India (17.5%). On the other hand; Vishnoi SK et al (2018),[13]Doley S et al (2022),[14] Singh S et al (2020),[15] and Prabakar J et al (2016),[16] found a higher prevalence of dental caries among school going children in rural area of western Rajasthan (23.85%), Kamrup District of Assam (27.3%), in India (36.7%) and in Chandigarh city (47.3%) respectively. This difference may be due to differences in practice of oral hygiene, teeth cleaning & brushing, geographical location, food habits and different settings of these studies.

Refractive errors: In the present study, the prevalence of refractive error was found to be 11.04%, which is almost similar to the study by Matta S et al (2017),[17] among adolescents in Jhansi

(12.5%), by Sandip S et al (2019),[18] among adolescents of eastern Bangalore (9.5%) and by Batra et al (2015),[19] among the school children in Ludhiana (12.7%). On the other hand; Nelson V et al (2018),[20] and Kawuma M et al (2002),[21] found a higher prevalence of refractive errors among school going children in southern Kerala (21.7%) and Kampala district of Uganda (25.32%); while Vishnoi SK et al (2018),[13]Sarawade S et al (2020),[22]Bhutia KL et al (2021),[23] and Sethi S et al (2017),[24] found a lower prevalence of refractive error in schools of western Rajasthan (8.6%), Solapur (8.1%), in East Sikkim (6.7%) and in Goa (7.2%) respectively. This difference may be due to differences in practice of eye cleanliness, geographical location, environmental conditions and different settings of these studies.

Acne: In the present study, the prevalence of acne was (11.04%), which is very less in comparison to the study by Meghwal N et al (2017),[25] in Pali district of Rajasthan (38%) and Sharma RK et al (2017),[26] in Chandigarh (72.3%). These differences in the prevalence may be due to difference in methodology, diagnosis and investigators (department of dermatology) among them.

CONCLUSION

On the basis of the above findings; we recommend that regular health check-up of school going adolescent is the need of the hour as more than 2/3rd of them have at least one or more morbidities at present. Anemia (43.33%), dental caries (18.54%), and refractive errors (11.04%) were top three morbidities; and detected earlier through school-health services, can easily be managed by effective preventive and curative services available in the city.

REFERENCES

1. World Health Reports 1996-2007. World Health Organization; 2008.
2. National health mission. Ministry of health and family welfare: Adolescent health, Accessed 15th December 2022
3. Lahariya C. State of the world's children. Volume 45, 2008. Indian Pediatr:2008
4. Bhattacharya A, Basu M, Chatterjee S, Misra RN, Chowdhury G. Nutritional status and morbidity profi le of school-going adolescents in a district of West Bengal. Muller J Med Sci Res 2015; 6:10-5.
5. Dowrula E, Vithanala VDP, Sreegiri S, et al. Morbidity profile of school children in rural and urban areas of Visakhapatnam – a comparative study. J Evid Based Med Healthc 2021;8(22):1835-1840. DOI: 10.18410/jebmh/2021/346
6. International Institute for Population Sciences (IIPS) and ICF. National family health survey (NFHS-5) 2019- 2021.
7. Kakkar R, Kandpal SD, Aggarwal P. Health Status of Children under School Health Services in Doiwala Block, Dehradun. Indian J Community Health 2012; 24:45-8.
8. Mahajan N, Kshatriya GK. Trends of nutritional anaemia among adolescents of Kukna Tribal Community of Gujarat, India. Online J Health Allied Scs. 2019; 18:1.
9. Varma A, Vagha J, Agrawal A, Meshram R, Damke S, Thakur S. Sociodemographic determinants in prevalence of anemia in adolescents of rural area of Maharashtra. J DattaMegheInst Med SciUniv2020; 15:209-14
10. Scott, S., Lahiri, A., Sethi, V., Wagt, A.,Menon, P., Yadav, K., Varghese, M., Joe, W., Vir, S. C., &Nguyen, P. H. (2022). Anaemia in Indians aged 10–19 years:Prevalence, burden and associated factors at national andregional levels. Maternal & Child Nutrition, 18, e13391.https://doi.org/10.1111/mcn.133911
11. Yerpude PN, Jogdand KS, Jogdand M. A study of health status among school going adolescents in South India. Int J Health Sci Res. 2018;3(11):8-12.
12. Malvania EA, Ajithkrishnan CG, Thanveer K, Hongal S. Prevalence of dental caries and treatment needs among 12-year-old school going children in Vadodara City, Gujarat, India: A cross-sectional study. Indian J Oral Sci2014; 5:3-9.
13. Vishnoi S.K., Jora R, Choudhary S, Chopra P. Comprehensive study of morbidity in school going children in rural areas of western Rajasthan 10.18231/2581-4702.2018.0016
14. Doley S, Srivastava M, Gupta R, Piplani A. Association between oral hygiene status and dental caries among 13–14 years old children of Kamrup District, Assam. J Indian Assoc Public Health Dent 2022; 20:137-41.
15. Singh S, Vijayakumar N. Height and dental caries among 13-year-old adolescents in India: A sociobehavioral life course approach. Dent Res J 2020; 17:373-9.
16. Prabakar J, John J, Srisakthi D. Prevalence of dental caries and treatment needs among school going children of Chandigarh. Indian J Dent Res 2016; 27:547-52(47.3%)
17. Matta S, Matta P, Gupta V, Dev A. refractive error among adolescents attending Ophthalmic OPD Jhansi India. Ind. Journal Comm Medicine. 2017-04-2018-06; 31(2).
18. Sandip S., Bhavya M., Meena C., Archana N., Diwakar R. Prevalence of refractive errors in 10 – 16 years of students in eastern Bangalore, India,
19. Batra N, Kaushal D, Gill AS. Refractive errors in School children – Data from a school. Tropical ophthalmology 2007; 7(3): 43 – 7.
20. Nelson V, Viswanathan G, Simon S. Prevalence and Determinants of Refractive Errors among School Children, A Study from South Kerala. Natl J Community Med 2018;9(11):813-818
21. MediKawuma, Robert Mayeku. A survey of prevalence of refractive errors among children in lower primary schools in Kampala district, Uganda. African health sciences, 2002; 2(2):69-72
22. S SSarawade. Study on the refractive status of school going children between age group of 10 to 15 years Volume 13 Issue 3 - March 2020
23. Bhutia KL, Bhutia SC, Gupta N, Shenga DO. Prevalence of refractive errors among the school-going children in East Sikkim. Indian J Ophthalmol2021; 69:2018-20.
24. Sethi S, Bhati D. Refractive error among adolescents attending Ophthalmic OPD Jhansi India. Ind. Journal Comm Medicine. 2017- 04-2018-06; 31(2).
25. Meghwal N et al. Prevalence and Determinants of acne among School Children, A Study from South Kerala. Natl J Community Med 2018;9(11):813-818.
26. Sharma, ReenaKumari; Dogra, Sunil; Singh, Amarjeet1; Kanwar, Amrinder J. Epidemiological patterns of acne vulgaris among adolescents in North India: A cross-sectional study and brief review of literature. Indian Journal of Paediatric Dermatology 18(3): p 196-201, Jul–Sep 2017. | DOI: 10.4103/ijpd.IJPD_82_16.