Study of Factors Affecting Morbidities Among School-Going Adolescents in Agra

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ABSTRACT
Adolescence is the period of rapid growth and maturation. Morbidities are common among school-going adolescents and this cross-sectional study was planned in Agra city of Uttar Pradesh with the objective to find the presence of morbidities and their associated factors. A descriptive, observational, cross-sectional study was conducted across selected government and private schools in Agra city of Uttar Pradesh. A sample size of 480 was calculated and equal number of boy and girl students were taken from each class of private and government schools. A multistage random sampling technique was used to draw the required sample size. Appropriate statistical tests were applied. Only 30.8% of school-going adolescents have no morbidity at present., while rest 69.2% has one or more morbidities. Presence of morbidities was significantly higher among adolescents aged 17-19 years (p<0.005), females (p=0.023) and students of 11th standard (p=0.014). Similarly., students belonging to lower-middle and upper-lower socio-economic classes (p=0.014), having middle schooled mothers (p=0.001), studying in government schools (p=0.001), not using auto-mobile as mode of transport to school (p=0.007) and consuming less than 400 grams of fruits and vegetables per days (p value=0.003) had significantly higher chances of morbidity in compared to their counterparts. 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. Female and older students, students of government schools, students whose mothers are lesser educated and students belonging to lower and lower-middle socio-economic class should be given extra attention during routine/additional school health services as they have higher chances of morbidities.

INTRODUCTION

Adolescence period is a period of transition from childhood to adulthood, signifying rapid growth and maturation. The World Health Organization (WHO) has further divided adolescence into early adolescent (10-13 years), mid-adolescent (14-16 years) and late adolescent (17-19 years)[1]. Schools provide a unique opportunity for adolescents as school-going adolescents can develop a positive outlook on life and establish healthy lifestyles., which in turn can help in building a healthy and productive life in future. Several recent Indian studies have investigated pattern of morbidities among school-going adolescents across different parts of the country[2]. Still our understanding in the association of socio-demographic, life-style and dietary factors with the morbidities among them is not fully understood. Moreover., morbidity pattern and factors associated with them should be assessed in all parts of the country, so that a comprehensive data set can be generated which could further help in formulation of national policies as well as local level strategies for the wellbeing of adolescents. With this background a cross-sectional study was planned in Agra city of Uttar Pradesh with the objective to find the presence of morbidities among school-going adolescents and its association with their socio-demographic, lie-style and dietary factors.

MATERIALS AND METHODS

The present study is a descriptive and observational type of study where cross-sectional surveys were carried out in selected schools of Agra city in Western Uttar Pradesh, India. The study was conducted among class VI to XI students who were aged between 10-19 years. In this descriptive type of study, no intervention was done. The study was conducted in 2 years from October 2020 to September 2022. Surveys of selected schools were conducted between January 2022 and June 2022.

Sample Size: The sample size of was calculated by using the formula, $N=Z2 \times (pq)/d2$., 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. The reference study used for calculation of sample was conducted by Bhattacharya[2] in school-going adolescents in Burdwan district of West Bengal where 88.2% were found suffering from one or more morbidities at the time of examination. So., for Z=1.96, p=88.2, q=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. Lists of public and private schools were obtained from the district education department. Next., two public schools-one boy's and one girl's school and one private co-educational school were selected randomly. This was done to ensure equal participation of both male and female in the study. In second 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 (40, 20 boys and 20 girls) 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:
- Children who were less than 10 years or more than 19 years of age and.
- 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 schools. 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 AND DISCUSSIONS

This cross-sectional study was undertaken to find some of the socio-demographic, life-style and dietary factors associated with morbidity among school-going students of Agra in the age group of 10-19 years. 20 male and 20 female students were randomly chosen from class 6th to 11th of selected public and private schools of Agra.

Common Morbidities Found were: anaemia (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%). The fig. shows that maximum 30.8% school-going adolescents had no morbidity at present., whereas

Table 1: Association of Socio-Demographic Characteristics and Morbidity Among School-Going Adolescents (N=480)

Variables	Category	Morbidity		Total Number (%)	Chi-Sq, df,(p-value)
		Present Number (%)	Absent Number (%)		
Sex	Male	154 (64.2%)	86 (35.8%)	240 (50%)	5.627, 1, (0.021)
	Female	178 (74.2%)	62 (25.8%)	240 (50%)	
Standard	6	48 (60%)	32 (40%)	80 (16.67%)	14.266, 5, (0.014)
	7	48 (60%)	32 (40%)	80 (16.67%)	
	8	56 (70%)	24 (30%)	80 (16.67%)	
	9	55 (68.8%)	25 (31.2%)	80 (16.67%)	
	10	57 (71.3%)	23 (28.7%)	80 (16.67%)	
	11	67 (83.3%)	13 (16.3%)	80 (16.67%)	
School type	Private	148 (61.7%)	92 (38.3%)	240 (50%)	12.66, 1,(0.000)
	Government	184 (76.7%)	56 (23.3%)	240 (50%)	
Age Group (In years)	10-13	164 (65.1%)	88 (34.9%)	252 (52.5%)	10.41, 2,(0.005)
	14-16	140 (70.7%)	58 (29.3%)	198 (41.25%)	
	17-19	28 (93.9%)	2 (6.7%)	30 (6.25%)	
Socio-Economic Status	Upper	7 (53.8%)	6 (46.2%)	13 (2.91%)	12.535, 4,(0.014)
	Upper Middle	134 (62%)	82 (38%)	216 (45.62%)	
	Lower Middle	32 (76.2%)	10 (23.8)	42 (7.91%)	
	Upper Lower	150 (76.5%)	46 (23.5%)	196 (40.83%)	
	Lower	9 (69.2%)	4 (30.8%)	13 (2.70%)	
Mother's education	Illiterate	87 (77%)	26 (23%)	113 (23.54%)	20.09, 5,(0.001)
	Primary School	43 (70.5%)	18 (29.5%)	61 (12.71%)	
	Middle school	32 (84.2%)	6 (15.8%)	38 (7.92%)	
	High School	34 (82.9%)	7 (17.1%)	41 (8.54%)	
	Intermediate	20 (60.6%)	13 (39.4%)	33 (6.87%)	
	Graduate/PG	116 (59.8%)	78 (42.2%)	194 (40.42%)	

Table 2: Association of Life-Style Factors and Morbidity Among School-Going Adolescents (N=480)

Variables	Category	Morbidity		Total Number (%)	Chi-Sq, df, (p-value)
		Present Number (%)	Absent Number (%)		
Daily moderate- to-vigorous physical activity	<60 minutes	145 (66.21%)	74 (33.78%)	219 (45.62%)	1.651, 1, (0.198)
	≥60 minutes	187 (71.65%)	74 (28.35 %)	261 (54.38%)	
Mode of transport	Walking	144 (74%)	40 (26%)	154 (31.87%)	9.933, 2,(0.007)
	Cycling	59 (79.7%)	15 (20.3%)	74 (15.20%)	
	Automobile	159 (63.1%)	93 (36.9%)	252 (52.91%)	
Daily sleeping hours	<8 hours	120 (67.8%)	57 (32.2%)	177 (36.88%)	0.254, 2,(0.881)
	8-10 hours	207 (69.9%)	89 (30.1 %)	296 (61.67%)	
	>10 hours	5 (74%)	2 (28.6%)	7 (1.45%)	
Daily screen time	<2 hours	184 (73.9%)	65 (26.1%)	249 (51.87%)	5.425, 1,(0.060)
	≥2 hours	148 (64.1%)	83 (35.9 %)	231 (48.13%)	
Smoking cigarette	Yes	13 (92.8%)	1 (7.14%)	14 (100%)	3.795, 1,(0.051)
	No	319 (68.5%)	147 (31.5 %)	466 (100%)	
Alcohol consumption	Yes	6 (75%)	2 (25%)	8 (1.66%)	0.130, 1, (0.719)
	No	326 (69.1%)	146 (30.9%)	472 (98.34%)	

Table 3: Association of Dietary Factors and Morbidity Among School-Going Adolescents (N=480)

Variables	Category	Morbidity		Total Number (%)	Chi-Sq, df, (p-value)
		Present Number (%)	Absent Number (%)		
Meals Per day	<5 times	241 (71.1%)	98 (28.9%)	339 (70.62%)	2.527, 2, (0.283)
	5 times	77 (66.8%)	40 (30.1%)	117 (24.37%)	
	>5 times	14 (58.3%)	10 (41.7%)	24 (0.5%)	
Daily eating breakfast	Yes	255 (67.6%)	122 (32.4%)	377 (78.54%)	1.922, 1, (0.166)
	No	77 (74.8%)	26 (25.2%)	103 (21.45%)	
Daily ≥400gm fruits-veg intake	Yes	223 (65.2%)	119 (21%)	342 (71.25%)	8.756, 1, (0.003)
	No	109 (79%)	29 (21%)	138 (28.75%)	
Consumption of cold drink	Yes	195 (65.9%)	101 (34.1%)	296 (61.67%)	3.915, 1, (0.548)
	No	137 (74.5%)	47 (25.5%)	184 (38.33%)	
Eating while studying / Watching T.V.	Yes	170 (68.5%)	78 (31.5%)	248 (51.67%)	0.092, 1, (0.762)
	No	162 (69.8%)	70 (30.2%)	232 (48.33%)	

30% had single morbidity, 23.1% had two morbidities, 11.7% had three morbidities and rest 4.3% has four or more morbidities. Mean number of morbidities was 1.30±1.18 with a range of 0-6. (Table 1) shows that significantly higher proportion of adolescents aged 17-19 years (p value <0.005), females (p value =0.023), students of 11th standard (p value =0.014) and those belonging to lower-middle and upper-lower socio-economic classes (p value =0.014), having middle schooled mothers (p=0.001) and studying in government schools (p value= 0.001) have morbidities

in compare to their counterparts. (Table 2 and 3) shows that among all life-style and dietary factors studied only 2., use of auto-mobile as mode of transport to school (p value=0.007) and consumption of more than 400 grams of fruits and vegetables per days (p value= 0.003) had significantly lower chances of morbidity in compared to their counterparts. All other life-style factors like daily physical activity, sleep and screen time, as well as smoking and alcohol consumption and dietary factors like number of meals per day, regular eating of breakfast and consumption

of carbonated/cold drinks were not significantly associated with morbidities among school-going adolescents in the present study. The present cross-sectional study was conducted to find some of the socio-demographic, life-style and dietary factors associated with morbidity among school-going adolescents of Agra city. Anaemia (43.33%), dental caries (18.54%) and refractive errors (11.04%) were most common found morbidities., while mean number of morbidities was 1.30±1.18 with a range of 0-6. The study found that 30.8% school-going adolescents had no morbidity at present i.e. were healthy while rest 69.2% had some morbidity at the time of examination.

Association of Morbidity and Socio-Demographic Characteristics: Age: Age-wise analysis shows that highest 93.9% of adolescents in the age group of 17-19 years have morbidities in compare to 70.7% in 14-16 years and 65.1% in 10-13 years of age group (p value <0.005). According to adolescent health epidemiology by World Health Organization[3] disease burden is higher in older adolescents (15-19 years) than in younger adolescents (10-14 years) across all income groups and for both males and females. Similar observations were made by Susmitha[4] in Nellore city of Andhra Pradesh and by Dowrula[5] in Visakhapatnam.

Gender: Gender-wise analysis shows that morbidities were more common in female than male as 74.2% female and 64.2% male in the present study were found to have morbidities (p=0.023). Similar observations were made by Sivagurunathan[6] in Kancheepuram district of Tamil Nadu and by Bhattacharya[2] in West Bengal.

Class of Study: The present study found that subjects of Class 11th had maximum chances of having morbidity (83.3%) while class 6th and 7th students had minimum chances of having morbidity (60%) (p value=0.014).

Type of School: A higher prevalence of morbidities was observed among students of government schools (76.7%) in comparison to private schools (61.7%) (pvalue=0.007).

Mother's Education: A significant difference was observed in morbidity among school-going adolescents and their mother's education as proportion of morbidity was least among subjects whose mothers have higher i.e. graduate/post-graduate education (p=0.001).

Socio-Economic Status (SES): Statistically significant difference in morbidity was also observed with socio-economic status of the study subjects where highest proportions were observed in lower middle and upper lower socio-economic class while lowest proportions were found in upper class (p value=0.014). Similarly, a study conducted by Sachan[7] in urban schools of Lucknow found that lower middle socio-economic class (78.7%) had highest prevalence of morbidity while upper socio-economic class had minimum prevalence (45.8%). The difference in morbidities among different socio-economic classes may be due to difference in their living standards and levels of awareness among parents.

Association of Morbidity and Various Life Style Factors: In the present study, a significant difference was observed in morbidities and mode of transport to school as proportion of morbidity was lower among those who used auto-mobile to reach their school in compare to those who either used cycle or walk to reach the school. This paradox might be due to higher level of awareness and afford ability, leading to early diagnosis and management of morbidities, among those who used auto-mobile transport to reach their school i.e. who were well off. The present study also analyzed various other life style factors like daily physical activity, sleep and screen time, as well as smoking and alcohol consumption., but none was found to have a statistically significant association with morbidity.

Association of Morbidity and Dietary Habits: The present study has found that participants who were eating more than or equal to 400 grams of fruits and vegetables every day have lesser proportion of morbidities in comparison to those whose had <400 grams of fruits and vegetables per day (p=0.003). All other dietary factors like number of meals per day, regular eating of breakfast and consumption of carbonated/cold drinks were found to have no statistically significant association with morbidity in the present study.

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. Female and older students, age-wise and class-wise, had more chances of presence of morbidity at present and so does the students of government schools, students whose mothers are lesser educated and students belonging to lower and lower-middle socio-economic class. They all should be given extra attention during routine/additional school health services.

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