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Original Research Article

Study of sociodemographic factors and their relationship with the morbidity among adolescent girls of Pune slum area

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ABSTRACT

Background: Socio-demographic factors such as age, gender, socioeconomic status, and education can influence health and nutritional outcomes, especially in adolescent girls. Aims and objectives of research work was to study of sociodemographic factors and their relationship with the morbidity among adolescent girls residing in slum areas of Pune region.
Methods: A cross-sectional study of the urban slum population from October 2011 to September 2012. Adolescent girls of the age group 10-19 years who gave consent and are living in a slum area for more than 6 months were enrolled. Information on health status including morbidity was collected by health examination.
Results: Majority of the adolescent girls (54.02%) had to age between 14-16 years. Majority of the adolescent girls (96.4%) were studying and were underweight (41.07%; of which majority 59.78% were in the age group 14-16years). Out of the 41.07% underweight girls, the majority (84.78%) had anaemia ($p<0.05$). A total 26.34% study subjects were stunted and 12.95% were thin (for both, commonly reported in the age group of 14-16 years). Majority of the girls (48.2%) belonged to class III SES. In class III socioeconomic status group mild, moderate and severe anaemia was reported in 50.45%, 41.51%, and 36.36% cases, respectively.
Conclusions: Among the studied sociodemographic factors lower socioeconomic status and overcrowding had an impact on the morbidities. However, we noted a significant impact of morbidity in underweight girls.

Keywords: An urban slum area, Girl's complications, Nutrition, Underweight

INTRODUCTION

The World Health Organisation (WHO) refers to adolescents as individuals belonging to the age group of 10-19 years. Adolescence is the transitional phase of life from childhood to adulthood.

During this period, it is observed that there is a rapid increase in height and weight, psychological, sexual maturity with cognitive development and even growth spurt.[1]

The intense physical, psychosocial and cognitive development demands more caloric and protein requirements.[2] Worldwide population of adolescents is 1.8 billion, of this 90% of the adolescent population is reported to be residing in developing countries.[3] One-fifth of this world's populations are adolescent girls and 84% lives in developing countries.[1]

Generally, the adolescent age group is considered to be relatively healthy period. But it is a great misconception proved by many studies. They are at risk of many

diseases and nutritional disorders. Malnutrition among adolescents is not only an important health problem but also an economic development problem.[4] Often in adolescent girls' physical growth, the onset of menarche and increase muscle mass describes their health and nutritional status. Physical growth of adolescent girls related to their dietary behavior and if this is compromised, it may lead to malnutrition.[3]

In India, the nutritional needs of adolescent girls, in particular, are often neglected.[5] It is observed that low literacy levels, lack of awareness about nutrition and health and poverty aggravate malnutrition. The cycle of poor nutrition perpetuates itself across generations, particularly in girls.

There has been ample evidence to demonstrate how the socio-demographic factors such as age, race, ethnicity, language, socioeconomic status, and education, can influence health and nutritional outcomes. Ever-increasing evidence suggests that the health and nutritional status of a population are greatly determined by the social and economic circumstances of that population, as well as its access to health care services. It is very much true that the growth and prosperity of a nation depend heavily on the status and development of adolescent girls.[3]

Therefore, it is required to evaluate such sociodemographic factors and their association with morbidity in adolescent girls.

METHODS

A cross-sectional study of the urban slum population from October 2011 to September 2012 carried out at the Urban Health Training Centre attached to the medical college. Information on demographic and socio-cultural variables was collected by interviewing the study subjects based on Global school-based student health survey questioner. Information on health status including morbidity was collected by health examination.

The study population included only girls in the household's urban area. Adolescent girls of age group 10-19 years and those who were willing to give consent were only included in the study. Adolescent girls who were not the permanent residents (permanent residents were those who lived in the slum for the period of 6 months or more) were excluded.

Before the survey, familiarization visits were made to the houses along with medico-social workers, and active women of the community. Following that, interviews with adolescent girls and physical examinations after informed consent were carried out in the nearest Anganwadi/urban health center.

Age of each girl (completed years as on the date of interview) was recorded and then divided into 3 groups 11-13 years, 14-16 years, 17-19 years. Education was noted as, illiterate (A person who could not read or write), primary school (upto 4th standard); middle school (5th to 8th standard); higher school (9th and 10th standard); intermediate/diploma (11th and 12th standard or any equivalent certificate course); graduate (graduate degree e.g. B.A./B.Sc./B.Com); post graduate (post graduate degree).

The subjects were categorized into four groups based on BMI according to WHO Asian Pacific 6 standards as underweight if BMI <18.5 kg/m^2, Normal if BMI is 18.5-22.99kg/m^2, Pre-obese (23-24.99 kg/m^2) and Obese with BMI >25kg/m^2. Data regarding morbidity status was collected using a pre-designed, pre- tested proforma. Every girl was examined physically from head-to-toe and deviations from normal were recorded. To assess morbidity, history, physical examination and laboratory investigations were used as criteria.

All adolescent girls having hemoglobin less than 12 were considered anaemic. Thinness defined by WHO in adolescents as BMI below the 5th percentile for age.[7] In this study, 5th percentile of NCHS standards of BMI for age was considered as thin. Wasting defined as height for age less than 3rd percentile of NCHS/WHO standards. In this study, 5th percentile of NCHS standards of height for age were considered as stunted or wasted.[8]

Data analyzed using SPSS Version 20.0 with a Chi-square test (significance criteria $p<0.05$). Proportions were calculated for different study variables with 95% confidence Interval were calculated applying finite correction formulas since the sample size was calculated using finite correction. The prevalence odds ratio was calculated for assessing the association of various risk factors with the presence of morbidity.

RESULTS

Mean age of 224 adolescent girls which were included in the present study was 14.29±1.86 years (95% C.I. 14.14-14.44). Majority of the adolescent girls were in the age group of 14-16 years (54.02%) followed by 11-13 years (33.03%) and by 17-19 years (12.95%) age group. Majority of subjects in the study population (96.4%) were studying. Only 3.6% were school drop outs. 52.4% of the study subjects had completed high school education.

In the present study, 92 (41.07%) out of 224 of the study subjects were underweight (with 95% C.I 37.23-44.97) of which majority (59.78%) were in the age group 14-16 years followed by 31.52% in 11-13 years and 8.70% in 17-19 years age group. Association between underweight status and age category was statistically non-significant ($p>0.05$).

In the present study, 59 (26.34%) out of 224 study subjects were stunted having the height for age less than 3rd percentile of 2007 WHO reference. Thinness having

BMI less than 5th percentile of 2007 WHO reference was seen in 29(12.95%) study subjects. Association between thinness and age groups and between stunting and age groups was found to be statistically significant (Table 1).

Table 1: Distribution of study subjects as per the prevalence of stunting and thinness in different age groups.

Age group	Thinness			Stunting		
	Present	Absent	Total	Present	Absent	Total
11-13	3(10.43%)	71	74	8(13.56%)	66	74
14-16	20(68.97%)	101	121	39(66.10%)	82	121
17-19	6(20.69%)	23	29	12(20.34%)	17	29
Total	29(100%)	195	224	59(100%)	165	224
Chi Square 6.52 df2 p=0.01				Chi Square 12.87 df2 p<0.001		

Table 2: Association between the age of study subjects and the prevalence of common morbidities.

Morbidity		Age in years		X^2	p value	Odds Ratio 95% C.I
		≤ 15	> 15			
Anaemia	Yes	142	33	0.059	0.807	1.103 (0.500-2.434)
	No	39	10			
Underweight	Yes	77	15	0.842	0.359	1.382 (0.691-2.763)
	No	104	28			
Pediculosis	Yes	47	30	2.747	0.097	1.874 (0.885-3.967)
	No	34	13			
Dental caries	Yes	114	23	1.319	0.251	1.480 (0.756-2.894)
	No	67	20			
H/o passing worms in stool	Yes	134	22	8.596	0.003	2.721 (1.373-5.394)
	No	47	21			
Skin disorders	Yes	59	16	0.332	0.565	0.816 (0.408-1.6)
	No	122	27			
Vaginal discharge	Yes	47	11	0.003	0.959	0.98 (0.458-2.098)

Association between the age of study subjects and the prevalence of common morbidities

For statistical convenience on the basis of age of study subjects, two groups were made that is one ≤15 years and another > 15 years of age. Association between the age of study subjects and the presence of all common morbidities except history of passing worms in stool in the past 6 months was found to be statistically non-significantly. The same is shown in Table 2.

Severe anaemia (<7) was reported in 11 subjects; 2 (18.18%) and 9 (81.82%) in the age group of 11-13 and14-16, respectively. Moderate anaemia (7-9.99) was reported in 53 subjects, 20 (37.74%), 30 (56.60%) and 3 (5.66%) in age group of 11-13, 14-16 and 17-19, respectively.

Mild anaemia (10-11.99) was reported in 111 subjects 37(33.33%), 56(50.45%) and 18(16.22%) in age group of 11-13, 14-16 and 17-19, respectively. Association between anaemia and age groups was found to be statistically non-significant.

Association between education level of study subjects and the presence of common morbidities

For statistical convenience on the basis of education of study subjects two groups were made one with <middle school and another >middle school education. Association between the education level of study subjects and the presence of all common morbidities except history of vaginal discharge was found to be statistically non-significantly (Table 3).

Association between socioeconomic status and prevalence of common morbidities

Association between socioeconomic status and presence of any of the common morbidities was found to be statistically non-significant (Table 4).

Table 3: Association between education level of study subjects and the presence of common morbidities.

Morbidity		Education		X^2	p value	Odds Ratio 95% C.I
		≤ Middle school	> Middle school			
Anaemia	Yes	67	108	0.971	0.324	1.406 0.713-2.775
	No	15	34			
Underweight	Yes	35	57	0.139	0.709	1.11 0.640-1.928
	No	47	85			
Pediculosis	Yes	67	110	0.564	0.453	1.299 0.655-2.576
	No	15	32			
Dental caries	Yes	53	84	0.657	0.418	1.262 0.719-2.216
	No	29	58			
H/o passing worms in stool	Yes	60	96	0.761	0.383	1.307 0.716-2.385
	No	22	46			
Skin disorders	Yes	24	51	1.031	0.310	0.738 0.411-1.327
	No	58	91			
Vaginal discharge	Yes	31	27	9.565	0.002	0.386 0.209-0.713
	No	51	115			

Table 4: Association between socioeconomic status and prevalence of common morbidities.

Morbidity	Socioeconomic status			X^2	p value
	Upper Middle Class II	Lower Middle Class III	Upper lower Class IV		
Anaemia	29	82	64	1.328	0.515
Underweight	14	37	41	4.772	0.092
Pediculosis	26	88	63	0.765	0.683
Dental caries	23	63	51	1.003	0.606
H/o passing worms in stool	26	73	57	0.965	0.617
Skin disorders	16	33	26	3.345	0.188
Vaginal discharge	14	22	22	5.893	0.053

Association between Socioeconomic status and grading of anaemia

Severe anaemia (<7) was reported in 11 subjects, 3 (27.28%), 4 (36.36%) and 4 (36.36%) in upper middle Class II, lower middle-Class III and upper lower Class IV, respectively. Moderate anaemia (7-9.99) was reported in 53 subjects, 8 (15.09%), 22 (41.51%) and 23 (43.40%) in upper middle Class II, lower middle-Class III and upper lower Class IV, respectively. Mild anaemia (10-11.99) was reported in 111 subjects, 18 (16.22%), 56 (50.45%) and 37 (33.33%) in upper middle Class II, lower middle-Class III and upper lower Class IV, respectively. Association between anaemia and age groups was found to be statistically non-significant.

Association between overcrowding and prevalence of pediculosis

In the present study, 177 girls had pediculosis and majority of them (77.4%) lived in houses where overcrowding was present. Association between overcrowding and presence of pediculosis was found to be statistically non-significant (Table 5).

Table 5: Association between overcrowding and prevalence of pediculosis.

Overcrowding	Pediculosis		Total
	Present	Absent	
Present	137(77.4%)	36(76.6%)	173
Absent	40(22.6%)	11(23.4%)	51
Total	177(100%)	47(100%)	224
Chi-Square Value= 0.014, df= 1, p=0.907			

DISCUSSION

Increasing investment in improving the lives of adolescents will also have an impact on achieving several of the Millennium Development Goals (MDGs) that includes gender equality, education and improving

maternal and child health. Nearly one-fourth of India's population comprises of adolescents representing a vibrant human resource. Hence it is of utmost importance to strengthen efforts and formulate innovative strategies to channelize adolescents' energies in a constructive direction. The present study was undertaken to assess the health status of adolescent girls by studying the distribution and determinants of common morbidities, in an urban slum of Pune. The results are discussed below.

In the present study, the majority of the Adolescent girls were in the age group of 14-16 years (54.02%) followed by 11-13 years (33.03%) age group. Mean age was 14.29±1.86 years. This is slightly different from the study by Chaturvedi et al from Rajasthan where 74.38% of adolescents were in the age group of 10 to 14 years and 25.6% between the age 15 to 18 years.[9] A similar trend was also seen in a study in Bangladesh by Shahabuddin et al where the majority (82.25%) had ages between 10 to 14 years.[10] The mean age of the study population was 12.9±2.06 years. Whereas in a study conducted in Ratnagiri by Patil et al, it was reported that 94.6% in the age group 15 to 19 years and 5.3% adolescent girls were in between 11 to 14 years with mean age as 16.9 years.[11]

In the present study, the majority of subjects in the study population (96.4%) were presently studying. Only 3.6% were school drop outs. Of the literate's majority of study, subjects had completed High school education [118 (52.4%)] followed by middle school [80 (35.6%)] and only 10.7% had completed intermediate and above. Similar results were seen in studies conducted at Kolkata by Senapati et al, at Tamilnadu by Balasubramanian, and at Ratnagiri by Patil et al who reported literacy rate of 75% to 90% with 8% to 23% school dropouts.[12,13,11] Whereas, a study conducted in Wardha by Kaur et al reported that 0.9% of girls were illiterate while 50% of girls had completed secondary level education and 5.6% had completed collegiate education.[14]

The common morbidity found in this study is anaemia, malnutrition (underweight, thinness, stunting), pediculosis, dental caries, helminthiasis, skin disorders, menstrual related that is dysmenorrhoea etc.

In the present study, 92 (41.07%) out of 224 of the study subjects were underweight of which majority (59.78%) were in the age group 14-16 yrs followed by 31.52% in 11-13 years and 8.70% in 17-19 years age group. Association between underweight status and age category was not found to be statistically significant (p>0.05).

In the present study, 59 (26.34%) out of 224 study subjects were stunted having the height for age less than 3rd percentile of 2007 WHO standards. Stunting was seen in the majority of study subjects (66.10%) in the age group 14-16 years. Thinness having BMI less than 5th percentile of 2007 WHO reference was seen in 29(12.95%) study subjects, of which majority (68.97%) were in age group of14-16 years. Association between thinness and age groups was found to be statistically significant, similarly, the association between stunting and age groups was also found to be statistically significant. Association between stunting and thinness in different age groups is shown in. Summary of the results of surveys in SEAR countries in the year 2006 to assess adolescent nutritional status showed that the prevalence of low BMI less than 3rd percentile (thinness) was 67%, 36%, and 32% and low height for age less than 5th percentile (stunting) was 48%, 47% and 39% in Bangladesh, Nepal, and Myanmar respectively.[6] Higher prevalence was seen in a cross-sectional study by Medhi et al carried out in tea gardens of Dibrugarh district of Assam, in 605 adolescents aged 10-18years, which showed a prevalence of thinness in boys to be 59.49% and in girls 41.32%.[15] In a study conducted by Das and Biswas in West Bengal, 37.8% were found to be stunted and 14.7% were thin.[16] In another study by Medhi et al, 52% of girls were stunted and 41% were thin when compared to NHANES standards.[15] A cross-sectional survey by Shahabuddin et al was conducted to assess the nutritional status of adolescent boys and girls in a rural community in Bangladesh carried out in 803 households, each containing at least one adolescent, sampled consecutively from four purposely-selected villages in Rupganj Thana, Narayanganj district.[10] Results showed 67% of adolescents were thin [defined as body mass index (BMI) less than 5th percentile of WHO recommended reference] with 59% of girls being affected. The prevalence of stunting [height for age less than 3rd percentile National Centre for Health Statistics (NCHS)/WHO standards were 48% for both boys and girls and rose from 34% at age 10 years to 65% at age 17 years.[10] In a study by Deshmukh et al, thinness was higher in early adolescence(57%) than in late adolescence (48.55%) whereas in my study thinness is highly prevalent in mid adolescence (68.97%) than in early adolescence (10.43%).[17] This may be due to a growth spurt.

According to the presence of various symptoms and signs observed in the study population, the major prevalent morbid conditions among study subjects were pediculosis (79%), 78.13% had anaemia, history passing of worms in stool in 69.6%, dental caries in 61.2%, underweight was seen in 41.07%, skin disorders in 33.5% and 26.34% were stunted, thinness was noted in 12.95%. In a study by Kapoor and Aneja conducted in 454 girls, of 11-18 years age group in Delhi, it was observed that 35.5% were under nourished, 3.1% were obese. Anaemia was found in 56% and dental caries in 23.3%.[7] In a study conducted by Das and Biswas in a rural area of West Bengal, in 143 adolescent girls of 10-19 years, prevalence of thinness was 14.7%, 37.8% were stunted,44.8% were anaemic, dental caries was found in 25.9%, 15.4% had angular stomatitis and goiter was found in 1.4%. The prevalence of stunting was significantly higher among the late adolescent age group than in early adolescent age group.[16]

In the present study, the prevalence of dental caries was found to be 61.2%. In the study by Srinivasan and Prabhu, dental caries was found to be 21.5%. 13.33% of dental caries was seen in the study conducted by Choudhary et al in adolescent girls in the rural area of Varanasi.[18,19] The high prevalence of dental caries in the present study may be due to poor oral hygiene. In a Study by Kalamka of Health Problems of Adolescents in urban field practice area of Nagpur, in the 10-20 years age group, 700 adolescents were studied. Age of menarche in females ranged from 10-17 years, with the majority having attained it at the age of 13years. Menstrual problems, were present in 30% of adolescents; 401(57.28%) suffered from anemia, 379 (54.14%) were having acne, 259 (37.0%) were having dental caries, 136 (19.42%) had a history of passing worms in stools, 45 (6.43%) adolescents had scabies, 52 (7.43%) pediculosis and 25 (3.57%) had obesity.[20] In a study by Agrawal et al, conducted in Mumbai among 1,144 girls of 5-15 years age, with 630 of primary section and 514 of the second section of an affluent population, the commonest health problems noted in these girls were related to hygiene (62.2%). While dental caries and helminthiasis were commoners in younger girls, pediculosis was most frequently seen in older girls of the second section. Nutritional disorders were present in 29.0%.[21]

In the present study, 56 (50.45%) out of 111 study subjects having mild anaemia, 30 (56.60%) of the 53 having moderate anaemia and 9 out of 11 having severe anaemia belonged to age group of 14-16 years. Association between anaemia and age groups was found to be not statistically significant. A study by Verma et al, carried out among 1295 girls of school going age (6-18years) residing in 15 randomly selected slums of the north Ahmedabad city, 81.8% of girls were anaemic, out of which 55.2 % were mildly anaemic, 44.2%were moderately anaemic, 0.6% severely anaemic respectively.[22] Another study by Trivedi and Palta conducted in 360 school going adolescent girls of 13-18years age group of Raipur city, the prevalence of anaemia was 82%.[23] Results are comparable to the present study. The probable reason for this similarity may be due to this study was done in nearly same age groups.

A higher prevalence was noted by Bulliyy et al found 96.5% prevalence of anaemia among non-school going adolescent girls in three districts of Orissa, of which, 45.2%, 46.9%, and 4.4% had mild, moderate, and severe anaemia.[24] Similar findings were seen in the study conducted by Rajaratnam et al in Tamil Nadu.[25] Toteja et al, found 90.1% prevalence of anaemia among adolescent girls from 16 districts of India, with 7.1% having severe anaemia.[26]

In the present study, none of the study subjects belonged to the upper class I and lower-class V socioeconomic status. Prevalence of anaemia was found to be maximum in lower middle class III (46.86%) and 64 (36.57%) in upper lower class IV and 29 (16.57%) in upper middle class II. Association between anaemia and socioeconomic status was found to be not statistically significant $p>0.05$. Similar findings were noted by Rajarathnam et al conducted to find the prevalence of anaemia among 288 adolescent girls in the age group of 13-19 years in Tamil Nadu.[25] Toteja et al, where a higher prevalence of anaemia was noted that is 90.1% among adolescent girls from 16 districts of India.[26] Association between socio-economic status and presence of anaemia was found to be not statistically significant, which may be due to the availability of non-adequate food with lower socio-economic status.

In the present study, overcrowding was seen in the majority of households. About 77.2% of the study population lived in overcrowded households. Association between overcrowding and presence of pediculosis was found to be not statistically significant $p>0.05$.

The study did not incorporate the assessment of psychological and behavioral problems. Information collected by asking questions about health-related events may be incomplete since it was provided by adolescent girls from their memory. Being a descriptive study, it might help only in understanding trends regarding prevalence and etiology of illnesses.

CONCLUSION

In this study adolescent girls belonged to lower middle or upper lower-class households. These girls reported common morbidities including anaemia, malnutrition (underweight, thinness and stunting), pediculosis, dental caries, helminthiasis, dysmenorrhoea, and skin disorders. Although the common factors responsible for these morbidities are lower socioeconomic status, overcrowding. However, in our study, a significant association was found in the presence of anaemia with a history of underweight whereas the other factors mentioned above were not found to be having a statistically significant association.

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