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OVERWEIGHT AND OBESITY AMONG EARLY ADOLESCENTS FROM GOVERNMENT AND PRIVATE SCHOOLS OF DHARAN, NEPAL: A COMPARATIVE STUDY

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ABSTRACT

Background: Overweight and obesity has emerged as one of the global health problems not only in developed countries but have also increased significantly in low and middle income countries such as Nepal. As these incidences are rising across the globe during childhood and adolescence, comorbidities related to these conditions are also increasing. **Objective**

- Determine the prevalence of overweight and obesity among study population and compare these prevalence in government and private schools.
- Gender-wise comparison of overweight and obesity in both types of schools.

Methods: Comparative cross sectional study was conducted in Dharan. A total of 800 early adolescents were selected, 400 each from 6 government and 18 private schools. Height and weight was measured and BMI calculated. Overweight and obesity was determined using the WHO (2007), age and gender specific BMI for age Z scores. **Results:** Among study population the prevalence of overweight and obesity was 8.8% and 3.3% respectively. The prevalence of overweight and obesity was higher among adolescents from private than government schools (13.7% and 5.8% vs. 3.8% and 0.8%). In both types of schools prevalence of overweight was higher among male than female. In government prevalence of obesity was higher among female, whereas in private it was higher among male. **Conclusion:** Overweight and obesity was significantly higher among adolescents from private than government schools. Awareness should be created to promote a healthy balance of diet and physical activity within and outside the school to prevent and control overweight and obesity among school children.

KEYWORDS: Early adolescent, anthropometry, overweight, obesity.

INTRODUCTION

WHO defines overweight and obesity as abnormal or excessive fat accumulation that poses a risk to health.[1] It is a complex multifactorial chronic disease caused by many factors, including the contributions of inherited, metabolic, behavioral, environmental, cultural and socioeconomic effects.[2] Obesity has emerged as one of the global health problems with 200 million school-aged children world-wide categorized as being overweight/obese, of which 40-50 million are obese and it can be described as the "New World Syndrome".[3,4]

Overweight and obesity was once considered as disease of rich in affluent and developed countries, however these conditions have significantly increased in low and middle income countries such as Nepal.[5] This is due to rapid globalization and urbanization which has led to reduction in energy expenditure along with an increase intake of high fat, energy dense food and sedentary life styles.[6] Changing dietary habits shift a disease pattern from communicable diseases dominance towards a status of double-disease burden with increasing prevalence of obesity and noncommunicable diseases (NCDs). Therefore with globalization, factors of Non communicable Disease have been globalized.[7]

The relationship between obesity and SES varies across countries. Higher SES subjects were more likely to be obese in Russia and China, but in the USA, lower SES group were at higher risk of obesity.[8]

Early adolescence (10-13yrs) is the period of rapid growth and maturation in human development. After the first year of life it is the critical period of rapid physical growth and changes in body composition, physiology and endocrine.[9] Adolescence is one of the vulnerable periods of life for the development of obesity and appears to be a period for entrainment of obesity related

morbidity. Dietary quality declines from childhood to adolescence, with dietary habits likely to promote fatness being actively adopted.[10]As the incidence of overweight and obesity during childhood and adolescent is rising across the globe, comorbidities related to these conditions are also increasing leading to significant short term and long term consequences. Overweight and obesity are major risk factor for NCDs such as Type 2 Diabetes mellitus, Cardiovascular diseases, Hypertension, Dyslipidaemia and Non-Alcoholic Fatty liver disease, Orthopaedic disorders and Obstructive Sleep Apnea syndrome. [11]Obese children have social and psychological problems such as stigmatization, poor self-esteem and tend to be more isolated.[12]

Childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years. [12]The worldwide obesity rate had increased from 2.3% to 19.6% between 1990 and 2000[7]. A study from New Delhi showed that the prevalence of childhood obesity increased from 16% to 24% between 2002 and 2007 leading to increase cardiovascular risk among obese children.[13]WHO estimates that NCDs cause 68% of deaths globally, and nearly three-quarters of all NCDs deaths occur in low- and middle-income countries.[14]NCDs account for 60% of all deaths in Nepal, and 22% are caused by cardiovascular diseases.[15]

Childhood obesity is considered to be a precursor of adulthood obesity and its related diseases. A prospective longitudinal study showed that 56% of male and 42% of female, who were overweight in adolescence remained overweight in adulthood and 47% of male and 55% of female who were obese in adolescence remained obese in adulthood.[16]Therefore, overweight and obesity in childhood and adolescence should be effectively intervened as early as possible. The prevalence of undernutrition is very high in developing countries like Nepal, on the other side the prevalence of overweight and obesity is also rising. Most nutritional studies are mainly concentrated on under-nutrition among children and adolescents. There is dearth of data on the prevalence of overnutrition among early adolescent of Dharan. Therefore the present study was conducted to determine the prevalence of overweight and obesity among study population and compare these prevalence among early adolescents from government and private schools of Dharan using WHO 2007 growth reference.

MATERIAL AND METHODS

Description of study area

Dharan is a major city in the Sunsari district in Eastern region of Nepal. It is homeland of many different races and ethnic groups. Dharan is also known by B.P. Koirala Institute of Health Sciences.

Study design

A comparative cross sectional study was conducted among early adolescents aged 10-13 years from Government and private schools of Dharan sub-metropolitan city, from July 2013 to July 2014. Ethical clearance was obtained from Institutional Ethical Review Board of B.P. Koirala Institute of Health Sciences.

Sample size

800 (400 each from government and private schools).

Sampling Technique

A list of all the government (24) and private schools (80) of Dharan sub-metropolitan city was made. Among 104 schools, 6 governments and 18 private schools were selected randomly by lottery method. Adolescents studying in grade IV to grade VIII were included. Adolescents from government and private schools were selected systematically on the basis of population proportionate systemic random sampling.

Method of Data Collection

Written consent was taken from principal of school and parents of students prior to anthropometric measurements. Height and weight were measured and Body Mass Index (BMI) was calculated for each adolescent. Overweight and obesity was determined using the WHO (2007), age and gender specific BMI for age Z scores (BAZ). In present study following operational definitions were used.[17]

Normal weight: BAZ +1SD to -2SD
Overweight: BAZ>+1SD to +2SD
Obesity: BAZ>+2SD
(BAZ= BMI for age Z score; SD= Standard Deviation)

Statistical Analysis

Collected data were entered in Microsoft excel and converted it into SPSS 17. For descriptive analysis percentage, proportion, mean and standard deviation (SD) were calculated. For inferential statistics independent t-test or Mann-Whitney U test were applied to find out the significant difference in anthropometric measurements between two groups at 95% CI, where $p \leq 0.05$.

RESULTS

A total of 800 early adolescents (aged 10-13years) were selected. Among them 400 adolescents were selected each from government and private schools of Dharan, Among 400 adolescents from government schools 49.5% were male and 50.5% were female. Similarly from private schools 48% were male and 52% were female.

Among study population 8.8% of adolescents were overweight and 3.3% of adolescents were obese (Figure-1). The prevalence of overweight and obesity was significantly higher among adolescents from private schools as compared to those from government schools ($p<0.001$) (Figure-2). The prevalence of overweight and obesity was significantly higher among both male and female adolescents from private as compared to those from government schools ($p<0.001$) (Figure- 3 &4).

In government schools, the prevalence of overweight was higher among male but obesity was higher among female adolescents ($p<0.05$) (Figure-5).Whereas in private schools, the prevalence of overweight and obesity was higher among male than female adolescents($p<0.05$) (Figure-6).

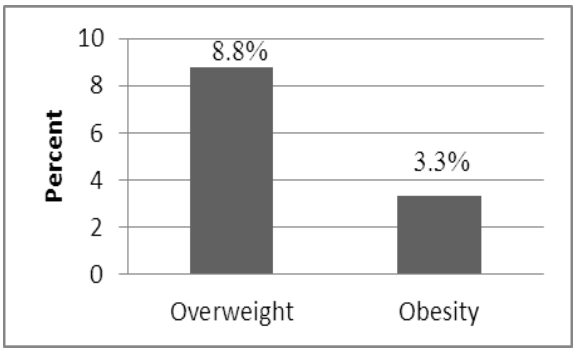

Figure-1 Prevalence of overweight and obesity among study population

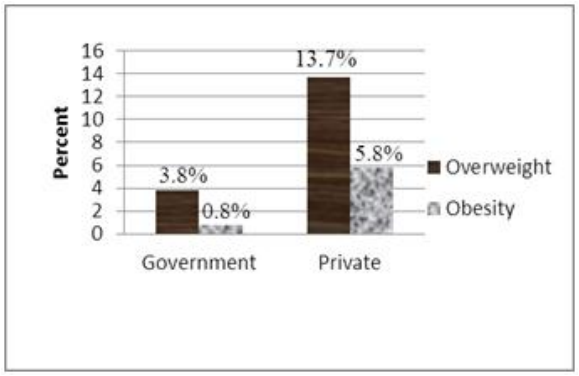

Figure-2 Comparison of overweight and obesity among adolescents from government and private schools

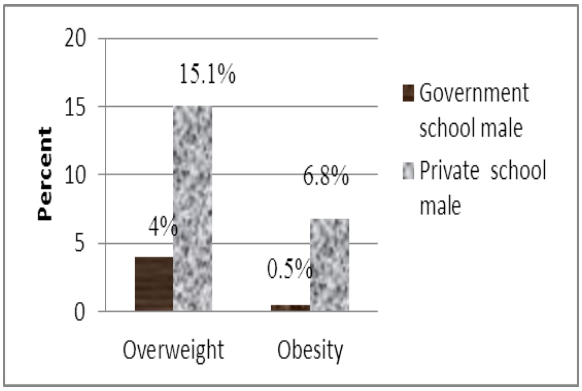

Figure-3 Comparison of overweight and obesity among male adolescents from government and private schools.

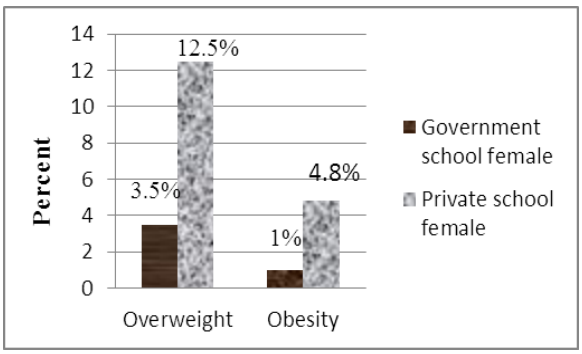

Figure-4 Comparison of overweight and obesity among female adolescents from government and private schools.

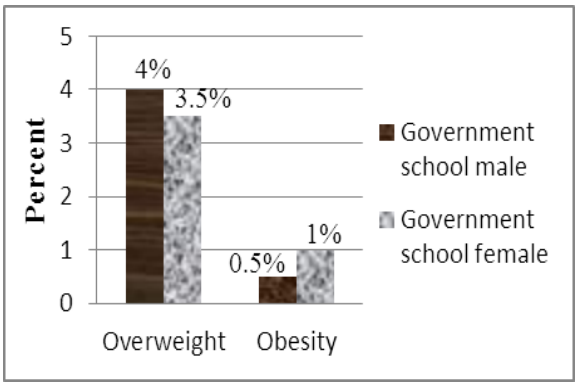

Figure-5 Genderwise comparison of overweight and obesity among adolescents of government schools.

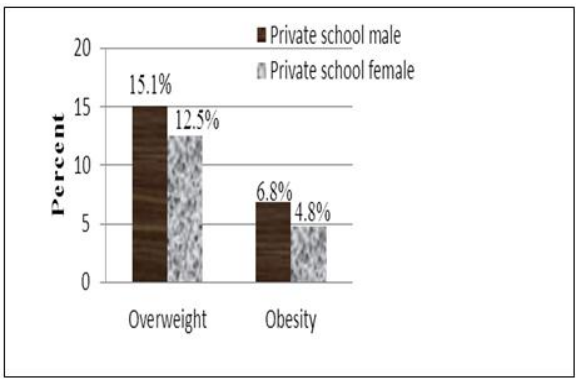

Figure-6 Genderwise comparison of overweight and obesity among adolescents of private schools.

DISCUSSION

Changing lifestyle patterns due to globalization in the past few decades have contributed to the epidemic proportions of overweight and obesity among childhood and adolescent, not only in developed countries but have also increased in Low and middle income countries like Nepal. The present study showed increasing prevalence of overweight and obesity among early adolescents of Dharan, with these prevalence being significantly higher among adolescents from private than government schools. The prevalence of overweight was 3.7 times higher and obesity was 13.6 times higher among male adolescents of private as compared to those from government schools. Likewise, the prevalence of overweight was 3.5 times higher and obesity was 4.8

times higher among female adolescents of private as compared to those from government schools.

The overall prevalence of overweight and obesity (8.8% and 3.3% respectively) seen in this study was nearly similar to the finding reported by Premanath et al. (8.5% and 3.4%) who conducted a study among 43152 school children from 139 schools. [18]Lower prevalence than present study was reported in rural block of Darjeeling India which may be due to the reason that study population were from rural area and with low SES.[19]However in other studies conducted in Ludhiana (Punjab),[20]Tunisia [21]and Canada[22] it was found to be higher. This could be due to the fact that study participants belonged to high socioeconomic class with an increased purchasing power, high standard of living and adaptation of western lifestyles.

The findings of the present study showed a higher prevalence of overweight and obesity in adolescents attending private schools compared to those attending government schools ($p<0.001$). This finding could be due to the fact that adolescents in private schools come usually from families with middle and higher socioeconomic class, whereas adolescents from government school are from low socioeconomic class. Therefore adolescents from private school have better access to meat and other energy dense food than those from government schools. The present study has indicated that high SES is positively correlated with overweight and obesity in developing countries. Other studies conducted by Premnath et al.,[18] Opara et al.,[23]Kaya et al.[24] and Kyallo et al.[25] had also stated the same.

In this study, prevalence of overweight and obesity was significantly higher among male and female adolescents from private as compared with those from government schools ($P<0.001$). This may be due to the reason that children from private school are from better socioeconomic background and they have increased intake of junk foods, decreased physical activity, increased television viewing hours, working parents and use of transport facilities to school. The findings of present study were in accordance with a study conducted in India among 21485 subjects. [26] Other studies conducted in turkey[24] and Kenya[25] had also reported a similar trend.

In government schools, the prevalence of overweight was higher among male adolescents but obesity was higher among female adolescents which may be due to the reason that female are involve in preparing meals thus have more access to food and are less involved in outdoor activities than boys. Contrary findings than present study was reported by Vasanta et al.[27] Study conducted in government schools of Anantang district, reported that overweight was higher among male adolescents but none were obese. [28]Other study in India revealed same prevalence of overweight among both gender but higher prevalence of obesity among boys from low socioeconomic status which was contrary to present study.[29]

In private schools prevalence of overweight and obesity was higher among male than female adolescents which could be due to cultural preferences as giving more advantage to boys in terms of diet and not involving boys in household activities or may be due to males spend more time watching television or playing computer games than girls. A study conducted in private schools of Recife, Brazil also reported similar findings.[30] Vaida et al. obtained findings were similar to present study as more male were overweight but contrary to findings of present study as more females were obese.[28] Study conducted in private school of Nigeria also reported contrary result as more girls were obese than male.[23]Other study conducted in India also revealed similar findings.[29]

CONCLUSION

The present study revealed significantly higher prevalence of overweight and obesity among early adolescents from private than government schools of Dharan. In government schools prevalence of overweight was higher among male but obesity was higher among female adolescents. Whereas in private schools, prevalence of overweight and obesity was higher among male than female adolescents. School based programs with special focus on educating parents, teachers and student regarding prevention and control of adverse effect of overweight and obesity should be carried out. As Effective prevention of adult obesity require the prevention and management of childhood obesity and awareness regarding factors leading to obesity.

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