

Prevalence of Overweight and Obesity in Preschool Children of Amritsar, Punjab

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ABSTRACT In the present study, an attempt has been made to report the prevalence of overweight and obesity in preschool children of Amritsar. A total of 1,745 children (875 boys and 870 girls) ranging in age from 2 to 5 years were measured for height and weight, and body mass index (BMI) was calculated. Overweight and obesity were assessed using international criteria of BMI. The overall prevalence of overweight and obesity was 6.42% and 2.00%, respectively, in the children of Amritsar. 6.85% boys and 5.97% girls were overweight, and 2.06% boys and 1.95% girls were obese. The levels of overweight and obesity among preschool children of Amritsar (Punjab) were lower than the preschool children of developed countries.

INTRODUCTION

Obesity represents the most frequent public health problem globally (Moschonis et al. 2008). A marked increase in the prevalence of overweight and obesity has been observed in the last few decades, both in adults and children, worldwide (Lobstein et al. 2004). A number of studies conducted in developed countries (Kotani et al. 1997; Wright et al. 2001; Freedman et al. 2004) have suggested that childhood obesity in most cases tracks into adulthood and increases the risk of degenerative diseases later in life. More specifically, it has been shown by Whitaker et al. (1997) that 69% of children between the ages of 6 to 10 years with a body mass index (BMI) greater than 95th percentile will continue to be obese in their adult life. In addition, the conditions, such as type-2 diabetes mellitus, hypercholesterolemia and hypertension which were previously seen mainly in adults, are becoming more common among children as the prevalence of obesity increases (Must and Strauss 1999).

A few studies have been conducted on overweight and obesity among children in developing countries like India. Punjab is an economically advanced and physically robust

state of India. During the last 50 years, the fast-developing economy of Punjab with an agricultural base transformed the whole India from a food deficient to grain surplus nation (Gill 2004). Simultaneously, the Punjabi society witnessed a White revolution in addition to Green one. This resulted in higher per capita availability of milk and milk products. Due to improved economic conditions and availability of nutritious food products, the living conditions and nutritional status of Punjabi population experienced a tremendous upward transformation (PSCST 2005). In this prevailing transitional situation of the state, the increased overweight and obesity prevalence may be expected. Therefore, in the present study, an attempt has been made to examine the prevalence of overweight and obesity in preschool children of Amritsar (Punjab).

MATERIALS AND METHODS

In the present cross-sectional study 1,745 children (875 boys and 870 girls) ranging in age from 2 to 5 years were studied from various crèches, playpens and nursery schools of Amritsar city of Punjab. During data collection, the exact date of birth was noted from the school registers or the birth records. Height and weight measurements were taken for each subject using standard methodology (Weiner and Lourie 1981). BMI was calculated as weight in kilograms divided by square of height in metres. International criteria for BMI percentiles for age and sex (Cole et al. 2000) were used to classify children as non-

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obese, overweight and obese. The data were arranged into four age groups, each of one-year duration, i.e., age group 2+ included children from age 2.00-2.99 years, the age group 3+ from 3.00-3.99 years and so on. Informed written consent was obtained from the children's parents and individual principals of respective institutes.

RESULTS

It is evident from table 1, that the prevalence of overweight and obesity according to BMI criteria among Amritsar boys was 6.85% and 2.05%, respectively. In boys, overweight and obesity prevalence varied from 2.56% to 10.33% and 1.11% to 2.56%, respectively. The prevalence of overweight and obesity among girls was 5.97% and 1.95%, respectively, (Table 2), but the range of overweight and obesity prevalence was 3.94%

to 8.26% and 0.50% to 2.92%, respectively. The prevalence of overweight and obesity among boys tended to increase from 2.56% at age group 2+ to 10.33% at age group 4+ and then suddenly decrease to 6.11% at age group 5+. A similar trend of increase and sudden decrease has also been observed among girls. The combined prevalence of overweight/obesity was higher among boys than girls at all age groups except at age group 3+.

DISCUSSION

In preschool children of Amritsar (Punjab), the prevalence of overweight and obesity (Table 3) was 6.42% and 2.00%, respectively. The proportion of children, who are overweight was higher as compared to obese in both sexes and in all age groups. The combined prevalence of overweight and obesity was slightly higher

Table 1: Percentage prevalence of overweight and obesity among boys of Amritsar.

Age group (years)	Total number of subjects	Percentage prevalence				Rate of percentage increase/decrease
		Non-obese	Overweight	Obese	Overweight/Obese	
2+	195	94.87 (185)	2.56 (5)	2.56 (5)	5.12 (10)	–
3+	229	90.82 (208)	6.98 (16)	2.18 (5)	9.16 (21)	4.04
4+	271	87.45 (237)	10.33 (28)	2.21 (6)	12.54 (34)	3.38
5+	180	92.77 (167)	6.11 (11)	1.11 (2)	7.22 (13)	-5.32
2+-5+	875	91.08 (797)	6.85 (60)	2.06 (18)	8.93 (78)	–

Figures in parentheses are the number of subjects

Table 2: Percentage prevalence of overweight and obesity among girls of Amritsar.

Age group (years)	Total number of subjects	Percentage prevalence				Rate of percentage increase/decrease
		Non-obese	Overweight	Obese	Overweight/Obese	
2+	198	95.45 (189)	4.04 (8)	0.50 (1)	4.54 (9)	–
3+	230	90.00 (207)	8.26 (19)	1.73 (4)	9.99 (23)	5.45
4+	239	89.45 (215)	7.11 (17)	2.92 (7)	10.03 (24)	0.04
5+	203	93.59 (190)	3.94 (8)	2.46 (5)	6.40 (13)	-3.53
2+-5+	870	92.06 (801)	5.97 (52)	1.95 (17)	7.92 (69)	–

Figures in parentheses are the number of subjects

Table 3: Comparison of percentage prevalence of overweight and obesity among boys and girls of Amritsar.

Sex	Total number of subjects	Percentage prevalence				χ^2
		Non-obese	Overweight	Obese	Overweight/Obese	
Boys	875	91.08 (797)	6.85 (60)	2.06 (18)	8.93 (78)	0.59*(df=2)
Girls	870	92.06 (801)	5.97 (52)	1.95 (17)	7.92 (69)	
Total	1745	91.58 (1598)	6.42 (112)	2.00 (35)	8.42 (147)	

Figures in parentheses are the number of subjects

* Non-significant at p<0.05 level

among boys (8.93%) than girls (7.92%), but this difference was statistically non-significant ($\chi^2=0.59$, $df=2$) between prevalence of overweight and obesity. The difference at all age groups was also statistically non-significant except at age group 2+ and 4+ among boys ($\chi^2=10.38$, $df=2$) and girls ($\chi^2=5.59$, $df=2$). In both the sexes a sharp increase in the percentage prevalence of overweight/obesity was observed at age group 4+. On comparing the percentage prevalence rates by sex, boys showed an increase of 7.42 percent while girls showed an increase of 5.49 percent up to age group 4+, while on the other hand, boys and girls at age group 5+ show a sharp decrease in the percentage prevalence of overweight and obesity. It is not clear whether this inconsistency in percentage prevalence reflects true difference in prevalence trends due to age or due to cross-sectional data. Therefore, additional studies are needed to understand fully this difference in gender and age groups.

The prevalence estimates of overweight and obesity in the present study are not comparable to other global studies because of variation in criteria used, age, socio-economic status and periodic dissimilarity. But some recent studies have used the reference values standardized by the International Obesity Task Force (IOTF). There is a paucity of nationwide data on prevalence of overweight and obesity in preschool children. Only one study was available from South India (Kumar et al. 2008), which reported the prevalence of overweight and obesity as 4.47% and 1.40%, respectively. On comparing the present data with prevalence rates of developed countries, it was apparent that the prevalence of overweight and obesity in children of Amritsar (Punjab) was lower than the preschool children of developed countries. For example, Whitaker and Orzol (2006) in United States have reported the prevalence of obesity as 14.80% whereas Kimbro et al. (2007) have reported that about 32.70% of children were obese. According to Canning et al. (2004), in Canada, the prevalence of obesity was 7.80% in boys and 8.20% in girls as per the IOTF cut-off points. Maffei et al. (2006) studied 2 to 6-year-old Italian children and reported the prevalence of overweight and obesity as 16.60% and 8.00%, respectively. In Great Britain (Jebb et al. 2004), the cumulative prevalence of overweight and obesity assessed in 1994 in 4 to 6-year-old children was 15.50% for boys and 20.70% for girls. Jiang et al. (2006) studied Chinese children aged 2-6 years and

reported the prevalence as 10.70% for overweight and 4.20% for obesity. It is evident from the above mentioned studies that these rates are considerably higher than the prevalence observed in the present study, and even the Chinese children showed higher prevalence. As reported in various reports of the developed countries (Kotani et al. 1997; Whitaker et al. 1997; Lobstein et al. 2004) in most of the high-income populations, overweight and obesity track from childhood to adulthood. If the current trend of obesity tracks from childhood to adulthood in Punjab also, as has been described in the developed nations, then Punjab might experience in the next two decades a prevalence of adulthood obesity similar to developed countries. Therefore, the prevention and control of this problem must claim priority attention. Further, additional research is needed to explore the cause of the trend observed and to find effective strategies for overweight and obesity prevention beginning in the preschool years.

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