Original Article

Assessment Of The Modifiable Risk Factors Contributing To Obesity In Adolescents Of Different Socioeconomic Groups

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Objective: To evaluate the modifiable risk factors associated with obesity in adolescents belonging to different socioeconomic groups.

Material & Methods: This comparative study was carried out in urban district of Lahore. A total of 270 adolescents 13-15 years of age were recruited, 90 each from upper, middle and lower socioeconomic groups (based on the school fee). Calorie intake, physical activity and hours of television viewing and computer usage was determined by a self administered questionnaire.

Results: There was statistically significant difference regarding daily calorie intake of the upper middle and lower socioeconomic groups ($F=4.588$, $df=2$, $p<0.05$). There was no significant difference in hours of physical activity per day in the upper, middle and lower socioeconomic groups ($F=1.997$, $df=2$, $p>0.05$). There was a statistically significant difference in the hours of television watching and computer use per day in the upper, middle and lower socioeconomic groups ($F=9.491$, $df=2$, $p<0.05$)

Conclusion: Calorie intake was influenced by socioeconomic status being highest in upper socioeconomic group followed by the lower socioeconomic group and was lowest in the middle socioeconomic group. There was no difference in the hours of physical activity per day in the upper, middle and lower socioeconomic groups. Hours of television watching and computer use per day was influenced by socioeconomic status being highest in the upper socioeconomic group followed by middle and then lowest in the lower socioeconomic group.

Keywords: Body mass index (BMI), food frequency questionnaire (FFQ)

Introduction

A global epidemic of pediatric obesity has occurred in recent years and disturbing trends of increasing obesity prevalence are being recorded in both industrialized as well as developing countries. Pediatric obesity is associated with significant burden of ill health for both obese children and for adults who were obese as children. Co-morbidities associated with obesity and overweight in children are similar to those seen in adult population. Elevated blood pressure, dyslipidemia and a higher prevalence of factors associated with insulin resistance and type II diabetes mellitus appear as frequent co-morbidities in the overweight and obese population. The risk factors contributing to obesity are both genetic and environmental but as obesity has increased so much in the last few decades, it appears to discount genetic as the major cause. Socioeconomic status has a direct bearing on this epidemic of obesity. Extensive research regarding childhood obesity has been conducted in the developed countries. Pakistan is a developing country, and few studies regarding this topic have been carried out in Hafizabad, Karachi and Islamabad. A National Health Survey evaluating the prevalence of childhood obesity was conducted in 1987 and 1997. No study has evaluated the risk factors contributing to adolescent obesity in different socioeconomic groups. When obesity occurs in adolescents, it tends to persist into adulthood causing different co-morbidities and premature mortalities. Evaluation of modifiable risk factors contributing to obesity in different socioeconomic groups will help in their detection and elimination resulting in decreased adult obesity and its consequences. This study was conducted to evaluate the modifiable risk factors contributing to obesity in adolescents of 13-15 years of age belonging to different socioeconomic groups.

Material and Methods

This comparative study was carried out in the urban district of Lahore. A total of 270 adolescents, 13-15 years of age were included. A socioeconomic segmentation based on the school fee was done, grouping the subjects into three groups:

(A) Upper socioeconomic group: included adole-

(B) Middle socioeconomic group: included adolescents with monthly school fee of Rs. 4000 to 5000.

(C) Lower socioeconomic group: included adolescents with monthly school fee of Rs. 10 (government school).

After taking consent from each subject on a proforma, following measurements were taken.

1. Calorie intake was determined using a self administered food frequency questionnaire (FFQ). Value of calories in different items of food was calculated[14] and then per day calorie intake was determined.
2. Physical activity was calculated by checklist of questionnaire for the frequency and duration of a specific activity within a defined period, i.e. last one week and then per day was calculated.
3. Hours of television viewing and computer usage were also surveyed in the last one week and average hours per day were calculated.

One way ANOVA was used to determine the significance of difference.

Table-1: Difference of calorie intake between different socioeconomic groups.

	df	F	p-value
Between Socioeconomic groups	02	4.588	0.011*
Within SE Groups	267		
Total	269		

* *statistically significant*

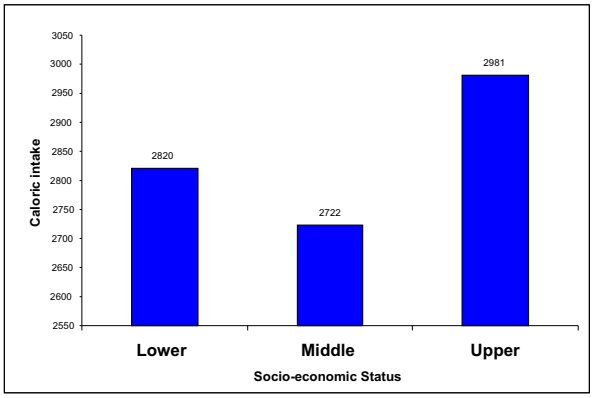

Fig 1: Difference of calorie intake between different socioeconomic groups.

Results

There was statistically significant difference regarding daily calorie intake of the upper, middle and lower socioeconomic groups (F=4.588, df=2, p<0.05) (**Table 1**).

(**Fig-1**) shows the calorie intake according to socioeconomic status. The intake was highest among children of upper socioeconomic group (2981 Cal) followed by lower socioeconomic group (2820 Cal). The children in the middle socioeconomic group had the lowest calorie intake (2722 Cal).

Table-2: Difference of hours of physical activity between different socioeconomic groups.

	df	F	p-value
Between Socioeconomic groups	02	1.997	0.138*
Within SE Groups	267		
Total	269		

* *statistically non-significant*

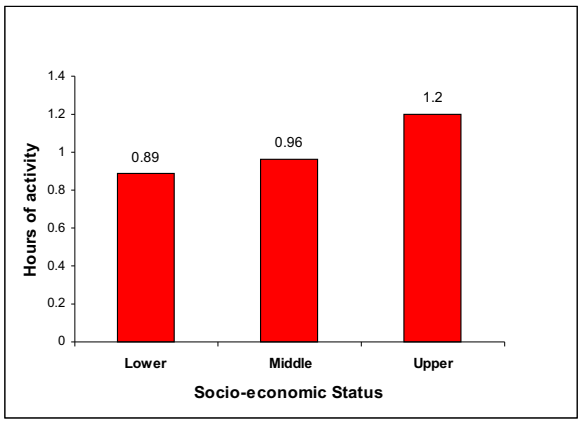

Fig-2: Difference of hours of physical activity between different socioeconomic groups.

There was no significant difference in hours of physical activity per day in the upper, middle and lower socioeconomic groups (F=1.997, df=2, P>0.05). **(Table 2).**

(Fig. 2) depicts the physical activity according to the socioeconomic status. The children in the upper socioeconomic group were at the highest activity level (1.2 hours per day) followed by those in the middle socioeconomic group (0.96 hours) and those in the lower socioeconomic group 0.89 hours.

There was a statistically significant difference in the number of hours of television watching and computer use per day in the upper, middle and lower socioeconomic groups (F=9.491, df=2, p<0.05) **(Table 3).**

The hours of TV watching plus computer usage were highest among upper socioeconomic group (3.36 hours) followed by the middle (2.84 hours) and then

Table-3: Difference of hours of television watching and computer usage between different socioeconomic groups.

	df	F	p-value
Between Socioeconomic groups	02	9.419	0.001*
Within SE Groups	267		
Total	269		

** Highly significant*

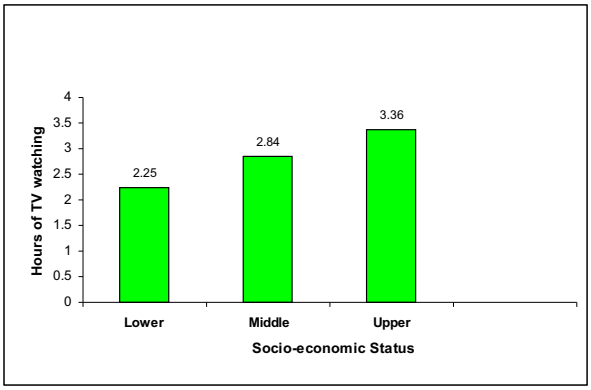

Fig 3: Difference of hours of television watching and computer usage between different socio-economic groups.

Discussion

Different studies report different results regarding calorie intake in different social classes. A survey on young adolescents in 2005 analyzed that upper socioeconomic status was positively associated with intake of high energy food. A cross sectional survey by Sharma et al (2005) compared the calorie intake of 336 adolescent girls studying in government versus private schools in Delhi. The mean daily calorie intake was less than the recommended dietary allowance in both groups but the deficit was more pronounced in respondents of government schools i.e. the lower socioeconomic group. Nagi et al (1995) reported that there was no difference in the calorie intake in different income groups. Results of all above studies were different from the present study. This was because in all these studies different criteria for socioeconomic status were used. Moreover, in the present study three groups of socioeconomic segregation were considered and in all these studies two groups were analyzed. There was also a difference in sample size, diet, race, geographic location and life style and cultural pattern (alcohol, pork, smoking). Moreover, methods for measuring food intake are not standardized all over the world. Different food composition tables, analytical methods and units have been used in these studies. It is important to note that studies which were conducted in different regions of India showed different results although all the subjects belonged to same social and cultural background with no difference in race, ethnicity and life style patterns.

The present study showed a significant difference in the calorie intake of participants of the upper and middle socioeconomic groups. While interviewing the students it was noted that in overweight and obese belonging to the upper socioeconomic groups, the frequency of outdoor hotelling was much more (up to 6-7 times/week) as compared to middle socio-economic group (1-2 times/week) and hotelling always involved food high in fat and protein thus a high calorie intake. This could have led to the significant difference in the two groups. The lower and upper socioeconomic groups showed no difference in calorie intake in the present study. This was probably because of two reasons. First is that the lower SE group in the present study included students who could afford to go to government school. They did not belong to the poorest community of people who cannot even afford to send their children to government schools; instead they involve them in child labour in order to earn for the family. Secondly, we noted that our lower socioeconomic group liked to eat inexpensive calorie rich food which was high in carbohydrate and fat like samosas, aloo nan, pakoras, dahi bhala, halwa puri and parathas.

Regarding the relation of socioeconomic status and physical activity, Larsen et al (2000) reported that high family income was related to increased moderate to vigorous physical activity in adolescents. Another study in Scotland by Macintyre and Mutrie (1988) reported that children from lower social class are more likely to be engaged in sports and active play. The results of both these studies differ from the present study, the reason being that they were conducted on subjects with a different racial, ethnic and cultural background, in a different geographical situation, and on a large sample size compared to the present study. Huang and Malina (1996) found no significant difference in energy expenditure by different socioeconomic status in boys. Kelly et al reported that socioeconomic status was not a significant factor in explaining the time spent in physical activity between affluent and deprived groups. Although these studies were conducted in a different racial and ethnic background and on population having a different life style and social setup, using a different methodology to measure

present study suggesting the universality of these results.

In the present study, there was a statistically significant difference in the hours of television watching and computer use per day in the upper, middle and lower socioeconomic groups. Holstein et al (1991) observed that there was a significant difference in hours of TV and video watching in upper and lower social class being more in lower class as compared to upper class. Another study on US adolescents showed that high family income was associated with less hours of TV/Video viewing and video/computer games per week.

Although no study on the prevalence of obesity in children has been conducted in Pakistan, it is probable that obesity may be more in the upper socioeconomic group, like other developing countries. That may be the reason why the upper socioeconomic group in the present study spent more time on T.V and computer viewing than the lower socioeconomic group. Another major difference between the two studies is that Holtien et al has analyzed the hours of television viewing only, and we have calculated hours of T.V plus computer usage. Difference in sample size was also present. Holstien et al examined 1671 children while Larsen et al studied a nationally representative data of 17766 US adolescents. Lastly, we opted for selective sampling due to which each socioeconomic group in the present study included 2/3rd i.e. 60 overweight and obese subjects compared to these studies in which random sampling technique was used due to which the percentage of overweight and obese was very less in each socioeconomic group. These differences may have resulted in the difference in results.

Conclusion

In conclusion, this study elucidates that among various risk factors, calorie intake and screen time (hours of television viewing and computer usage) are influenced by socioeconomic status. It also shows that socioeconomic status is not a significant factor influencing the time spent in physical activity between upper middle and lower socioeconomic groups.

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Medical News

RENAL SYMPATHETIC DENERVATION

SRenal sympathetic efferent nerve activity participates in renin release, sodium retention, and reduced renal blood flow (RBF), which in turn contributes to the development and maintenance of hypertension. Inhibition of renal sympathetic efferent or afferent nerves (or both) represents an attractive target for the treatment of established hypertension as well as related disorders. Surgical renal denervation has been shown to be an effective means of reducing sympathetic outflow to the kidneys, augmenting natriuresis and diuresis, and reducing renin release, without adversely affecting other functions of the kidney such as glomerular filtration rate (GFR) and RBF. These early surgical approaches (e.g. splanchnicectomy) were complicated by severe orthostatic hypotension, impotence, and incontinence (both urinary and faecal).[8] A minimally invasive, catheter-based approach to directly target sympathetic nerves adjacent to the renal artery has therefore been developed in an attempt to overcome the above, surgery-related problems.

The renal denervation procedure itself involves femoral artery catheterization, with the tip of the catheter being placed in the distal renal artery. Radiofrequency (RF) energy is then applied to the endothelial lining, the catheter is drawn back 12 cm, circumferentially rotated, and a further RF energy is applied. This procedure is repeated 45 times in the individual renal artery and then the same RF energy is applied to the contralateral renal artery **(Figure 1).**

Figure- 1.

Percutaneous renal denervation procedure. Graphic of catheter tip in distal renal artery. Reproduced with permission from Ardian Inc.

Patients recruited in the BP range of 140180 mmHg (despite three or more antihypertensive drugs, including a diuretic). Renal imaging was undertaken to exclude atherosclerotic renal artery disease prior to catheterization substantial and progressive reductions in office BP measurements were observed. The main problem to emerge at the time of RF energy application was that of loin pain. This was treated with prophylactic use of intravenous analgesia. Potential longer-term complications such as vessel thrombosis have been mitigated with the prophylactic use of aspirin and clopidogrel. Evaluation of development of catheter-related complications e.g. renal artery dissection are benefits may theoretically include: reduction of insulin resistance, reduction of central sleep apnoea, improvements in perfusion to exercising muscle in heart failure, reduction of left ventricular hypertrophy, reduction of ventricular rates in patients with atrial fibrillation, abrogation of lethal arrhythmias, and slowing of progression of deterioration of renal function in chronic kidney disease. A key issue with this RF energy denervation approach is whether anatomical and/or functional re-growth of renal sympathetic nerves occurs,javascript:newshowcontent('active','references'); in this regard; longer-term (24 month) data are currently being collected and will be presented soon at major meetings.