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Alkali YS
Ambe JP
Sabin M
Zacharin M

Socio-economic status, lifestyle and childhood obesity in Gombe.

Alkali YS （✉ ）
Department of Paediatrics,
Federal Teaching Hospital.
Gombe, Nigeria.
Email: ysalkali@yahoo.com

Ambe JP
Department of Paediatrics,
University of Maiduguri. Nigeria

Sabin M, Zacharin M
Murdoch Children's Research Institute
The Royal Children's Hospital and
University of Melbourne. Australia.

Abstract: *Background:* Childhood obesity is a complex condition resulting from an interplay of genetic predisposition, environmental factors and socio-economic status. The prevalence has been increasing all over the world, probably due to economic transition and rapid urbanization as well as globalisation. This relationship should be well established for Improved Health Planning in Gombe State and Nigeria.
Objectives: To establish the prevalence of Childhood Obesity and it`s relationship with the Socio-Economic Status of Parents and guardians.
Methodology: Anthropometric measurements of children and adolescents in both public and private schools from primary to secondary levels were taken and their BMI calculated. The socio-economic statuses of their parents, as well as the lifestyle of the children were assessed.
Results: Overweight and obesity were more prevalent in children whose parents belonged to the middle and upper socio-economic class; these children had televisions and computers in their rooms and were driven to school
Conclusion: The picture is completely the reverse of what is obtainable in the developed and industrialised nations where overweight and obesity are more prevalent in children of the lower socio-economic class.
Authors` contribution: The first author is the lead researcher and is a staff of Federal Teaching Hospital Gombe while the second author, a staff of University of Maiduguri is the first supervisor who gave guidelines and made corrections. The second and the third authors are members of staff of the University of Melbourne in Australia; the third author provided a template on which the questionaire was based while the fourth author who is also the second supervisor, is a tutor of the European Society for Pediatric Endocrinology; she facilitated the acceptance of the proposal and the sponsorship for the research. The research was carried out in Gombe, the capital of Gombe State in North Eastern Nigeria

Keywords: Socio-Economic, Childhood, Obesity, Nigeria

Introduction

Obesity is a complex disease but is thought to mainly arise from a long-term imbalance in the number of calories expended to those consumed[1]. The global increase in obesity is driven by economic transition, globalisation and unplanned urbanization[2]. In children and adolescents, it is defined as a body mass index (BMI) >95th percentile for age and sex[3]. Though genetic factors are estimated to explain 30- 50% of habitability of obesity[4], environmental factors[5] as well as medical conditions such as hypothyroidism and Cushing`s disease are recognised[6]. Fat accumulation may occur in the intra-abdominal organs or subcutaneous tissues of the abdo-men, the thigh and the buttocks and may generate free fatty acids when metabolised. This results in generation of oxidant stress molecules, reduced nitric oxide (NO) production and impairment of endothelial relaxation along with insulin resistance[7]. Obesity in childhood is associated with a number of metabolic disorders such as Type 2 diabetes mellitus, non-alcoholic steatohepatitis, dyslipidaemia and hypertension[8], as well asmusculoskeletal problems[9].

 In a recent report, the World Health Organization stated that obesity is a risk factor for type 2 diabetes, high blood pressure, stroke and various types of cancers[10]. Obese children may also face discrimination and rejec-

tion[11], and may subsequently become depressed and withdrawn[12]. Childhood obesity seems to be related to socio-economic status in both the developed and the developing countries though differently[13]. Whereas in the developed world, children belonging to the lower socioeconomic strata are at increased risk of developing obesity, in the developing nations, higher prevalence rates of obesity are seen in children from the higher socioeconomic strata, especially in urban areas[14].

Countries with food insecurity and under nutrition problems are also paradoxically not spared by childhood obesity probably due to misdistribution of resources and affluence co-existing with abject poverty[15,16]. There are few studies of childhood obesity from Nigeria[17] and we were therefore interested in assessing rates of childhood obesity, and it's association with socioeconomic status and lifestyle parameters in North Eastern Nigeria. The broad objective was to determine the prevalence of obesity in both private and public school children in Gombe Local Government Area of Gombe State, Nigeria.

Subjects and methods

Study Area; The study area was Gombe, which is the seat of Gombe Local Government Area as well as the Headquarters of Gombe State. It is situated almost in the centre of North Eastern Nigeria.

Study Procedure;Study design was a cross-sectional one in which two schools (one public and one private) were chosen in a multistage random sampling method; each of the schools had two sections, A and B. The B – section of each school which attended in the morning was studied. Inclusion criteria were age 5-18 years, resident in Gombe Metropolis, attending one of the schools being studied, and being physically and mentally healthy. Ethical approval for the study was from the State Ministry of Education and Federal Medical Centre Gombe.

The Sample Size was determined by the formula[18] - N= $(Z_{1-a})^2$ (1-P)(P)/d^2 – where the minimum sample size was calculated as 384, using the assumptions that P (the best estimate of prevalence of childhood obesity) = 0.5 and 20% attrition rate built in, giving a total sample size needed of 450.

The principal researcher attended one of the Parents/ Teachers` Association meetings of each of the selected schools, during which details of the project were discussed. The selection was done in a stratified sampling manner and proformas were distributed to all children who fulfilled the inclusion criteria. The height and weight of each child were measured three times and the average was recorded. The height was measured to the nearest O.1 meters using a standard Stadiometer (GlaxoSmithKline) with the child standing in a "Frankfort" position, after removing shoes and headgears with the back and buttocks in a straight line against the stadiometer.

The weight was measured to the nearest O.1Kg without shoes and bags using a digital bathroom scale (Seca

GmbH & Co) which was standardized daily with known weights. Body Mass Index was calculated and compared to the Centre for Disease Control cut-points. Overweight was defined as a Body Mass Index between 85th and 94th percentile and obesity ≥95th percentile[19]. The lifestyle parameters of the children and their families was also assessed by discussing with the children. These parameters include means of transport to school, presence of televisions and computers in the home or even the child`s room, number of hours spent on outdoor activities and the degree of activies carried out. The Socio-economic status of the parents was determined using the Olusanya and Okperi classification system[20].

Data entry and analysis

Data was recorded on SPSS spreadsheet version 7.5 and analysed using Epi-info 2002. Chi-square test was used and statistical significance was set at a p-value of <0.05.

Results

Four hundred and fifty children were recruited for the study. Exactly half(225) of them were from a public school and the other half (225) from a private school. Seventy-one (16%) of them were aged between 5 and 10 years and 379 (84%) were between 11 and 18 years. Two hundred and thirty seven (52%) of them were boys while 213(48%) were girls.

**Table 1:** Distribution of the children according to age, gender and school

Factors	Public School	Private School	Total
Gender			
Male	121	116	237
Female	104	109	213
Total	225	225	450
Age group			
5-10 years	25	46	71
11-18 years	200	179	379
Total	225	225	450
BMI (Percentile			
<85th	206	214	420
85th -95th	11	6	17
>95th	8	5	13
Total	225	225	450

Ninety-four percent had a Body Mass Index of less than 85th percentile, 17(4%) between 85th and 94th percentiles (overweight) giving a prevalence of 3.7% and 13(2%) 95th percentile and above (obese) giving a prevalence of 2.8%. The overall prevalence of overweight/obesity was 6.5%. The age distribution, socio-economic class and the type of school attended by the obese/overweight children can be seen in Table 2.

Table 2: Distribution of overweight/obesity in children in terms of school, sex, age and socio-economic class

Factors	Public school	Private school	Total
Gender			
Male	3	6	9
Female	6	15	21
		P= 0.7	
Age group			
5-10yrs	4	7	11
11-18yrs	5	14	19
		P= 0.6	
Socio economic status			
-Upper	5	15	20
-Middle	3	6	9
-Lower	1	0	1
		P=0.03	

Table 2: Lifestyle parameters of the obese children

Parameter	Public	Private	Total
Transport to school			
Walking	1	0	1
Car/Motorcycle	0	12	12
			P = 0.007
Physical Activity			
A bit	0	12	12
A lot	1	0	1
			P = 0.007
Room TV/Compu			
Yes	0	4	4
No	9	0	9
			P = 1.7
Playtime outdoor			
<1 hour	3	5	8
1-2hours	4	1	5
			P = 0.26

Fig 1 shows that most(8) of the obese children came from the upper socio-econmic class and two were from the middle socio economic class, all enrolled in the private school. There was only one obese child from each of the three socio-economic classes in the public school.

Fig 1: Distribution of obesity among the three socio-economic classes
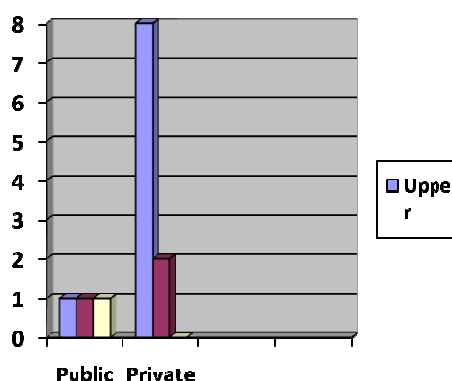
The lifestyle parameters of the obese children is shown in Table 2. It can be seen that12(92%) of the children were dropped at school by either a car or a motocycle and so were not involved in much of physical activity. This is statistically significant with a p-value of less than 0.05. Eight(61%) of the obese children spent less than an hour on out-door activities and four (30%) of them had either a computer or a television in their rooms; these were not statistically significant.

Discussions

Excess weight may have a great impact on the health and quality of life of individuals; unfortunately it has now become a global problem spreading to the developing countries[10]. In this study the prevalence of overweight is 3.7% and obesity 2.8% which is higher than what was reported earlier by Adegoke et al in Ile-Ife South Western Nigeria[17]; this may be due to the difference in cut-off points study area and sample size used by the two studies. This study also used calculation of BMI while other studies used bio-electric impedance [11] and skinfold thickness [13]. However this study showed that overweight and obesity occurred commonly in children who attended private schools compared with public schools which is similar to what was reported by Gupta [14] and the Ile-Ife study[17]. Most of the children who were found to be either overweight or obese were those whose parents or guardians belonged to the upper or middle socio-economic class. Such parents may belong to the working class with little or no free time to plan proper nutrition and cook healthy meals for their children[5]. Such mothers have also been known to indulge their children with a fairly constant flow of sweet-treats and high-fat snacks[8]. The situation is worsened by aggressive advertising practices, relatively low cost of energy-dense foods and improved purchasing power[7], which drives children and adolescents into consuming foods high in saturated fats, refined carbohydrates, sweetened carbonated beaverages and diets low in polyunsaturated fatty acids and fibers[8]. This is in contrast to the findings in developed countries where obesity and overweight was found to be more prevalent in children of the lower socio-economic class [12,15]. Those who were obese, admitted that they were not engaged in much physical activity as they were almost all dropped at school by car or motorcycle. They also had televisions or computers in their rooms and spent less than one hour on outdoor activities. A similar observation was reported by Gupta in India in 2005[14], who attributed the rapid increase in childhood obesity to

a shift in actvity pattern from outdoor play to indoor entertainment like television viewing, internet and computer games. Such lifestyles apparently can be afforded by the affluent only and that explains why their children have a higher tendency to be obese. On the other hand, parents who are of the lower socio-economic class may not be able to afford such luxuries and so their children are usually enrolled in public schools and walk to school. The schools are usually spacious enough for so many outdoor activities. Such children have a lower tendency to develop overweight or obesity. A similar observation was made by Ankpa and Mato in other parts of Nigeria[16]. In this study, a good number of the obese children were adolescent girls and this is similar to reports by workers both within and outside Nigeria[9,11,13,18]. This may be attributed to the socio-cultural barriers in this part of the world where adolescent girls have very low levels of physical activities as is obtained in many developing countries[13]. It may however be due to hormonal changes that take place during the adolescent period[4]. On the other hand, gender-wise distribution of overweight and obesity prevalence did not show any significant difference in other studies in developing countries[4,6] Whitaker and co-workers[2] reported thatchildren from families in which one or both parents are overweight have a substantially higher risk of becoming obese than do children whose parents are not overweight. This aspect was not considered in this study even though some of the children admitted having one or two parents being obese;this was revealed during discussions of the resultsthat took place after the measurements and calculations of BMI were made.

Conclusion

Childhood overweight and obesity in Gombe local Government Area in North Eastern Nigeria is 3.7% and 2.8% respectively.This is higher in the upper and middle socio-economic class unlike what is obtainable in Western Europe and America where the reverse is the case.It is also higher in children who have Televisions and computers in their rooms.
Lifestyle parameters like being taken to school by a car or a motorcycle and not being involved in much physical activity are related to childhood obesity with a statistical significance. Possessing a television or computer in the house/room may be a predictor of childhood overweight/obesity but the relationship is not statistically significant

Limitations

 The major limitations of this study are sample size may be too small to draw a generalised conclusion and study was carried out in the State capital which may not give a real picture of the whole state

Future study

There is a need to carry out further studies on a wider scale covering a good part of the state with a larger sample size, putting prental obesity as one of the determinats of childhood obesity

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