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Research Article

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Determination of body mass index on academic performance among primary school pupil in Nassarawa LGA area of Kano state Nigeria

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Abstract

The body mass index is one of the commonly used indicators of body fat composition and has been applied into public health and clinical practice. The index is obtained by dividing a person's weight by the square of the height expressed in kg/m^2. Academic performance is the extent to which a student, teacher' or institution has achieved their educational goals. It can be measured through various means, the most commonly utilised being examinations. In primary schools, students are categorized based on their performance in examinations in to positions. 1st position being the best and the last number being the opposite. The present study is primarily aimed at existence relationship between BM1 and academic performance in primary school pupil in Nassarawa local government area of Kano northern Nigeria. A total of 400 students participated in study in selected 2 randomly primary schools in Nassarawa local government area. The measurement of height and weight were taken and BMI was calculated and the students position of the exams (academic performance) was examined by the terminal examination recorded from school management. The study found that there was no correlation between BMT and academic performance.

Keywords: body mass index, academic performance, primary school, pupils

Introduction

Determination of influence of BMI on academic performance among primary schools pupils in Nassarawa Local Government area of Kano northern Nigeria Academic performance is the outcome of education; in which a student, teacher or institution has achieved their educational goals [1]. *Since* national or community development depends largely on the quality of education, an understanding of the nature of the relationship between health and education is important for policy planners as well as the masses. It has been believed that health is an important factor for academic achievement at school [2].

Body mass index is one of the commonly used indicators of body fat composition and has been applied into public health and clinical practice [3]. The clinical significance of BMI measurement is to classify adult individuals as underweight (<18.5kg/m^2), normal weight (18.5kg/m^2-24.9kg/m^2), overweight (25kg/m^2-29.9kg/m^2), obese (30kg/m^2-34.9kg/m2), severely obese (35kg/m^2-39.9kg/nr), and morbidly obese (>40kg/m^2). Body mass index is screening tool that can indicate whether a person is underweight or if they have a healthy weight, excess weight, or obesity. if a person's BMI is outside of Healthy range, their health risks may increase significantly. carrying too much of weight can lead to variety of Health conditions, such as type 2 diabetes, High blood pressure, and cardiovascular problems. A weight that is low can increase risk of malnutrition, osteoporosis and Anemia. Children and adolescents a healthy weight however varies with age and sex and is defined not as an absolute number but in relation to a historical normal group such that obesity is a BMI greater than 95'" percentile [4]. BMI is not a diagnostic tool. For children, BMI is age and gender specific and nutritional status is identified based on percentiles [5]. Because BMI changes substantially as children gets older, BMI-for-age is the measure used for children ages 2-20 years. For adults, BMI is neither age nor gender specific and nutritional status is defined by fixed cut points.

BMI-for-age provides a reference for adolescents not previously available. When the 1977 NCHS growth charts were developed, weight-for height percentiles were provided only for prepubescent girls up to 10 years and for boys up to 11.5 years. BMI-for-age is the only indicator that allows us to plot a measure of weight and height with age on the same chart. BMI-for-age was not available in the 1977 charts. Age as well as stage of sexual maturity is highly correlated with body fatness [1]. BMI-for-age is not used in the United States before 2 years of age to screen for growth, BMI values at younger ages have a weak association with adolescent or adult obesity [6]. BMI can be used to track body size throughout the life cycle. This is important because BMI-for-age in childhood is a determinant of adulthood BMI.

In 1997, a consensus panel recommended that BMI for age be used routinely to screen children for overweight. They also recommended cut points of between the 85th and 95th percentiles to identify children and adolescents as at risk of overweight and at or above the 95th percentile to identify children and adolescents as overweight [7]. The study was done to determine the relationship between BMI and academic performance of primary school pupils in Nassarawa LGA Area of Kano, Northern Nigeria.

Materials and Methods

Study area

The study was conducted in two (2) randomly selected primary schools in Nassarawa Local Government Area of Kano State, namely Race course models Primary School and kawo unguwar gaya special primary School.

Methodology

Data for this study were collected from student participants. An informed verbal consent was taken from school students who are willing to participate in the survey. Amhropometric measurements on participants were carried out by the researcher and a well-trained classmate assist. In order to reduce observation errors, anthropometric measurements were read twice independently and the mean of the two

measurements was taken as the actual value. In each of the school visited, position of the terminal exams of each of the students were recorded from their teachers for academic performance correlations.

Data collection technique

Samples for the present cross-sectional study were randomly collected from primary school pupil in Nassarawa Local Government area of Kano state.

Study population

A total number of 400 students were selected from primary schools from Nassarawa local government in Kano, N is Total number of the participants (n =400; males = 172 and females = 228).

Sampling Size Determination

The total number of students included in the study was calculated from the formular:

$n = z^2pq/d^a$ (Naing and Rusli. 2006)
Where,
n = the desired sample size
z = the standard normal deviation, usually set at 1.96 (=2.0)
p - the proportion in the target population having the particular trait (when no estimate 50% is used; i.e. 0.50)
q = l.0 - p
d = degree of accuracy desired, usually set at 0.05
Thus = $(1.96)^2(0.5)(05)/(0.05)^2$ = 384.16

Thus, a minimum number of 384 students were needed for this study in order to draw valid conclusions from it. However, it was rounded up to 400 students.

Ethical approval

Ethical approval was obtained from the schools authorities. Introduction letter was used to seek for permission at selected study schools.

Inclusion criteria

A student selected for the purpose of this study must fulfill the following criteria:

i. Must be a student of one of the participating schools.
ii. Must be physically fit.
iii. Must be regularly attending the school
iv. Must have full academic record.

Exclusion criteria

i. Any subject that does not meet above criteria,
ii. Any subject that does not physically fit
iii. Subject with incomplete academic record

Body height measurement

The height of each subject was taken using standard metre rule with the subject standing upright on stadiometer placed on a flat ground. The subject stands with weight evenly distributed on both feet with heels adducted and the head positioned and looks straight ahead being sure that the line of vision is at right angles to the body, and level with the ground (Cogill, 2001). The correct position of the head was in the Frankfurt horizontal plane. The arms hang freely by the sides. The head, back, buttocks and heels are positioned vertically so that the buttocks and the heels are in contact with the vertical board.

Statistical analyses

The statistical analysis was performed using "SPSS statistic version 20.0". The variables measurements were presented as mean ± standard deviation (SD). The relationships between the variables were compared by using "independent sample t-test", likewise the test for the differences between males and females. The correlations between the height, weight, BMI and academic performance were found using Pearson correlation. Values of $p < 0.05$ were considered as significant .Excel 2010 was used to plot bar charts.

Results

Table l: Shows sexual dimorphism

The minimum and maximum ages were 6years and 17 years respectively. From the table height and BMI were statistically significant at p< 0.05 while weight and position of exams showed no significance.

Variables	Males (n=228) Menu ± SD	Females(n=172) Mean ± SD	t	p-value
Weight (kg)	29.61±5.S5	30.79±6.56	-1.331	0.185 0.000
Height (m)	1.419±0.14	l.519±0,18	-4.525	0.000 0.402
BMI (kg/m^2)	14.86±2.35	15.55±2.63	3.664	
Position	19.98±14.1	1S.18±15.9	0.84	

Table 2: Correlation of BMI, weight and position

Variables	r-value	P- value
Position-BMI	0.136	0.056
Position-Height	-0.117	0.100
Position- Weight	0.004	0.955

Table 2: Pearson's correlation showing no relationship between the position in the exams and weight, height and BMI of all subjects as the p < 0.05.

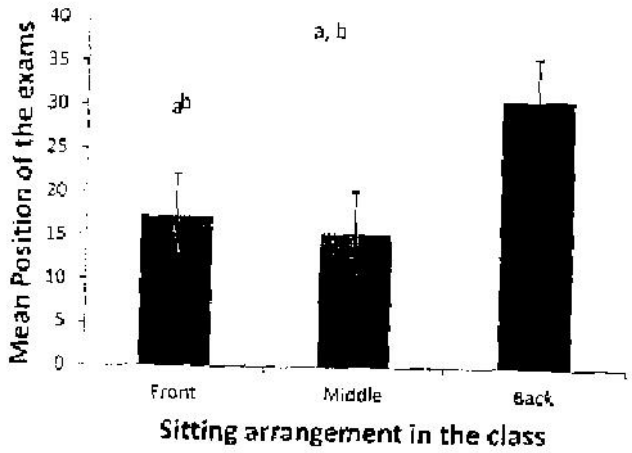

Figure 1: A bar chart showing relationship between sitting arrangement in class and position in the exams. Students that sit in front of class came first in their exams than those sitting in the middle and back of class while those silting in the middle came first in the position of exams than those sitting at the back of class

Discussion

The present study was undertaken to establish the relationship between BMI, Weight, height and academic performance and sitting arrangement and academic performance. The result obtained from this study shows no significant relationship between BMI and academic performance which is in relation to study done by Abdelalim *et al.* [8] who investigated the association between obesity and academic performance in the classroom. The researchers found no difference between obesity and academic achievement among male students, but instead said overweight students did better than both the normal and obese students.

It is also in relation to study conducted by Kaestner *et al.* [9] studied weight and children's educational achievement. They found no association between obesity and student achievement.

The studied 30 first year medical students of both sexes in New Delhi were found no association between BMI and cognition or BMI and physical self-concept [3] which is also supported the finding of this study

Studies that focus on child weight and their academic achievement also report conflicting findings. Sabia [10], reported that weight lowers academic performance though only in girls which is in contrast with this study which shows that an increase in weight brings about an increase in academic performance and a decrease in academic performance with an increase in weight of females. The study showed no relationship between children's weight which is in conformity with Fletcher *et al.* [11] report no significant relationship between children's weight and educational performance.

Sabia [10] examines 14-17 year-olds from the National Longitudinal Study of Adolescent Health and finds a negative relationship between white girls' weights and their educational achievement.

The present study was supported *by* the following research: In their study of seat choice and personality, Totusek and Staton-Spicer [12] tested two hypothesis: (1) students who voluntarily chose to sit in the seats located in the front and Centre have different personality characteristics than students who close to sit elsewhere, and (2) when students are assigned seats, the students m the front and Centre seats have different personality traits than students sitting in other parts of the room. Their research concluded that in cases, whether assigned or self-selected, students who sit front and Centre were generally more assertive, more imaginative and more self-reliant.

Conclusion

The study showed that there was no relationship between BMI and academic performance among primary school pupils in Nassarawa LGA, there were no relationship between the measured anthropometric parameters (weight and height) and academic performance. And there was correlation between sitting arrangement in class and position in the exams.

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