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Body Weight and Academic Performance among Medical Students at a Nigerian Higher Education Institution in Kano

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ABSTRACT

The current study looked at the relationship between body weight and academic performance among students at Yusuf Maitama Sule University Kano's Basic Medical Science program. A stratified sampling technique was used to select subjects for a correlational survey study. A total of 162 male and female subjects who met the inclusion criteria were chosen. On approval by the University's ethical committee, each student's cumulative grade point average (CGPA) was collected. A standiometer was used to assess their weights (kg) and heights (m). SPSS version 20.0 was used to analyze the data, with a $\alpha 0.05$ considered significant. The subjects' mean ages (Years), weights (Kg), heights (m), BMI, and CGPA were found to be 22.55 ± 3.52, 54.14 ± 7.72, 1.65 ± 0.09, 20.04 ± 1.14, and the minimum and maximum of CGPA were 1.18 and 4.89, respectively. A significant relationship between sexual dimorphism and weight and height was observed, with males having a higher mean value in both weight and height (P – value = 0.00). There was no significant difference in CGPA or BMI between males and females (P–value = 0.983 and 0.905, respectively). Correlation of CGPA with weight, height, and BMI between males and females shows no significant differences. This study demonstrates that weight and gender differences are not related to academic performance among the subjects under study, contrary to other hypotheses.

Keywords: Weight, Height, Gender, Academic Performance and Cumulative grade point average (CGPA).

INTRODUCTION

The importance of education and intelligence in a country's development has long been recognized. Developing human resources is often the first step in this process[1]. While academic achievement has been linked to an individual's or a nation's health and well-being, particularly in higher education institutions[2, 3, 4]. The context of universities or colleges is to promote effective learning by promoting the health and well-being of its members, whether students or faculty[2].

Some studies have found that physical well-being, such as weight control, improves academic performance. Weight, as a predictor of obesity, could be used as an important index for identifying some obesity-related health issues in both children and adults. Overweight and obesity have recently been observed to be serious problems in children and young adults, such as those found in developing-country universities[5].

An individual's weight status can be related to socioeconomic status and physical surroundings, which may contribute to factors affecting academic performance[6]. Glewwe et al. proposed that early childhood nutritional status could influence academic performance because children who focus on age pairs or siblings often pay less attention to academic activities due to poor feedings[7]. Genetic factors may also be markers that influence an individual's health and weight, which can affect academic performance[8]. Obesity or overweight can lead to medical conditions that impair mental ability and learning in children and adolescents[9, 10, 11]. Overweight or obesity may influence how an individual is treated by peers or teachers, and this affecting the psychology of the individual's learning ability.

Sleep disturbances, heart intolerance, shortness of breath when active, and tiredness are some of the other issues associated with obesity. This factor may also have an impact on academic performance, which may have an impact on future educational attainment and

income[12]. Increased levels of education and income allow for a better understanding of nutrition messages and access to healthy foods[13].

Researchers and policymakers have been drawn to the potential for health to improve cognitive function, learning, and academic achievement in children[14], all of which can be influenced by a weight index such as BMI[3]. Education, on the other hand, is a strong predictor of long-term health and quality of life in various populations, settings, and time periods[15]. Low anthropometric measurements (height-for-age, weight-for-height, and head circumference) have been linked to poor academic performance in the past[15]. However, the majority of the studies were conducted on European and Asian populations, and no conclusive evidence has been found.

Although the aforementioned research studies found a link between normal weight, overweight, and obesity and academic performance in some places but not in Kano, Nigeria. Datar et al. discovered that overweight individuals had significantly lower math and reading test scores compared to non-overweight individuals, particularly in children, but they suggest this to be a marker rather than a cause[16]. In the United States, Sabia in 2007 reported a significant negative relationship between body weight and grade point average (GPA) for white females, but no evidence of a causal link for nonwhite females and males[17]. Crosnoe finds no evidence of a causal relationship between obesity and academic performance[18]. Kantoma et al. on the other hand, and Zhao et al. published contradictory findings[10, 19]. The scarcity of information in this field of study in Nigeria, particularly in Kano, prompted the current study on the relationship between body weight and academic performance among students at Yusuf Maitama Sule University in Kano.

MATERIASLAND METHODS

Study area: The research was carried out at Yusuf Maitama Sule University, one of four universities in Kano, Nigeria's most populous state with a population of over 9 million people[20]. It is bordered on the north by Jigawa and Katsina states, on the south by Kaduna and Bauchi states, on the west by Kaduna state, and on the east by Jigawa and Bauchi states. In 2012, the Nigerian Universities Commission (NUC) established and accredited the University, which has five faculties, including a faculty of basic medical sciences, and 29 different departments.

Study population: The university has approximately 7000 students spread across its faculties and departments, with 800 of them coming from the Faculty of Basic Medical Sciences, which is divided into three departments: Human Anatomy, Human Physiology and Biochemistry.

Study design and subject selection: The study was a correlational survey, with subjects chosen using a stratified sampling technique. Prior to sampling, the entire population was divided into homogeneous groups known as strata based on the sex of the subjects (Male and Female), from which the sampling unit was obtained. Proportional allocation was used to recruit 162 subjects who met the inclusion criteria and included both males and females. The Yusuf Maitama Sule University Kano Faculty of Basic Medical Science ethical committee gave their approval. On approval, the cumulative grade point average (CGPA) of each student was collected from their various departments.

Inclusion criteria: Healthy adult males and females studying Basic Medical Sciences at Yusuf Maitama Sule University were eligible to participate in the study.

Exclusion criteria: Students other than those studying Basic Medical Sciences at Yusuf Maitama Sule University.

Sample size estimation: The sample size was calculated using a standard formula that takes into account the entire population, precision level, confidence interval, and standard deviation. $N \geq Z2\alpha\ 2S2/d2$

Where n = sample size, z = normal distribution table value*, d = detection level considered to be important and s = standard deviation of the sample data, based on previous knowledge[21].

Demographic data collection: A data capture form specifically designed to include age, gender, hospitalization for any ailment, department and level of students for this study was used to collect personal information, anthropometric information, and clinical information.

Measurement of body weight: A weighing scale was used to measure the subjects' body weight to the nearest Kilogram (kg), with the subjects standing erect on a horizontal resting plane barefooted, palms turned inward and fingers pointing downwards, and the maximum deflation on the scale recorded as the subjects' weight. During this procedure, participants were asked to remove their shoes, phones, and anything else that could add weight so that their feet would be properly aligned against the scale as recommended by the International Biological Program[22].

Measurement of the height of the subjects: The standiometer method was used to determine the subjects' height. Participants were asked to remove their shoes and soaks during the procedure so that their feet would be properly aligned against the ground. The subjects' necks must be parallel to the wall, and their hips must be in contact with it. The subject was also instructed to stand up straight and keep his or her shoulders level. A standiometer with the tip facing the wall was placed above the person's head. The standiometer was lowered until it reached the top of

their head, resulting in a level position. The standiometer was slowly moved toward the wall until it came into contact with the subject's head. The height was then measured starting from the standiometer in meters (m).

Assessment of academic performance: The students' academic performance was assessed using their grade point average (GPA). Yusuf Maitama Sule University Kano's GPA system is based on a 5-point scale from 1 to 5, with the following grades: 1.5 (Provation), 1.5-2.49 (Pass), 2.5-3.49 (Second class lower), 3.5-4.49 (Second class upper), 4.5-5.0. (First class Honour).

Statistical Analysis: The data was analyzed using the statistical packages for the social science (SPSS) program for windows, version 20.0 (SPSS inc., Chicago, IL). The mean value of the subject's height, academic performance, and other socio-demographic characteristics were determined using descriptive statistics of mean and standard deviation. The relationship between body weight and academic performance was determined using person's correlation. P value 0f <0.05 was considered statistically significant.

RESULTS

Descriptive statistics of age, weight, height, BMI and CGPA: The average age of was 22.55±3.52. The lowest and highest CGPAs were 1.18 and 4.89, respectively. The average body weight, height, and BMI were 54.14±7.72, 1.65±0.09, and 20.04±3.14, respectively (Table 1).

Sexual dimorphism in weight, height, BMI and CGPA: There was a significant sexual dimorphism in weight and height, with males having higher mean values in both height and weight. There was no statistically significant difference in CGPA or BMI between males and females (Table 2).

Correlation of CGPA with weight, height and BMI: There were no significant differences in CGPA, weight, height, or BMI between males and females (Table 3).

Table 1: Descriptive statistics of age, weight, height, BMI and CGPA

Variables	Minimum	Maximum	Mean ± SD
Age (years)	18	43	22.55 ± 3.52
Weight (Kg)	38	80	54.14 ± 7.72
Height (m)	1.34	1.91	1.65 ± 0.09
BMI (Kg/m^2)	14	29.5	20.04 ± 3.14
CGPA	1.18	4.89	2.92 ± 0.91

Table 2: Sexual dimorphism in weight, height, BMI and CGPA

		Male (n=63)	Female (n=69)		
Departments	Variable	Mean ± SD	Mean ± SD	T	P Value
Anatomy & Physiology	Weight (Kg)	57.79 ± 6.83	50.81 ± 6.97	5.80	<0.001
	Height (m)	1.70 ± 0.07	1.60 ± 0.08	7.92	<0.001
	BMI (Kg/m^2)	20.07 ± 2.92	20.01 ± 3.35	0.12	0.905
	CGPA	2.92 ± 0.92	2.92 ± 0.91	0.02	0.983
Anatomy	Weight (Kg)	58.21 ± 6.53	50.56 ± 5.88	4.89	<0.001
	Height (m)	1.69 ± 0.07	1.58 ± 0.07	6.23	<0.001
	BMI (Kg/m^2)	20.50 ± 2.99	20.48 ± 3.22	0.03	0.976
	CGPA	3.10 ± 0.93	2.86 ± 0.83	1.07	0.286
Physiology	Weight (Kg)	57.44 ±7.16	51.06 ± 7.97	3.50	0.0008
	Height (m)	1.71 ± 0.06	1.62 ± 0.08	5.13	<0.001
	BMI (Kg/m^2)	19.71 ± 2.84	19.55 ± 3.46	0.21	0.837
	CGPA	2.77 ± 0.91	2.98 ± 1.00	-0.89	0.378

Table 3: Correlation of CGPA with weight, height and BMI

	CGPA (All)			Male (CGPA)			Female (CGPA)		
Variables	R	R^2	P Value	R	R^2	P Value	R	R^2	P Value
Weight (Kg)	-0.100	0.009	0.260	-0.030	0.000	0.840	-0.190	0.036	0.120
Height (m)	0.000	5E-06	0.980	0.060	0.003	0.670	-0.050	0.002	0.670
BMI (Kg/m^2)	-0.110	0.012	0.210	-0.040	0.001	0.740	-0.160	0.026	0.180

r; coefficient of correlation, BMI; body mass index

DISCUSSION

The current study looked at the relationship between body weight and academic performance among some Basic Medical Sciences students at Yusuf Maitama Sule University Kano. The findings on the correlation between weight and cumulative grade point average are consistent with the findings of Crosnoes[18], who also discovered no evidence of a relationship between weight and academic performance in non-white racial groups. Sabia's findings contradict our findings of a negative relationship for white females[17], whereas Kantoma et al. and Zhao et al. found contradictory evidence on the relationship between weight status and academic performance in both genders[10, 19]. The current study also contradicted the findings of Hedwig Acham et al, who reported that weight, height, and BMI have an association with learning that is positive for Mathematics and English but negative for life skills and verbal comprehension among children in Kumi district. Gender and age, in addition to weight, height, and BMI, play important roles in children's achievement[15]. As they grew older, their performance improved significantly, which could be linked to their nutritional status. Low anthropometric measurements (height-for-age, weight-for-height, and head circumference) have been linked to poor school outcomes[15].

Another study by Davis et al supports the idea that increasing level physical activity especially in growing young adults which is common among student of Yusuf Maitama Sule University improves academic achievement. Their observation was based using cognitive assessments questionnaire and functional magnetic resonance imaging in sedentary, overweight children doing regular aerobic physical activities[23]. However, the current study revealed only significant gender differences in weight and height but not in academic performance.

CONCLUSION

This study demonstrates that, contrary to other hypotheses, differences in weight, BMI, and gender are not related to academic performance among the subjects studied. However, significant gender differences in weight and height were discovered, but not in academic performance.

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