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Gender and age differences in BMI and school sedentarism of undergraduates, Bauchi state college, North-Eastern Nigeria

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Abstract
The study was conducted to assess the Age and Gender differences in Body Mass Index of undergraduate male and female Health education students of Bauchi State College of Education, Nigeria and the challenges of school sedentarism. Subjects were 35 male and 35 female students purposefully sampled from a population of 195 undergraduate students. The participants were measured for height and weight by a Standard Instrument to calculate the BMI. T-test was used to find the gender difference, and One – way ANOVA and Post Hoc tested the age differences in the BMI of the subjects. A statistically significant Gender difference was found in the BMI with more females (Mean BMI: 25.35), having a higher BMI than their male counterparts (Mean BMI: 22.39). A significant difference was also found in the BMI of the Age groups 20 – 30 and 31 – 40. Based on the results, it was suspected that school sedentarism may likely contribute to the overweight of the students, although empirical evidence is needed to make generalizations.

Keywords: Age, gender, BMI, sedentarism, undergraduates

Introduction
Body Mass Index (BMI) has become one of the most researched constructs in the field of public health and physical fitness. This body of literature suggests that negative body image predisposes males and females to a number of health risks [1]. Teenagers who are in the period of change and growth in the physical, mental and social aspects may be predisposed to be overweight and obese along with other factors such as genetics, daily routine, metabolic and environmental factors [2].

Several factors determine ideal weight. While it is natural to gain weight as we age, Pietro [3] submits that the most important factors are actually height, body frame and gender. He further pointed that taller people should weigh more than shorter people should. People, especially women tend to gain fat over the years. But until around forty years old, age doesn't play a big factor in determining ideal weight [3]. According to Macreary [4], over the past decades, the percentage of overweight and obese Nigerians has increased, with researches showing that men are more likely than women to be overweight. However, Harold and Heather [5] argued that while reversing the Obesity epidemic is not solely the responsibility of schools; the trend is unlikely to change without school's assistance. Harold and Heather [5] described a significant contributory factor to overweight and obesity in schools to what they referred to as 'sedentarism'. They said the word is used to describe the status of person or a population with high level of sedentary behaviors or a sedentary lifestyle. Sedentarism, according to Harold and Heather, can be categorized as (1) recreational sedentarism (media use or reading), and (2) non-recreational sedentarism, which refers to school work or other type of work that occur while sitting. Many Tertiary Institutions in Nigeria have workloads from 8am to 6pm daily thereby occupying their students with school work that may not allow them to have moderate physical exercises to reduce the chances of overweight and obesity.

This study was therefore conducted to assess the differences between Age, Gender and BMI among undergraduate physical and health education students of Aminu Saleh College of Education, Azare, Bauchi State, Nigeria and the challenges of school sedentarism. It was hypothesized that there will be no significant difference between Gender, Age and BMI of the

undergraduate students of Aminu Saleh College of Education, Azare, Bauchi State, Nigeria.

Methods and Materials

The subjects were 70 male and female undergraduate health education students consisting of 35 males and 35 females purposefully sampled from among the 195 students. All the participants filled and returned the consent form, and were thereafter measured for Height (in meters) and weight (in kilograms). Height and body weight was taken using the instrument RG2–160 Mechanical and Height Scale, manufactured in Jiangsu – China with HS code 8423100000. It is applicable to all groups. Subjects were weighted bare – footed with light indoor closing. The subject's BMI was calculated and classified based on the World Health Organization (WHO) categorization [6]. Paired T – test was used to test the Gender differences in the BMI of the students, while a One – way ANOVA was used to assess to the mean age differences in the BMI, and Post Hoc analysis was applied to determine where the difference lies. The data was analyzed using Statistical Package for Social Sciences (SPSS), version 23.

Results

The mean Age of males was 22.39, while that of female was 25.35. The mean BMI was 25.35 for females and 22.39 for males. The BMI was shown in Table 1. Overall, 25.71% were overweight with more females (31%, n=11) compared to males (20%, n=7). 17.4% (n=6) of the females were obese while no male was found to be obese. Moreover, 63% (n=44) of the students had BMI within the normal range, with 80% (n=28) males against 45.71% (n=16) females. 5.71% of the females (n=02) were underweight and no male was so classified.

Table 1: Descriptive Percentages of BMI of the Undergraduate Students of Aminu Saleh College of Education, Azare

Subject	Classification of BMI (Kg/M^2) N (%)			
	Underweight	Normal	Overweight	Obesity
Female (N=35)	02(2.86)	16(22.86)	11(15.71)	06(8.57)
Male (N=35)	00(00)	28 (40)	07(10)	00(00)
Total	02(2.86)	44(62.86)	18(25.71)	06(8.57)

Table 2: Results of T-test and Descriptive Statistics for BMI by Gender

Gender						95%CI for mean Difference			
Male			Female						
M	SD	N	M	SD	N		t	Dt	sig.
22.39	3.09	35	25.35	5.82	35	- 5.33,-.60	-2.54*	34	0.016

*P<.05

The data in Table 2 showed that there was a statistically mean difference in BMI between males and females. Results indicated that the female undergraduate students tend to have a higher BMI than the male students.

Table 3: One-Way Analysis of Variance of BMI by Age

Source	DT	SS	MS	F	P
Between groups	2	311.735	155.868	7.906	0.001
Within groups	67	1320.938	19.715		
Total	69	1632.663			

A One-way ANOVA between subjects was conducted to compare the BMI of the students by Age as presented in Table 3. The data provides statistically significant evidence that mean BMI are not the same for all age groups at the P<05 level. (One-way ANOVA, F=7.906, Df = 2, 67, P<0.0001).

Post Hoc comparisons using the LSD test indicated that the mean BMI for age 20 – 30 years was significantly different than the 31 – 40 years (MD= - 4.29802, P 0.000). However, the 41 – 50 years did not significantly differ from the 20 – 30 years. The data is presented in Table 4.

Table 4: Post Hoc Analysis of Mean Age Differences

Comparisons	Mean Difference	Std. Error	95%CI	
			Lower Bound	Upper Bound
20 – 30 yrs vs 31 – 40yrs	- 4.29802*	1.15098	- 6.5954	- 2.0007
31 – 40yrs vs 20 – 30 yrs	4.29802*	1.15098	2.0009	6.5954
41 – 50yrs vs 20 – 30yrs	5.74348	3.20722	-.6582	12.1451

*P<0.05

Discussion

The results of the study are in agreement with the research by Christopher [7] who found that in Nigeria, overweight and obesity is an emerging public health problem. Moreover, Nigeria National Survey, in Shalom, Opeyemic, Dominic, Olubanke & Franklin [8] showed that 11% of women were underweight and 45% were overweight or obese, corroborated by the sample of this study which showed 25.71% overweight and 5.71% underweight. The findings further support that of Ezekie l [9] which revealed a higher prevalence of overweight and obesity in females than males, and explained that Nigerian women engaged more in sedentary activities. However, Kwan, Shuhaili, Siti and Gudun [2] in their study of gender difference in BMI, body weight perception and weight loss strategies among undergraduates in a Malaysian University found 28% of the students were overweight with more males (34%) compared to females (22%).

The results of the study also support that of Shalom, Opeyemi, Dominic, Olubanke, and Frankly [8, 9] who found that overweight and obesity were prevalent at middle and advanced adulthood, and that age strongly correlated with height, weight, BMI, and body weight status of the participants. Similarly, Ahmad and Airedek [1] found that females were generally heavier than their age – matched counterparts, though the difference was not statistically significant. They also found that the mean BMI values were consistently higher in the females, compared to those of their male counterparts. According to Alawode [10] statistical data showed that between 25 – 57% of all Nigerians are physically inactive. The national demographic and health survey 2003 data revealed that 21% of women in Nigeria were overweight. Alawode [10] further indicated that two separate studies among adults (15-49years) showed 38-41% prevalence of physical inactivity. One may expect that these figures serve as an impetus for the authorities to accord greater priority to the promotion of physical activity.

Conclusion

The result of the study revealed a significant age and gender differences in the BMI of undergraduate male and female students. The study had also added support to the growing literature on the prevalence of overweight and obesity among males and females with females having more weight than their males. Nigeria still lacks official data on the economic and human cost of physical inactivity and sedentarism and therefore may not know the magnitude of this "disease" and its sequel on the Nigerian people. Schools should seek creative ways to integrate high physical activity into the

additionally sedentary school work. Research is however needed to explore sedentarism in schools so that evidence based school policies to decrease these behaviors can be implemented in Nigerian institutions to promote physical fitness and reduce the risk of overweight and obesity.

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