JHER Vol. 22, No. 2, December 2015, pp. 79 – 88

Body Mass Index and Health Risks Status: Case Study of Health Education Students in University of Nigeria, Nsukka

Aniodo, D.A.; Anike, A.I. &Dibia, S.I.C
Department of Health and Physical Education
University of Nigeria, Nsukka

Abstract

The study examined the body mass index and health risks status of Health Education students in University of Nigeria, Nsukka. Quasi-experimental research design was used to evaluate the association between the baselines Body Mass Index (BMI). The population of the study consisted of all the health education students (n=59) of University of Nigeria, Nsukka. The instruments for data collection were the standard Anthropometric data and structured questionnaire to illicit some demographic information and the health status of the respondents. The information elicited on gender and level of study was used to ascertain the health status of the students. Data analyzed were presented using descriptive statistics. The findings of this study showed that many students had healthy status. There were however, indications that some students are at risk of underweight while some at risk of being obese later in life. The study recommended that concerted efforts need to be made by the management of University of Nigeria, Nsukka, especially Department of Health and Physical Education to educate undergraduates on what constitutes health hazards.

Keywords*:* BMI, Obesity, health risk, Students, Health, Education.

Introduction

Body mass index (BMI) is a simple index of weight –for – height that is commonly used to classify underweight, overweight, and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2) (Park, 2009). It is employed to determine fairly the accurate measurement of the health risks associated with body weight for average people. It is one of the most commonly used ways of estimating whether a person is overweight and hence more likely to experience health problems than someone with a healthy weight. It is also used to measure population prevalence of overweight and obesity. However, BMI is only a proxy for body fatness (Department of Health, 2009). On the contrary, despite its effectiveness in measuring obesity, BMI is not known to distinguish between fat weight and fat free weight.

These are evident in people of short stature, muscular athletes, and other adults with little muscle mass due to inactivity or an underlying disease.

Many complications and diseases are directly linked to BMI. Park (2009) noted that a simplistic relationship between BMI and the risk of co-morbidity can be affected by a range of factors including the nature of the diet, ethnic group, and activity level. According to Park, risks associated with increased BMI are continuous and are graded and begin at a BMI above 25.Wardlaw and Smith (2011) stated that a BMI 25 to 29.9 is a marker of overweight (compared to a standard population) and not necessarily a marker of over fat. They stressed that many men (especially athletes) have a BMI greater than 25 because of extra muscle tissue. According to them very short adults (under 5 feet tall) may have high BMI that may not reflect overweight or fatness. They concluded that BMI should be used as screening test for overweight or obesity. BMI is an easy way used by clinicians to screen who might be at greater risk of health problems such as hypertension and diabetes due to their weight.

BMI provides an indication of health status. A number of research studies have demonstrated a relationship between raised BMI and increased risk of health status or death (Lloyd-Jones, 2010; Flegal, Kit, Orpana, & Graubard, 2013; and Onyesom, Oweh, Etumah & Josiah, 2013). Roth and Insel (2006) stated that under the standards issued by the National Institutes of Health (NIH), a BMI between 18.5 and 24.9 is considered healthy, a person with a BMI of 25 or above is classified as overweight, and a with a BMI of 30 or above is classified as obese. A person with a BMI below 18.5 is classified as underweight although a low BMI values may be healthy in some cases if they are not the result of smoking, eating disorder or an underlying disease. There are several health problems associated with obesity that is when one has a BMI greater than or equal to 40 or weight at least 100 pounds over healthy body weight.

Obesity doubles mortality rates and can reduce life expectancy by 10-20 years. Obese individuals have a 50-100 per cent increased risk of death from all causes, compared with normal persons. It is associated with unhealthy cholesterol and triglyceride levels, impaired heart function, and death from cardiovascular disease. Other health risks associated with obesity include hypertension, many kinds of cancer, impaired immune function, gall bladder and kidney diseases, skin problems, impotence, sleep and breathing disorders, back pain, arthritis, breathing disorders, other bone and joint diseases. It is linked with complication of pregnancy, menstrual irregularities, urine leakage, psychological disorders and increased surgical risk. The concept of underweight has been described.

Lifestyle factors can work for or against BMI. Feeding patterns, extent of engagement in physical activities, and weight management practices

influence BMI (Abdullah, Peters, & de Courten, 2010; Dibia, 2015). Underweight is categorized by a BMI less than 18.5 and can be caused by a variety of factors such as cancer, infectious disease (e.g., tuberculosis), body weight, digestive tract disorders (e.g. chronic inflammatory bowel disease), compulsive vomiting, and physical activity. Studies have linked certain health problems to obesity (Sothern, Gordon & von Almen, 2006; Wang, Hou, Zhang, Bao, Zou, Zhong, Xiang, & Jia, 2010). These health problems include loss of menstrual function, low bone mass, complications with pregnancy and surgery, slow recovery after illness and coronary heart disease. The relation between specific types of the fat and risk of coronary heart disease differed by age and BMI category (Oh, Hu, Manson, Stampfer & Willett, 2004). The results of prospective epidemiologic studies have in general suggested relations between specific types of fat and risk of coronary heart disease (CHD), but no relation with total fat (Oomen, Ocke, Feskens, et al, 2001). These findings are consistent with the effects of dietary fats on blood lipids in controlled feeding studies (Mensink, Zock, Kester, et al., 2003) and the limited randomized trials examining CHD endpoints (Sacks & Katan, 2002). Body mass index (BMI) is strongly associated with risk of CHD and is a major determinant of insulin resistance (Pyorala, Miettinen, & Halonen, et al., 2000). The metabolic responses to dietary fat are strongly modified by underlying insulin resistance (Dibia, 2015), but whether the relations between fat intake and risk of CHD are modified by BMI and other risk factors has not been examined in detail. Underweight can also lead to death (Wardlaw & Smith, 2009).

Smoking and overweight are principal determinants of poor health across the life course (Roberts, Galea, Austin, Corliss, Michelle, Williams & Koenen, 2012). Although these risk factors have long been recognized to contribute to poor health, they are stubbornly resistant to intervention. Policy measures such as indoor smoking bans and cigarette taxes have been successful at reducing smoking, but individual-level interventions for these risk factors are ineffective or only modestly effective over the longer term (Brown, 2009). This limited effectiveness may be because determinants of smoking and overweight extend beyond the individual and are difficult to change in the short term (Brown, & Summerbell, 2009).

Students of Health Education undertake courses in various aspects of health and lifestyle promotion. These courses have contents which if utilized are capable of normalizing BMI status and keeping health risks at a low level. However, it is not clear whether these students have BMI and health risk status expected of the individuals undergoing such course. This study therefore sought to find out the BMI and health risk status of

Health Education students in University of Nigeria, Nsukka

Purpose of the Study

The main purpose of the study was to examine the BMI and health risk status of Health Education students in University of Nigeria, Nsukka. Specifically, the study determined:

1. BMI and health risk status of Health Education students in University of Nigeria, Nsukka,
2. based on gender; and
3. based on year of study.

Research Questions

The following research questions guided the study;

1. What is the BMI and health risk status of Health Education students in University of Nigeria, Nsukka?
2. What is the BMI and health risk status of Health Education students in University of Nigeria, Nsukka based on gender?
3. What is the BMI and health risk status of Health Education students in University of Nigeria, Nsukka based on year of study?

Methodology

***Design of Study*:** Quasi-experimental research design was adopted to assess BMI and health risk status of Health Education undergraduates in University of Nigeria Nsukka.

***Area of Study*:** The study was conducted at University of Nigeria, Nsukka, Department of Health and Physical Education on students offering Health Education courses. These students were selected based on the fact that they offer courses and training on life skills that promote health as well as maintain a good BMI and health status.

Population for the study: The population of the study consisted of all the Health Education students in University of Nigeria Nsukka (59 students). The entire population was used for the study because the population was manageable. This is consistent with the submission of Israel (2013) which posited that where the number in the target population is small, it is preferable to utilize all the respondents in order to ensure representativeness and generalizability of findings.

Sample for the study: There was no sampling procedure.

***Instrument for data collection*:** The instruments for data collection were the standard Anthropometric data and structured questionnaire to elicit some demographic information and the health status of the respondents. The questionnaire was the researchers developed questionnaires that elicited information on the health status of the students.

Data Collection: In data collection, height and weight were measured with standardized protocols and calibrated equipment in the departmental exercise physiology laboratory. BMI was calculated as weight in kilograms divided by height in metre squared and rounded to one decimal place. Ages of the respondents were gotten from the respondents through questioning. The

ages were compared with the calculated BMI to ascertain the health status of the students.

Data Analysis: The analyses included one pregnant woman. Data analyzed were presented using descriptive statistics of frequency and percentages.

Results

The results for this study are presented in tables 1-3

Table 1: BMI and Health Risk Status of Health Education Students in UNN (n=59)

Category	Range of BMI (Kg/m^2)	f	%	Health Risk
Underweight	16.6	1	1.69	Moderate
Normal weight	18.5 – 24.71	42	71.19	Very Low
Overweight	25.10 – 29.41	13	22.03	Low
Obese	30.04 – 34.5	3	5.08	High

Overall range = 16.6 – 34.5kg/m

Table 1 shows that 42 (71.19%) of the Health Education students have normal weight with a very low health risk. The table also show that 13 (22.03%) of the Health Education students are overweight, 1(1.69%) is underweight while 3 (5.08%) were obese with a high level of health risk.

Table 2: BMI and Health Risk Status of Health Education Students in UNN Based on Gender (n=59)

Category	Range of BMI (Kg/m^2)	Male (n=24) f (%)	Female (n=35) f (%)	Health Risk
Underweight	16.6	0 (0)	1 (2.86)	Moderate
Normal weight	18.5 – 24.71	18 (75.0)	24 (68.57)	Very Low
Overweight	25.10 – 29.41	5 (20.83)	8 (22.86)	Low
Obese	30.04 – 34.5	1 (4.17)	2 (5.71)	High

Table 2 shows that more Health Education male students (75%) had normal weight than their female counterparts (68.57%) while females had higher proportions in other categories. The table also shows that 2.86 per cent of the female Health Education students were underweight with a moderate health risk, against nil of the male Health Education students. The table further show that 22. 86 per cent of the females were overweight while the other 5.71 per cent obese.

Table 3: BMI and Health Risk Status of Health Education Students in UNN based on Year of Study (n=59)

Category	Range of BMI (Kg/m^2)	100 level (n=13) f (%)	200 level (n=12) f (%)	300 level (n=22) f (%)	400 level (n=12) f (%)	Health Risk
Underweight	16.6	0(0)	0 (0)	1 (4.55)	0 (0)	Moderate
Normal weight	18.5 – 24.71	11(84.6)	9 (75)	14 (63.6)	8(66.7)	Very Low
Overweight	25.10 – 29.41	2 (15.4)	1 (8.3)	6 (27.3)	4 (33.3)	Low
Obese	30.04 – 34.5	0 (0)	2 (16.7)	1 (4.55)	0 (0)	High

Table 3 shows that more than 84.6 per cent of the 100 level and 75 per cent of the 200 level and slightly more than two third of the 300 and 400 level Health Education students had normal weight {100 level =84.6% > 200 level =75%; > 400 level = 66.7% > 300 level = 63.6%}. The table further show that 300 level Health Education students were overweight (27.3%) and obese (4.55%) with a low and high health risks respectively.

Discussion

This study focused on the body mass index and health risk status of health education students in University of Nigeria, Nsukka. The finding revealed that the overall range of BMI of the Health education students in UNN is 16.6 - 34.5kg/m. The overall range of BMI showed that the students' health status is within acceptable normal healthy range based on evidence report of Department of Health (2009).

The findings in Table 1 revealed that greater proportion (71.19%) of the health education students have normal weight with overall range of 18.5 – 24.71kg /m. This indicated that majority of the students have healthy status. The finding was expected because health education students have a good understanding of the importance of healthy living as well as the risks associated with unhealthy risk status. The finding is in line with the assertion of Wardlaw and Smith (2009) that a healthy weight –for-height is a BMI of 18.5 to 24.9. Data in Table 1 further revealed that 22.03 per cent of health education students are overweight with the overall range of 25.1 – 29.41kg/m. This finding is worrisome when the effects of overweight on health status are considered. Aniodo, Dibia and Anike (2015) opined that the prevalence of overweight is increasing in developing countries. The findings of the study is at variance with the findings of Aniodo *et al* who found out that only 3.7 per cent of their respondents were overweight. Nevertheless, the finding is consistent the findings of Peter-Kio, Briggs, Ogunleye & Leghemo, (2013) where 21 per cent of the respondents were overweight. Overweight is known to be linked to both current and future morbidity. This notwithstanding, overweight has a low health risk when compared with obesity. The finding in Table 1 showed that 5.08 per cent of health education students in UNN are obese. This finding is not surprising. Although the

figure is quite small, but the conditions and complications associated with it is hearth-throbbing. Obesity is a frequent co-morbid condition associated with excessive increase in weight (Onyesom *et al*, 2013). It is one of the most important modifiable risk factor in the pathogenesis of health disorders such as hypertension and type 2 diabetes mellitus (Dibia, 2015). Table 1 further indicated that a negligible proportion (1.69%) of the health education students in UNN is underweight. This finding is at variance with the study of Kodoma (2010) and Sirang, Bashi, Jalil, Khan, Hussain, Baig, Taufeeq, Samad and Kadir (2013) on problems of underweight in young females and pregnant women in Japan, and weight patterns and perception among female university students of Karachi respectively where over a quarter were underweight.

The findings in Table 2 presented the BMI and health risk status of Health Education students in UNN based on Gender. The table showed that three quarter of male health education students had normal weight while slightly more than two-third (68.57%)of the females proportion on the same category. This finding is expected because male have more lean muscles than females. On the other hand, females were ahead of the males in underweight, overweight and obesity categories (Table 2). This lends support from report of Onyesom *et al.* (2013) where female undergraduates have considerable risk of increased BMI and associated abnormalities in blood glucose homeostasis. In contrast, Boffetta, McLerran, Chen, Inoue, Sinha, He, et al (2011) reported that the shape of the association between BMI and prevalence of diabetes was consistent between the sexes.

Table 3 shows the BMI and health risk status of Health Education students in UNN based on year of study. The findings show that 100 level health education students had the highest normal weight (84.6%) followed by the 200 levels. This finding is interesting and plausible because these levels are still fresh and may not have had much academic stress coupled with associated hunger that is ,more prevalent in penultimate and final years. This was expected because one expects that as the students' level of study increases there should be corresponding increase in knowledge with respect to nutrition information and thereby cultivating healthy eating behaviours. This finding negates the cohort study of Aniodo *et al* (2015) where 400 level PE students had 100 per cent normal weight. This notwithstanding, above three quarter of 100 level PE students in the study reported normal weight.

Conclusion

Sequel to the findings and discussion of the study, the following conclusions were reached. Higher proportion of Health Education students has normal weight with very low health risk status. Higher proportion of male Health Education students has normal weight compared to female Health education students, while females

reported higher proportions in underweight, overweight and obese. The higher the level of study, the more normal weight the Health Education students assume very low healthy status; Students should partake in activities such as physical activity and nutrition education that helps to reduction of BMI among students, and as a strategy to prevent and control overweight and obesity, and their associated co-morbidities.

Recommendations

Based on the findings of this study, the following recommended that students should be counseled by experts in weight management to eat adequately in order to meet nutritional needs of the body and avoid health problems associated with unhealthy eating habits. They should also be counseled to undertake regular exercise to maintain healthy weight. Thirdly, concerted efforts need to be made by the management of University of Nigeria, Nsukka, especially Department of Health and Physical Education to educate undergraduates on the health hazards of extreme weights (increased weight and underweight) and the advantage of weight maintenance within the limits of what is formally acceptable using World Health Classification. Female undergraduate students should be counseled to pay more attention to their weight by taking adequate diet and taking part in regular exercises.

References

Abdullah, A., Peters, A., & De Courten, M. (2010). The magnitude of association between overweight and obesity and the risk of diabetes: a meta-analysis of prospective cohort studies. *Diabetes Research and Clinical Practice,* 89, 309–319.

Aniodo, D. A, Dibia, S. I. C., & Anike, A. I. (2015). Body mass index and health risk status of physical education students, University of Nigeria, Nsukka. *International Journal of Human Kinetics, Health and Education, 1*(1), 99-104.

Boffetta, P., McLerran, D., Chen, Y., Inoue, M., Sinha, R., He, J. et al (2011). Body mass index and diabetes in Asia: a cross-sectional pooled analysis of 900,000 individuals in the Asia cohort consortium. *PLoS ONE, 6*(6), e19930 doi:10.1371/journal.pone.0019930

Brown, T. & Summerbell, C. (2009). Systematic review of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity: an update to the obesity guidance produced by the National Institute for Health and Clinical Excellence. *Obesity Reviews*10, 110-141, doi:10.1111/j.1467-789X.2008.00515.x

Brown, T. (2009). Systematic review of long-term lifestyle interventions to prevent weight gain and morbidity in adults. *Obesity Reviews,*10, 627-638

Department of Health. (2009). The national child measurement programme guidance for PCTs: 2008/09 school year. London: COI for the Department of Health. Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/DH-086724 (Accessed May, 2009)

Dibia, S. I. C. (2015). Health Promoting practices among diabetics attending tertiary hospitals in Imo East Senatorial District, Imo State. *Unpublished Master's*

Thesis of the Department of Health and Physical Education, University of Nigeria, Nsukka.

Flegal K. M., Kit, B. K., Orpana, H., & Graubard, B. I. (2013). Association of All-Cause Mortality With Overweight and Obesity Using Standard Body Mass Index Categories A Systematic Review and Meta-analysis. *The Journal of the American Medical Association,* 309 (1), 71–82. doi:10.1001/jama. 2012.113905. PMID 23280227

Roth, W. &.T Insel, P.I,. (2006). *Core concepts in health* (10th Ed).Toronto, McGraw- Hill

Isreal, D. (2013). *Determining sample size*. http://edis.ifas.ufl.edu/pd006 (30 March 2013, date last accessed)

Kodoma, H. (2010). Problems of underweight in young females and pregnant women in Japan. Japan Medical Association Journal, 53(5), 285-289.

Lloyd-Jones, D. M. (2010). Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic Impact Goal through 2020 and beyond. *Circulation,* 121, 586-613

Mensink, R. P., Zock, P. L., Kester, A. D, et al. (2003). Effects of dietary fatty acids and carbohydrates on the ratio of serum total to HDL cholesterol and on serum lipids and apolipoproteins: a meta-analysis of 60 controlled trials. *American Journal of Clinical Nutrition, 77*:*1146*–55.

Oh, K., Hu, F. B., Manson, J. E., Stampfer, M. J.& Willet, W. C. (2004). Dietary Fat Intake and Risk of Coronary Heart Disease in Women: 20 Years of Follow-up of the Nurses' Health Study. *American Journal of Epidemiology*, 161 (7), 672-679.

Onyesom, I., Oweh, O. T., Etumah, O. S. & Josiah, I. E. (2013). Correlation between body mass index and blood glucose levels among some Nigerian undergraduates. *Herbert Open Access Journal*. ISSN 2050-0874

Oomen, C. M, Ocke, M. C., Feskens, E. J, et al. (2001). Association between trans fatty acid intake and 10-year risk of coronary heart disease in the Zutphen Elderly Study: a prospective population-based study. *Lancet*, *357*:*746*–51

Park, K. (2009). *Preventive and social medicine*: Jabalpur, M/S Banarsidas Bhanot

Peter-Kio, O. B., Briggs, L. A., Ogunleye, V., & Leghemo, T. S. (2013). Assessment of body mass index, fat percentage and participation in exercise among female undergraduates in Rivers State, Nigeria. *Nigerian Journal of Health Education,* 17(1), 64-71.

Pyorala, M., Miettinen, H., Halonen, P., et al. (2000). Insulin resistance syndrome predicts the risk of coronary heart disease and stroke in healthy middle-aged men: the 22-year follow-up results of the Helsinki Policemen Study. *Arteriosclerosis Thrombosis Vascular Biology*, 2000; 20:538–44.

Roberts, A.L., Galea, S., Austin, S.B., Corliss, H.L., Michelle A. Williams, M.A., Koenen, K.C. (2012). Women's experience of abuse in childhood and their children's smoking and overweight. American Journal of Preventive Medicine,

Sacks, F. M.,& Katan, M. (2002). Randomized clinical trials on the effects of dietary fat and carbohydrate on plasma lipoproteins and cardiovascular disease. *American Journal of Medicine,*113 (suppl 9B):13S–24S.

Sirang, Z., Bashir, H. H., Jalil, B., Khan, S. H., Hussain, S. A., Baig, A., Taufeeq, M., Samad, K., & Kadir, M. (2013). Weight patterns and perception among female university students of Karachi: a cross sectional study. *Biomedical Medical Central Public Health*. B230 www.biomedcentral.com/1471-2458/13/230.

Sothern, M. S., Gordon, S. T., von Almen, T. K, (eds.) (2006). *Handbook of Pediatric Obesity: Clinical Management* (illustrated ed.). CRC Press. ISBN 978-1-4200-1911-7.

Wang, C, Hou, X. H., Zhang, M. L., Bao, Y. Q., Zou, Y. H., Zhong, W.H., Xiang, K.S., & Jia, W. P. (2010). Comparison of body mass index with body fat percentage in the evaluation of obesity in Chinese. *Biomedical and Environmental Science*. 23(3):173-179.

Wardlaw, G.M &Smith, A.M.(2009). *Contemporary nutrition* (8th Ed.) New York: McGraw- Hill.