

Assessment of Body Mass Index and Blood Pressure among Academic Staffs in Ignatius Ajuru University of Education, Port Harcourt



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Abstract

High blood pressure which is exacerbated by overweight, and obesity requires a screening method such as the BMI for early detection which can enhance the effective management of the condition. This study investigated the Body Mass Index and Blood Pressure among Academic Staff in Ignatius Ajuru University of Education, Port Harcourt, Rivers State. The descriptive cross-sectional research design was adopted. The population of the study comprised of all the four hundred and twenty-one (421) academic staffs in Ignatius Ajuru University of Education. BP monitor and calibrated mere rule were used to gather data. Data gathered was analyzed using percentage, Pearson correlation and linear regression. The result of the study showed that, more (40.1%) of the academic staffs were overweight, 34.1% normal BMI, 23.3% obese while 2.6% were underweight. The result also showed that 14.2% and 37.2% of academic staff have normal systolic and diastolic blood pressures respectively. There was a moderate relationship between systolic blood pressure and diastolic ($r = .647$) and a low relationship between systolic blood pressure and BMI ($r = .0041$) and a low relationship between diastolic blood pressure and BMI ($r = 0.036$). It was concluded that academic staffs in Ignatius Ajuru University of Education have unhealthy weight and were pre hypertensive. It was recommended that; the school authority create a free BMI and BP checking unit at the medical centre of the University for Academic Staff so they can visit for checking and monitoring of their BMI and BP respectively.

Introduction

High blood pressure which is exacerbated by overweight, and obesity requires a screening method such as the BMI for early detection which can enhance the effective management of the condition [1] stated that, body mass index is a measure of body size and a screening tool that can indicate whether a person is underweight or have a healthy weight, excess weight or obesity. It a tool for monitoring blood pressure and weight. It is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m^2) [2] This makes the measurement of body mass index a priority in order to maintain a balance. Wang, McPherson, Marsh, Gortmaker and Brown (2011) posited that, several diseases such as hypertension, type 2 diabetes, cardiovascular diseases, arthritis, disability and cancer are linked with overweight and obesity. Therefore, the World Health Organization [2] recommended body mass index (BMI) as the most useful epidemiological measure of obesity. Despite the fact that excess bodyweight has been recognized as

a major public health concern, Gretchen, Singh, Yuan, Danaei, Lin and Finucane [3] reported from their studies that, mean BMI has increased globally but, the trends and mean population BMI varied substantially between nations. According to Marie, Tom and Margaret [4] globally the proportion of people who are obese or overweight continues to increase, with obese adults accounting for 37% of the population worldwide. Studies have shown that high body mass index is a risk factor for hypertension and high blood pressure.

Blood pressure is the pressure of the resistance of blood flow against the walls of the arteries and are measured as both systolic and diastolic [5,6]. Systolic blood pressure (SBP) is the amount of pressure in the arteries during contraction of the heart muscle while diastolic pressure is the pressure required to allow constant flow in the blood vessels and filling of the ventricles before the next systole. Therefore, a normal blood pressure is given as 120 mmHg (systolic)/80 mmHg (diastolic). On the other hand, Saxon, Etten and Perkins [7] noted that, blood pressure is said to be high

showing a systolic reading of ≥ 140 mmHg and/or higher over a diastolic reading of ≥ 90 mmHg.

Relating BMI to blood pressure, Faramawi, *Fischbach and Delongchamp* [8] found that, for every one-unit increase in BMI, short-term blood pressure variability (BPV) increased by 0.25. Also, epidemiological studies showed positive correlation between the two variables and studies have shown that both BMI and BP are on the increase worldwide, but some variations existed in relation to the demography of the population [9]. Demographic variable such as age and gender could influence BMI and Blood pressure respectively.

Age is the number of days an individual had existed and is measured in years or months. Age is one of the key demographic factors that could affect the BMI and blood pressure of an individual. Studies have shown that BMI increase with an increase in age. For instance, Oladapo, Salako, Sodiq, Shoyinka, Adedapo and Falase [10] documented that, as high as 60% of non-communicable diseases related death occurred in people below the age of 60 years in low- and middle-income countries. Also, the study of Vuvor [6] showed that, the highest rate of obesity was recorded by respondents aged 46–50 years. In recent times, people are gradually becoming inactive than ever before. In addition to age, studies have shown gender variations in BMI and BP. Funke and Ibrahim [9] and Vuvor [6] reported that, females were more likely to be obese than male probably because females were less likely to engage in regular exercise than males. Likewise, the study of Preedy [11] revealed that, more women than men were obese in all age groups. The authors stressed that one of the reasons that could explain for such result among gender was the fact that men are more physically active than women.

Academic staffs of universities are highly well read and could be said to be early adopter of innovation. In recent times observations seem to show that academic staffs are becoming less physically active due to increase in workload, high students to staff ratio and demand for efficiency. This seems to have reduced their physical activity level and increase deaths rate among academic staff in the University Environment. This study, therefore, investigated the body mass index and blood pressure among staffs in Ignatius Ajuru University of Education, Port Harcourt

Purpose of the Study

The purpose of the study is to assess the body mass index and blood pressure among academic staffs in Ignatius Ajuru University of Education, Port Harcourt, Rivers State. Specifically, the objectives of the study are to determine:

1. body mass index of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.
2. blood pressure of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.

3. relationship between body mass index and blood pressure of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.

4. relationship between age and body mass index of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.

5. relationship between age and blood pressure of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.

6. relationship between gender and body mass index of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.

7. relationship between gender and blood pressure of academic staffs in Ignatius Ajuru University of Education, Port Harcourt.

Methodology

Descriptive research design was adopted for the study to assess the body mass index and blood pressure. According to Eenu (2010), the descriptive design is one that generates data from a selected population, studying and describing events as they occur in their natural setting at a particular time. The present study is aimed at describing the body mass index and blood pressure of the respondents without manipulating any variable. This research design was successfully used by Funke and Ibrahim [9] to assess the blood pressure and body mass index among Jos University Teaching Hospital staffs. It was also used by Joseph-Shehu et al. [12] to examine the relationship between blood pressure, and body mass index of women in selected rural communities in Osun state. Therefore, this design was considered to be appropriate for this study.

The study population comprised of all the four hundred and twenty-one (421) academic staffs in Ignatius Ajuru University of Education (IAUE Registrar, 2019). This population is a manageable population hence, no sample size and sampling procedure. The instrument for data collection.

Results

This chapter presents results of analysis of data to answer the research questions and test hypotheses.

Research Question 1: What is the BMI of Academic Staff of Ignatius Ajuru University of Education.

Research Question 2: what is the BMI of academic Staff of Ignatius Ajuru University based on age?

Table 1 shows the percentage distribution of BMI based on Age of academic staff of Ignatius Ajuru University of Education. The result of the study indicated that of the 34.1% of academic staff with healthy BMI 38.5% were age less than 40years, 34.4%

were 60years old and above, 33.8% age 40-59years. Of the 40.1% of the participants with overweight, 46.2% were aged less than 40years, 40.3% 40-59years, 37.7% aged 60yeras and above. Of the 23.3% obese, 26.2% were age 60years and above, 23.0% a40-

59years. Thus, the result of the study showed that as age increases healthy BMI decreases and increase in age results in increase in obesity.

Table 1: Percentage distribution showing the BMI of Academic Staff based on age.

Age	BMI				Total
	Healthy BMI	Underweight	Overweight	Obese	
<40years	5(38.5%)	0(0%)	6(46.2%)	2(15.4%)	13(3.7%)
40-59years	94(33.8%)	8(2.9%)	112(40.3%)	64(23.0%)	278(79.0%)
>59years	21(34.4%)	1(1.6%)	23(37.7%)	16(26.2%)	61(17.3%)
Total	120(34.1%)	9(2.6%)	141(40.1%)	82(23.3%)	352(100.0%)

Research Question 3: what is the BMI of academic Staff of Ignatius Ajuru University based on gender?

Table 2 shows the percentage distribution of BMI based on gender of academic staff of Ignatius Ajuru University of Education. The result showed that 46.6% of female academic staff were

overweight, 43.7% obese, 8.7% healthy BMI. Of the male academic staff 44.8% have health BMI, 37.1% overweight, 14.9% obese. Thus, the result of the study reveals that more males compared to female have healthy BMI and more females compared to males are obese.

Table 2: Percentage distribution showing the BMI of Academic Staff based on gender.

Gender	BMI				Total
	Healthy BMI	Underweight	Overweight	Obese	
Females	9(8.7%)	1(1.0%)	48(46.6%)	45(43.7%)	103(100.0%)
Males	111(44.8%)	8(3.2%)	92(37.1%)	37(14.9%)	248(100.0%)
Total	120(34.1%)	9(2.6%)	140(39.9%)	82(23.4%)	351(100.0%)

Research question 6: What is the blood pressure of academic staff of university?

Table 3 shows the percentage distribution of blood pressure among the study participants. The result of the study shows that 14.2% and 37.2% of academic staff have normal systolic and

diastolic blood pressures respectively. Twenty-nine per cent presented with systolic stage 1 hypertension while 9.9% stage 2 systolic hypertension. The result reveals that 13.1% and 11.4% of the participants presents with stage 1 and stage 2 diastolic hypertension. Thus, the results indicated that 38.9% have systolic hypertension while 24.5% have diastolic hypertension.

Table 3: Percentage distribution showing Blood Pressure of Academic Staff of University.

BP Classification	Systolic Blood Pressure (SBP)		Diastolic Blood Pressure (DBP)	
	F	%	F	%
Normal	50	14.2	131	37.2
Prehypertension	165	46.9	135	38.4
Stage 1	102	29	46	13.1
Stage 2	35	9.9	40	11.4

Research question7: What is the relationship between BMI and blood pressure of academic staff?

Table 4 shows the relationship between BMI and Blood pressure among academic staff of Ignatius Ajuru University

of Education. The result of the study indicated a moderate relationship between systolic blood pressure and diastolic ($r = .647$) and a low relationship between systolic blood pressure and BMI ($r = .041$) and a low relationship between diastolic blood pressure and BMI ($r = 0.036$).

Table 4: Pearson Product Moment Correlations Coefficient showing the relationship between BMI and Blood Pressure of Academic Staff.

Variables	SBP	DBP	BMI
SBP	-	0.647	0.041
DBP		-	0.036
BMI			-

Testing of Hypotheses

Ho₁: There is no significant relationship between age and Body Mass Index among Academic Staff of Ignatius Ajuru University of Education.

Table 5 shows Regression analysis on the relationship between age and BMI of academic staff of Ignatius Ajuru University of

Education. The null hypothesis states that there is no significant relationship between age and BMI. The result of the study shows a non-significant low positive relationship between age and BMI (r = 0.038; F=0.505; p >0.05). The result further showed that as age increases BMI increases (B= 0.034). The null hypothesis is thus not rejected.

Table 5: Regression analysis showing the relationship between age and BMI.

Model	R	R square	F	P	B	Decision
	0.038	0.001	0.505	0.478	0.034	NS

Ho₂: There is no significant relationship between gender and Body Mass Index among Academic Staff of Ignatius Ajuru University of Education.

Table 6 shows Regression analysis on the relationship between gender and BMI of academic staff of Ignatius Ajuru University of Education. The null hypothesis states that there is no significant

relationship between age and BMI. The result of the study shows a significant moderate positive relationship between age and BMI (r = 0.381; F=59.417; p <0.05). The result further showed that as number of males increases BMI decreases (B= -5.118). The null hypothesis is thus rejected.

Table 6: Regression analysis showing the relationship between gender and BMI.

Model	R	R square	F	P	B	Decision
	0.381	0.145	59.417	0	-5.118	S

Ho₃: There is no significant relationship between educational qualification and Body Mass Index among Academic Staff of Ignatius Ajuru University of Education.

Table 7 shows Regression analysis on the relationship between educational qualification and BMI of academic staff of Ignatius Ajuru University of Education. The null hypothesis states that there

is no significant relationship between educational qualification and BMI. The result of the study shows a non-significant low positive relationship between educational qualification and BMI (r = 0.020; F=0.143; p >0.05). The null hypothesis is thus not rejected.

Table 7: Regression analysis showing the relationship between educational qualification and BMI.

Model	R	R square	F	P	B	Decision
	0.02	0	0.143	0.706	0.217	NS

Ho₄: There is no significant relationship between marital status and Body Mass Index among Academic Staff of Ignatius Ajuru University of Education.

Table 8 shows Regression analysis on the relationship between marital status and BMI of academic staff of Ignatius

Ajuru University of Education. The null hypothesis states that there is no significant relationship between marital status and BMI. The result of the study shows a non-significant low positive relationship between marital status and BMI (r = 0.087; F=0.007; p >0.05). The null hypothesis is thus not rejected.

Table 8: Regression analysis showing the relationship between marital status and BMI.

Model	R	R square	F	P	B	Decision
	0.087	0.007	2.556	0.111	0.926	NS

Ho₅: There is no significant relationship between Blood pressure and Body Mass Index among Academic Staff of Ignatius Ajuru University of Education.

Table 9 shows Regression analysis on the relationship between educational qualification and BMI of academic staff of Ignatius

Ajuru University of Education. The null hypothesis states that there is no significant relationship between educational qualification and BMI. The result of the study shows a non-significant low positive relationship between educational qualification and BMI ($r = 0.043$; $F=0.727$; $p >0.05$). The null hypothesis is thus not rejected.

Table 9: Regression analysis showing the relationship between Blood pressure and BMI.

Model	R	R square	F	P	B	Decision
	0.043	0.002	11.975	0.727	0.011	NS
					0.009	

Discussion of Findings

The findings of this study in Figure 1 shows that more (40.1%) of the participants were overweight, 34.1% normal BMI, 23. 3% obese while 2.6% were underweight. This finding is discouraging more especially among academic staff of universities who are compendium of knowledge and role models for students and the larger society. Academic staffs are well read and are expected to be knowledgeable in maintaining healthy lifestyle including healthy weight for heights and age. The finding of this study is similar to that of Funke and Ibrahim [9] which showed that more than two-third (72%) respondents were either overweight or obese. The similarity found between the two studies might be due to the similar nature of the respondents in the two studies. The present study was carried out among academic staffs while the previous

was among medical staffs. It might be that these group of persons pay more attention to their profession with little or no time for the monitoring of their weight. It is worthy of note that, an unhealthy weight can lead to a variety of health conditions the personality of the individual carrying it not withstanding hence, must be monitored always. The finding of this study gives credence to Gretchen, Singh, Yuan, Danaei, Lin and Finucane [3] who reported from their studies that, mean BMI has increased globally but, the trends and mean population BMI varied substantially between nations. According to Marie, Tom and Margaret [4] globally the proportion of people who are obese or overweight continues to increase. This increase in BMI reported by several researchers might be due to the negligence of the populace in the monitoring of their weight.

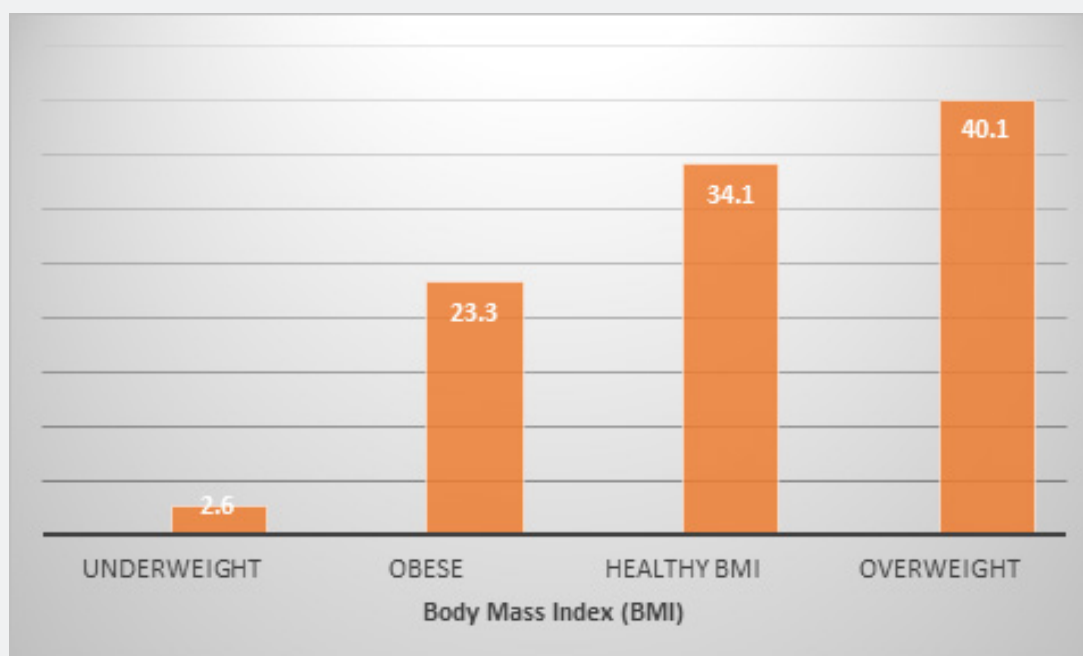


Figure1: BMI of Academic Staff

The result of the study in Fig pictorially displayed BMI of Academic Staff of Ignatius Ajuru University of Education. The result showed that more (40.1%) of the participants were overweight, 23. 3% obese while 2.6% were underweight. Thus 75.9% of academic staff have unhealthy BMI.

BMI of academic Staffs based on age

The findings of the study in Table 1 showed that as age increases BMI increases ($\beta = 0.034$) but not statistically significant. More especially the findings of the study showed that participants older than 59 years had unhealthier BMI compared to those aged <40 years. The plausible reasons for higher unhealthy BMI among older age group could be as a result of less participation in physical activities and increase workload in the academic environment but maintain the same level of energy intake as during young age. Therefore, the excess energy that is not expended is stored as fat, increasing their chances of becoming obese or overweight. The finding of this study corroborates that of Vuvor (2015) which showed that, the highest percentage of respondents of a normal BMI across the age groups was 26.5%, and majority of the respondents with obesity were among the older age group. This finding is at variance with that of Wang, Ma, However, the findings of this study is at variance with the findings of Wang, Yi, Jia and Xue [13] were a statistically significant difference existed between age and BMI. The variance could be as a result of the populations of the study as the current study was institution based where all the participants are in active service while the previous study was a community study comprising middle-aged and elderly people.

The findings of this study in Table 2 showed that more males compared to female have healthy BMI and more females compared to males are obese and that more of the females were overweight and obese compared to males. The finding of this study is in keeping with that of Vuvor (2015) who reported that, majority of the males were of a normal BMI (41.0%) and females were overweight and obese more than males. Likewise, Funke and Ibrahim [9] reported that, female respondents were more likely to be obese than male probably because females were less likely to engage in regular exercise than males. The findings of this study also corroborate that of Wang, Ma, Wang, Yi, Jia and Xue [13] who reported that, the prevalence of obesity differed between males and females. In males, no significant difference in the prevalence of obesity was found between age groups. In females, the prevalence of general obesity increased with increasing age and was highest in the age 70-79 group. The finding of this study is also in keeping with that of Preedy [12] which revealed that, more women than men were obese in all age groups. The similarity found between the present study and the previous ones might be due to the fact that men are physically active than women and urbanization is making people to become less physically active in recent times because most people prefer driving or taking cars to walking and sedentary lifestyle is on the increase. The finding of this study is in contrast with that of Ataei, Hosseini and Iranmanesh [14] which showed that there was a higher body mass index in boys than their girls' counterparts in a sample of 3186 from Tehran. Also, the finding of this study varies from that of Carroll, Curtin, Lamb and Flegel (2010) who reported that males have higher percentage in overweight, obesity, and risk for obesity groups than females. This

variation might be due to the fact the present study was carried out among matured adults while the previous ones were focused on adolescents who are very physically active and are engaged in several activities including playing which make them expend energy.

Blood pressure of academic Staffs

The finding of this study in Table 3 shows that 38.9% have systolic hypertension while 24.5% have diastolic hypertension. The result of the study shows that 14.2% and 37.2% of academic staff have normal systolic and diastolic blood pressures respectively. Twenty-nine percent presented with systolic stage 1 hypertension while 9.9% stage 2 systolic hypertension. The result reveals that 13.1% and 11.4% of the participants presents with stage 1 and stage 2 diastolic hypertension. Funke and Ibrahim [9] show that both BP is on the increase worldwide and that the proportion of respondents with high blood pressure increased across the age group. The similarity found between the two studies might be due to the similar characteristics of the respondents. The finding of this study is in line with that of Kearney [15] who reported that, hypertension affects one in four adults worldwide and its prevalence is increasing globally. The finding of this study is in keeping with that of Vuvor [6] which showed that nearly 32.5% of the study population had high SBP while about 23.0% of the respondents had high diastolic blood pressure. The finding of this study is in contrast with that of Joseph-Shehu, Irinoye and Ajani [12] which showed that more than half of the respondents had normal systolic blood pressure while majority had normal diastolic blood pressure. The variation found between the present study and the previous one might be due to the difference in the sample size and the characteristics of the population studied.

Relationship between BMI and blood pressure of academic staffs

The findings of the study in Table 4 showed a low positive relationship between systolic blood pressure and BMI ($r = .041$) and a low positive relationship between diastolic blood pressure and BMI ($r = 0.036$). This finding is not surprising because though the relationship was low but, it can also contribute and place an individual at risk of developing high blood pressure so, it must be monitored. The findings of this study is in line with that of Droyvold, Midthjell, Nilsen and Holmen [16] body mass index (BMI) is positively associated with both systolic blood pressure (SBP) and diastolic blood pressure (DBP). The finding of this study is in tandem with Anyanwu, Ekezie, Danborn and Ugochukwu (2010) who noted that, obesity was a positive risk factor for the development of high blood pressure. The finding of this study is in line with Wang, McPherson, Marsh, Gortmaker and Brown (2011) who posited that, high blood pressure is linked with overweight and obesity. The finding of this study is also in support of that of Funke and Ibrahim [9] which showed a positive correlation between the BMI and blood pressure. The finding of this study is in keeping with that of Vuvor (2017) which showed

that there was an association between BMI and BP. The result of the tested hypothesis in this study shows a non-significant low positive relationship between educational qualification and BMI ($r = 0.043$; $F=0.727$; $p > 0.05$).

The finding of this study is in contrast with that of Joseph-Shehu, Irinoye and Ajani [12] which showed a positive and significant relationship between BMI and blood pressure ($r = 0.145$, $p=0.004$). The finding of this study is also at variance with that of Oladapo, Salako, Sodiq, Shoyinka, Adedapo and Falase [10] which showed that there is a significant relationship between BMI and blood pressure. The findings of this study also differ from that of Saxon, Etten and Perkins [7] which shows a significant positive correlation between BMI and blood pressure [17-19]. The variations in the study population, sample size and study location might be implicated for the difference found between the previous studies and the present one.

Conclusion

Based on the findings of the study, it was concluded that majority of the academic staffs in Ignatius Ajuru University of Education have unhealthy weight and have prehypertension, also, there was a low positive relationship between the body mass index and blood pressure of the staffs.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. The school authority should create a free BMI and BP checking unit at the medical centre of the University for academic staffs so they can visit for checking and monitoring of their BMI and BP.
2. The school management should make it compulsory at the beginning of every semester for staff to show their BP result so as to limit course load to be taught.
3. The Department of Human Kinetics, Health and Safety Education in the Universities should carry out awareness programme every month on BMI and BP.
4. The University management in collaboration with the Health Department should create a health week in each semester where medical professionals will be brought carry out necessary medical check-up for the academic staffs in the University.
5. The work for live exercise physical activity programme adopted by the University should be made compulsory to older staffs and their BP and BMI should be checked before and after the semester.

References

1. Brazier Y (2018) Measuring body mass index to adults, children and teens. UK: Healthline media.

2. World Health Organization (2018) Body Mass Index - BMI. Geneva: WHO
3. Stevens GA, Singh GM, Lu Y, Danaei G, Lin JK, et al. (2012) National, regional, and global trends in adult overweight and obesity prevalence. *Popul Health Metr* 10(1): 22.
4. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, et al. (2014) Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis. *Lancet* 384(9945): 766-781.
5. Martin E (2015). *Concise Colour Medical Dictionary*. UK: Oxford University Press
6. Vuvor F (2017) Correlation of body mass index and blood pressure of adults of 30–50 years of age in Ghana. *J Health Res Rev* 4(3): 115-121.
7. Saxon S, Etten M, Perkins E (2010) *The nervous system*. In: *A Guide for the Helping Professions: Physical Change & Aging*. New York: Springer
8. Faramawi M, Fischbach L, Delongchamp, Cardenas V, Abouelenien S, et al. (2015) Obesity is associated with visit-to-visit systolic blood pressure variability in the US adults. *J Public Health* 37(4): 694-700.
9. Funke O, Ibrahim KS (2013) Blood pressure and body mass index among Jos University teaching hospital staff. *Transnational Journal of Science and Technology* 3(9): 67-83.
10. Oladapo OO, Salako L, Sodiq O, Shoyinka K, Adedapo K, et al. (2010) A prevalence of cardiometabolic risk factors among a rural Yoruba south-western Nigerian population: a population-based survey. *Cardiovasc J Afr* 21(1): 26-31.
11. Preedy VR (2012). *Handbook of Anthropometry: Physical Measures of Human form in Health and Disease*. London UK: Springer Science & Business Media
12. Joseph-Shehu EM, Irinoye OO, Ajani GOD (2016) Relationship between blood pressure, body mass index and health promoting lifestyle practices of women in selected rural communities in Osun State Nigeria. *Research Journal of Health Sciences* 4(2): 36-46.
13. Wang SK, Ma W, Wang S, Yi XR, Jia HY, et al. (2014) Obesity and Its Relationship with Hypertension among Adults 50 Years and Older in Jinan, China. *PLoS One* 9(12): e114424.
14. Ataei N, Hosseini M, Iranmanesh M (2009) The relationship of body mass index and blood pressure in Iranian children <7 yr old. *Journal of Tropical Pediatrics* 55(5): 313-317.
15. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, et al. (2005) Global burden of hypertension: analysis of worldwide data. *Lancet* 365(9455): 217-223.
16. Drøyvold WB, Midtjell K, Nilsen TI, Holmen J (2005) Change in body mass index and its impact on blood pressure: a prospective population study. *Int J Obes (Lond)* 29(6): 650-655.
17. Al-Wehedy A, Abd Elhameed SH, Abd El-Hameed D (2014) Effect of Lifestyle Intervention Program on Controlling Hypertension among Older Adults. *Journal of Education and Practice* 5(5): 288-295.
18. Rolfes SR, Pinna K, Whitney E (2014). *Understanding Normal and Clinical Nutrition*. Stamford USA: Cengage Learning.
19. Staessen JA, Wang J, Bianchi G, Birkenhager WH (2003) Essential hypertension. *Lancet* 361(9369): 1629-1641.



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