



**COMPARATIVE ANALYSIS OF BLOOD PRESSURE VALUES BETWEEN SECOND
YEAR AND FORTH YEAR STUDENTS OF BIOMEDICAL TECHNOLOGY OPTION,
UNIVERSITY OF PORT HARCOURT**

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ABSTRACT

In Nigeria hypertension is twice as high compared with other East Africa countries and less than 20 per cent of Nigerians are aware that they have the condition. This work investigated the comparative analysis of the blood pressure between the second year and fourth year students of biomedical technology. A total of two hundred students, hundred from each level both male and female were used for this study. A sphygmomanometer was used to measure the blood pressure of each student. Data from completed questionnaires were entered into SPSS version 20.0 and the differences among means were separated by mean standard deviation. The result were then be expressed as mean \pm standard error of mean (SEM) with the level of significance set at $p < 0.05$. During exam the year four students had higher systolic (136mmHg), diastolic mmHg, and pulse rate of 63b/m. At the beginning of the semester the blood pressure of females in both level were normal while male counterpart of the year two had elevated blood pressure and pulse rate. The blood pressure was 147mmHg systolic over 100mmHg diastolic and pulse rate of 109b/m. This study concluded an elevated blood pressure in year two male, students of school of science laboratory technology. This study also recorded an elevated pulse rate in the year four male student of biomedical technology which suggests heart problems.

KEYWORDS: Comparative, Blood, Analysis and Pressure.

INTRODUCTION

Blood pressure (BP) is a complex, multifactorial clinical outcome driven by genetic susceptibility, behavioral choices, and environmental factors (Anand *et al.*, 1999). High blood pressure or hypertension is defined as a systolic blood pressure (SBP) above 140 mmHg or diastolic blood pressure (DBP) above 90 mmHg and is regarded globally as one of the chief causes of sudden death among the elderly. Most cardiovascular diseases has been linked to elevated blood pressure as data compiled and made public by America heart association has shown that approximately 80% of all cardiovascular disease can be prevented by controlling blood pressure. Diseases like diabetes and high cholesterol, along with adopting unhealthy lifestyle such as smoking and alcoholism have been linked to high blood pressure. Despite societal understanding of hypertension and availability of treatment for the disease, about 20 million still suffer varying degree of deformities resulting from high blood pressure (Bartosh *et al.*, 1999). In Nigeria hypertension is twice as X high compared with other East Africa countries and less than 20 per cent of Nigerians are aware that they have the condition. They

have been more than 20 million cases of hypertension in Nigeria in 2010, affecting one in three men and one in four women (Burt *et al.*, 1995). Based on relation of pathological effect of stress on the body and its reflex on blood pressure, the high level of stress undergone by University students becomes a major concern as it has direct impact on the level of assimilation of the student and hence the quality of training. The aim of this research is to determine and compare the blood pressure values of second year and fourth year students of biomedical technology, School Science Laboratory Technology, University of Port Harcourt. Ninety Five percent (95%) of all hypertension cases were categorized as essential hypertension that also known as primary hypertension or idiopathic hypertension (Carretero *et al.*, 2000). It is a heterogeneous disorder as different patients have different factors that cause high blood pressure (Carretero *et al.*, 2000). Secondary hypertension can be caused by medical conditions such as renal parenchymal disease, renal artery stenosis, hyperaldosteronism, or pheochromocytoma (Carretero *et al.*, 2000). Temporary high blood pressure also can cause by medications such as corticosteroids, nonsteroidal anti-inflammatory drugs

(NSAIDs), cold medicines and birth control pills. Corticosteroids such as prednisone and prednisolone will lead to Cushing syndrome in long-term use. Usage of nonsteroidal anti-inflammatory drugs (NSAIDs) increase blood pressure as well as will interfere in anti-hypertensive treatment, and abolish its effect (Carretero *et al.*, 2000). Blood pressure regulation via two different reaction involving ACE enzyme that converts angiotensin I that also known as inactive peptide, to a powerful vasoconstrictor Angiotensin II and inactivate the synthesis of vasodilator peptide, bradykinin (Carretero *et al.*, 2000).

MATERIALS AND METHODS

Sample Collection

Two hundred (200) students in a ratio of 50:50 were drawn from second and fourth year in the Department of Biomedical Technology Option, School of Science Laboratory Technology, University of Port Harcourt and were recruited for the study.

Materials

Materials used for this study include: Tables, Pen, Calculator, Chairs. Blood pressure machine (sphygmomanometer).

Questionnaire

Demographic including details of participants were obtained using short ended questionnaire participants were also requested to provide information on their alcohol consumption, sleep duration, level of education, medical history, diet, exercise habits etc.

RESULTS AND DISCUSSION

Table 1: Alcoholism, Smoking and History of High Blood Pressure Among Second Year Students at the beginning of the semester.

Age Group	Positive (N)	Alcoholism (%)	Smoking	HPB History
18-20	56	10(17.9)	5(8.9)	7(12.5)
21-23	34	9(26.0)	6(17.6)	7(20.6)
24-26	10	6(60.0)	3(30)	2(20)
27-30	0	0	0	0
Total	100	25	14	16
Sex				
Male	40	11(27.5)	10(25.0)	10(25.0)
Female	60	14(23.3)	4(28.5)	6(10.0)
Total	100	25	14	16

Response to questionnaires by second year students recruited in the study showed that Alcoholism was more among the 24-26 age group with 6(60 %) occurrence. It was followed by the 9(26) recorded for age group 21-23 group, whereas the least was recorded for 18-20 age group 10(17.9). About 5(8.9 %) smoking was recorded for students who fell under age group 18-20 with 7(12.5 %) having history of high blood pressure in their families. However history of High blood pressure was similar for age groups 21-23 and 24-26 with a 7(20 %) and 2(20%) history respectively. These groups also recorded a smoking prevalence of 6(17.6%) and 3(30%) respectively.

Sphygmomanometer Procedure

Digital sphygmomanometer was used for this research. It is a full-automatic arm blood pressure monitor. Display mode is LCD digital, measuring method is oscillographic measurement method, Furthermore in other to get the value for the systolic, diastolic pressure and pulse rate, digital sphygmomanometer was used to check the blood pressure manually.

The patient were advice to take 15 minutes rest (no smoking, drinking or eating)

Inserted the cuff tubing connector to the left side of the monitor positioning the cuff on a solid surface with the tubing facing up and away from the patient, widen the cuff by pulling the bottom of the cuff towards the right.

Inserted the patient's hand into the cuff, position the cuff symbol over the main artery on the inside of his/her arm, the bottom edge of the cuff be one inch above his/her elbow joint. Pulled the end of the cuff towards his/her body tighten the cuff, the cuff should fit comfortably yet snugly around his/her arm, in a way that two fingers were inserted between his/her arm and the cuff, positioned the monitor on a flat table surface and the patient's feet flat on the floor, his/her elbow rested on the surface with their palm facing upwards. Pressed the power button, selected the memory bank to store the reading by pressing the memory button then recorded the reading.

Sex related showed that male subjects had 11(27%) alcoholism, 10(25%) History record for HPB and smoking prevalence whereas the female counter part showed a 14(23.3%) alcoholism, 4(28.5%) smoking prevalence and a HBP history of 6(10%)

Table 2: Systolic and Diastolic Blood Pressure and Pulse Rates Among Second Year Students At the beginning of the semester.

Age Group	Positive (N)	Systolic Pressure (mmHg)	diastolic (mmHg)	Pulse Rate (b/m)
18-20	56	127	70	78
21-23	34	129	87	99
24-26	10	124	85	68
27-30	0	0	0	0
Sex				
Male	40	111	83	91
Female	60	118	75	77

The highest mean systolic pressure was 129 among age group 21-23 with a mean diastolic pressure of 87 and mean pulse rate of 99, the least systolic however was recorded for age group 24-26 with a mean value of 124 and a diastolic pressure and pulse rate of 85 and 68 respectively.

Sex related mean systolic pressure showed that the male subjects had less systolic pressure of 111 compared to the female with 118. Similarly 83 and 91 diastolic pressure and 91 pulse rate were higher in the male counterpart compared to the female with 75 diastolic and 77 pulse rate respectively.

Table 3: Alcoholism, Smoking and History of High Blood Pressure among Second Year Students During Exams.

Age Group	Positive (N)	Alcoholism (%)	Smoking	HPB History
18-20	56	10(17.9)	5(8.9)	7(12.5)
21-23	34	9(26.0)	6(17.6)	7(20.6)
24-26	10	6(60.0)	3(30)	2(20)
27-30	0	0	0	0
Total	100	25	14	16
Sex				
Male	40	11(27.5)	10(25.0)	10(25.0)
Female	60	14(23.3)	4(28.5)	6(10.0)
Total	100	25	14	16

Response to questionnaires by second year students recruited in the study showed that Alcoholism was more among the 24-26 age group with 6(60 %) occurrence. It was followed by the 9(26) prevalence recorded for age group 21-23 group, whereas the least was recorded for 18-20 age group 10(17.9). About 5(8.9 %) smoking was recorded for students who fell under age group 18-20 with 7(12.5 %) having history of high blood pressure in their families. However history of High blood pressure was similar for age groups 21-23 and 24-26 with a 7(20

%) and 2(20%) history respectively. These groups also recorded a smoking prevalence of 6(17.6%) and 3(30%) respectively.

Sex related prevalence showed that male subjects had 11(27%) alcoholism, 10(25%) History record for HPB and smoking prevalence whereas the female counterpart showed a 14(23.3%) alcoholism, 4(28.5%) smoking prevalence and a HBP history of 6(10%).

Table 4: Systolic and Diastolic Blood Pressure and Pulse Rates Among Second Year Students During Exams.

Age Group	Positive (N)	Systolic Pressure (mmHg)	Diastolic Pressure (mmHg)	Pulse Rate (b/m)
18-20	56	107	85	104
21-23	34	123	96	97
24-26	10	124	81	110
27-30	0	0	0	0
Sex				
Male	40	147	100	109
Female	60	117	77	91

The highest mean systolic pressure was 124 among age group 24-26 with a mean diastolic pressure of 81 and mean pulse rate of 110, the least systolic however was recorded for age group 18-20 with a mean value of 107 and a diastolic pressure and pulse rate of 85 and 104 respectively.

Sex related mean systolic pressure showed that the male subjects had higher systolic pressure of 147 compared to the female with 117. Similarly 100 and 109 diastolic pressure and pulse rate were higher in the male counterpart compared to the female with 77 diastolic and 91 pulse rate respectively.

Table 5: Alcoholism, Smoking and History of High Blood Pressure among Fourth Year Students At the beginning of the semester.

Age Group	Positive (N)	Alcoholism (%)	Smoking	HPB History
18-20	0	0	0	0
21-23	70	47(67.1)	20(28.6)	20(28.6)
24-26	24	14(58.3)	12(50)	8(33.3)
27-30	4	2(50)	0	0
Total	98	63	32	28
Sex				
Male	43	28(65)	19(44)	21(48)
Female	57	35(61)	13(22)	8(14)
Total	60	63	32	29

Response to questionnaires by fourth year students recruited in the study showed that Alcoholism was more among the 21-23 age group with 47(67.1 %) occurrence. It was followed by the 14(58%) recorded for age group 24-26 group, whereas the least was recorded for 27-30 age group with 2(50%). About 20(28.6 %) smoking was recorded for students who fell under age group 21-23 with 20(28.6 %) having history of high blood pressure in their families. However history of High blood pressure

was similar for age groups 24-26 with a 8(33.3 %) and a smoking prevalence of 2(50%).

Sex related showed that male subjects had 28(65%) alcoholism, 21(48%) History record for HPB and smoking prevalence of 19(44) whereas the female counterpart showed a 35(61%) alcoholism, 13(22%) smoking prevalence and a HBP history of 8(14%).

Table 6: Systolic and Diastolic Blood Pressure and Pulse Rates Among Fourth Year Students At the beginning of the semester.

Age Group	Positive (N)	Systolic Pressure(mmHg)	Diastolic Pressure(mmHg)	Pulse Rate (b/m)
18-20				
21-23	70	106	77	76
24-26	24	120	86	86
27-30	4	106	62	96
Sex				
Male	43	136	74	63
Female	57	122	92	100

The highest mean systolic pressure was 120 among age group 24-26 with a mean diastolic pressure of 86 and mean pulse rate of 76, the least systolic however was recorded for age group 18-20 (same as 27-30 age group) with a mean value of 106 and a diastolic pressure and pulse rate of 77 and 76 respectively.

Sex related mean systolic pressure showed that the male subjects had higher systolic pressure of 136 compared to the female with 122. Diastolic pressures of 74 and 92 for male and female, pulse rate of 92 and 100 respectively.

Table 7: Alcoholism, Smoking and History of High Blood Pressure among Fourth Year Students During Exams.

Age Group	Positive (N)	Alcoholism (%)	Smoking	HPB History
18-20	0	0	0	0
21-23	70	47(67.1)	20(28.6)	20(28.6)
24-26	24	14(58.3)	12(50)	8(33.3)
27-30	4	2(50)	0	0
Total				

Sex				
Male	43	28	19	21
Female	57	35	13	8
Total				

Response to questionnaires by fourth year students recruited in the study showed that Alcoholism was more Prevalent among the 21-23 age group with 47(67.1 %) occurrence. It was followed by the 14(58%) prevalence recorded for age group 24-26 group, whereas the least was recorded for 27-30 age group with 2(50%). About 20(28.6 %) smoking was recorded for students who fell under age group 21-23 with 20(28.6 %) having history of high blood pressure in their families. However history of

High blood pressure was similar for age groups 24-26 with a 8(33.3 %) and a smoking prevalence of 2(50%).

Sex related prevalence showed that male subjects had 28(65%) alcoholism, 21(48%) History record for HPB and smoking prevalence of 19(44) whereas the female counterpart showed a 35(61%) alcoholism, 13(22%) smoking prevalence and a HBP history of 8(14%)

Table 8: Systolic and Diastolic Blood Pressure and Pulse Rates Among Fourth Year Students During Exams.

Age Group	Positive (N)	Systolic Pressure(mmHg)	Diastolic Pressure(mmHg)	Pulse Rate (b/m)
18-20	0			
21-23	70	117	71	88
24-26	24	111	79	89
27-30	4	138	103	94
Sex				
Male	43	114	70	87
Female	57	130	82	94

The highest mean systolic pressure was 138 among age group 27-30 with a mean diastolic pressure of 71 and mean pulse rate of 88. The least systolic blood pressure, however was recorded for age group 111 for age group 24- 26 with a mean value of 79 diastolic pressure and pulse rate of 89.

Sex related mean systolic pressure showed that the female subjects had higher systolic pressure of 130 compared to the male with 114. Diastolic pressures of 70 and 87 pulse rate for male while 82 and 94 for female diastolic pressure and pulse rate respectively.

Table 9: Comparing Systolic and Diastolic Blood Pressure and Pulse Rates Among Fourth Year Students SECOND year students During Exams and at the beginning of the semester.

LEVEL	Positive (N)	Systolic Pressure (mmHg)	Diastolic Pressure (mmHg)	Pulse Rate (b/m)
Year 2	100	106	77	84
YEAR 4	100	78	56	57
PART 2				
YEAR 2	100	144	89	102
YEAR 4	100	113	72	85

The highest mean systolic pressure was 144 with a mean diastolic pressure of 89 and mean pulse rate of 102 which was for the year two student. The least systolic blood pressure, however was recorded was 78 which is for the year four student with a mean value of 56 diastolic pressure and pulse rate of 57.

The year two compared to that of the year four blood pressure is higher in both during exam and at the beginning of the semester.

DISCUSSION

Extreme blood pressure over the years has proven to be a major cause of sudden collapse especially for the elderly who are exposed to risks factors of high blood pressure. We comparatively analyzed blood pressure among second and fourth year students of biomedical technology department of the University of Port Harcourt. Open ended questionnaires were used to obtain demographic details and level of exposure to alcoholism.

A digital sphygmomanometer was used to obtain systolic and diastolic blood pressures as well as pulse rate.

Responses based on questionnaires by second year students recruited in the study after resumption showed that Alcoholism was more prevalent among the 24-26 age group with 6(60 %) occurrence. It was followed by the 9(26) prevalence recorded for age group 21-23 group, whereas the least was recorded for 18-20 age group 10(17.9). About 5(8.9 %) smoking was recorded for students who fell under age group 18-20 with 7(12.5 %) having history of high blood pressure in their families. However history of High blood pressure was similar for age groups 21-23 and 24-26 with a 7(20 %) and 2(20%) history respectively. These groups also recorded a smoking prevalence of 6(17.6%) and 3(30%) respectively. Sex related prevalence showed that male subjects had 11(27%) alcoholism, 10(25%) History record for HPB and smoking prevalence whereas the female counterpart showed a 14(23.3%) alcoholism, 4(28.5%) smoking prevalence and a HBP history of 6(10%). Result of analysis reviewed the highest mean systolic pressure was 129 among age group 21-23 with a mean diastolic pressure of 87 and mean pulse rate of 99, the least systolic however was recorded for age group 24-26 with a mean value of 124 and a diastolic pressure and pulse rate of 85 and 68 respectively. Sex related mean systolic pressure showed that the male subjects had less systolic pressure of 111 compared to the female with 118. Similarly 83 and 91 diastolic pressure and 91 pulse rate were higher in the male counterpart compared to the female with 75 diastolic and 77 pulse rate respectively.

Data gotten after exams showed a different results as the level of stress among recruits is high because of several activities like increased studying for coming examination and overnight reading. The highest mean systolic pressure was 124 among age group 24-26 with a mean diastolic pressure of 81 and mean pulse rate of 110, the least systolic however was recorded for age group 18-20 with a mean value of 107 and a diastolic pressure and pulse rate of 85 and 104 respectively. Sex related mean systolic pressure showed that the male subjects had higher systolic pressure of 147 compared to the female with 117. Similarly 100 and 109 diastolic pressure and pulse rate were higher in the male counterpart compared to the female with 77 diastolic and 91 pulse rate respectively. Results gotten from the year four class after resumption of school were analyzed. Response to questionnaires by fourth year students recruited in the study showed that Alcoholism was more prevalent among the 21-23 age group with 47(67.1 %) occurrence. It was followed by the 14(58%) prevalence recorded for age group 24-26 group, whereas the least was recorded for 27-30 age group with 2(50%). About 20(28.6 %) smoking was recorded for students who fell under age group 21-23 with 20(28.6 %) having history of high blood pressure in their families. However history of High blood pressure was similar for age groups 24-26 with 8(33.3 %) and a smoking prevalence of 2(50%). Sex

related prevalence showed that male subjects had 28(65%) alcoholism, 21(48%) History record for HPB and smoking prevalence of 19(44) whereas the female counterpart showed a 35(61%) alcoholism, 13(22%) smoking prevalence and a HBP history of 8(14%). The highest mean systolic pressure was 120 among age group 24-26 with a mean diastolic pressure of 86 and mean pulse rate of 76, the least systolic however was recorded for age group 18-20 (same as 27-30 age group) with a mean value of 106 and a diastolic pressure and pulse rate of 77 and 76 respectively. Sex related mean systolic pressure showed that the male subjects had higher systolic pressure of 136 compared to the female with 122. Diastolic pressures of 74 and 92 for male and female, pulse rate of 92 and 100 respectively. During exams for same subjects, the highest mean systolic pressure was 138 among age group 27-30 with a mean diastolic pressure of 71 and mean pulse rate of 88. The least systolic blood pressure, however was recorded for age group 111 for age group 24- 26 with a mean value of 79 diastolic pressure and pulse rate of 89. Sex related mean systolic pressure showed that the female subjects had higher systolic pressure of 130 compared to the male with 114. Diastolic pressures of 70 and 87 pulse rate for male while 82 and 94 for female diastolic pressure and pulse rate respectively.

CONCLUSION

In conclusion, the study investigated the blood pressure among second and fourth year students of biomedical technology department of the University of Port Harcourt. Open ended questionnaires were used to obtain demographic details and level of exposure to alcoholism. A digital sphygmomanometer was used to obtain systolic and diastolic blood pressures as well as pulse rate. The study concludes that the blood pressure of students increases before exams due to stress factor. Students exposed to alcoholism had high systolic and diastolic blood pressure indicating that alcoholism is a major risk factor of hypertension. Age related alcoholism blood pressure were not significantly different.

The year four class had a higher systolic and diastolic blood pressure when compared to their year two counterparts.

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