



COMPARISON OF BODY MASS INDEX AND BLOOD PRESSURE IN COMMERCIAL MOTOR DRIVERS IN PORT HARCOURT, NIGERIA.

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ABSTRACT

This study aimed at investigating the relationship between the body mass index (BMI) and blood pressure (BP) of commercial motor drivers (CMDs) in Port Harcourt, Nigeria. Five hundred and seventeen (517) consenting male CMDs were randomly selected for the study. The study involved the measurement of the BP, weight and height of the CMDs; and the completion of a questionnaire relevant to the topic. From the results, 39.46% of the CMDs had a normal BMI status, 42.55% were overweight, while 17.99% were obese. A positive correlation was observed between the BMI and the Systolic BP ($r = 0.254$), the Diastolic BP ($r = 0.323$), and the age ($r = 0.896$) of the CMDs. There was also a positive correlation between the age and the Systolic BP ($r = 0.207$) and Diastolic BP ($r = 0.270$) of the CMDs. Also, a higher percentage of the CMDs consumed alcoholic drinks, a lesser percentage exercised regularly, while a higher percentage had longer durations of daily working hours resulting in shorter hours of rest and sleep. It can be concluded that the positive correlation between the BMI and BP may not be unrelated with the high rate of alcohol consumption and the sedentary lifestyle of the CMDs. It is our recommendation that basic measurements of BP in comparison to an individual's BMI status should be a routine assessment and requirement for the issuing and renewing of drivers licenses.

KEYWORDS: Blood Pressure, Body Mass Index, Drivers, Alcohol Consumption, Exercise.

INTRODUCTION

The high prevalence rates of non-communicable diseases (NCDs), especially hypertension, in developing countries has gained much attention. Blood pressure and anthropometric measurements (especially weight and height) have been used as important tools in evaluating the health of individuals.^[1]

Due to industrialization and urbanization, the standard of living has continued to rise, especially in developing countries. This has led to weight gain and obesity in individuals, which now poses a threat to the health of citizens. Obesity is perhaps the most prevalent form of malnutrition in developing countries, both among adults and children.^[2] Studies have demonstrated that obesity is related to elevations in systolic blood pressure (SBP) and diastolic blood pressure (DBP), dyslipidemia, diabetes, etc.^[2-5]

Body Mass Index (BMI) is a measure of body fat (obesity) using the height and weight measurements of an individual, and this applies to both men and women. Based on the WHO guidelines,^[6] BMI can be classified into the following categories: Underweight (≤ 18.4

kg/m^2), Normal ($18.5 - 24.9 \text{ kg/m}^2$), Over weight ($25 - 29.9 \text{ kg/m}^2$), Obese ($\geq 30 \text{ kg/m}^2$).

The health and life style of commercial motor drivers (CMDs) is vital to their performance and concentration on the road when driving. The increased rate of motor accidents on the roads has been a major cause of concern and most often the CMDs are usually at fault due to their poor health conditions such as obesity, hypertension, obstructive sleep apnea, and bad eye sight.^[7,8] Studies have shown that a high body mass index (BMI) which is often a causative factor leading to hypertension has been implicated to be a strong indicator for potential road accidents.^[7,9] CMDs accidents have been an important public health hazard in Nigeria. In 2006 alone, commercial motor accidents caused the death of over 5200 persons and more than 125,000 injuries as was stated in Federal Road Safety Commission report.^[10] The FRSC report revealed that CMDs were at fault in over 80% of these accidents.

Despite this growing burden of obesity and hypertension in developing countries, there is paucity of information on the relationship between BMI and blood pressure

(BP) among CMDs. As such, this study aimed at investigating the relationship between the BMI and BP in commercial motor drivers in Port Harcourt, Nigeria. The objectives of this study is to determine the level of hypertension (if any) in the CMDs; to determine the risk factors that can cause an increase in blood pressure in the CMDs; and to produce a reference document that can be used by the government and regulatory agencies for the proper regulation of the operations of commercial motor drivers.

MATERIALS AND METHODS

The study population was drawn from four (4) main commercial motor parks in Port Harcourt metropolis, namely; Rumuokoro Motor Park, Mile 1 Motor Park, Mile 3 Motor Park, and Choba Motor Park. A total of 517 consenting male CMDs were randomly selected for the study. Ethical permission for the study was obtained from the Research Ethics Committee of the College of Health Sciences, University of Port Harcourt. The weight (kg), height (m), and blood pressure (mmHg) measurements of the CMDs were taken and recorded. The following instruments were used for taking the measurements: Standard bathroom weighing balance (manufactured by Harson), Automated Blood Pressure Monitor and Cuff (manufactured by Lloyds pharmacy), Calibrated measuring tape, and a well-structured questionnaire with questions relevant to the topic. The questionnaires were duly filled individually by the CMDs. Before the blood pressure measurements were taken, it was ensured that the CMDs were sitting down and relaxed with the blood pressure measuring cuff placed around their left arm (this was done for consistency for all the subjects). Weight and height measurements were taken with the CMDs standing upright and bare footed on the weighing balance, while their height measurements were taken with the calibrated measuring tape.

The CMDs were grouped into age groups of 21-30 years, 31-40 years, 41-50 years, and 51-60 years; labelled as age groups A, B, C, and D respectively. BMI was calculated using the standard formula and the BMI status of the CMDs was classified in line with the World Health Organization (WHO) recommendation,^[6] while blood pressure of the CMDs was classified using the classification by JNC7.^[11]

Statistical Analysis

Statistical analysis was done using SPSS (version 20) and Microsoft excel. Descriptive statistics of mean and standard error of mean were used to examine the data. Pearson moment correlation was used to find the correlation between the anthropometric and blood pressure measurements of the subjects.

RESULT AND DISCUSSION

From the result in Table I, the BMI of the CMDs significantly increased with progressive increase in age, as was also seen in the positive correlation ($r = 0.896$) of

age with BMI as shown in Figure 1. The result in Table I further shows that the CMDs in age group A had a normal BMI status based on the WHO recommendation.^[6] However, the CMDs in age group B had an overweight BMI status, while the CMDs in age groups C and D both had obese BMI statuses. Generally, 39.46% of the drivers had normal BMI statuses, while 42.55% were overweight and 17.99% were obese. This overweight and obese BMI statuses seen among the CMDs may not be unrelated to their sedentary lifestyle and their minimal or lack of exercise. The result in figure 2 shows that most of the CMDs spent longer hours of the day sitting behind the steering wheel and driving, as seen in the high percentage of average daily working hours across each age group (A = 67.08%; B = 69.58%; C = 60.42%; and D = 53.33%). However, only a few percentage of the CMDs across each age group participated in routine exercise (A = 31.61%; B = 25.58%; C = 22.78%; and D = 18.37%). This, combined with the lack of rest and shortened sleep hours, as seen from the high percentage of average daily working hours of the CMDs across each age group, may have likely contributed to their overweight and obese BMI statuses; and this may also be responsible for the pre-hypertensive blood pressure status of the CMDs as shown in Table II. It is pertinent to state that lack of sufficient sleep and sleep apnea can lead to increased stress which in turn can result in elevations in blood pressure, most likely due to increased sympathetic nervous system activity.^[8]

The result in figures 3 and 4 show that a positive correlation exists between the BMI and both the SBP ($r = 0.254$), and DBP ($r = 0.323$) of the CMDs. Similarly, a positive correlation between the age and the Systolic BP ($r = 0.207$) and Diastolic BP ($r = 0.270$) of all the CMDs irrespective of age group was also observed. The result in Table II further shows that the average SBP and DBP of the CMDs across the age groups (except for the DBP measurement of the CMDs in age group A) was seen to be within the pre-hypertensive category;^[11] that is, within the blood pressure value range of 120-139 mmHg (for SBP) and 80-89 mmHg (for DBP). This pre-hypertensive blood pressure classification as seen among the CMDs may not be unconnected with their overweight and obese BMI statuses as studies have shown that overweight or obese BMI statuses have been implicated as causative factors for hypertensive states.^[1,5,7]

Furthermore, the high percentage rate of alcohol consumption by the CMDs across each group (A = 68.96%; B = 63.72%; C = 67.09%; and D = 67.35%) as also shown in figure 2, may also be liable for the pre-hypertensive blood pressure classification of the CMDs, due to the fact that alcohol consumption has been implicated to be a causative risk factor that culminates in blood pressure elevations.^[12] Recent epidemiological and clinical studies have indicated that chronic alcohol consumption (more than three drinks per day, which is approximately equivalent to 30 g ethanol) is usually associated with an increased incidence of hypertension

and an increased risk of cardiovascular diseases.^[12-16] Also, the magnitude of the increase in blood pressure among persons who consume alcoholic drinks averages about 5 to 10 mmHg; with systolic increases nearly always greater than diastolic increases,^[12] as was observed in this study.

ABBREVIATIONS USED IN THIS ARTICLE

CMDs: Commercial Motor Drivers

BMI: Body Mass Index

BP: Blood Pressure

SBP: Systolic Blood Pressure

DBP: Diastolic Blood Pressure

NCDs: Non Communicable Diseases

FRSC: Federal Road Safety Commission

FIGURES

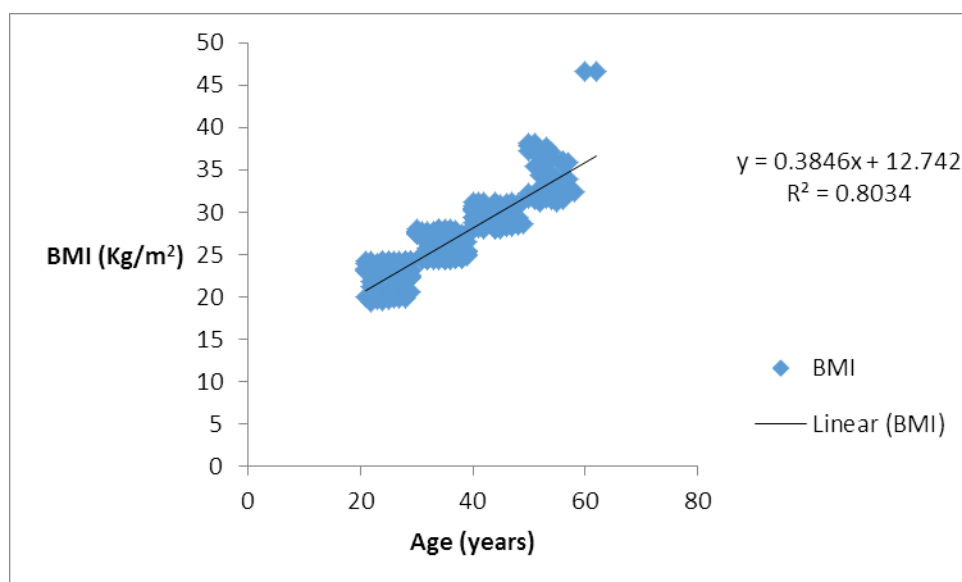


Figure 1: Scattered diagram showing correlation between Age and BMI of commercial motor drivers. ($r = 0.896$)

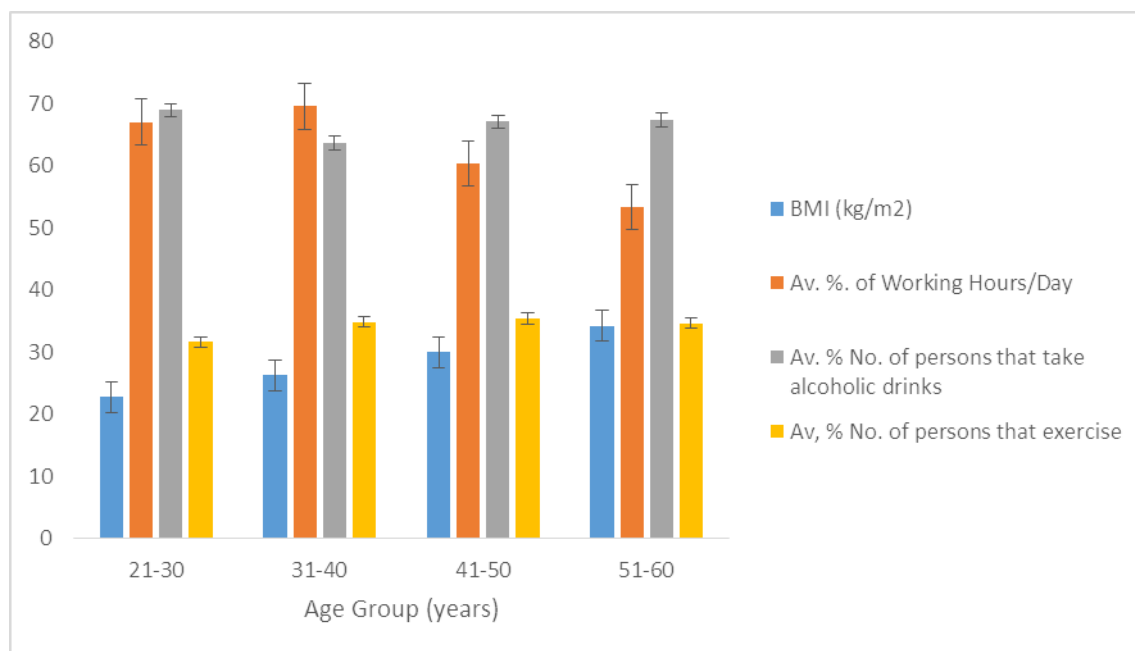


Figure 2: Comparism of BMI with some lifestyle patterns of CMDs across the various age groups

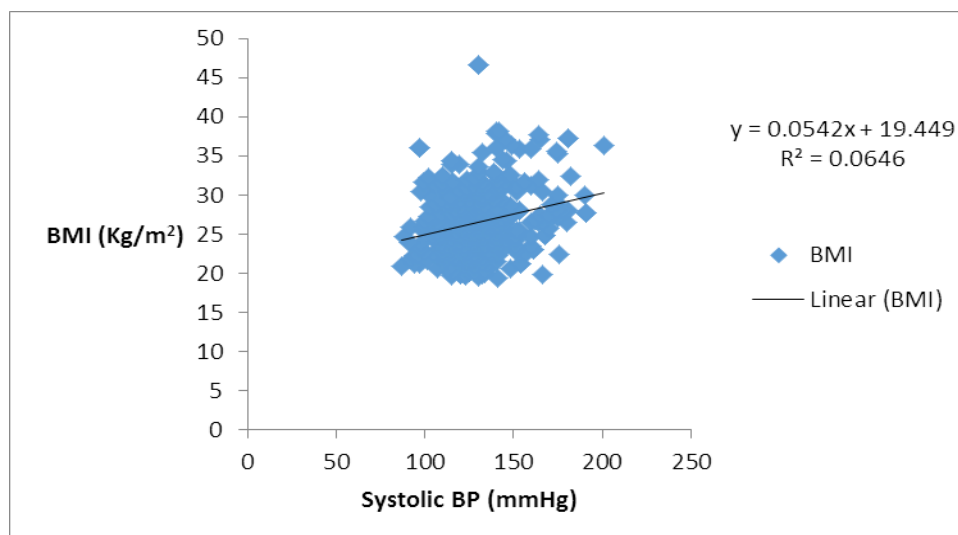


Figure 3: Scattered diagram showing correlation between BMI and SBP of commercial motor drivers. ($r = 0.254$)

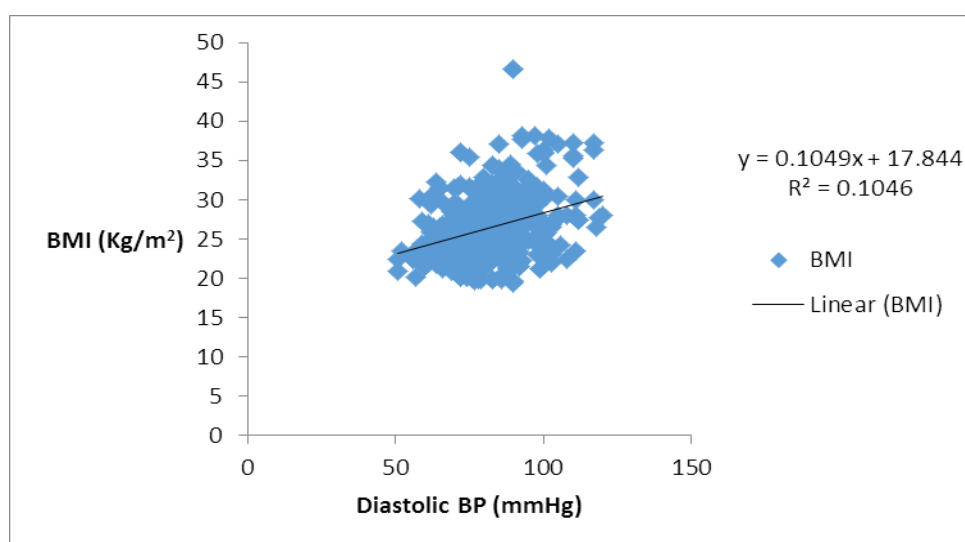


Figure 4: Scattered diagram showing correlation between BMI and DBP of commercial motor drivers. ($r = 0.323$)

TABLES

Table I: Mean Age and BMI of CMDs and their correlation across the various age groups

Age Group (years)	Mean age in Group $\pm$ SEM	Mean BMI (Kg/m ²) $\pm$ SEM	Correlation value	No. of persons in age group (n)
A (21 – 30)	25.80 $\pm$ 1.318	22.79 $\pm$ 0.73	0.412**	174
B (31 – 40)	35.79 $\pm$ 1.223	26.27 $\pm$ 0.35	0.238**	215
C (41 – 50)	44.94 $\pm$ 1.493	30.01 $\pm$ 0.86	0.436**	79
D (51 – 60)	54.31 $\pm$ 1.23	34.24 $\pm$ 1.29	0.297*	49

Table II: Comparison of systolic and diastolic blood pressures of CMDs across the various age groups

Age Group (years)	Mean Age in Group $\pm$ SEM	Mean BMI (Kg/m ²) $\pm$ SEM	Mean SBP (mmHg) $\pm$ SEM	Mean DBP (mmHg) $\pm$ SEM
21 – 30	25.80 $\pm$ 1.318	22.79 $\pm$ 0.73	*124.68 $\pm$ 1.13	78.24 $\pm$ 0.83
31 – 40	35.79 $\pm$ 1.223	26.27 $\pm$ 0.35	*128.32 $\pm$ 1.23	*81.76 $\pm$ 0.78
41 – 50	44.94 $\pm$ 1.493	30.01 $\pm$ 0.86	*134.05 $\pm$ 1.86	*86.39 $\pm$ 1.24
51 – 60	54.31 $\pm$ 1.23	34.24 $\pm$ 1.29	*136.96 $\pm$ 2.29	*87.55 $\pm$ 1.29

** $r = 0.207$

** $r = 0.270$

*Pre-hypertensive blood pressure readings recorded in CMDs using the classification by JNC7^[11]

**Correlation value of Age with Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) of all the CMDs irrespective of age group.

CONCLUSION

Driving a motor vehicle is a complex task involving perception, appropriate judgment, adequate response time, and reasonable physical capability. A range of medical conditions, as well as certain treatments may impair any of these factors. Such impairment may adversely affect driving ability, possibly resulting in accidents which may lead to injury, or even death. Given the many causative factors responsible for motor vehicle accidents, the extent to which medical conditions and treatments contribute may be difficult to assess. However, the recognition of the potential of a medical condition or the mindset of motor drivers being partly responsible for motor vehicle accidents cannot be over emphasized; especially as it concerns commercial motor drivers (CMDs) due to the fact that the lives of their passengers are in their custody when they drive.

This study has established that there is a positive correlation between BP and BMI in individuals as was seen among the CMDs. It is our recommendation that basic measurements of BP in comparison to an individual's BMI should be a routine assessment and requirement for the issuing and renewing of drivers licenses to individuals, especially licenses to be used by CMDs. We strongly recommend that the criteria for issuing drivers licenses should not be limited to one's driving performance only, but should also include one's health status.

Also, regular medical checkups between averages of three to six months should be enforced by the management/authorities of commercial motor parks where these drivers operate from. An enlightenment on lifestyle modification changes should also be done so as to orientate CMDs on the dangers of alcohol consumption, lack of exercise, and the lack of rest and sleep; as all the aforementioned are precursors for a high BMI and BP values, as this has been implicated as potential markers for vehicular road traffic accidents.

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