

Research Article

The Prevalence and Predictors of MetS Among Commercial Long Distance Bus Drivers (CLDBDs) in Cape Coast, Ghana

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Abstract

Background: Metabolic syndrome (MetS) is a foremost risk consideration for the development of cardiovascular disease which is a major cause of mortality around the globe. **Objective:** This study determined the prevalence and predictors of MetS amongst Commercial Long Distance Bus Drivers (CLDBDs) in Cape Coast, Ghana. **Methods:** A cross sectional study design that conveniently enrolled 170 registered male CLDBDs from five bus Unions. We included in the study long distance bus drivers registered at the unions, with a valid drivers' license C. Obesity was determined using the WHO cut-offs. We determined blood pressure among the drivers through diastolic and systolic readings of arterial blood pressures and categorized based on the WHO cut offs. Fasting blood glucose level was reached through laboratory analysis. The MetS was determined based on ATP III NCEP criteria. Percentages were presented for socio-demographic and lifestyle variables. Chi-square statistics was performed on socio-demographic, occupational and lifestyle factors associated with MetS. Multinomial logistic regression was used to determine the factors that predicted the likelihood of developing metabolic syndrome at 95% confidence interval (95%CI). **Results:** The average age and duration of commercial long-distance driving were 41 ± 8 years and 18 ± 8 hours respectively. About 14.2% were obese. A total of 22.4% had diastolic blood pressure 90 mmHg or higher and 21.2% had systolic blood pressure 140 mmHg or higher. About 2.2% of respondents had high levels of LDL-c and 8.8% had high HDL-c levels. Whilst 2.2% had high levels of triglyceride, 4.4% had high levels of total cholesterol (TC). About 82.6% had fasting blood glucose level > 6.1 mmol/L. The prevalence of MetS was 44% alcohol intake was statistically associated with metabolic syndrome ($p < 0.01$). Alcohol intake predicted MetS [OR=5.17; 95% CI: 1.75-15.2; $P=0.03$]. **Conclusion:** The prevalence of metabolic syndrome was high among this group. Out of the five symptoms used for MetS classification, fasting blood glucose proportion was highest and alcohol intake placed drivers at about five times at risk of development of MetS compared with drivers who do not.

Keywords

Central Region, Metabolic Syndrome, Alcohol, Bus Drivers, Prevalence

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1. Introduction

Metabolic Syndrome (MetS), formally known as insulin resistance group of conditions that together increase your risk of cardiovascular disease, Type 2 diabetes and stroke [1]. In many African countries MetS is cogitated to be of significant public health importance with pervasiveness varying among genders and ethnicity [2]. Although there are challenges in the determination of MetS prevalence as a result of the different classifications, the International Diabetes Federation (IDF) estimates that nearly 537 million people of across the globe suffers from MetS [3]. Kaur indicates that the prevalence of MetS varies widely across countries and lies within the range of 10–84% depending on factors such as ethnicity, gender, age, and race of population under consideration [4]. Although the underlying cause of MetS is not entirely assumed, insulin resistance and obesity are cogitated to be major players [5]. IDF estimates that nearly a quarter of the world's population suffers from MetS [6]. Around 20–30% of the adult population in most countries experience MetS [7]. There is also a projection that by 2045 persons between the ages of 20 and 79 living with diabetes will surge from 643 million in 2030 to 783 million [3]. In the case of the African region, the projected increase is 143%, being the highest on the globe, from 24 million in 2022 to 47 million by 2045 [3]. In Ghana, there has been a steady increased in the prevalences of chronic diseases among the adult population as reported by various reports of the Ghana Health Data Exchange [8]. Individual risk factors of MetS have repeatedly been recounted among Ghanaians and this embraces high blood pressure, obesity and diabetes [9]. There are concerns for an escalation of metabolic disorders among Ghanaians [10]. We believe that understanding the contribution of economic and lifestyle activities to MetS in the Ghanaian population is key to tailoring case management and preventing or reducing the proportion of individuals that have reduced quality of life as a consequence of the burden of diabetes and hypertension and other related metabolic risk factors. Adu-Asare & Steiner-Asiedu, acknowledged overweight and obesity proportions among short expanse drivers, taxi drivers, in Accra to be 41.6% and 38.8% respectively [10]. These data indeed indicate that commercial drivers of short distance are at risk and the need to estimate the long-distance drivers cannot be overstressed. The contribution of long-distance bus driving to MetS such as sitting and driving for long hours has not been investigated. We thus sought to establish the prevalence and predictors of MetS in commercial long-distance bus drivers (CLDBDs) in Cape Coast, Ghana.

2. Methods

Design: We adopted a quantitative cross-sectional approached.

Area and setting: This was in Cape Coast in the Central Region. We collected data from drivers in five transport unions

(bus stations). These are: (Tantri number 1, Tantri number 2, Francol Transport Services Ltd, Metro Mass Transit Services and Pedu Union). These unions have buses which ply routes that are further than 140 km cogitated to be long distance [11]. Cape Coast covers a total land mass of 9,826 square kilometers with an estimated population of 1,805,488 [12]. Cape Coast is sited within longitude 1°15'W and latitude 5°06'N and jackets a space of 122 square kilometers. The main business of the people is fishing undoubtedly because the southern portion of the township is delimited by the Gulf of Guinea.

Study participants: These encompassed 170 Commercial Long-Distance Bus Drivers (CLDBDs), in the Cape Coast metropolis.

Sample size determination: This study was snuggled in a study on hypertension and so we used the prevalence of hypertension in the the sample size determination. We estimated the sample size by means of the prevalence of hypertension in West African workforce which was 34.4% [13]. We used the formula: $n = Z^2 pq/d^2$. Where n = estimated sample size, Z = confidence level (95% level of confidence - 1.96), p = the probability of having hypertension, (Prevalence = 34.4%) = 0.344, $q = 1 - p$, which is the probability of not having hypertension, in this case: $1 - p = 0.656$, $d = 0.05$ as the acceptable margin of error. The population of CLDBDs was =325. Therefore, $n = (1.96)^2 (0.344) (0.656) (0.05)^2 = 347$. Correction for finite population $n / \{1 + (n / \text{population})\} = 165$. We rounded the calculated figure up to 170 to upturn the exactness of the estimates.

Sampling method: The list of CLDBDs was gotten from the supervisors of the five transport unions. The number of potential respondents needed from each union to make up the sample size was calculated through weighting. Simple random sampling was used to recruit respondents from each union. Those sampled were given identification tags.

Inclusion and exclusion criteria: We included only long-distance bus drivers with a valid drivers' license C registered at the unions. Drivers who did not have License C and also those who worked at the locations but were not registered at the unions were excluded.

Anthropometric measurements: Height was measured using stadiometer (model: HM200P Charder USA) following standard protocol [14].

Measurement of blood pressure: A standardized digital Omron automatic blood pressure monitor (HEM-172CN2; Omron, China) was used. Classification was done based on the categories [15]. Blood pressure above 140 mmHg and 90 mmHg respectively were used as the reference points.

Fasting blood glucose and lipid measurements:

Commercially available rapid diagnostic test kits were used to measure these parameters (Model HumaSens Human GmbH; Wiesbaden-Germany) through standard protocol and measured to the nearest 0.01 mmol/L. The lipid profile, was measured through (Model CardioChek P A; POCD Australia).

The serum cholesterol fractions levels were estimated in 0.01 mmol/L. The WHO (1999) and the ATP III NCEP classifications were used for the categorization [16].

Training and pretesting of questionnaire: We trained the data collectors for two days at the University of Ghana staff resource Centre on interview skills and anthropometrics. We

pretested every aspect of the questionnaire at Madina Lorry Park was the location for pretesting. About 5% of CLDBDs who ply Madina-to-Aflao, Madina-to-Kpando, Madina-to-Ho, and Madina-to-Hohoe were used. Following this, we made modifications to the questionnaire and also identified the best time to conduct the study.

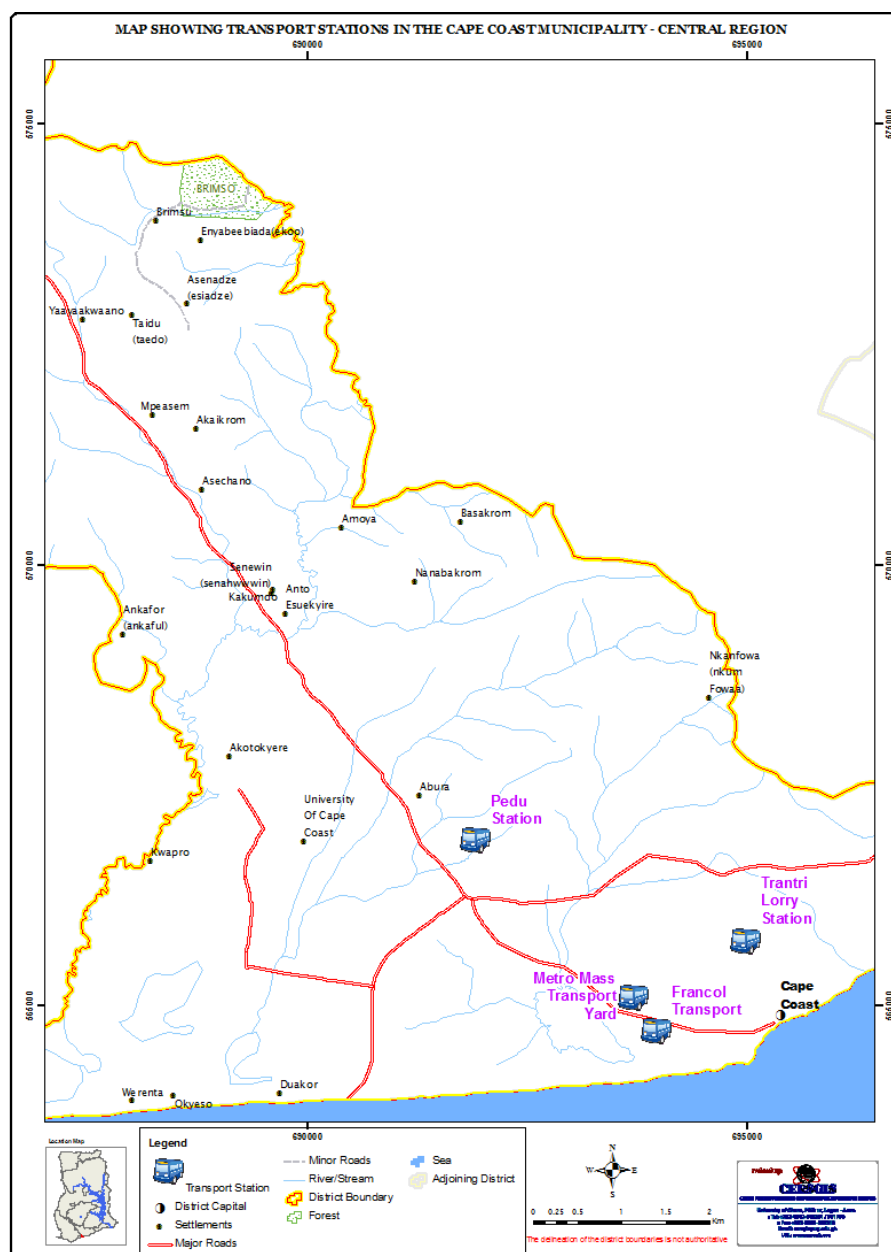


Figure 1. Map of Central Region showing the bus unions.

Classification of Study Variables

BMI classification: Anthropometric measurements were converted into the WHO cut-offs. The values were: Underweight: < 18.50; Normal weight: 18.5–24.99; Overweight: ≥ 25.00; Obese class I: 30.00–34.99; Obese class II: 35.00–39.99 and Obese class III: ≥ 40.00 [14].

Hypertension classification: This was done based on the

WHO categorization. [15].

Serum lipids classification (mmol/L):

We categorized the Low density lipoprotein fraction as: normal (< 2.59); near normal (2.59– 3.35); borderline high (3.36– 4.12) and high (4.13 – 4.90). For the triglycerides (TG) we have two categories which are: normal (< 1.70) and borderline high (1.70– 2.25). High density lipoprotein (HDL-c)

fraction was classified as: Low (<1.04), normal as (>1.04 ≤1.54) and high as (1.55 or more). We categorized Total cholesterol (TC) into: desirable (< 5.18), borderline high (5.18- 6.20) and high (6.21 and above). The ratio of total cholesterol and HDL-c category was: desirable (<= 4.5), and risk for CVD (> 4.5).

Fasting blood glucose (mmol/L)

This was categorized as: below normal (<3.6), normal (3.6-6.1) and high blood glucose level (> 6.1)

Classification of Metabolic Syndrome

This was based on the ATP III NCEP criteria of Triglyceride, High Density Lipoprotein, < 1.04 mmol/L; Low Density Lipoprotein 6.21 mmol/L; BMI, underweight <18.5, normal 18.5-24.99, overweight/obese >25 kg/m²; fasting blood glucose > 6.1 mmol/L; high blood pressure >140/90.

Data analysis:

We encoded data, doubly recorded into IBM SPSS Inc. version 16 (Chicago, Illinois, USA).

Proportions were presented for socio-demographic, occupation and lifestyle features. Descriptive statistics was presented for the five selected categorized metabolic syndrome indicators. Chi-square statistics was performed on socio-demographic, occupational and lifestyle features related with MetS. Multinomial logistic regression was used to estimate the factors that forecasted the likelihood of developing metabolic syndrome at 95% confidence interval (95%CI).

Ethical issues: Consent was sought from each respondent before recruitment. Those who were found to have hypertension were immediately referred to Cape Coast Teaching Hospital for physician attention. Ethical authorization (#004/12-13) was given by Institutional Review Board of Noguchi Memorial Institute for Medical Research, University of Ghana, Legon.

3. Results

Socio-demographic, Lifestyle and Lifestyle Characteristics of CLDBDs

All the respondents in this study were men (Table 1) with mean age of 40.78 ± 8.26 years. About 76.5% had completed JHS/MSLC schooling. The mean years of driving commercial vehicle was 18.46 ± 8.48 with majority 88 (51.8%) of them driving for 18 years or less. They drive for 2.96 ± 0.76 mean hours with utmost of them driving in the range of 2-3 hours 126 (74.1). The top number of voyages made in a day was two with 55.3% making one rounded trip. The turn-around time ranged between 1 – 24 hours with 52.9% having a turn-around stint of 1 hour.

Table 1. Socio-demographic, occupational and lifestyle characteristics of CLDBDs (N = 170).

| Characteristics | n (%) |
|-----------------|-------|
| Age (years) | |

| Characteristics | n (%) |
|----------------------------------------------|------------|
| < 35 | 45 (26.5) |
| 35-40 | 39 (22.9) |
| 41-45 | 42 (24.7) |
| ≥46 | 44 (25.9) |
| Educational Level | |
| None/ Primary | 13 (7.6) |
| ¹ JHS/MSLC/ | 130 (76.5) |
| ² SHS/GCE (OL)/Tech/Voc | 26 (15.3) |
| Tertiary | 1 (0.6) |
| Years of commercial driving | |
| ≤ 18 | 88 (51.8) |
| ≥ 19 | 82 (48.2) |
| Hours driven to destination | |
| 2-3 | 126 (74.1) |
| >3 | 44 (25.9) |
| Number of round trips in a day | |
| 1 | 94 (55.3) |
| 2 | 76 (44.7) |
| Turn- around time back to Cape Coast (hours) | |
| 1 | 90 (52.9) |
| 2 | 61 (35.9) |
| 3 | 18 (10.6) |
| 24 | 1 (0.6) |
| Lifestyle Practices | |
| Alcohol intake | |
| Yes | 78 (45.9) |
| No | 92 (54.1) |
| Type of alcohol | |
| Spirit | 42 (53.8) |
| Beer | 35 (44.9) |
| Wine | 1 (1.3) |
| Tobacco use | |
| Yes | 3 (1.8) |
| No | 167 (98.2) |

¹JHS/MSLC denotes Junior High School/Middle School Leavers Certificate ²SHS/GCE (OL/AL)/Tech/Voc denotes Senior High School/ General Certificate Examination (Ordinary level/Advance Level)/ Technical School level/Vocational Education CLDBDs denotes commercial long distance bus drivers.

Metabolic Syndrome Indicators Among the CLDBDs

Table 2 shows the categorized metabolic indicators of the drivers. The mean BMI (kgm^2) was 25.4 ± 4.2 and 14.2% were obese. A total of 21.2% had systolic blood pressure 140 mmHg or higher and 22.4% had diastolic blood pressure 90 mmHg or more (Table 2). The mean concentration of low-density lipoprotein (LDL-c) was 1.3 ± 0.7 mmol/L and

2.2% of respondents had high levels of LDL. The mean concentration of high-density lipoprotein (HDL-c) level was 1.5 ± 0.7 mmol/L and 8.8% had high HDL levels. Whilst the mean triglyceride (TG) level was 1.0 ± 0.1 mmol/L, 2.2% had high levels. About 4.4% had high levels of total cholesterol (TC) and the mean for the respondents was 1.1 ± 0.4 (mmol/L). The mean fasting glucose level was 6.5 ± 1.9 mmol/L.

Table 2. Descriptive statistics of metabolic syndrome indicators among the CLDBDs.

| Measurements | n (%) |
|------------------------------------------------|-------------------|
| Body Mass Index (BMI) | 25.39 ± 4.22 |
| Underweight | 5 (2.9) |
| Normal | 79 (46.5) |
| Overweight | 62 (36.5) |
| Obese | 24 (14.1) |
| Systolic blood pressure (mmHg) | 130.51 ± 18.1 |
| Normal | 134 (78.8) |
| High | 36 (21.2) |
| Diastolic blood pressure (mmHg) | 81.03 ± 13.72 |
| Normal | 132 (77.7) |
| High | 38 (22.3) |
| Fasting blood glucose (mmol/L) (n=109) | 6.50 ± 1.86 |
| Low | 1 (0.9) |
| Normal | 18 (16.5) |
| High | 64 (58.7) |
| Very high | 26 (23.9) |
| Triglycerides (mmol/L) (n=91) | 0.77 ± 0.34 |
| Normal | 89 (97.8) |
| High | 2 (2.2) |
| Low density lipoprotein (mmol/L) (n=91) | 2.01 ± 0.75 |
| Low | 74 (81.3) |
| High | 17 (18.7) |
| High density lipoprotein (mmol/L) (HDL) (n=91) | 1.03 ± 0.39 |
| Low | 54 (59.3) |
| High | 37 (40.7) |
| Total cholesterol (TC) (mmol/L) (n=91) | 3.45 ± 0.81 |
| Normal | 86 (94.5) |
| High | 5 (5.5) |
| TC: HDL ratio (n=91) | 3.75 ± 1.40 |
| Normal | 57 (62.6) |
| High | 34 (37.4) |

| Measurements | n (%) |
|---------------------------|-----------|
| Metabolic syndrome (n=91) | |
| Absent | 51 (56.0) |
| Present | 40 (44.0) |

BMI (kg/m²): Underweight (<18.5); Normal (18.5-24.9); Overweight (25-29.9); Obesity (\geq 30); Systolic blood pressure (mmHg): Normal (\leq 140); High (>140); Diastolic blood pressure (mmHg): Normal (\leq 90); High (> 90); Triglycerides (mmol/L): Normal (< 1.70); Borderline high (1.70- 2.25); Total cholesterol (mmol/L): Desirable (< 5.18) Borderline high (5.18- 6.20) High (6.21 and above); Total cholesterol: HDL: Desirable (< = 4.5) Risk for CVD (> 4.5); High Density Lipoprotein (HDL): Desirable (< 5.18) Borderline high (5.18- 6.20) High (6.21 and above); Fasting blood glucose (mmol/L): Below normal, (<3.6) Normal (3.6-6.1); High glucose level (>6.1)

Chi-square Statistics of Socio-demographic, Lifestyle and Occupational Factors Associated Metabolic Syndrome Among the CLDBDs

Relatively, less proportion of the drivers had family history of diabetes, hypertension and obesity, although these proportions were not statically associated with MetS development. The occupational and lifestyle variables were also not statistically related with the elaboration of metabolic syndrome but for alcohol ingestion, (Table 3; P= 0.01).

Table 3. Chi-square statistics of socio-demographic factors associated Metabolic Syndrome among the CLDBDs (N=170).

| Characteristics | Metabolic Syndrome | | | p-value |
|-----------------------------|--------------------|-----------|-----------|---------|
| | Absent | Present | Total | |
| Age (years) | | | | |
| <35 | 14 (27.5) | 7 (17.5) | 21 (23.1) | 0.35 |
| 35-40 | 15 (29.4) | 9 (22.5) | 24 (26.4) | |
| 41-45 | 12 (23.5) | 10 (25.0) | 22 (24.2) | |
| \geq 46 | 10 (19.6) | 14 (35.0) | 24 (26.4) | |
| Educational level | | | | |
| None | 0 (0.0) | 1 (2.5) | 1 (1.1) | 0.17 |
| JHS/MSLC | 46 (90.2) | 31 (34.1) | 77 (84.6) | |
| SHS | 2 (3.9) | 6 (15.0) | 8 (8.8) | |
| OTHER | 3 (5.9) | 2 (5.0) | 5 (5.5) | |
| Years of Commercial driving | | | | |
| <14 | 21 (41.2) | 14 (35.0) | 35 (38.5) | 0.58 |
| 14-21 | 14 (27.5) | 9 (22.5) | 23 (25.3) | |
| >21 | 16 (31.4) | 17 (42.5) | 33 (36.3) | |
| Hours to destination | | | | |
| \leq 3 | 36 (70.6) | 29 (72.5) | 65 (71.4) | 0.84 |
| >3 | 15 (29.4) | 11 (27.5) | 26 (28.6) | |
| Turn around time | | | | |
| \leq 4 | 28 (54.9) | 23 (57.5) | 51 (56.0) | 0.83 |
| >4 | 23 (45.1) | 17 (42.5) | 40 (44.0) | |
| Trips in a day | | | | |

| Characteristics | Metabolic Syndrome | | | p-value |
|-----------------|--------------------|-----------|-----------|---------|
| | Absent | Present | Total | |
| 1 | 27 (52.9) | 21 (52.5) | 48 (52.7) | 0.97 |
| 2 | 24 (47.1) | 19 (47.5) | 43 (47.3) | |
| Family history | | | | |
| Diabetes | 75(86) | 16 (9.0) | | 0.44 |
| Hypertension | 89(93.5) | 11 (6.5) | | |
| Obesity | 29(63.5) | 62 (36.5) | | |
| Alcohol use | | | | |
| Yes | 17 (33.3) | 25 (62.5) | 42 (46.2) | 0.01* |
| No | 34 (66.7) | 15 (37.5) | 49 (53.8) | |

Predictors of Metabolic Syndrome Among CLDBDs

Multinomial logistics regression was used to estimate the predictors of metabolic syndrome among the population. Drivers who consume alcohol are about five times more likely to develop metabolic syndrome linked with drivers who did not (Table 4; OR= 5.17; %95 CI=1.75-15.26; P< 0.03). The rest of the explanatory factors did not indicate any statistically significant associations with MetS development.

Table 4. Multinomial logistics regression of predictors of metabolic syndrome among CLDBDs.

| Variables | OR | 95 % confidence interval | | p-value |
|-----------------------------|------|--------------------------|-------|---------|
| | | Lower | Upper | |
| Age | | | | |
| <35 | 0.20 | 0.03 | 1.26 | 0.40 |
| 35-40 | 0.40 | 0.09 | 1.79 | |
| 41-45 | 0.45 | 0.11 | 1.89 | |
| ≥46 | 1.00 | | | |
| Years of Commercial driving | | | | |
| <14 | 1.67 | 0.36 | 7.65 | 0.52 |
| 14-21 | 0.75 | 0.20 | 2.85 | |
| >21 | 1.00 | | | |
| Hours to destination | | | | |
| ≤3 | 1.40 | 0.32 | 6.25 | 0.66 |
| >3 | 1.00 | | | |
| Turn around time | | | | |

| Variables | OR | 95 % confidence interval | | p-value |
|---------------------|------|--------------------------|-------|---------|
| | | Lower | Upper | |
| ≤4 | 0.85 | 0.22 | 3.37 | 0.82 |
| >4 | 1.00 | | | |
| Family history | | | | |
| Diabetes | 0.76 | 0.34 | 0.52 | 0.55 |
| High blood pressure | 0.57 | 0.35 | 0.38 | |
| Obesity | 1.0 | | | |
| Yes | 2.06 | 0.66 | 6.42 | 0.21 |
| No | 1.00 | | | |
| Alcohol use | | | | |
| Yes | 5.17 | 1.75 | 15.26 | 0.003* |
| No | 1.00 | | | |
| Fruit intake | | | | |
| Yes | 1.57 | 0.28 | 8.78 | 0.61 |
| No | 1.00 | | | |

*Significant at p-value< 0.05. Adjusted R²=0.23; OR's are adjusted for all variables in the table
1.0: reference values

4. Discussion

This cross sectional study was undertaken among 170 Long Distance Commercial Bus Driver (LDCBDs) in Cape Coast to determine the prevalence and determinants of metabolic syndrome (MetS). The combination of anthropometric and

biochemical variables permitted MetS diagnosis and provided insight into the individual MetS components and factors that are associated with it.

This study is the first that assess MetS among this cohort in Central region and Ghana. We found the prevalence of Metabolic syndrome (MetS) to be 44% based on the ATP III NCEP classification. The prevalence of MetS among Ghanaians was estimated by different studies in Ghana to range between 6 – 21.2% depending on the whether you used ATP III NCEP, WHO, and IDF guidelines. Gyakobo et al. measured MetS among Ghanaian rural residents and stated high prevalence of MetS [15% (ATP III)] Gyakobo et al. [17]. Their finding was among rural dwellers as compared to ours which was among urban dwellers. The lower prevalence among that cohort may be due to the fact they were rural folks and small industrialist whose occupation lifestyle and dietary intake may have an association with their findings. In other words, the dietary habits among the agrarian society may have been protective compared to our sample which were urban and usually eats away from home and also have different occupation and lifestyle. Their daily shift starts at about 5.00 am daily including weekends and holidays. Lifestyle and occupational practices differ among rural and urban dwellers. The lifestyle among Ghanaians has been noted to contribute to an escalation in MetS development [7] – specify the lifestyle for contextual relevance. Poor nutrition, poor sleep quality has been associated with MetS diagnosis, as well as with hyperglycemia, high triglycerides, low HDL cholesterol and obesity [18, 19]. The difference in gender of respondents could also be a factor since in Ghana females are more obese than men [7] and obesity has been implicated in the development of MetS.

Although a study has linked both short and long sleep interval in MetS risk. [20], sleep was not a significant predictor of MetS in this study. Among the occupation variables, turn-around time, hours driven to destination, number of round trips, some of which were in the night turned out to be potential protective factor for MetS development among our population. The higher prevalence reported in our study could be due to the proportion of respondents with high fasting blood glucose and is in consonance with [21]. They reported a higher MetS prevalence of (29.2%) among Nigerians when some of the respondents had type 2 diabetes. Prevalence of high fasting blood (> 6.1 mmol/L) glucose was 82.57% among the drivers. This high fasting blood glucose level can lead to the development of type 2 diabetes, damages to nerves, blood vessels and some organs of the body [22].

Empirical evidence points to an increase in the prevalence of hypertension [23], diabetes mellitus [24], hyperlipidemia, and obesity [25], which are individual components of MetS, is in Ghana and in West Africa [26].

Obesity which is one of the indicators of MetS development is lower in our group (14.2%) compared with the national prevalence of obesity (23.1%) for males 20 years and older [27]. Our lower BMI value may be due to lower dietary energy intake among the population as suggested by our data.

It has been noted driving is not a sedentary activity and therefore some amount of energy is expended in conveying passengers. Our results are dissimilar to a study in Ghana which establish high prevalence of overweight and obesity among commercial minibus (trotro) drivers and among taxi drivers by Adu-Asare and Steiner-Asiedu [10]. The same trend was discovered among qualified bus and truck drivers [28]. The socio-demographic and occupational correlates such as in the commercial long distance bus driving would have to be pondered in preventive efforts [29].

This could be due to the fact that alcohol intake is independently related to obesity in men since it is a form of empty calorie [30]. Our respondents could have been involved in the habit because intake of alcohol has been shown to increase the risk of hypertension in black men [31]. Asiamah et al. found drivers used alcohol because it is thought to have a relaxation effect, removes their inhibitions, upturn their driving confidence level, builds-up acquaintances and, also because of the savor [32]. About 50% of the respondents took alcohol and these may have accounted for alcohol intake precipitating development of MetS in this group. The study design is strong in its ability to provide a quick, cost-effective snapshot of long-distance bus drivers in Cape Coast and their characteristics. However, its reliance on non-probability sampling, cross-sectional nature, and inability to establish causality or account for temporal changes pose limitations. Therefore, careful interpretation of results is required, especially regarding generalizability and causation. We believe the cross-sectional nature and the sample size may have reduced the relevance of the findings in terms of generalization. However, we added a margin to the calculated sample size to surge the accuracy of the assessments. The differences in the subset of respondents who presented data on serum and BP could also be a reason.

5. Conclusion

The prevalence of MetS is high from the study. The exposure to occupational long-distance driving did not appear as a factor in MetS manifestation among the group however, alcohol intake predicted MetS. Counselling against alcohol intake should be part of treatment protocols among this group.

Abbreviations

| | |
|---------|-------------------------------------|
| ATP III | Adult Treatment Panel III |
| BMI | Body Mass Index |
| CI | Confidence Interval |
| CLDBDs | Long Distance Commercial Bus Driver |
| CVR | Cardiovascular Risk |
| DSP | Diastolic Blood Pressure |
| FBS | fasting Blood Glucose |
| GHDx | Ghana Special Demographic and |

| | |
|--------------------------|----------------------------------------------------------------------|
| GSS | Health Survey |
| HDL-c | Ghana Statistical Services |
| IBM SPSS | High Density Lipoprotein |
| | Statistical Package for the Social Sciences |
| IDF | International Diabetic Federation |
| JHS | Junior High School |
| LDL-c | LOW Density Lipoprotein |
| MetS | Metabolic Syndrome |
| MSLC | Middle School Leavers Certificate |
| NCEP | National Cholesterol Education Programme |
| OR | Odds Ratio |
| SBP | Systolic Blood Pressure |
| SHS/GCE (OL/AL)/Tech/Voc | Senior High School/ General Certificate Examination (Ordinary Level) |
| TC | Total Cholesterol |
| TG | Triglyceride |
| WHO-ISH | World Health Organization-International Society of Hypertension |
| WHO | World Health Organization |

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Author Contributions

Heckel Amoabeng Abban: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing

Jacob Setorglo: Conceptualization, Data curation, Formal Analysis, Methodology, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Christiana Nsiah-Asamoah: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing

Samuel Acquah: Data curation, Formal Analysis, Methodology, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

Matilda Steiner-Asiedu: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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