



Original Research Article

Volume 12, Issue 4 -2026

DOI: <http://dx.doi.org/10.22192/ijcrms.2026.12.04.001>

Haematological and Anthropometric Variables in Commercial Food Vendors in Port Harcourt Metropolis, Rivers State

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Abstract

30 apparently healthy commercial food vendors and 30 apparently healthy persons who are not commercial food vendors (students) were recruited for this study. The test group has been on the job for at least five months. The following parameters were accessed, Packed Cell Volume (PCV), Erythrocyte Sedimentation Rate (ESR), Haemoglobin Estimation (HB), Total White Blood Cell Count (TWBC), Differential Count, Body Mass Index (BMI), Waist – Hip Ratio, Systolic Blood Pressure, Diastolic Blood Pressure, Red Blood Cell Count. The result showed significant differences ($P < 0.05$) in Body Mass Index in age ranges of 18 – 22 and 33 – 37. the Packed Cell Volume and Erythrocyte Sedimentation Rate of the age ranges 18 – 22, 23 – 27 and 33 – 37. The total white blood cell count, the neutrophils, lymphocytes, monocytes, eosinophil's and basophils were insignificant ($P > 0.05$). Commercial foods are intimately connected with junk food, snacks, without nutritional fact labels to indicate nutritional contents and servings per person. To this effect, the test group may be overfeeding themselves without knowing and thereby exposing themselves to risk of being overweight.

Keywords: Hematological parameters, Anthropometric indices, Food vendors, Nutritional status, Occupational health.

Introduction

Commercial food vendors are people who sell food along the streets. Fast food is the term given to food that can be prepared and served very quickly. While any meal with low preparation time can be considered to be fast, typically, the term refers to food sold in a restaurant or store

with low quality preparation and served to the customer in a packaged form or take out/take away. The term fast food was recognized in a dictionary by Merriam – Webster in 1951. Outlets may be stands or kiosks which may provide no shelter or seating or fast food restaurants.

Franchise operations which are part of restaurants chains have standardized food stuffs shipped to each restaurant from central locations [1-3].

Fast food in areas which have access to constant or tidal waters, include local shell fish or seafood, such as oysters or as in London the eels. Often this seafood would be cooked directory on the quay or close by. Most of these outlets are take away or take out providers, often with a drive through service which allows customers to order and pick up food from their cars; but most also have a seating area in which customers can eat the food on the premises. People eat there more than five times a week and often one or more of those times are at a fast food restaurant [4-5]. Nearly from its inception, fast food has been designed to be eaten on the go, often does not require traditional cutlery, and is eaten as a finger food. Common menu at fast food outlets include fish and chips, sandwiches, pittas, hamburgers, fried chicken, French fries, chicken nuggets, tacos, pizza, hot dogs and ice cream, although many of the outlets offer slower foods like chili, mashed potatoes and salads [6-7].

Materials and Methods

Research Design: The study is experimental descriptive survey. It tends to investigate the relative hematological and anthropometric changes in commercial food vendors in Port Harcourt Metropolis Rivers State.

Area Of Study: The geographical location of this study is Port Harcourt Metropolis, Port Harcourt Metropolis Rivers State.

Population Study: A total of 30 persons were recruited for the study; they are commercial food vendors (fast food in particular) we also recruited 30 individuals who are not commercial vendors (students)

Sample Collection: Blood samples were collected for the study 3ml of venous bloods was collected from each subject via anticubital vein using a disposable plastic syringe. It was dispensed into on ethylene diaminetetracetic acid

(EDTA) bottle. Samples were analysed within few hours of collection.

Method:

1. Blood samples were properly mixed and the capillary tubes filled with blood up to $\frac{3}{4}$ level by capillary action.
2. One end of the tube was sealed with plasticine a sealant.
3. The tube was spume at 1200g for 5 minutes using haematocrit centrifuge.
4. The haematocrit reader was used to read the packed cell volume in percentage

Erythrocyte Sedimentation Rate (Esr)

Method: westergreen

Procedure:

1. 0.4ml of sodium citrate was added into a small test tube.
2. It was made up to 2ml by adding 1.6ml of well mixed venous blood and mixed together
3. With the help of pipette filler, the blood was filled in to a westegreen pipette.
4. It was stood vertically on the stand.
5. The time was set for one hour and it was placed where there is no direct exposure to sunlight.

Haemoglobin Estimation (Hb)

Method: cyanmethaemoglobin

Procedure

1. 20 um (0.02ml) of well mixed venous blood was measured and dispensed into 4ml of drabkins solution.
2. The tube was stoppered mixed and left at room temperature away from sunlight for 4-5 minutes.
3. The wavelength was set at 540nm
4. The colorimeter was blanced at zero with drabkins fluid and the absorbance was read.
5. A chart was used to read the haemoglobin value.

Red Blood Cell Count (Rbc Count)

Procedure

1. 0.02ML of EDTA BLOOD sample was added to 4ml of the diluent (formol citrate) it was well mixed.
2. By capillary action a drop of the mixture was left to stand for about 10 minutes.
3. The squares of the central value area was counted under x40 objective lens and calculated.

Total White Blood Cel Count (Twbc)

Procedure

1. 0.38ML of Turks fluid was pipetted into khan tubes.
2. 0.02ml of blood was added the turks fluid mixed and allowed to stand for about 5 minutes.
3. A clean cover slip was placed on the counting chamber until newton rings appeared on the slide.
4. The chamber was charged with mistures and the white cells allowed to settle for a while.
5. The white cells were counted with the 100mm objective and x10 eye piece in the four 1mm²area.
6. The total white cell count was calculated as follows

$$TWBC = \frac{N \times DF \times 10^6}{D \times A}$$

Where N is the number of cells calculated. DF is the dilution factors D is the depth of the chamber. A is the area of the chamber and 10⁶ converts the number to 10⁹ per liter

Differential count

Procedure:

1. A thin peripheral blood film was made on a clean grease free glass slide.
2. The film was allowed to air dry
3. The slide was placed on a staining rack and the blood film was covered with leishman stain for 2 minutes.

4. Buffer water of PH 6.8 was added (volume twice that of the stain)
5. The stain was washed off with t ap water after 8 minutes and was allowed to air dry.
6. Immersion oil was added and using x100 objective to focus. The cells were counted.

Body mass index:

Method: $\frac{\text{weight in kilogram}}{\text{Height in meters}^2}$

Materials: weighing balance, tape.

Procedure:

1. This subject is allowed to feet on the weighing scale making sure that he is not holding anything. The two hands should be down then readings were taken in kilogram.
2. With the aid of measuring tape, the height was measured starting from the occipital bone to the end of the heels readings were taken in centimeter it was later converted to meters by dividing with 100. It was then squared.

(ii) WAIST –HIP RATION

Material: Measuring tape

Procedure: The measuring tape was placed round the waist of the subject was placed directory above the upper hip bone readings were taken in centimeter.

The hip circumference was also measured with the use of the tape calculation waist –tip ratio= waist circumference

Hip circumference

(iii) BLOOD PRESSURE:

Material:

Sphygmomanometer

Procedure:

The cuff is placed 1-2 cm above the elbow joint the palm was placed on a flat surface facing up

and with the rubber the rubber tube running down the center of the arm. The cuff was tightened as the apparatus is pumped the systolic and diastolic pressure was noted.

Results

The age range is 18-22 years.

In this age range, all other parameters except BMI, PCV, Hb, ESR AND RBC were significant due to the difference between their environments. Test group has easy access to commercial foods which are mainly fast food like sandwiches, hamburgers, salads, French fries among others which have high calories and iron giving nutrients. The mean \pm standard deviation of test and control. The age range is 23-27 years. In this age range the waist-hip ratio was statistically significant (table 1). This can be an indication of possible risk of being obese. Ranges greater than 0.7 has been found to be more predictor of possible cardiovascular risk factors, it indicates body fat distribution and other risks like hypertension and type 2 diabetes mellitus. Nutrition affects erythropoietic status. Dietary sources of iron like vegetables, unripe plantain is within the reach of the commercial food vendors compared to the control hence, there was a significant increase in packed cell volume, haemoglobin level, and red blood cell count (table 2).

Table 3: The mean \pm standard deviation of test and control. The age range is 28-32 years.

In this age range other parameters except the waist – hip ratio and red blood cell count were statistically insignificant. For waist – hip ratio and red blood cell count, $p < 0.05$. Waist – hip ratio indicates body fat distribution. The energy output of the commercial food vendor is less than energy input per day. They eat food with high calories and do not burn them up. Most of them are sedentary workers.

Table 4: The mean \pm standard deviation of test and control. The age range is 33 –37 years.

In this age range, the body mass index, waist - hip ratio, systolic and diastolic blood pressure were statistically significant. ($P < 0.05$). The body mass index and waist - hip ratio are used to measure weight category, hence risk of cardiovascular diseases like hypertension and type 2 diabetes mellitus. The high waist – hip ratio indicates larger fat distribution. Fast food snacks are associated with trans-fat. The commercial food has no nutritional fact label, the people that sell it will not know when they exceed the recommended dietary allowance for each nutrient; hence they gain more weight with higher fat in their body. BMI has been known to correlate with waist – hip ratio. Normally, people with increasing BMI often have waist – hip ratio more than 0.7.

Table 1: Mean and standard deviation of the test and control group at age interval of 18 -22 years

Parameters	Test	Control	P Value
BMI	23.86 \pm 2.52	21.93 \pm 1.41	P<0.05
WHR	0.97 \pm 0.04	0.79 \pm 0.03	P>0.05
PCV(%)	41.21 \pm 4.76	37.07 \pm 3.27	P<0.05
HB (g/dl)	12.16 \pm 1.32	11.16 \pm 0.99	P<0.05
ESR (mm/hr)	10.14 \pm 2.63	10.86 \pm 3.18	P<0.05
RBC (x10 ¹² /L)	5.07 \pm 0.79	3.29 \pm 0.99	P<0.05
TWBC (x10 ⁹ /L)	4.99 \pm 1.95	5.51 \pm 1.95	P>0.05
Neutrophils (%)	64.78 \pm 11.74	63.50 \pm 13.09	P>0.05
Lymphocytes (%)	32.43 \pm 12.21	33.43 \pm 11.97	P>0.05
Monocytes (%)	1.64 \pm 0.93	2.21 \pm 1.31	P>0.05
Eosinophils (%)	0.79 \pm 0.97	0.71 \pm 0.61	P>0.05
SBP (mmHg)	110 \pm 7.84	106 \pm 8.42	P>0.05
DBP (mmHg)	68.57 \pm 5.35	67.14 \pm 8.25	P>0.05

KEY:PCV = Packed cell volume, ESR = Erythrocyte sedimentation rate, Hb=Haemoglobin, TWBC=total white blood cell count, BMI =body mass index, WHR=Waist – hip ratio, SBP=systolic blood pressure, DBP = Diastolic blood pressure

Table 2: Mean and standard deviation of the test and control group at age interval of 23-27 years

Parameters	Test	Control	P Value
BMI	23.65±3.15	21.19±0.96	P>0.05
WHR	0.79±0.03	0.75±0.03	P<0.05
PCV (%)	38.29±2.06	33.85±1.77	P<0.05
HB (g/dl)	11.47±0.49	10.11±0.50	P<0.05
ESR (mm/hr)	10.57±1.90	13.86±1.46	P<0.05
RBC (x10 ¹² /L)	5.07±0.79	3.29±0.99	P<0.05
TWBC (x10 ⁹ /L)	6.23±1.89	5.66±2.81	P>0.05
Neutrophils (%)	61.14±18.60	64.28±15.73	P>0.05
Lymphocytes (%)	37.57±18.73	32.57±14.39	P>0.05
Monocytes (%)	1.14±1.21	2.00±1.63	P>0.05
Eosinophils (%)	0.14±0.38	1.14±0.89	P>0.05
SBP (mmHg)	108.57±8.99	100.00±0.00	P>0.05
DBP (mmHg)	70.00±8.16	61.43±3.78	P>0.05

KEY: PCV = Packed cell volume, ESR = Erythrocyte sedimentation rate, Hb=Haemoglobin, TWBC=total white blood cell count, BMI =body mass index, WHR=Waist – hip ratio, SBP =systolic blood pressure, DBP= Diastolic blood pressure

Table 3: Mean and standard deviation of the test and control group at age interval of 28-32 years

Parameters	Test	Control	P Value
BMI	26.36±4.11	21.83±0.64	P>0.05
WHR	0.89±0.40	0.76±0.05	P<0.05
PCV (%)	37.20±2.17	34.4±2.61	P>0.05
HB (g/dl)	11.14±0.68	10.38±0.89	P>0.05
ESR (mm/hr)	11.20±2.68	12.80±2.04	P>0.05
RBC (x10 ¹² /L)	4.89±0.96	3.39±1.08	P<0.05
TWBC (x10 ⁹ /L)	5.40±0.91	5.70±3.07	P>0.05
Neutrophils (%)	60.60±11.13	59.80±16.84	P>0.05
Lymphocytes (%)	37.40±10.64	37.00±15.02	P>0.05
Monocytes (%)	1.80±1.30	2.60±1.67	P>0.05
Eosinophils (%)	0.20±0.44	0.60±0.54	P>0.05
SBP (mmHg)	118.00±4.47	114.00±8.94	P>0.05
DBP (mmHg)	78.00±4.47	74.00±8.94	P>0.05

KEY: PCV = Packed cell volume, ESR = Erythrocyte sedimentation rate, Hb=Haemoglobin, TWBC=total white blood cell count, BMI =body mass index, WHR=Waist – hip ratio, SBP =systolic blood pressure, DBP= Diastolic blood pressure,

Table 4: Mean and Standard deviation of the test and control group at age interval of 33-37

Parameters	Test	Control	P Value
BMI	31.69±3.73	22.42±0.51	P<0.05
WHR	0.91±0.02	0.74±0.35	P<0.05
PCV (%)	37.50±4.51	33.25±1.36	P>0.05
HB (g/dl)	11.40±1.36	9.95±0.41	P>0.05
ESR (mm/hr)	12.25±3.59	13.50±1.91	P>0.05
RBC (x10 ¹² /L)	4.70±0.89	3.28±1.18	P>0.05
TWBC (x10 ⁹ /L)	4.83±1.36	6.02±3.59	P>0.05
Neutrophils (%)	56.75±14.55	55.25±15.10	P>0.05
Lymphocytes (%)	41.50±13.77	40.77±14.36	P>0.05
Monocytes (%)	1.75±1.50	3.00±1.41	P>0.05
Eosinophils (%)	0.00±0.00	1.00±0.82	P>0.05
SBP (mmHg)	122.50±5.00	100.00±0.00	P<0.05
DBP (mmHg)	77.50±5.00	60.00±0.00	P<0.05

KEY: PCV = Packed cell volume, ESR = Erythrocyte sedimentation rate, Hb = Haemoglobin
 TWBC = total white blood cell count, BMI = body mass index, WHR = Waist – hip ratio
 SBP = systolic blood pressure, DBP = Diastolic blood pressure

Discussion

In this study, the following parameters were investigated; packed cell volume (PCV), Erythrocyte sedimentation rate (ESR), Haemoglobin Estimation (Hb), Red Blood Cell (RBC) count, Total and differential white cell count, body mass index (BMI), waist-hip ratio, blood pressure. In this study, the packed cell volume, the haemoglobin estimation erythrocyte sedimentation rate, Red Blood cell count, the body mass index of the test group was found to be statistically significant (P<0.05). The high BMI found in the test group at age ranges of 18-22 and 33-37. They found out that commercial foods are intimately connected with junk food, snacks, without nutritional fact label to indicate nutritional content and serving per person. Subsequently, the commercial food vendor may be overfeeding himself without knowing and hence exposed to the risk of being overweight. Most of the fast foods are associated with transfat. Hence the BMI increase in the group (P<0.05) [8]. The packed cell volume and erythrocyte sedimentation rate of the test group were found to

be significant in the ranges of 18-22, 23-27. Haemoglobin estimation was also significant when compared with control. This can be explained by the fact that nutrition affects erythrocyte status which can lead to normal or abnormal haemoglobin values. (Pallister, 1998) the eosinophils, monocytes, were statistically not significant when compared to those of control (P>0.05). Genetics have been known to play a part in leucocyte count. Those with increasing body mass index in the test group (18-22) and 23-37) were also associated with raised waist – hip ratio as both indicate body fat distribution [9]. Preference varies from 0.6 in China to 0.8 or 0.9 in parts of South America and Africa. Women with 0.7 correlates with good health and fertility, less susceptible to major diseases like diabetes, cardiovascular disorders, and ovarian cancer. It has been found to be a predictor of mortality in older people [10].

Conclusion

Commercial food vendors have increased body mass index, waist – hip ratio, packed cell volume, haemoglobin level, systolic and diastolic blood pressure levels. Based on age group, those in the age ranges of 18-22 and 33-37 have higher body mass indices as well as waist – hip ratio. The trans fat which is found in fast food consumed by those age group plays a significant role in the weight of each of the age groups by increasing their weight. They are likely to be more susceptible to major diseases like type 2 diabetes mellitus, ovarian cancer.

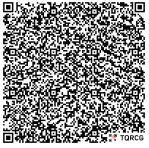
Acknowledgements

Lateral border of the scapula terminates superiorly at glenoid cavity (GC) which articulates with the head of the humerus to form gleno-humeral joint.¹ The articular surface of GC is pear shaped, with its inferior half being 20% larger than the superior half.²

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	Website: www.ijcrims.com
	Subject: Haematology
Quick Response Code	
DOI: 10.22192/ijcrms.2026.12.04.001	

[How to cite this article:](#)

Miriam Daberechi Nwuzor. (2026). Haematological and Anthropometric Variables in Commercial Food Vendors in Port Harcourt Metropolis, Rivers State. *Int. J. Curr. Res. Med. Sci.* 12(4): 1-8.

DOI: <http://dx.doi.org/10.22192/ijcrms.2026.12.04.001>