ANTHROPOMETRIC INDICES AND CARDIOVASCULAR RISK OF POLYTECHNIC STUDENTS IN SELECTED TERTIARY INSTITUTION IN OGUN STATE SOUTH WEST NIGERIA.

[1]Nupo S.Sedodo. and [1]Ilori O. Adesola

[1]Department of Nutrition and Dietetics Moshood Abiola Polytechnic, Ojere, Abeokuta

ABSTRACT

Cardiovascular disease is one of the leading causes of morbidity and mortality associated with obesity. The BMI offers useful information that allows the overall assessment of adiposity, while waist circumference (CC) and waist / height index (ICE) assess abdominal adiposity as predictors of cardiovascular risk. This study was designed to determine anthropometric indices and cardiovascular risk of polytechnic students in Southwest Nigeria. A simple random technique was used to select about 2000 ready and willing regular students selected from Polytechnics in Southwest Nigeria. A pre-validated structured questionnaire was used to obtain information on the sociodemographic characteristics while anthropometric characteristics were evaluated to determine the weight, height, waist and hip ratio. The Body Mass Index was used to classify the Nutritional status while the Cardiovascular risk was classified according to World Health Organization standard. The result of the body mass index of the respondents showed that 75 % of the respondents had normal weight (18.5-24.9 kg/m^2), 11 % are overweight (25.5-29.9 kg/m^2), 3 % had obesity grade 1 (30.5-34.9 kg/m^2), 3 % had obesity grade 2 (30.5-34.9 kg/m^2) and 6 % are underweight (below 18.5 kg/m^2). The results of the Cardiovascular risk showed that 70 % had normal, 15 % had abdominal obesity which is the indicator of cardiovascular risk. The study revealed that the majority of the students had good body mass index while few had obesity grade 1 and 2. Also, the cardiovascular risk factor indicators are a little bit high. There is need for nutrition education and advocacy for the students.

INTRODUCTION

Cardiovascular disease (CVD) is the most common cause of morbidity and mortality worldwide, with ischemic heart disease and stroke as the leading causes of CVD-related deaths (Townsend *et al*., 2022; Roth *et al.*, 2017). Comprehensive treatment and prevention of CVD should include adherence to a healthy diet, a healthy body composition, and regular physical exercise. It is well known that an unhealthy lifestyle is associated with cardiovascular risk factors and can contribute to excess accumulation of (visceral) fat and subsequently lead to atherosclerotic processes (Ibanez *et al.*, 2017)**.**

Obesity has been identified as an important risk factor for cardiovascular disease development; however, other factors, combined to obesity or not, also exert influence on this risk and must be considered in cardiovascular risk stratification in pediatrics (Daniels *et al.*, 1999). Among these factors, waist circumference (WC)was highlighted as a visceral fat indicator which has already been well explored in the adult population and has more recently been identified as a risk factor in children and adolescents (Sjarif *et al.*, 2002). Evidence suggests the importance of measuring abdominal obesity besides general obesity for the evaluation of health risks in the first decades of life (Lee *et al.*, 2008).

Cardiovascular diseases are now becoming rampant among all categories of people in different life cycle. Students of the high citadel of learning are not exempted from this menace. Early detection of the signs of cardiovascular can be of tremendous help. Therefore, it is imperative that the anthropometric characteristics of young adults in ivory towers are assessed. This study was designed to the assess the anthropometric characteristics and cardiovascular risk factors of the undergraduates in South west Nigeria.

SUBJECTS AND METHODS

Study Location

This study was carried out in three selected institutions in Ogun state namely: Moshood Abiola Polytechnic, Abeokuta, Federal Polytechnic, Ilaro and Ogun State College of Health Technology, Ilese, Ogun State.

Study Population and Sampling

The study was descriptive and cross-sectional study was carried out in three selected institutions of the states in Nigeria between May to September 2021 when the project commenced and was consummated between January to May, 2023 when the final write-up was collated. The study population consisted of students in tertiary institutions in Ogun State.

Selection Criteria

- Participants were registered students in the selected institution.
- Those who had been clinically ill 24 hours previous to the day of the interview were excluded.
- Participants must not be on any medication

Sample Size Selection

Since part of the objectives of this study is to estimate the hypertensive proportion of subjects, a prevalence value of 40±2.5 % was used. The margin of error was put at 5 % and anticipated non-response rate at 10 % to obtain a minimum sample size of 2000.

Sampling Procedures

A multistage sampling procedure was be used to select the three Thousand students. For the second stage, students sampled were selected randomly. In the third stage, respondents were randomly selected from the sample institution.

Ethical Approval

Ethical approval for this survey was obtained from the Nutrition and Dietetic Moshood Abiola Polytechnic, Abeokuta Ethical committee and individual consent was sought and obtained from the participants. A full description of the aim and Objectives of the study was provided to the students and every participant, with a clear indication of the nature of questions. Firm assurances were given to them about the commitment of the research team to preserve the confidentiality of all the information provided. In line with the principles of informed consent, they were given the option to participate voluntarily or not in the survey. Subsequently those who consented participated in the study.

ANTHROPOMETRIC MEASUREMENTS

Anthropometric measurements such as weight, height, waist and hip circumference were taken using standard procedures described by Cogill, (2003). Body mass index and abdominal obesity were calculated from the measurements using World Health Organization standards: Underweight (<18.5 kg/m^2), Normal (18.5 kg/m^2 –24.9 kg/m^2), Overweight (25.0 kg/m^2 –29.9 kg/m^2), Obese I (30.0 kg/m^2 – 34.9 kg/m^2), Obese II (35.0 kg/m^2 – 39.9 kg/m^2),Obese III (≥40.0 kg/m^2) (WHO, 2000). The following cutoffs were used with regards to metabolic/cardiovascular disease screening: high-risk waist circumference (Visceral Obesity) ≥102 cm for men and ≥ 88 cm for women.

DATA ANALYSIS

Data analyses were carried out testing for gender variations as well as socio demographic variations in beverage consumption. Means and standard errors was calculated for continuous variables while proportions with percentages was calculated for categorical variables. Associations of beverage intakes with demographic and socio-economic characteristics were determined using analysis of variance (ANOVAs). Pearson correlation was used to determine the statistical difference between the variables.

RESULTS AND DISCUSSION

Anthropometrics Data of the Respondents

Table 1. shows the body mass index of the respondents, it showed that 75 % of the respondents had normal weight 18.5-24.9 kg/m^2, 11 % are overweight (25.5-29.9 kg/m^2), 3 % had obesity grade 1 (30.5-34.9 kg/m^2), 3 % had obesity grade 2 (30.5-34.9 kg/m^2) and 6 % are underweight (below 18.5 kg/m^2). In this present study, the prevalence of underweight, overweight, obesity grade1, and obesity grade 2 were discovered to be 6 %, 9 %, 3 %, and 3 % respectively. The percentage of respondents with obesity evaluated by body mass index in this study was in variance to the study carried out by Iwuala *et al.*, (2015) who conducted a similar study in Lagos state. This observation might be because of civilization in Lagos state and divergent study groups.

Table 2: Mean and Standard Deviation

Table 2 shows the mean and standard deviation of anthropometric measurement. It shows the mean and standard deviation of height (1.63±0.6), weight (53.59±10.2), Body Mass Index (2.07±596), waist (28.5±3.3), Hip (36.53±3.9), Waist to hip ratio (1.12±357) respectively. The mean and standard deviation of the anthropometric indices reveals that the study participants have healthy and good index. This is reflected in the good nutritional status observed among the study group. The percentage of respondents who were overweight was similar to that of Sola *et al*., (2011) who reported that 22 % of adults Nigerian living in rural and urban communities of Benue State were overweight. The Centers for Disease Control and Prevention (CDC, 2017) buttress the trend on nutritional status of adult assessed by BMI and reported that 39.8 % of United State of America adults were obese which is similar to that of this present study.

Table 3: Correlation between Anthropometric Indices and Cardiovascular Risks

The table shows Correlation between Anthropometric Indices and Cardiovascular Risks. There was a significant correction between height and BMI, waist to hip ratio and weight ($p<0.05$)

Table 4 shows the result for the waist/hip ratio of the respondents, the result showed that 70 % had normal, 30 % had abdominal obesity, therefore they are at increased risk of cardiovascular diseases (CVD). Prevalence of abdominal obesity was observed to be significantly high among the respondents and this may be considered a serious issue because central/ abdominal obesity is a strong independent risk factor for hypertension and cardiovascular disease (Grundy *et al*., 2004). Overweight and obesity have been shown to correlate with increased risks for coronary heart disease, type 2 diabetes mellitus, cancers, high blood pressure, high blood cholesterol concentration, stroke, liver and gallbladder disease, respiratory difficulties.

Tables

Table 1: Body Mass Index (BMI)

Body Mass Index	Standards (mm/hg)	Frequency	Percentage (%)
Under Weight	<18.50	190	6
Normal weight	18.50-24.9	1246	75
Overweight	25.9-29.99	268	9
Obesity grade 1	30.90-34.9	87	3
Obesity grade 1I	35.90-39.9	104	3

Table 2: Mean and Standard Deviation of Anthropometrics Measurement

PARAMETERS	MEAN AND STANDARD DEVIATION
Height	1.63±0.6
Weight	53.59±10.2
Body Mass Index (BMI)	2.07±596
Waist	28.5±3.3
Hip	36.53±3.9
Waist to hip ratio (W/HR)	1.12±357

Table 3: Correlation between Anthropometric Indices and Cardiovascular Risks

	Weight	**BMI**	**Waist**	**Hip**
Height	0.437**	0.091*	0.181**	0.163**
W/HR	0.130**	0.109*	0.364**	0.073

Table 4: WAIST/HIP RATIO OF THE RESPONDENTS

Waist/Hip Ratio	Frequency	Percentage (%)
Normal	1096	70
Abdominal Obesity	900	30

Conclusion and Recommendation

The study revealed that most of the students had good body mass index while few had obesity grade 1 and grade 2. Also, the cardiovascular risk factor indicators are a little bit high. There is need for nutrition education and advocacy for the students,

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