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Contribution of Information and Communication Technology to the Prevalence of Obesity and Elevated Blood Pressure among Secondary School Students in Nigeria

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Abstract: The study was designed to evaluate contributions of Information and Communication Technology (ICT) to the prevalence of obesity and elevated blood pressure among students in Ogbomosho Girls' High School, Ogbomosho, Oyo State, Nigeria. Sample population of 120 female's students aged 11-22 years were randomly selected from the school for the study. Skin fold measures at triceps, thigh and supra-iliac of the subjects were taken at the right side of the body. Percentage Body Fat (PBF) of the subjects was calculated from the values derived from body density ($P.B.F. = 570/D_b - 4.142$) $\times 100$. Structured questionnaire was used to collect data from the subjects on their eaten pattern and activity level. Results showed that, the subjects had high percentage body fat, high percentage body mass index and high systolic and diastolic blood pressure. Results also indicated insignificant relationship between eaten pattern and percentage body fat, while there were indication of significant relationship between systolic and diastolic blood pressure and activity level of the subjects. Increased physical exercises were a strategy postulated for preventing and managing obesity and elevated blood pressure.

Key words: Obesity, elevated blood pressure, body fat, weight, eating pattern, activity level

INTRODUCTION

Advances in science and technology have led to the development of labour saving devices making people more sedentary. Thus, science and technology have negatively given mankind inactive lifestyle leading to obesity from excessive accumulation of body fat. This assertion gives credence to the view of Blair (1995), who stated that, invention and the use of automobiles, public transport and other labour saving devices contribute to sluggish lifestyles.

Obesity, as defined by Joseph *et al.* (1999) is an increase in body weight resulting from an excess body fat. Roche *et al.* (2005) described it as the presence of excess adipose tissues. Thus, obesity arises when food (energy) intake is in excess of body energy demands (Swinburn *et al.*, 2005; Shehu, 2005).

Obesity is a condition that can be influenced by many factors such as endocrinal, environment and nutritional factors as well as low activity levels. Some studies suggest that genetic factors accounts for 25-40% of the etiology of obesity and postulated that unhealthy

eating habit is one of its major factors (Swinburn *et al.*, 2005).

Poor activity level pre-disposes an individual to obesity and its co-morbidities. This assertion lends credence to the view of Klesges *et al.* (1993) and Kimm (1995) who have found in their studies, that the prevalence of obesity in children and adolescents is directly related to the hours of television viewed because watching television replaces more active pursuits and so, decreases the metabolic rate.

In children, adolescents and adults, obesity predisposes to significant cardiovascular risks and non-insulin-dependent diabetes mellitus through the promotion of insulin resistance and other associated physiological abnormalities including dyslipidemia, elevated blood pressure and increased left ventricular mass (Gerber *et al.*, 2003). Pulmonary, skeletal, dermatologic and immunologic and endocrinology system display obesity related morbidities.

Generally, inactivity and poor nutritional habit have been identified as common major factors of the incidence of obesity and its co-morbidities. Consequently,

management has been suggested to include increased physical exercise, healthy eaten patterns, weight reduction and other healthy living styles (Molarius, 2003; Ogunbiyi, 2002; Shehu, 2005).

Technology has been considered to contribute to scientific advancement as a result of which many people are becoming lazy and inactive (Ford and De Stefano, 1991). This development has decreased energy expenditure giving rise to health disorders of sedentary life such as obesity and its co-morbidities. This study therefore, was designed to evaluate contributions of Information and Communication Technology (ICT) to prevalence of obesity and elevated blood pressure among students in Ogbomoso Girls' High School, Ogbomoso, Oyo State, Nigeria, with the hope to improve and enhance the quality of the life of the young people. The purpose of this study was to evaluate contributions of Information and Communication Technology (ICT) to prevalence of obesity and elevated blood pressure among students in Ogbomoso Girls' High School, Ogbomoso, Oyo State, Nigeria.

MATERIALS AND METHODS

A total of 120 female students ranging from 11-22 years from Ogbomoso Girls' High School, Ogbomoso, Oyo State, Nigeria, volunteered to participate in this study. They were randomly selected from Junior Secondary School (JSS) 1-3 and Senior Secondary School (SSS) 1-3 during their second term 2007 academic session. All the 120 subjects completed the research instrument. Standardized techniques described by Eston *et al.* (1995) and Mukherjee (2002) were used to measure the subjects skin fold thickness. Fat-O-Meter Skin fold caliper was used to measure skin fold at three sites (triceps, supra-iliac and thigh). All measurements were taken at the right side of the body.

The equation of Mukherjee (2002) was used to calculate body density of the subjects. This equation is a generalized type which takes into consideration the effect of age on the distribution of subcutaneous and internal fat and originally developed for female subjects with age range 11-24 years. The equation is: Body Density (female): $D_B = 1.0764 - 0.00081 (\text{Supra-iliac Skin fold}) - 0.00088 (\text{triceps skin fold}) - \text{Lean Body Weight (LBW) (Female)}$. $LBW = 1.66 + 0.668 (\text{weight}) - 0.158 (\text{subscapular skin fold}) - 0.081 (\text{triceps skin fold}) + 0.555 (\text{neck circumference}) - 0.141 (\text{maximum abdominal circumference})$.

The Percentage Body Fat of the subjects was calculated from the value derived for body density (American College of Sports Medicine, 2001). The calculation is: $(PBF = 4.570 / D_B - 4.142) \times 100$ where, $D_B =$

Body Density and P.B.F. = Percentage Body Fat. Percentage was considered high when it exceeded the generally acceptable healthy range value of 19-31% for females (American College of Sports Medicine, 2001). Self developed structured questionnaire was used to gather information from the subjects in their activity and eating patterns. The critical value was 0.195 at 0.05 alpha level of significance.

RESULTS AND DISCUSSION

Descriptive Statistics (mean and standard deviation) were used to calculate the subjects eating and activity pattern. The eating pattern of the subjects was considered good if the mean of variables Strongly Agree and Agree (x of SA and A) was found statistically less than 2.5, the criterion mean of the total sum of the rating scale, while the eating pattern was considered poor when the mean of the variables was found statistically greater than the criterion mean of 2.5. Conversely, activity patterns, of the subjects were considered high if the mean of their activity pattern (x of SA and A) was found statistically greater than the criterion mean of 2.5, but considered low if the mean was less than the criterion mean.

Pearson product moment correlation analysis was used to determine relationship between percentage body fat and eating habit, percentage body fat and activity pattern, activity pattern and Systolic Blood Pressure (SBP) and Activity Pattern and Diastolic Blood Pressure (DBP).

Information regarding the mean (x) of the subjects age (years), weight (kg), lean body weight (kg) and Body Mass Index (BMI) were provided in Table 1. Table 2 contains information on the mean (x) of total Percentage Body Fat (PBF), Systolic Blood Pressure (SBP mm Hg) and Diastolic Blood Pressure (DBP mm Hg), while Table 3 contains summary of Pearson Correlation analysis

Table 1: Age, weight, Lean Body Weight, (LEW) and Body Mass Index (BMI) of girls in Ogbomoso Girls' High School, Oyo State, Nigeria

Variables	Mean (x)	SD (+)	Range	Norm
	(N = 120)			
Age (years)	15.15	3.24	11-24	
Weight (kg)	50.20	15.46	24-88	40.1
LBW (kg)	33.39	6.75	18-59	18.0
BMI	32.68	3.93	15-40	26.0

Table 2: Percent body fat, Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) of girls in Ogbomoso Girls' High School, Oyo State, Nigeria

Variables	Mean (x)	SD (+)	Range	Norm
	(N = 120)			
Body fat (%)	35.80	5.20	13-45	30%
SBP (mmHg)	130.67	15.55	70-140	127
DBP (mmHg)	70-90	9.96	40-80	79

Table 3: Summary of pearson correlation analysis of the relationship between percentage body fat and eating habit, percentage body fat and activity pattern, activity pattern and systolic blood pressure and activity pattern and diastolic blood pressure

Variables	Correlation coefficient	Coefficient of determination	(N = 20) x	SD	DF	Critical values	Significant	Not significant
Body fat and eating habit (%)	-0.177	0.031	191,2250	728.3284	119	0.195		×
Body fat and activity pattern (%)	-0.651	0.415	96.3083	13.1471	119	0.195	×	
Activity pattern and SBP	--	0.502	98.4917	18.1188	119	0.195	×	
Activity pattern and DBP	-0.714	0.502	38.4817	18.1188	119	0.195	×	

Critical value is 0.195 at 0.05 level of significance

of the relationship between percentage body fat and eating habit, percent body fat and activity pattern, activity pattern and systolic blood pressure and activity pattern and diastolic blood pressure.

Results showed that, the weight (kg), Body Mass Index (BMI), Percentage Body Fat (PBF), systolic and diastolic blood pressure of the subjects were statistically high. Results further showed that, the eating pattern of the subjects was good while their activity pattern was statistically poor. Results also indicated significant relationships between percentage body fat and activity pattern, activity pattern and systolic blood pressure, activity pattern and diastolic blood pressure.

In this study, the mean of the subject's weight, body mass index, percentage body fat, systolic and diastolic blood pressure were found statistically high. The study also showed that, there were significant relationships between percentage body fat and activity pattern, activity pattern and systolic blood pressure and activity pattern and diastolic blood pressure.

The activity pattern of the subjects was poor, hence the high accumulation of body fat, high Body Mass Index (BMI) and elevated blood pressure, notwithstanding their good eating habit. These findings agrees with those of Haruna (1994), Barlow and Dietz (1998), who all posited that, combination of both dietary restriction and exercises will produce more effects in weight reduction and prevention of obesity than using either method independent of the other. Also, the findings agreed with those of Anderson *et al.* (1998), who investigated the relationship among physical activity, television watching and body weight and level of fatness in American children. They found a very strong relationship between television watching and fatness. Furthermore, they found that, 25% American children watched one or more hours of television each day, a rate that was higher among Mexican-American (30%) and African-American (43%) children. Boys and girls who were high television watchers and not regularly active were found fatter than children who were low television watchers and highly active.

The results also agree with those of Robbins *et al.* (2002) who all posited that, aerobic exercise can reduce high blood pressure, obesity, type II diabetes and

osteoporosis. In addition, they agreed that, stroke and several types of cancer (such as breast, prostate and lung cancer) can also be reduced with regular physical activity. The study agreed with the study of Mauricio *et al.* (2005) who linked the impact of training in restoring blood pressure and obesity. They concluded that diet and exercise training restore blood pressure and forearm vascular conductance in obese children. Also, Harding *et al.* (2008) agreed with the present study, the result of their study on the impact of overweight on high blood pressure in early adolescence revealed that the rise in obesity in adolescence portends a rise in early onset of cardiovascular disease across ethnic groups.

CONCLUSIONS

It is clear from this study, that advancement in information and communication technology has contributed significantly to sedentary lifestyle leading to obese conditions and elevated blood pressure among students in Ogbomosho Girls' High School, Oyo State, Nigeria.

The implications of the above is that more youths with sedentary lifestyle are likely to suffer from diseases like the stroke, obesity, high blood pressure and other heart/cardiac health related diseases and ultimately mortality rate among the youths is likely to be higher.

One observed that the love for pleasurable activities, surfing for cartoons, games and other interesting things on the internet if not discouraged early enough may have serious adverse effects on the well-being and longevity of life for the youths. Adolescents that present incidence of any or all of the above health related problems should as a matter of urgency engage in physical related activities. A sedentary individual should not eat too much but should increase his/her activity pattern (Martinez, 2000).

Health education and campaign should be intensified to improve people's awareness of the consequences of unhealthy lifestyles with the aim of encouraging them to make right decisions and choices. Attempt should be made to discourage youths from spending long hours watching television and surfing through the internet with no cogent reasons. Cases of obesity, cardiac or heart related diseases, high blood pressure and other health

problems can be reduced by engaging in physical activities and eating healthy.

Based on the findings of this study, individuals should engage in adequate physical activities to prevent excessive accumulations of fat and health inadequacies associated with obese conditions. Health Education and campaign should be intensified to improve people's awareness of the consequences of unhealthy lifestyle with the aim of encouraging them to make right decisions and choices.

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