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Body Mass Index and Menorrhagia among Adolescent Female Undergraduate Students in Nigeria

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Abstract

Menstruation is a normal physiological feature of development among adolescent females but also pose significant challenge as its presentation has the capacity to the affect quality of life if the blood flow is above tolerance level. This study is a descriptive study which attempts to investigate the relationship between Body Mass Index menorrhagia, as well as the strength and direction of the relationships among adolescent female undergraduate students in Nigeria. The purpose of this study is to provide evidence based description of the strength and direction of the relationship between Body Mass Index and menorrhagia for counseling and healthcare intervention. Using purposive sampling techniques, a total of 421 students were recruited to respond to a modified questionnaire. Data obtained were analysed using frequency distribution charts as well as pearson correlation test and presented in figures and tables. Findings generally revealed that there is a correlation between Body Mass Index and menorrhagia among students while the strengths and direction of the relationships differ across the difference indices of height, weight, waist circumference, hip circumference and waist-hip ratio. Recommendations on the basis of these findings include: education, counseling and female adolescent friendly healthcare provision.

Introduction

Body Mass Index (BMI) or quetelet index is a statistical measure which compares a person's height and weight. BMI is defined as the individual's bodyweight divided by the square of his height. Studies have highlighted the relationship between BMI and several health reproductive characteristics. Tonnin and Durain consensually argue that Body Mass Index (BMI) is related to an earlier onset of puberty and menarche. They posit that age of menarche tends to be lower in obese and higher in underweight compared to girls with normal weight, which may have implications for subsequent reproductive problems. BMI is the most widely used diagnostic tool to identify obesity problems within a population [1,2].

The period of adolescence is transition from childhood to adult life characterized by pubertal development and sexual maturation. During puberty, hormonal, psychological, cognitive and physical changes occur simultaneously. The period of adolescence for a girl is a period of physical and psychological transformation for motherhood. One of the major physiological changes that take place in adolescent girls is the onset of menarche. Within this course, many girls suffer problems of painful and irregular menstruation as well as excessive bleeding.

The National Institute for Health and care excellence (NICE, 2012) describes menorrhagia as menstrual blood loss which interferes with a woman's physical, emotional, social and mental quality of life which can occur alone or in combination with other symptoms and it is the second most common gynaecological condition to be referred to hospital, accounting for 12% of all gynaecological referrals. NICE (2012) report also reveals that 33% of women describe their periods as heavy. The perception of what is heavy menstrual bleeding is subjective and 30% women consider their bleeding excessive. However, only half of these women fit the clinical criteria of greater than 80 ml of blood loss per cycle. Research studies usually take menorrhagia to be a monthly menstrual blood loss in excess of 80 ml (NICE, 2012).

The average menstrual cycle has a blood loss for 7 days of a cycle of between 21 to 35 days. The usual shorthand for this is: K=7/21-35 in which K represents menstrual cycle, 7 is the duration of the bleeding and 21-35 represent the length of the cycle (NICE, 2012).

Menstrual loss is heaviest for the first few days and becomes much lighter, tailing off towards the end. The average menstrual blood loss is about 35-40 ml. Some researchers have found that no more than 10% of women who complain of heavy menstruation have blood loss in excess of 80ml (NICE, 2012). Menorrhagia is very subjective; a more practical definition may be that it is the blood loss that is greater than the woman feels she can reasonably manage. The National Institute for Health and care excellence (NICE, 2012) defines heavy menstrual loss as excessive blood loss that interferes with a woman's physical, social, emotional and/or quality of life.

Menorrhagia is related to increased limitations in physical activities and limitations in social and leisure activities [3].

Statement of the research problems

Body Mass Index (BMI) has been related to reproductive health [4]. An extreme of body mass adversely affects reproductive function, starting from pubertal development, menstrual function and fertility. Available literature unveils that extreme body mass causes different health risks, including gynecological-endocrine problems such as hyperinsulinemia, insulin resistance, hyperandrogenism, anovulation, polycystic ovary syndrome (PCOS), and infertility and in case of achieving pregnancy-following obstetric risks [5].

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quality of life which can occur alone or in combination with other symptoms and it is the second most common gynaecological condition to be referred to hospital, accounting for 12% of all gynaecological referrals. Menorrhagia is commonly described as one of the common and debilitating gynecological challenges among adolescents because of inexperience and poor coping skills. Body size has been related to several gynecological disorders or symptoms including polycystic ovary syndrome infertility and general menstrual disorders [6]. Higher risks of infertility have been found in both overweight and underweight women. Body size is a function of economic, social, environmental and genetic determinants of individuals.

The increasing drive to alter bodily structure through lifestyles; including unhealthy dietary habits, like consumption of junk, fast food coupled with increasing sedentary lifestyles had been found to result in menstrual disturbances [7].

Although studies have explained the connection between body size and menstrual disorders, scientific reports about the strength and direction of the relationships between the various variables of body mass index and menstrual disorders is lacking. This study hopes to fill this essential gap in anatomical literature for policy direction.

Objectives of the study

1. To examine the relationship between Body Mass Index and menorrhagia among adolescent female undergraduate students.
2. To examine the strength of that relationship between Body Mass Index and menorrhagia.
3. To find out the direction of the relationship between BMI and menorrhagia among adolescent female undergraduate students.

Materials and Methods

Assessment and tools

Menorrhagia and Quality of Life (QOL): A modified scale on gradation of pain i.e. Numeric Pain Rating Scale (NRS) and QOL based on the American Chronic Pain Association (ACPA) was used to measure pain of dysmenorrhoea and QOL.

1. Semi-structured self-administered questionnaire.
2. Numeric Pain Rating Scale (NRS) and Quality of Life (QOL) rating scale.
3. Modified menorrhagia impact questionnaire (MIQ) (NICE, 2012).
4. Stand meter (England).
5. Measuring tape (Non stretchable).

Anthropometric indices: The following indices were computed:

Body mass index (Quetelet's index): It gives the ratio of body Weight (W) to Height (H) squared ($BMI=W/H^2$). It is often used to assess obesity and under nutrition. The subjects were divided into three groups according to the old definition of obesity by Nippon Himan Gakkai [8]. Underweight group (BMI<19.8), normal group (BMI>19.8 or <24.2) and overweight group (BMI>or =24.2). Waist Hip Ratio: Waist-hip ratio or waist-to-hip ratio (WHR) is the ratio of the circumference of the waist to that of the hips. This was calculated as waist measurement divided by hip measurement (W/H).

Research design

The study is descriptive and cross-sectional survey aimed at investigating the relationship between Body Mass Index and menorrhagia as well as the strength and direction of their relationships.

Study area

The research was carried out in University of Nigeria, Enugu campus. The University is located in the eastern part of Nigeria. The study area covers the following faculties in the University: Faculty of Medical Sciences, Health Sciences and Technology and Management Sciences. The subjects were all second year students (2013/14 academic session) of the following department: Medicine & Surgery, Nursing Sciences, Radiography, Medical Laboratory Science, Medical Rehabilitation, Accounting and Business Administration.

Study population: Four hundred and twenty one (421) post-menarcheal female undergraduates (200 Level) volunteers of the Faculties of Medical Sciences (UNEC) Health Sciences & Technology and Management Sciences (UNEC) were recruited for this study.

Inclusion requirements: Post menarcheal 200 level students of Faculties of Medical, Health Sciences & Technology and Management Sciences.

Students with menarcheal age of two years and above.

Exclusion requirement: Students who are mothers

Students with clinically established pelvic inflammatory disease.

Ethical consideration: Ethical Clearance and permission was obtained from the Health Research Ethics Committee.

The purpose of the study was explained to all the participants and informed consent was obtained from all the willing subjects.

Presentation and analysis of data

The data was analysed using descriptive and inferential statistics through the application of SPSS version 20. While histogram was used to analyse the various anthropometric indices used in the study, Pearson's correlation coefficient was used to evaluate relationship between Body Size Indicators (BSI) and dysmenorrhea.

Guide on coefficient (r) according to Khan,

0.0-0.20 = Negligible relationship

0.20-0.40 = Low

0.40-0.60 = Moderate

0.60-0.80 = Substantial

0.80-1.00 = High-very high.

Direction:

-1.00 = Negative relationship

+ 1.00 = positive relationship

0 = No relationship

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Shows histogram of the frequency distribution and the mean of BMI (kg/m^2). BMI ranges from 17.36 to 44.9 with a mean BMI of 25.43 and the modal BMI of 28.40 (Figure 1).

Bar chart showing the distribution of menorrhagia based on BMI, reports of menorrhagia is highest among the normal body mass index group (18.5-24.9) followed by the overweight group (25.0-29.9) (Figure 2).

Correlations between menorrhagia and some BSI's

The columns and rows showing the relationship between menorrhagia and height reveals a correlation index of 0.078. Similarly that of weight and menorrhagia reveals an index of 0.028. In a similar trend while waist circumference is 0.080, hip circumference is -029. Finally, the index of correlation between waist hip ratio and menorrhagia is 0.011.

The strength of the relationship between height and menorrhagia is a strong one with a pearson value of 0.078 while that of weight and menorrhagia is weak showing an r value of 0.028. While the relationship between while circumference is strong with an r index of 0.080 that of hip circumference and menorrhagia is weak having revealed an r.index of -0.29. Finally, there exist no substantial relationship between waist hip ratio and menorrhagia with an r. value of 0.011 (Table 1).

On the direction of the relationships, there exist a positive relationship between BMI and menorrhagia at a general level. The relationships between menorhagia and all index of BMI such as height, weight, waist circumference, hip circumference and waist hip ratio are positive except that of BMI and hip circumference that demonstrates a negative direction according to the table of hypothesis.

Discussion of Findings and Recommendations

This paper examines the relationship between BMI and menorrhagia defined as heavy menstrual flow among adolescent female undergraduate students in Nigeria. The finding of this study has revealed that there exist a relationship between body mass index and menorrhagia among adolescent female undergraduate students in Nigeria. This is in Harmony with Tonnin and Durain [1,2]. In general terms, the study has revealed that the mean BMI of the population under study 25 exceeds normal range relative to healthy menstrual cycle. This is a demonstration of an unhealthy Body Mass Index development in height, weight, waist and hip among adolescent female undergraduate students. In another dimension, the frequency distribution chart reveals that menorrhagia is highest among participants with normal BMI (18.5-24.9) followed by the overweight group (25.0-29.9) This report therefore calls for the reversal of the normal BMI standard or moderation strategies for undergraduate adolescent students.

On the strength of the relationship, the data reveals that there is a strong relationship between menorrhagia and height while that of menorrhagia and weight is weak.

This finding demonstrates that the height of a person is a significant factor in menstrual flow measured in either duration or volume and even both. However, the weight of a person is not a crucial factor in menstrual flow. While weight gain is more or less a temporal feature among humans, height is a relatively more permanent feature determined by varied biological, genetic, economic and environmental factors. In another dimension, the study also reveals that there is a positive relationship between height and weight gain signifying that height and menstrual flow moves in the same direction. The implication of this is that the higher the height the higher the menstrual flow and vice-versa. In the same way, weight is positively correlated with menorrhagia. It shows that weight and menorhagia moves in the same direction. Though weight according to this study is not a significant factor in menorrhagia, it suggests that those with higher weight are more likely to have more menstrual flow than people with average or low weight irrespective of their height or other probable intervening variables.

Finding on waist circumference and menorrhagia reveals that there is a strong relationship between manorrhagia and waist circumference with a correlation index of 0.080. This demonstrates that adolescent waist circumference is a strong indicator for incidence or absence of the menorrhagia. However, hip circumference has a weak correlation with menorrhagia given a correlation index of -028. In the context of the direction of the relationship, the r. value of 0.080 shows that there is a positive relationship between waist circumference and menorrhagia. This finding is a pointer that waist circumference and menorrhagia moves on the same direction. Thus, the higher the

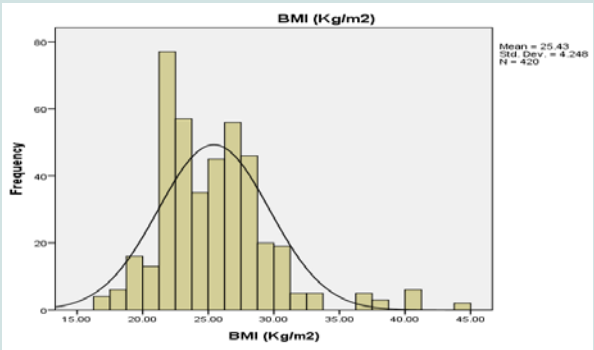

Figure 1: Shows histogram of the frequency distribution and the mean of BMI (kg/m2). BMI ranges from 17.36 to 44.9 with a mean BMI of 25.43 and the modal BMI of 28.40.

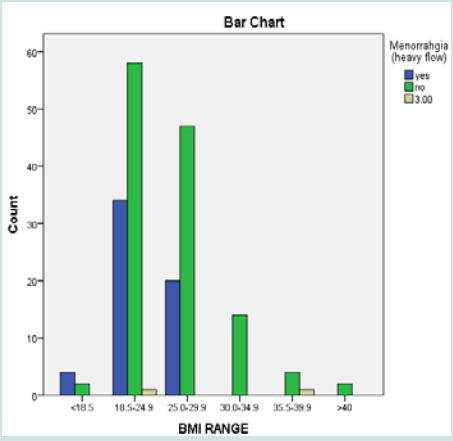

Figure 2: Bar chart on menorrhagia and Body Mass Index.

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Table 1: Correlations between menorrhagia and some BSI's.

		Height (M)	Weight (kg)	Waist Circumference (cm)	Hip Circumference (cm)	BMI (Kg/m^2)	WHR	Menorrahgia (heavy flow)
Height (M)	Pearson Correlation	1	0.333**	0.084	0.086	-0.204**	0.035	0.078
	Sig. (2-tailed)		0.000	0.087	0.077	0.000	0.478	0.111
	N	421	421	421	421	420	421	421
Weight (kg)	Pearson Correlation	0.333**	1	0.571**	0.600**	0.850**	0.138**	0.028
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.005	0.570
	N	421	421	421	421	420	421	421
Waist Circumference (cm)	Pearson Correlation	0.084	0.571**	1	0.884**	0.582**	0.478**	0.084
	Sig. (2-tailed)	0.087	0.000		0.000	0.000	0.000	0.084
	N	421	421	421	421	420	421	421
Hip Circumference (cm)	Pearson Correlation	0.086	0.600**	0.884**	1	0.619**	0.022	0.091
	Sig. (2-tailed)	0.077	0.000	0.000		0.000	0.650	0.061
	N	421	421	421	421	420	421	421
BMI (Kg/m^2)	Pearson Correlation	-0.204**	0.850**	0.582**	0.619**	1	0.112*	-0.029
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.022	0.554
	N	420	420	420	420	420	420	420
WHR	Pearson Correlation	0.035	0.138**	0.478**	0.022	0.112*	1	0.011
	Sig. (2-tailed)	0.478	0.005	0.000	0.650	0.022		0.825
	N	421	421	421	421	420	421	421
Between	Pearson Correlation	0.078	0.028	0.084	0.091	-0.029	0.011	1
	Sig. (2-tailed)	0.111	0.570	0.084	0.061	0.554	0.825	
	N	421	421	421	421	420	421	421

waist circumference value, the higher the menstrual flow. On the contrary, the pearson value of -029 shows an inverse relationship between hip circumference and menorrhagia. It means if the value of hip circumference is high, incidence of menorrhagia is low and vice-versa among adolescent female undergraduate students. Finally, although there seems to be negligible relationship between waist hip ratio and menorrhagia with an r value of 0.011, the relationship is a positive one suggesting that all things being equal, the higher the waist hip ratio, the higher, the incidence of menorrhagia and vice-versa among adolescent female undergraduate students [9].

Recommendations

On the strength of the findings of this work, the following recommendations are germane for healthy menstrual behavior among adolescent female undergraduate students in Nigeria.

First, menstrual health education should be provided for adolescent female undergraduate students to forestall risky behaviors that have immediate and long term reproductive health consequences. In addition, counseling services should be made available and accessible to all adolescent girls relating to reproductive health disorders. Finally, health centers should oriented towards providing adolescent girl friendly health services.

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