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Menstrual Pattern and Blood Pressure as Predictors of General Health Among Undergraduates

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ABSTRACT

The study was to ascertain the relationship between menstrual pattern, blood pressure, and general health of undergraduates. A cross-sectional survey was undertaken in which respondents were selected using multi-stage sampling techniques were questionnaires were administered and readings of blood pressure, height, and weight were taken. Inferential statistical analysis such as Pearson Product Moment Correlation and regression analysis was used to analyze data. The mean age at menarche was 14.5 years; mean of length of the cycle was 28.9days, with a range of 20-33 days while 31.2% of the respondents experienced irregular cycle. The prevalence of menstrual disorder was 18.9%. 22.1% of the respondents had a problem with blood pressure while 10.4 % of the respondents had a high level of psychopathology. The study revealed that there is a significant negative relationship between menstrual disorder and blood pressure ($p < .01$, $-.364$), a significant negative relationship between menstrual disorder and general health ($p < .05$, $-.247$), and a significant positive relationship between blood pressure and general health of respondents ($p < .01$, $.814$). The study concluded that there is a relationship between the study variables. Thus, the need to educate adolescents on what to expect on menstrual pattern to avoid anxiety and other related problems that comes with lack of knowledge on menstrual pattern. Also, the significance of problem-related to menstruation should be discussed for the same reason. Early diagnosis and treatment can also help to manage in time psychological problems that can arise as a result of menstrual problems.

KEYWORDS: General wellbeing, Menstrual pattern, Blood pressure, Adolescents, Female Undergraduates, Health, Anxiety.

INTRODUCTION

Health they say is wealth, according to a popular saying. A lot of people have come up with a definition of health. An average person on earth believes that

health is just the absence of disease in a person. However, the one proposed by the World Health Organisation (WHO) has been widely accepted. According to their 1948 definition, health is a



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complete state of physical, mental, and social wellbeing, not merely the absence of disease or infirmity (WHO, 1948). Researchers have observed differences in the health status of undergraduate students over time; Female students with irregular menstrual patterns and blood pressure can have various health implications. As observed in an earlier study, menstrual cycle length variations were more frequently observed with increasing age in women while blood pressure (Hypertension) is a major public health problem due to its high prevalence all around the globe.

The definition proposed by WHO linked health to general well-being and explains that health is not limited to the physical aspect alone. All modern concepts of health recognize health as more than the absence of disease, implying a maximum capacity of the individual for self-realization and self-fulfillment. Health pertains to everyone and we all want to be healthy irrespective of our gender and status in society. The holistic concept of health is contained in the expression of wholeness. Health is a relative state in which one can function well physically, mentally, socially, and spiritually to express the full range of one's unique potentialities within the environment in which one lives. Both health and illness are dynamic processes and each person is located on a graduated scale or continuous spectrum (continuum) ranging from wellness and optimal functioning in every aspect of one's life, at one end, to illness culminating in death, at the other (Kujundžić, 2017).

Compared to anything that mankind may possess, health is the most valuable. This is because health is very important to our productivity on earth. As general as it is, health is not the same in males and females. According to research, some diseases are gender-specific and (Ngo, Steyn & McCombe, 2014). Sex-specific diseases are diseases that are only found in people of one sex (for instance, Prostate cancer in male and Uterine or Ovarian cancer in female). Sex-related diseases are diseases that are more common to one sex. For example, breast cancer, Thyroid disorder, Clinical depression (APA, 2013), Lupus, Osteoporosis have been observed to be common in females while Hernia, Heart disease, Stroke, Autism (Newschaffer, Croen & Daniels, 2013) are predominant in male. Factors contributing to this include biological, social, and behavioural factors.

Research on individual perceptions regarding health and illness has been accumulating for some time, and it is becoming apparent that they have significant consequences on the person's health behaviour (Dowey & Chang, 2013). Although women in almost all modern populations live longer than men (Zarulli, Julia, Anna, Rune, & Vaupel, 2018), there are some areas of health that they experience severe diseases with poor outcomes. For instance, a third of all health problems are related to reproductive health and are experienced by women in their reproductive years, averagely from age 12-45 (WHO, 2006).



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Reproductive health focuses on the processes, functions, and systems at all stages of life from menarche through menopause. Hence, the reproductive age of females is marked by Menarche that is, the first occurrence of menstruation. This is an important milestone as it signifies the transition from girlhood to adulthood. This is also the beginning of the first menstrual cycle.

Young girls and their caretakers (that is, parents or guardians) frequently have difficulty assessing what constitutes normal menstrual cycles or patterns of bleeding (American College of Obstetricians and Gynecologists, 2015). The female adolescence and their caretakers may be unfamiliar with what is normal and the girl child may not inform their caretakers about menstrual irregularities or missed menses. At some point, female adolescence is often reluctant to discuss this topic with a caretaker, although they may confide in another trusted adult. Besides, they may not be aware that abnormality may be attributed to significant underlying medical issues with the potential for long-term health consequences.

Menstrual disorders are common in women according to Davis et al, (2011) and have a prevalence rate of 30-70% (Gordley, Lemaster, Sippson, Yiin, (2000). For female adolescence, there may be difficulty in assessing what constitutes normal menstrual cycles or patterns of bleeding (American College of Obstetricians and Gynecologists, 2015), and may not be aware that

abnormality may be attributed to significant underlying medical issues with the potential for long-term health consequences. According to Frank and Williams (1999), girls who have been educated about menarche and early menstrual patterns will experience less anxiety when they occur.

Until now, no previous study has addressed the menstrual patterns and blood pressure as the affect general health of female students at Obafemi Awolowo University (OAU). In this present study, our objectives are to ascertain the prevalence of menstrual characteristics and address the menstrual problems together with their associated risk factors among female students in OAU; to know if there is a relationship between menstrual pattern and general health of female students and the relationship between blood pressure and general health of students.

REVIEW OF RELATED STUDIES

A lot of studies have been carried out relating to Menstrual cycle and female adolescents. Chumlea et al. (2003) carried out a study on age at menarche and racial comparisons in US girls and found out that despite variations worldwide, the median age at menarche has remained relatively stable between 12years and 13years across well-nourished populations in developed countries. Finer and Philbin (2014) found out the same in their study on trends in ages at key reproductive transitions in the United States. Studies on height and time of puberty have



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shown that body mass index during childhood was related to an earlier onset of puberty and may result from the attainment of a minimal requisite body mass index at a younger age (He & Karlberg, 2001; Wang, 2002).

In Nigeria, Menstrual disorder has been studied in association with academic stress (Titilayo, Agunbiade, Banjo Lawani, 2009), and its prevalence was found to be high. Its awareness has also been studied among college students (Esan & Esimai, 2010). Menstruation and Menstrual Health Management (MHM), have always been an issue for women. However, they are also issues which have been considered private, and sometimes shameful. It is therefore remarkable how quickly public attention has grown since the turn of the millennium. More so, women examine how menstrual cycle affects blood pressure levels and what that means for your overall health, knowing that the menstrual cycle is a monthly series of changes a woman's body goes through in preparation for the possibility of pregnancy.

High blood pressure in children and adolescents is a growing health problem and this is well documented. According to Hansen, Gunn, and Kaelber, 2007, the combined prevalence of elevated blood pressure and hypertension in children is around 6% or 3% for each. They added that the combined prevalence increases by nearly five times, to around 30%, in adolescents. There has not been a lot of research about the relationship between

blood pressure and periods. Some studies (Reed & Car, 2018), have shown that blood pressure may increase during certain stages of the menstrual cycle. This occurs due to the spike of progesterone (female hormone) levels.

METHOD

This section focused on data collected and analyzed.

Participants:

The study was carried out among female undergraduates at Obafemi Awolowo University, Ile-Ife in the western part of Nigeria. Out of about 120 students interviewed for this study, only Seventy-seven (77) respondents gave their consent to be part of the study. In selecting the participant, the purposive sampling method was used. This is because areas with a high concentration of the subjects were used for the study. These include female hostels within the University such as Moremi Hall, Alumni Hall, Mozambique Hall, and Akintola Hall. All the respondents have similar socio-demographic characteristics, they are all educated to senior secondary level, freshly admitted into the University for Undergraduate Programmes with their age between 16 and 20 years old.

Research Instrument

The research instrument used for gathering data was a pretested questionnaire as used by Esimai and Esan (2010) that consists of four parts: background information on the respondents such as age, family type, marital status, educational level, and



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religion; questions related to menstrual pattern such as duration of period, length of cycle, age of menarche among others and questions related to the health of the respondents assessed with the use of General Health Questionnaire (GHQ-12) developed by Goldberg (1970). The GHQ is made up of twelve questions that assess how often a particular symptom has been experienced recently, on a 4 points Likert scale: less than usual, no more than usual, rather than usual, and much more than usual. A total score of 36 is derived based on Likert scoring (0-1-2-3), in which score ranging from 0-12 is considered to indicate low presence of psychopathology, 13-24 medium while 25- 36 is considered high.

The last part covers the blood pressure, weight (in kilograms), and height (in meters) of the respondents as measured by trained investigators who followed standard protocol during the study. Blood pressure was measured using a sphygmomanometer in a sitting position. Any reading equal or above 140/90mmHg was considered high blood pressure, less than or equal to 120/80 mmHg was considered normal while a blood pressure less than 80/60 mmHg was low according to WHO/ISH guidelines. From the data for height and weight, the body mass index was computed by dividing the weight by height squared. Each individual was then classified into any of these subgroups based on age: Underweight, normal, overweight, and obese

Procedure:

The study was conducted at the student's halls of residence in Obafemi Awolowo University Ile Ife. The researchers meet with the Hall supervisors and executives and discuss the purpose of the study to them haven't satisfy appoint a guide for the team who visit the students in their various rooms and explain to them the purpose of the students and sampled within the rooms those that have accepted to take part in the study. The Blood pressure of the sampled is first taken and the research instruments administered on them and one hour were given to the participants to complete and return to the research instrument. The participants are also debriefed immediately after the study.

Design and statistics

The design of this study is a cross-sectional survey and SPSS is employed for data analysis.

Conflict of Resolution: No conflict of interest among the researchers

Inclusion and exclusion criteria: Only female students who have reached menarche and living within the campus were included in the study. Male students were not allowed in the study

Ethical consideration:

The aim and objectives of the study were explained to the participants. Informed consent was obtained and data confidentiality and voluntary participation were respected at all times. This research was self-funded



RESULTS

A. Socio-demographic Characteristics of the Respondents

This section represents the distribution of respondent’s characteristics with regards to age group, religion, marital status, family type, and educational level.

Table 1: Socio-demographic details of Respondents

Variables	Levels	N= 77	Percent %
Age group	16-18years	31	40.3
	19-21years	29	37.6
	22-24years	17	22.1
Religion	Islam	28	36.4
	Christianity	45	58.4
	Traditional	4	5.2
Marital Status	Single	71	92.2
	Married	6	7.8
Family Type	Monogamy	45	58.4
	Polygamy	20	26.0
	Single Parenting	12	15.6
Educational Level	Level 1	23	29.8
	Level 2	15	19.5
	Level 3	20	26.0
	Level 4	19	24.7

The results indicate that in terms of age group, 31(40.3%) of the respondents fall into the 16-18 age bracket, while 29 (37.6%) of the respondents belong to age bracket 19-21, and 17(22.1%) of the respondents are within 22-24 age group. In terms of religion, 28(36.4%) of the respondents practiced Islam while 45(58.4%) of the respondents practiced Christianity, and 4(5.2%) of the respondents were traditional worshippers. Based on their marital status, 71(92.2%) of the respondents were single while 6(7.8%) of the

respondents were married. Regarding the family type, 45(58.4%)of the respondents were from monogamous family, 20(26.0%) of the respondents were from a polygamous family and 12(15.6%) of the respondents were raised by single parents Finally, based on educational level, 23(29.8%) of the respondents were in One hundred Level, 15(19.5%) of the respondents were in two hundred level, 20(26.0%) of the respondents were in three hundred level while 19(24.7%) of the respondents were in their four hundred level.

Table 2: Menstrual Pattern of Respondents

Menstrual Pattern	Levels	N= 77	Percent %
Age at menarche	Less than 10	11	14.3
	11-13	15	19.5
	14-16	42	54.5
	More than 17	9	11.7
Duration of Flow	Less than 2	10	12.9
	2-4	34	44.2
	5-7	31	40.3
	greater than 8	2	2.6
Amount of Flow	Little	20	26
	Moderate	43	55.8
	Heavy	14	18.2
Length of cycle	Less than 20days	5	6.5
	21-35days	42	54.5
	6	7.8	
	greater than 3624 irregular	31.2	
Discomfort during period	Yes	25	32.5
	No	52	67.5

The mean age at menarche was 14.5 years; mean of length of the cycle was 28.9days, with a range of 20-33 days while 31.2% of the respondents experienced irregular cycle. In terms of duration of flow, 10 (12.9%) of the



respondents reported flow less than two days, while 34 (44.2%) of the respondents reported flow between 2-4 days, 31(40.3%) reported flow between 5-7 days and 2(2.6%) reported a flow for more than 8 days. Based on the amount of flow, 20(26%) of the respondents reported little flow, 43(55.8%) of the

respondents reported moderate flow while 14(18.2%) of the respondents reported heavy flow. For discomfort during the period, 25(32.5%) of the respondents had discomfort during their period while the rest 52 (67.5%) of the respondents do not experience any discomfort.

Table 3: Blood pressure of Respondents

Blood pressure	Levels	Frequency(N=77)	Percentage(%)
Normal	120/80mmHg	60	77.9
High	above140/90mmHg	11	14.3
Low	below80/60MmHg	6	7.8

The table reveals the blood pressure of the respondents. 60(77.9%) of the respondent had normal blood pressure

while 11(14.3%) of the respondents had High blood pressure. 6(7.8%) of the respondents had low blood pressure.

Table 4: Body Mass Index of Respondents

BMI (Kg/m ²)	Frequency(N=77)	Percentage (%)
Underweight	22	28.6
Normal	33	42.8
Overweight	18	23.4
Obesity	4	5.2

The results of the study revealed that 22(28.6%) of the respondents were categorized as underweight, 33 (42.8%), as normal, 18 (23.4%) as overweight, and 4(5.2%) as obese.

Table 5: General Health of Respondents

Health	Score	Frequency(N=77)	Percentage
Low	0-12	44	57.1
Medium	13-24	25	32.5
High	25-36	8	10.4

Table 5 shows the scores on the general health of the respondents A general overview reveals that out of 77 tested, 44 (57.1%) of the respondents had a low level of psychopathology, 25(32.5%) of the respondents had medium level of psychopathology while 8(10.4%) of the respondent had high level of psychopathology.



Table 6: Descriptive statistics of variables

Descriptive Statistics			
	Mean	Std. Deviation	N
MenstrualPattern	14.5974	3.77756	77
Blood Pressure	8.7143	1.88385	77
General Health	33.1948	12.74965	77

Table 7: Summary of Multiple Regression table showing joint and independent determinant of peer pressure and menstrual pattern on general health

Variables	B	t	P	R	R ²	F	p
Peer pressure	0.83	11.57	<.05	0.42	0.15	21.12	<.05
Menstrual pattern	0.05	0.79	>.05				

From Table 7, the results indicate that there was a significant joint prediction of peer pressure and menstrual pattern on general health ($R^2 = .15$, $F(2, 75) = 21.12$, $p < .05$). The $R^2 = .15$ indicates that the independent variables (peer pressure and menstrual pattern) explained a 15% variation in the dependent variable (general health). Furthermore, only peer pressure ($\beta = 0.83$, $t = 11.57$, $p < .05$) independently predict general health.

DISCUSSION

The main objective of the study is to examine the relationship between menstrual pattern, blood pressure, and general health of female undergraduates at Obafemi Awolowo University, Ile-Ife. The findings showed that the age of the respondents ranged between 16-24, with a median age of 18.5 and most of the respondents fell into the age bracket of 16-18. This indicated that most of the respondents were adolescents. Most of the respondents were part two students, Christians, single and from monogamous families.

The study also revealed that the mean age at menarche was 14.5 years, with a mean length of the cycle as 28.9 days with a range of 20-33 days. This is in line with the study carried out by Esan & Esimai, (2010) where they reported the mean age at menarche to be 14.18 years among female college students.

The study also revealed that there is a significant relationship between menstrual pattern and blood pressure, at $p < .01$. For example, as the age of menarche decreases, blood pressure increases. This means that the age a woman begins menstruation is associated with having high or low blood pressure later in life. This is contrary to the result of a study by Shen, Wang, Hu, et al. (2019) that revealed that the early onset of menstruation significantly increased the risk of hypertension in late adulthood. According to them when one system develops early or experiences a delay that has an impact on other body systems. Women with early menarche may have less than an optimal



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developed cardiovascular system, therefore had a higher risk for advanced outcomes, such as hypertension in late adulthood.

The prevalence of the menstrual disorder among the respondents was 18.9 %. This was in contrast to the prevalence of menstrual disorder as stated by Akpan, et al (2011). The difference may be because respondents may find it difficult to talk about their menstrual problem, which they may see as personal. A significant negative relationship was also observed between menstrual pattern and General Health at $p < .05$. This relationship reveals that a decrease in menstrual patterns (for instance, duration of flow) leads to an increase in psychopathology in the respondents. This is in agreement with a study by Baron, Flick, Cook et. al. (2009) which revealed that a relationship exists between the menstrual cycle and the health of respondents. They reported that among women with shorter cycles, 25% had a lifetime substance abuse or dependence disorder. Among the lifetime substance abuse disorders, tobacco dependence was *not* significantly associated with shorter cycle length. However, both alcohol abuse and dependence (OR=2.12, 1.09–4.10) and drug abuse or dependence (OR=1.98, 1.01–3.85) were significantly associated with shorter cycle length.

Lastly, the study revealed that a significant positive relationship exists between blood pressure and the general

health of respondents. This means as blood pressure increases, psychopathology in respondents also increases. This is in agreement with the study carried out by Rozario & Masho, (2018) in the United States and also agree with the study of Ojike, Sowers, Seixas et al (2016) that revealed that there are links between psychological and hypertensive disease.

CONCLUSION

The study concludes that there is an interrelationship between menstrual patterns, blood pressure, and general health of female undergraduates which are in the adolescent age bracket.

RECOMMENDATION

There is a need to educate adolescents on what to expect on menstrual patterns to avoid anxiety and other related problems that come with lack of knowledge related to menstrual patterns. Also, the significance of problem-related to menstruation should be discussed for the same reason. Early diagnosis and treatment can also help to manage in time psychological problems that can arise as a result of menstrual problems. Schools or institutions as such should employ the services of trained Clinical psychologists, who from time to time will counsel people as the need arises.

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