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Full Length Research Paper

Prevalence of Dysmenorrhea and Menstrual Bleeding in Relation to Packed Cell Volume among Female Students of Bingham University

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Abstract

Menstruation is the regular discharge of blood and mucosal tissue through the vagina. It is a natural phenomenon that indicates a woman's sexual health. Its disorders affect 40-95% of menstruating women. This study aims at determining the prevalence of dysmenorrhea among female students of Bingham University, Nigeria, and to compare premenstrual and postmenstrual hematocrit in adult females. A cross-sectional study was used to determine the prevalence of dysmenorrhea among the students, while for the comparison of haematocrit, a random selection of normal healthy women was made. A total of 282 women consented to participate in the research. 35 participants were included in the second part of the study. A detailed multiple choice questionnaire was used to elicit the various responses. The Packed Cell Volume (PCV) of dysmenorrhic and eumenorrhic premenopausal females was collected from each participant 48 hours prior to menstruation and three days following the end of menstruation. The results indicate that dysmenorrhea is common among the students, and the prevalence is 78%. The study also observed that the mean value of haematocrit measured during the premenstrual period was significantly higher than that observed in the postmenstrual period for dysmenorrhic participants ($p < 0.05$). Similarly, the mean difference in haematocrit was higher in the eumenorrhic participants compared to the dysmenorrhic ones ($p < 0.05$). Dysmenorrhea is a common problem among female population of Bingham University and it adversely affects their performance. Both eumenorrhic and dysmenorrhic women experience cyclic variation in haematocrit and the effect of estrogen rather than menstrual blood loss is the most likely cause.

Keywords: *Menstruation, Eumenorrhea, Prevalence, Dysmenorrhea, Haematocrit.*

INTRODUCTION

Menstruation is the regular discharge of blood and mucosal tissue from the inner lining of the uterus through the vagina. It is a natural phenomenon which is an important sign of women's sexual health (McCracken et al., 1995), (Poureslami and Osati-Ashtiani, 2002), reflecting their physiological response to endocrine secretions and fluctuations (Sanyal and Ray, 2008). Although it has been established that cyclic changes occur in hematocrit (Sanyal and Ray, 2008), there is still the unanswered question of what exactly is responsible for these cyclic changes and if these changes differ in dysmenorrhic from eumenorrhic women (Sanyal and Ray, 2008).

Menstruation occurs more or less at regular monthly intervals throughout the active reproductive life of a woman. A woman's first menstruation is called menarche. It is an important maturity indicator used to

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assess the developmental status of a pubertal female (Blondell et al., 1999, (Cameron and Nafgdee, 1996). Menarche occurs averagely at the age of 12 but may vary from person to person (Harlow and Campbell, 2004). The menstrual cycle is the time from the onset of menstrual flow to the day before her next menstrual flow. It occurs approximately every 28 days, with variation between 24 and 35 days (Harlow and Campbell, 2000) (Walraven et al., 2002).

Despite being a natural and physiologic phenomenon in all women, menstrual disorders in diverse ways affect 40-95% of menstruating women. Among these disorders of menstruation are menorrhagia, dysmenorrhea, amenorrhea and oligomenorrhea (Walraven et al., 2002), (Banikarim et al., 2000) and (Grant et al., 2000).

Dysmenorrhea, which is the focus of this study, is defined as sharp painful menstrual cramps in the lower abdomen or painful menstruation (El-Gilany et al., 2005), (Kamatenesi-Mugisha et al., 2007). Dysmenorrhea may be categorized into two distinct types: primary and secondary. Primary dysmenorrhea is painful menses in women with normal pelvic anatomy, usually beginning during adolescence (Avasarala and Panchangam, 2008). On the other hand, secondary dysmenorrhea is menstrual pain associated with underlying pathology (Poureslami and Osati- Ashtiani, 2002) (Titilayo et al., 2009)

Prevalence of primary dysmenorrhea is difficult to determine because of different definitions of this condition, but estimates vary from 45% to 95% of all women within the reproductive age group. Dysmenorrhea seems to be the most common gynecological condition, regardless of age and ethnicity, though more common among women of younger age group (Harel, 2002) (Harlow and Park, 1996).

Studies have shown that not less than 10% of menstruating young women are incapacitated for up to three days monthly all because of dysmenorrhea (Pullon et al., 1998). Dysmenorrhic pain may range from mild pain that does not interfere with sleep or normal day activities to severe excruciating pain that is capable of interrupting sleep and may be disabling; often resulting in school and work absenteeism, leading to poor educational performances and economic loses. Such issues are often omitted in the public health agenda of many low and middle income countries. If any, very few attempts have been made at exploring menstrual cycle problems in sub-Saharan Africa. Studies employing retrospective questionnaires have found that dysmenorrhic women report cyclical changes in psychological symptoms such as irritability, difficulty concentrating, crying spells, anxiety and depression and these are often referred to as premenstrual syndrome (Alonso and Coe, 2001).

The current study aims to evaluate the prevalence, severity and management of dysmenorrhea as it affects the various age groups in Bingham University (North-central Nigeria)) as dysmenorrhea remains a major reason for school absenteeism.

In addition, as menstruation involves monthly acute blood loss, premenopausal women are susceptible to fluctuations in hematocrit (Packed Cell Volume). Packed Cell Volume (PCV) is the proportion of blood occupied by red blood cells (RBCs), expressed in percentage. It is the volume of RBCs packed at the bottom of a hematocrit tube when the blood is centrifuged. It is also called hematocrit value or erythrocyte volume fraction (EVF). Normal PCV in males = 40% to 45% and in females = 38% to 42% (Sembulingam and Sembulingam, 2010). During menstruation, the amount of blood loss is not expected to be so significant to compromise homeostatic status of non-menorrhagic individuals. However, it is not uncommon to experience symptoms relating to hematologic imbalance especially dizziness, headaches and fatigue. These have always been assumed to be due to fluctuations in hormones mediating the menstruation process. As much as this assumption could be true, a useful parameter that may further explain the reason for the presence of these symptoms has always been neglected. Up until now, no study has compared premenstrual and postmenstrual PCV. The general belief that normal menstrual blood loss should not be so significant to cause PCV drop without seeking to understand and establish it through empirical evidence may be misleading and will perpetuate the existing knowledge vacuum regarding hematocrit fluctuations during menstruation . The knowledge may be insightful as determination of premenstrual and postmenstrual hematocrit levels may provide a more objective and a better alternative method of assessing and quantifying menstrual blood loss especially when excessive (menorrhagia) is suspected. The traditional approach is crude, subjective and unreliable as it depends on the extent of soaking and frequency of change of sanitary towels or tampons. Comparing premenstrual and postmenstrual PCV/hematocrit may therefore be of a great value and a good guide in determining the level of hematocrit fluctuations to be regarded as menorrhagia in women.

MATERIALS AND METHODS

Study Area

The cross sectional study of prevalence of dysmenorrhea in relation to premenstrual and postmenstrual haematocrit were carried out among adult female students of the university in the Department of Physiology, from February, 2015 to May 2015. Prevalence of dysmenorrhea was the phase 1 of the study, while comparison between premenstrual and postmenstrual haematocrit was the phase 2.

PHASE 1

Development of Questionnaire

To assess how common dysmenorrhea was in the community, interviews were held with 38 dysmenorrhic females and questions as it pertained to the severity and duration of pain, the presence or absence of premenstrual syndrome and the means by which dysmenorrhic females alleviate dysmenorrhea were asked. This assisted in the development of the questionnaire. The multiple-choice questionnaire included a brief definition of dysmenorrhea and request for information concerning demographics, age at menarche, predictability/regularity of menstrual cycle, menstrual cycle length, duration of menses, premenstrual symptoms, pains associated with menstruation and its severity. Additional questions relating to the frequency and severity of symptoms, changes in daily activities, and management of dysmenorrheal were asked.

A pilot study was conducted to assess the understanding of each question and to determine where modifications of the questionnaire were needed.

Sample size calculation

The total population of females in the University was nine hundred and ninety–four (994). The sample size for distribution of the questionnaire was calculated by the following formula:

Sample size (n): $Z_{1-\alpha/2}^2$ p (1- p)/ d^2 for a qualitative variable

Z = confidence level or standard normal variance (at 5 % type 1 error ($p < 0.05$) is 1.96 i.e. confidence level of 95%

P = expected proportion of population based on previous studies is 80%

d = absolute error or precision is 0.05. (Charan and Biswas, 2013)

$n = 1.96^2 * 0.80* (1-0.80)/ 0.05^2$

n = 3.84168* 0.16/ 0.0025

n = 245

Distribution of questionnaire and collection

A total of 300 anonymous multiple-choice questionnaires were administered to all consenting female students occupying rooms with odd numbers in each block in the female hostel. The aim of the study and the contents of the questionnaire were explained to each respondent, and voluntary participation was requested. Females who had attained menarche were included while non-consenting and non-nulliparous women were excluded from the study. A total of 247 questionnaires were returned.

PHASE 2

Sampling method and Participants Selection

The study was carried out on 35 normal healthy female students 17 to 24 years of age. The selection was on a random basis. A specially designed form providing information about the study was given to respondents. Since this study involved disclosure of intimate knowledge, participants were assured of confidentiality and anonymity. Their detailed menstrual history including the average cycle length, duration of menstruation, presence or absence of dysmenorrhea, and use of NSAIDs was taken. The premenstrual phase was taken as 1 to 2 days preceding the onset of menstruation. This is to ensure that the participants with unstable cycle length were not left out of the study. Also exactly 3 days following the last day of menses was adopted as the postmenstrual phase to allow for physiologic hemodilution that follows acute blood loss. The students were informed of their right to withdraw from the study at any time.

Inclusion criteria

Selections of participants were on the basis of attainment of menarche and normality of menstrual cycle length i.e. menstrual cycles within 21- 35 days.

Exclusion criteria

Selection of participants were on the basis of usage of anti-malaria drugs as these medications delay intraerythrocytic development and may bias the hematocrit results; non-nulliparity as it has been postulated that dysmenorrhea is decreased in parous females; and persons suffering bleeding diathesis in involving chronic blood loss.

Consent

The selected participants gave a written consent to the study. The participants were further divided into two groups:

GROUP A: Eumenorrhic participants

GROUP B: Dysmenorrhic participants

MATERIALS

Sterile hypodermic 2ml syringes, EDTA anticoagulant bottles, Cotton wool, Tourniquet, Plastic hand gloves, Vitrex Microhematocrit tubes, McJefferson

Microhematocrit Centrifuge, Model SH 120-1, Hawsley Plastacine and Methylated Spirit, and Hawsley hematocrit reader.

Collection of Blood samples

The blood samples were collected from each participant via venopuncture at the cubital fossa region or the dorsum of the wrist region 48 hours prior to menstruation and three days following the end of menstruation. The selected area was sterilized using methylated spirit and cotton wool and afterwards 2ml of blood samples were collected and immediately emptied into the already prepared ethylenediaminetetriacetic acid (EDTA) anticoagulant bottle.

Determination of Hematocrit

The hematocrit of each participant during the premenstrual and postmenstrual phases was determined by collecting blood samples into a heparinized capillary tube and centrifuging for ten minutes at 12000 revolutions per minute. Each blood sample was immediately centrifuged twice to eliminate error. Afterwards, the hematocrit was read by the means of hematocrit reader, the mean of two separately obtained readings was taken as the haematocrit value. The value was confirmed by more than one trained personnel and double checked with a repeat centrifuging and reading of another sample to ensure accuracy.

Statistical analysis

The data from the questionnaire were analyzed using frequency distribution table, mean and graphical analysis using pie charts and bar charts, the comparison between hematocrit in dysmenorrhic and eumenorrhic participants was determined using mean, standard deviation, standard error of mean and paired t-test was used to compare results for the two groups. The association between blood group and dysmenorrhea was determined, and data was analyzed at 95% confidence interval ($P<0.05$) to determine significance of the results.

RESULTS

The results from this study are presented in two parts. The results for phase one represents the study on prevalence of dysmenorrhea while the results for phase two represents the study on hematocrit fluctuations before and after menstruation.

All 247(100%) respondents reported having attained menarche out of which 1 (0.40%) began menstruating below 8 years of age (precocious puberty), 64(25.9%) between 8-11 years of age, 180(72.87%) between 12-18 years and 2(0.81%) began menstruating above 18years of age (delayed puberty). The mean age at menarche was 13.2±2.8 years. This complies with other studies' findings in which, the mean age of menarche was 13.9±1.6 (Titilayo et al., 2009) 12.3±1.5 years (Ortiz et al., 2012), 12.58±1.2 (Gagua et al., 2012) and 13.38 ± 1.20 (Unsal et al., 2010).

PHASE 1: Questionnaire Analysis

Out of a total of 300 women who volunteered for the study 247 completed and returned the multiple-choice questionnaire. The information contained in each questionnaire was analyzed and presented in tabular form and by the use of charts.

The mean age of the respondents was 19.56±0.01 years, range (13-25 years). All 247(100%) respondents reported having attained menarche out of which 1 (0.40%) began menstruating below 8 years of age, 64(25.9%) between 8-11 years of age, 180(72.87%) between 12-18 years and 2(0.81%) began menstruating above 18years of age. The mean age at menarche was 13.15±0.01 years.

It was also observed that 5.66% of the respondents menstruated for less than 2 days, 92.70% menstruated for 3-7 days while 1.61% menstruated for greater than 7 days. 2% of the population were oligomenorrhic, 87% had normal menstrual cycle length of 21-35 days while 11% were polymenomenorrhic. Figure 1

In this study it was observed that 111(46%) had regular or predictable menstrual cycles while 131(54%) of the total respondents reported having irregular or unpredictable menstrual cycles. Figure 2

Out of the 247 women who complete the multiple choice questionnaire, 193 (78%) reported having experienced dysmenorrhea, while 54 (22%) do not experience dysmenorrhea. Figure 3

The frequency of pain differed from person to person. 84 (44%) respondents reported that they experienced dysmenorrhea every month while for 109(56%) respondents dysmenorrhea was not as frequent as every month. Of all students experiencing dysmenorrhea, 19% reported mild pain, 51% reported moderate pain and 30.7% reported severe pain. Table 1

It was also observed that 6(4.41%) experienced dysmenorrhea on the first day of menses only, 57(41.90%) experienced pain for first and second day of the period, 12(8.80%) experienced pain throughout their period and 61(44.85%) experienced pain but before their periods and first few days of their period. Figure 4, table 2 and 3.

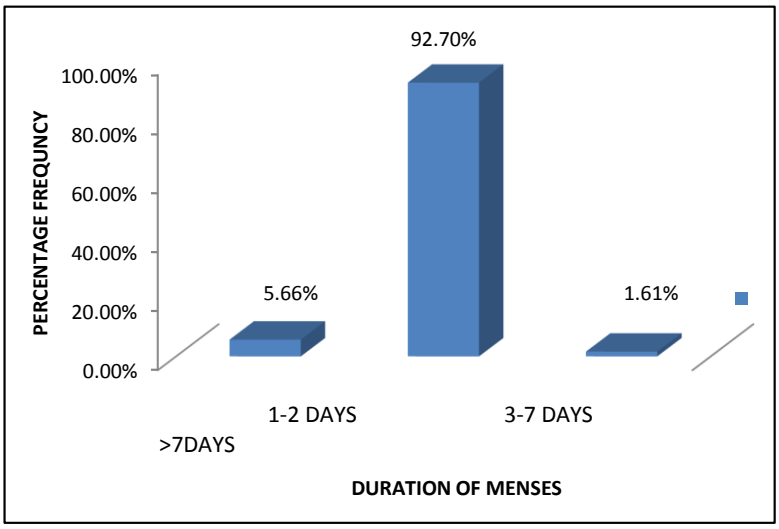


Figure 1. Percentage frequency of menstrual duration amongst both eumenorrhic and dysmenorrhic participants

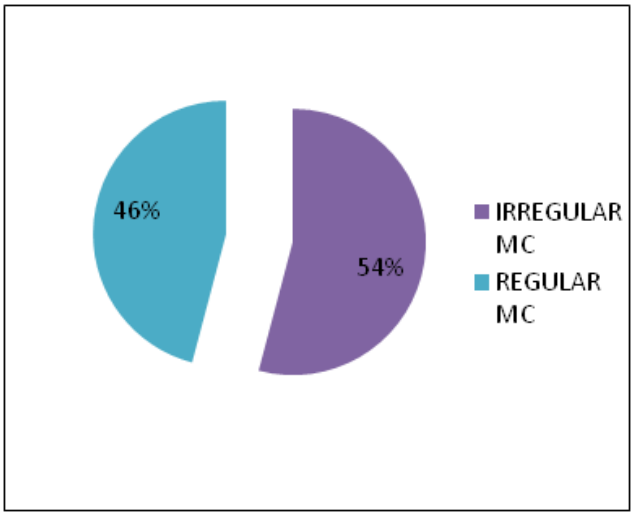


Figure 2. Pattern of menstrual cycle

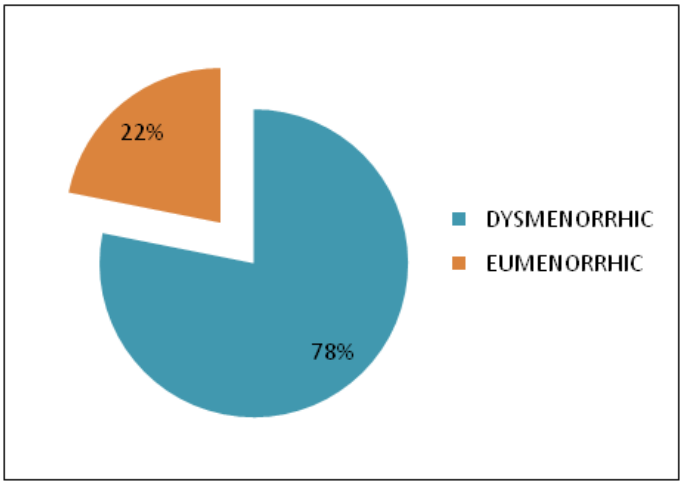


Figure 3. Chart showing the prevalence of dysmenorrhea

Table 1a. Frequency of dysmenorrheal

Frequency of dysmenorrhea	No (%)
Comes every month	84 (44%)
Not every month	109(56%)
TOTAL	193(100%)

Table 1b. Severity and impact of dysmenorrheal

Severity and impact of dysmenorrhea	No (%)
Mild (Not incapacitating)	36(19%)
Moderate (Rarely results in School Absenteeism (SA)	98(51%)
Severe (Results in SA and disturbs sleep)	51(30.7%)
TOTAL	193 (100%)

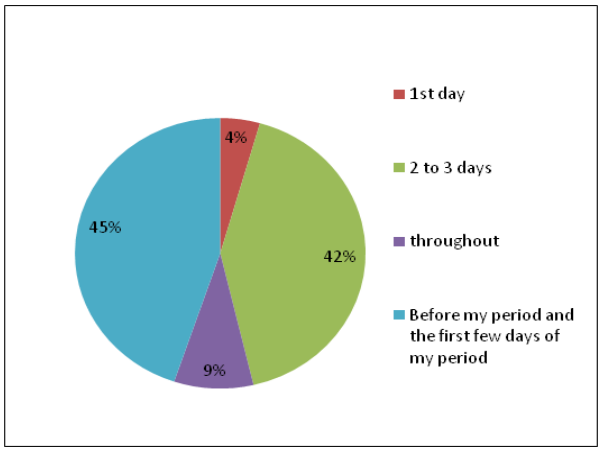


Figure 4. Showing duration of pain

Table 2. Premenstrual syndrome experienced by both eumenorrhic and dysmenorrhic females

Symptomatology	n	(%)
Headache	32	12.9%
Poor appetite	45	18.4%
Increased appetite	21	8.9%
Poor sleep	11	4.7%
Sleepiness	21	8.9%
Bloating	16	6.8%
Fatigue/lethargy	65	26.7%
Lower backache	68	27%
Nausea	16	6.8%
Pelvic heaviness	52	21.2%
Anxiety/moodiness/depression	81	32.8%
Gastrointestinal disturbances	30	12.3%
Abdominal cramps	125	50.6%
Crying spells	8	3.4%
Irritability	67	27.1%
Pimples	13	5.4%
Nothing at all	20	8%

Table 3. Means used in the treatment of dysmenorrheal

Non-clinical means	n	(%)
Nothing at all	52	26.9%
Exercise	20	10.3%
Hot water bottle	35	18.1%
Fruits	5	2.5%
Drugs		
Paracetamol	37	19.1%
Buscopam	20	10.3%
Aspirin	2	1.0%
Ibuprofen	28	11.3%
Diclofenac	10	5.1%
Feldene/ Piroxicam	52	26.9%

PHASE 2: Hematocrit analysis

The results for the analysis of hematocrit are divided into two parts the first set of results represent the analysis of hematocrit fluctuations in dysmenorrhic women and the second, in eumenorrhic women.

Dysmenorrhic participants

A mean hematocrit of 33.33% ±0.54 was observed in the premenstrual phase and 32%±0.47 in the postmenstrual phase for 21 dysmenorrhic participants. An average drop of 0.66% was observed between the mean postmenstrual and premenstrual Hct. Table 4 and Figure 5.

Eumenorrhic participants

A mean of 32.85% ±1.19 was observed in the premenstrual phase and 31% ±1.37 in the postmenstrual phase for 14 eumenorrhic participants.

The data was tested for significance using paired t-test, $P< 0.05$. An average drop of 1.86% was observed between the premenstrual and postmenstrual Hct for the eumenorrhic participants. The data obtained was statistically significant at $P< 0.05$. Table 5 and figure 6

DISCUSSION

Menarche and Premenstrual syndrome.

The results of the present study indicate that the following symptoms are experienced by the respondents: abdominal cramps (50.6%), anxiety/moodiness/depression (32.8%), irritability (27.1%), lower backache (27%), fatigue/lethargy (26.7%), pelvic heaviness (21.2%), and poor appetite (18.4%). Escape of prostaglandins from the uterus into the systemic circulation may be responsible for some of the somatic complaints such as faintness, dizziness, headaches, nausea, abdominal cramps, vomiting and diarrhea. However, mood swings which are known to be associated with changes in the autonomic functions are believed to be mediated by endorphins (Mehta and Chalranartu, 1993). These symptoms seem to worsen with approaching menstruation and improve with the onset of menstruation or thereafter (Thomas et al., 1997).

Menstrual cycle characteristics

11% of the total population of respondents was polymenomenorrhic with menstrual cycles less than 21 days, 87% have normal menstrual cycle length of 21-35 days, while 2% are oligomenorrhic with menstrual cycles longer than 35 days. The duration of menses also varies from individual to individual. The study showed that 92.70% of the respondents menstruate for 3-7 days, 5.66% menstruate for less than 3 days while 1.61% menstruate for longer than 7 days.

Likewise, it was observed that 111(46%) had easily predictable menstrual cycles (regular menstrual cycles) while 131(54%) of the total respondents reported experiencing varied menstrual cycle lengths or irregular menstrual cycles.

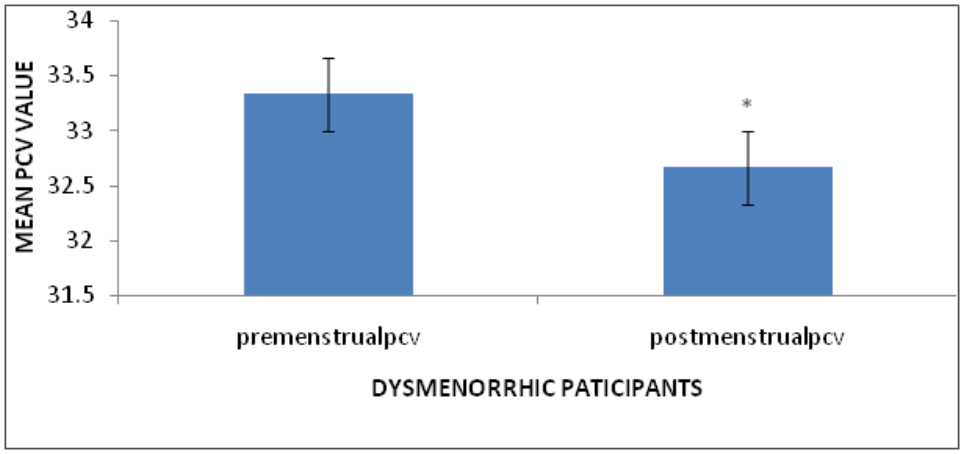
Prevalence and impact of dysmenorrhea

It is estimated that the prevalence of dysmenorrhea varies from 20% to 95%across the world.[18] The results of this study confirmed that dysmenorrhea is very prevalent among female students in Bingham University; out of the 247 participants, 193 (78%) reported dysmenorrhea, while 54 (22%) do not experience dysmenorrheal (i.e about 56% difference between the two groups). This result is largely comparable with that

Table 4. Showing the mean and standard error of mean for the premenstrual and postmenstrual hematocrit in dysmenorrhic participants.

Dysmenorrhic Participants (n=21)	Mean±SEM
Premenstrual hematocrit	33.33±0.54482*
Postmenstrual hematocrit	32.67±0.47476*

n- Number of participants; * data was significant at P< 0.05.



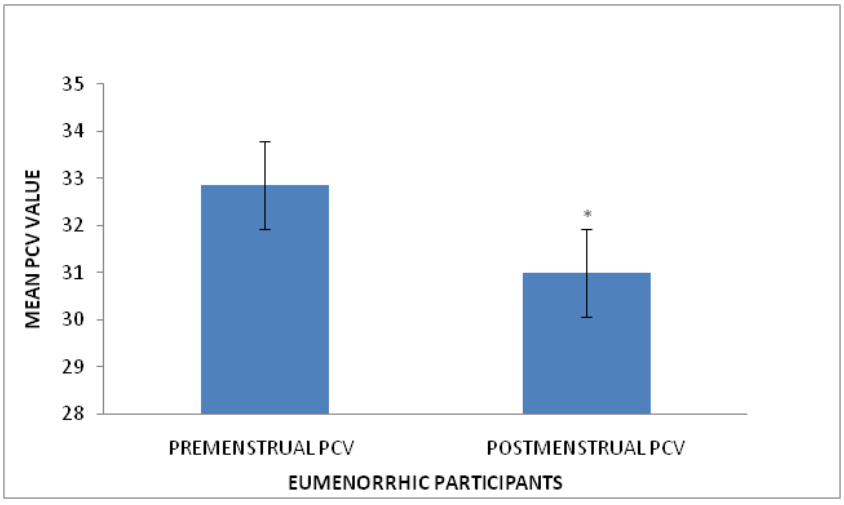
***mean difference in hematocrit was significant at P< 0.05**

Figure 5. Bar charts showing mean PCV values before and after menstruation in dysmenorrhic participants

Table 5. Showing the mean and standard error of mean for the premenstrual and postmenstrual hematocrit in eumenorrhic participants.

Eumenorrhic participants (n=14)	Mean ±SEM
Premenstrual Hematocrit	32.86± 1.19*
Postmenstrual Hematocrit	31.00± 1.30*

n- Number of participants; * data was significant at P< 0.05



N -number of participants * data was significant at P< 0.05

Figure 6. Bar charts showing mean PCV values before and after menstruation in eumenorrhic participants

obtained in previous studies that reported the prevalence of dysmenorrhea among students from South Western Nigeria as 80.1% (Adeyemi and Adekanle, 2006) students in South Eastern University as 70 % (Chigbu and Azubuike, 2013) and 69.8% for medical students in Maiduguri, North Eastern Nigeria (Amaza et al., 2012). The variation in prevalence may have resulted from difference in age of respondents as it has been assumed that younger age and nulliparity are associated with dysmenorrhea and that dysmenorrhea subsides with increasing age (French, 2005). Thus, studies recruiting older age groups may observe lower prevalence rates of dysmenorrheal (Harlow and Park, 1996).

Menstrual distress leads to unpleasant and disturbing pain (Latthe et al., 2006) (Patel et al., 2006) (Jamieson and Steege, 1996). Severity of dysmenorrhic pain is graded as mild, moderate and severe depending on limitation to activities or sleep. Of all participants experiencing dysmenorrhea, 19% reported mild pain, 51% reported moderate pain and 30.7% reported severe pain. This indicates that dysmenorrheal could cause school absenteeism (SA) in about 81% of population of women, ($p< 0.05$).

81 % of women with dysmenorrhea reported that it limited their daily activities. Of these women, 30.7% reported school absenteeism. It was also observed that 6(4.41%) experienced dysmenorrhea on the first day of menses only, 57(41.90%) experienced pain for first two days of their period, 12(8.80%) experienced pain throughout their period and 61(44.85%) experienced pain but before their periods and first few days of their period.

Management of dysmenorrhea

Respondents who had mild pain with little effect on their daily activities did not take any medication for treatment of dysmenorrhea (21%), others used non clinical means which includes the use of heating pads(14.1%), exercise (10.3%) and fruits such as pineapple, banana and watermelon (2%), while the majority of people who had moderate to severe pain use medication (77.9%) for the relief of dysmenorrhea (nonsteroidal anti-inflammatory drugs (NSAIDs).

Hematocrit Analysis

The results show that fluctuations in hematocrit studied show significant ($P<0.05$) changes during the menstrual cycle. The mean values of premenstrual hematocrit (Hct) and postmenstrual Hct of both dysmenorrhic and eumenorrhic participants were observed to vary significantly at $P<0.05$.

The mean value of Hct reported for premenstrual hematocrit (luteal phase) was 33.33±0.54 and was significantly higher than that reported in the postmenstrual hematocrit (follicular phase) 32.67±0.47 for dysmenorrhic participants. Similarly, mean hematocrit dropped from 32.86±1.19 in the premenstrual phase (luteal phase) to 31.00±1.30 in the postmenstrual phase (follicular phase) for eumenorrhic participants. Therefore the mean difference in hematocrit was higher in the eumenorrhic participants compared to the dysmenorrhic ones (see tables 4 and 5).

Cyclic changes occur in hematocrit (Hct) during the menstrual cycle as confirmed in the present study. The variations in hematocrit may not be adequately explained by blood loss during menstruation alone as menstruation involves a loss of an average of 35ml of blood (10-80ml) (Ziporyn et al., 2004) and 1% drop in hematocrit has been found to be equivalent to an average loss of 160- 180ml of blood (Mark et al., 2006). This observed difference could not have arisen from measurement error as the readings were confirmed by a minimum of two people and PCV assessed twice for each sample.

Changes in the concentration of estrogen during the menstrual cycle could be a major contributing factor. Experimentally, it has been demonstrated that estrogens cause fluid retention (Mark et al., 2006). This could be in part due to enhanced osmotic stimulation of arginine vasopressin (AVP) (Heritage et al., 1980). Furthermore, a number of studies have demonstrated that basal plasma AVP concentration ($P_{[AVP]}$) is elevated in the presence of high plasma concentrations of unopposed estrogen as during the mid-follicular phase of the menstrual cycle in young women (Forsling et al., 1981) and after exogenous estrogen administration in postmenopausal women (Forsling et al., 1982). It could therefore be suggested that high estrogen level that potentiates vasopressin effect causes fall in PCV. The enhancing effect of estrogen on ADH thus causes greater fluid retention postmenstrually. The resulting hemodilution translates to the observed fall in PCV. This fluctuation in PCV level may be higher in menorrhagic subjects.

The mean percentages values of hematocrit showed significant difference in both eumenorrhic and dysmenorrhic participants thus dysmenorrhea is not a constituent factor affecting blood loss. This can be accounted for by estrogen levels in varying concentrations in the menstrual cycle.

CONCLUSION

Dysmenorrhea is highly prevalent among female students of Bingham University, Karu, Nigeria, and thus, a common public health issue that requires attention. In view of the public health importance and the social and academic challenges dysmenorrhea poses, it is important that the school management in collaboration with the medical centre periodically organize health

education on this topic on how to alleviate the condition.

Given that most women who experience dysmenorrhea are too shy to seek medical advice and attention, health care providers should be more proactive in treating and counseling students concerning dysmenorrhea. In addition, they could intervene by providing tips on appropriate medication use as first aid and when to present to the medical centre for expert care.

The study revealed that the mean value of hematocrit observed for premenstrual hematocrit differed significantly from postmenstrual hematocrit in both eumenorrhic and dysmenorrhic participants. It is therefore suggested that estrogen enhancing effect on anti-diuretic hormone causing fluid retention and not menstrual blood loss is the probable explanation for the observed hematocrit fluctuations in premenopausal females.

Limitations

Secondary dysmenorrhea is rare among adolescents but it has been impossible to differentiate between primary and secondary dysmenorrhea in this study because this is an anonymous study, the information on dysmenorrhea was obtained by self-report and could not be validated.

It was difficult to compare premenstrual and postmenstrual hematocrit of menorrhagic subject as hematocrit fluctuations in this group of persons may give a different picture.

REFERENCES

Adeyemi A, Adekanle D (2006). *Management Of Dysmenorrrhoea Among Medical Students*. The Internet Journal of Gynecology and Obstetrics;7; 1

Alonso C, Coe CL (2001). "Disruptions of social relationships accentuate the association between emotional distress and menstrual pain in young women". *Health and Psychology*; 20:411-6.

Amaza D, Sambo N, Zirahei J, Dalori M, Japhet H, Toyin H (2012). "Menstrual Pattern among Female Medical Students in University of Maiduguri, Nigeria" *British Journal of Medicine and Medical Research; 2(3): 327-337.*

Avasarala AK, Panchangam S (2008) "Dysmenorrhea in different settings: Are the rural and urban adolescent girls perceiving and managing the dysmenorrhea problem differently?" *Indian Journal of Community Medicine*; 33:246–9.

Banikarim C, Mariam R, Chacko MD, Steve H (2000). "Prevalence and Impact of Dysmenorrhea on Hispanic Female Adolescents" *Archives of Pediatrics and Adolescent Medicine*;154(12)

Blondell RD, Foster MB, Dave KC (1999) Disorder of Puberty. Am FAM Physiology 60: 209 - 218

Cameron N and Nafgdee I (1996). Menarcheal age in two generations of South African Indians. Annals of Human Biology, 23,113 – 119

Charan J, Biswas TM (2013). How to calculate sample size for different study designs in medical research. Indian J Psychol Med.; 35(2):121-6. doi: 10.4103/0253-7176.116232

Chigbu OC, Azubuike KO (2013). See-and-treat management of high-grade squamous intraepithelial lesions in a resource-constrained African setting. *International Journal of Obstretic and Gynaecology;* 124: 3; 204–206.

El-Gilany AH, Badawi K, El-Fedawy S (2005). Epidemiology of dysmenorrhoea among adolescent students in Mansoura, Egypt. *Eastern Mediterranean Health Journal;* 11 (1/2), 155-163.

Elzik ME, Dirschl DR, Laurence E (2006). Dahners Correlation of Transfusion Volume to Change in Hematocrit Correlation of Transfusion Volume to Changein Hematocrit. *American Journal of Hematology*; 81:145–146

Forsling ML, Akerlund M, Stromberg P (1981). "Variations in plasma concentrations of vasopressin during the menstrual cycle". *Journal of Endocrinology; 89:263–266.*

Forsling ML, Akerlund M, Stromberg P (1982). "Effect of ovarian steroids on vasopressin secretion". *Journal of Endocrinology 1982; 95:147–151.*

French L (2005). Dysmenorrhea. *Am Fam Physician, Jan 15*,15;71(2):285-291

Gagua T, Besarion T, Gagua D (2012). Primary dysmenorrhea: prevalence in adolescent population of Tbilisi, Georgia and risk factors. *J Turk Ger Gynecol Assoc*; 13(3): 162–168.

Grant C, Gallier L, Fahey T, Pearson N, Sarangi J (2000). Management of menorrhagia in primary care - impact on referral and hysterectomy: data from the Somerset Morbidity Project. Journal of Epidemiology and Community Health; 54, 709–713.

Harel Z (2002). "A contemporary approach to dysmenorrhea in adolescents". *Pediatrics and Drugs*; 4: 797-805.

Harlow SD and Campbell OM (2000). Menstrual dysfunction: are we missing an opportunity for improving reproductive health in developing countries? Reprod Health Matters; 8:142–147

Harlow SD, Campbell OM (2004). Epidemiology of menstrual disorders in developing countries: a systematic review. BJOG.;111(1):6-16.

Heritage AS, Stumpf WE, Sar M, Grant LD (1980). "Brainstem catecholamine neurons are target sites for sex steroid hormones". *Science; 207:1377–1379*

Jamieson DJ, Steege JF (1996). "The association of sexual abuse with pelvic pain complaints in a primary care population". *American Journal of Obstetrics and Gynecology;* 177(6):1408-1412.

Kamatenesi-Mugisha M, Oryem-Origa H, Olwa O (2007) Medicinal plants used in some gynecological morbidity ailments in Western Uganda. *African Journal of Ecology;* 45 (Suppl. 1), 34-40.

Latthe P, Mignini L, Gray R, Hills R, Khan K (2006). "Factors predisposing women to chronic pelvic pain: systematic review'. *British, Medical Journal*; 332:749–55.

McCracken JA, Custer EE, Lamsa JC (1995). "Luteolysis: a Neuroendocrine mediated event. Physiology Rev, 79:263–323.3. Wathes DC, Lamming GE. The oxytocin receptor, luteolysis and the maintenance of pregnancy. *Journal of Reproduction and Fertility Supplementation*; 49:53–67.

Mehta V, Chalranartu AS (1993). "Autonomic functions during different phases of menstrual cycle". *Indian Journal of Physiology and Pharmacology;*37:56-8.

Ortiz BV, Perry C, Sullivan D, Lu P, Kemerait R, Davis RF, Smith A, Vellidis G, Nichols R (2012). Variable-rate applications of nematicides on cotton: A promising site-specific management strategy. Journal of Nematology;44:31–39

Patel V, Tanksale V, Sahasrabhojanee M, Gupte S, Nevrekar P (2006). "The burden and determinants of dysmenorrhea: a population-based survey of 2262 women in Goa, India". *British Journal of Obstetrics and Gynecology*; 113:453–463.

Poureslami M, Osati-Ashtiani F (2002). "Assessing knowledge, attitude, and behavior of adolescent girls in suburban districts of Tehran about dysmenorrhea and menstrual hygiene". Journal of International Women's Students; 3(2):1-11.

Pullon S, Reinken J, Sparrow M (1998). Prevalence of dysmenorrhoea in Wellington women. *New Zealand Medical Journal;* 10, 101, 52-54.

Sanyal S, Ray S (2008). Variation in the menstrual characteristics in adolescents of West Bengal Singapore Medical Journal 2008; 49(7), 542-550.

Sembulingam K, Sembulingam P (2010). Essentials of Medical Physiology, 5thEdition, Japee Brothers Medical Publishers (P) Ltd, New Delhi, India.

Thomas B, Mathew B, Sharon, B (1997). "Premenstrual syndrome".

University of Pennsylvania health system: 1-2.

Titilayo A, Agunbiade OM, Banjo O, Lawani A (2009). Menstrual discomfort and its influence on daily academic activities and psychosocial relationship among undergraduate female students in Nigeria *Tanzania Journal of Health Research, Vol. 11, No. 4, October, pp. 181-188*

Unsal A, Ayranci U, Tozun M, Gul A, Elif C (2010). Prevalence of dysmenorrheal and its effect on quality of life among a group of female university students" *Journal of Medical Science*; 115(2): 138–145.

Walraven G, Ekpo G, Coleman C, Scherf C, Morison L, Harlow SD (2002). Menstrual disorders in rural Gambia. Stud Fam Plann; 33:261–268

Ziporyn K, Carlson J, Stephanie A (2004). Eisenstat Terra "The New Harvard guide to women's health". *Cambridge, Mass: Hazard University Press*.

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