Amal M Elhusein
Assistant Professor, Department
of Pediatrics Nursing, Khartoum
University, Sudan

Niama M Ibrahim
Associate Professor, Department
of fundamental of Nursing and
basics Sciences, Khartoum
University, Sudan

Hadayat A Amasha
Associate Professor, Department
of Maternity Nursing, Port Said
University, Egypt

Practices affecting menstrual cycle among first level students in government nursing colleges Khartoum State

Amal M Elhusein, Niama M Ibrahim and Hadayat A Amasha

Abstract
Background: A menstrual cycle (the female reproductive cycle) is episodic uterine bleeding in response to cyclic hormonal changes. The purpose of a menstrual cycle is to bring an ovum to maturity and renew a uterine tissue bed that will be necessary for the ova's growth to be fertilized. Menarche may occur as early as 9 years of age, it is good to include health teaching information on menstruation to both school–age children and their parents as early as fourth grade as part of routine care. It is a poor introduction to sexuality and womanhood for a girl to begin menstruation unwarned and unprepared for the important internal function it.
Aim of the study: To investigate Practices influence menstrual characteristics among first level students in government nursing colleges, Khartoum State.
Methods & Subjects: A descriptive university based cross-sectional design. This study was conducted on first level nursing students in three faculties in (Khartoum, Elneelian, and Omdurman Islamic University/ faculty of nursing) academic year 2016-2017.
Sample consist of 287 participants. A formal structured questionnaire was used. This study was carrying out in first level university adolescence who attended menarche, between to 15 – 19 years old, after agreeing to the formal consent. They were invited to answer the questionnaire, which included socio-demographic data, menstrual history, and diet and exercise pattern.
Results: Ninety nine percent of participants were Muslim, (91%) live in cities, 167(58%) of them have 1-3 sisters and 115(40%) were the oldest. 150(52%) from nuclear family. Majority 221 (74%) of participants mothers were unemployed.128 (45%) of fathers were self-employed.164(57%) of the girls have attained menstrual at age 14-17 years old. 199 (69%) of them have regular cycle.213 (74%) have menstrual intervals between 21-35 days.217 (75.6%) of them have moderate menstrual flow (66%) of participants change pads 2-3 times/ day. 200 (70%) used to have abdominal pain with menses. 109(38%) of girls got information about menstruation from family. One hundred forty-seven of them have changed in appetite pre-menstruation. (72.8%) with decreased appetite. According to participant's dietary habits, (48.1%) drink tea from 1-3 times/day. One hundred sixty-seven (58.2%) drink soda 1-3 times /day. 60% of them sometimes consume food with saturated fat. According to the health habits of participants during menstruation it is found that; Sixty-nine (24%) perform physical exercise, (51.6%) have regular sleep pattern at night, (43.5%) remove their perennial hair, (75.3%) do not take medication, and (70%) have no restriction to special food.
Conclusion and recommendation: Results indicate that; family as source of information about menstruation is poor. Most of participants do not change their food intake during menstruation. Recommendation based on this study; education regarding menstruation reproductive health should be taught in the curriculum, mothers should function as a primary source, nutrition education should be involved in the curriculum.

Keywords: Menstrual cycle, practices, 1st level nursing students, sudan

Introduction

Menstruation is the process in a women of discharging blood and other Materials from the lining of the uterus (Womb). Menstrual blood flows from the uterus through the small penning in the cervix and passes out of the body through the vagina. (Anonymous, 2018) [6]. Normal menstrual cycle is characterized by length of 28 days (±7 days), duration of flow 4 days (± 2 days) Dangal, (2005) [10].
A menstrual cycle (the female reproductive cycle) is episodic uterine bleeding in response to

Corresponding Author:
Amal M Elhusein
Assistant Professor, Department
of Pediatrics Nursing, Khartoum
University, Sudan

cyclic hormonal changes. The purpose of a menstrual cycle is to bring an ovum to maturity and renew a uterine tissue bed that will be necessary for the ova's growth to be fertilized. Girls began to menstruate usually between the age 9-17 years (Ahmed & Yasmin, 2005) [1]. It is good to include health teaching information on menstruation to both school–age children and their parents as early as fourth grade as part of routine care. It is a poor introduction to sexuality and womanhood for a girl to begin menstruation unwarned and unprepared for the important internal function it represents (Pillitteri, 2014) [27].

In most women, various normal physical changes are brought about by fluctuations in hormone levels during the menstrual cycle. This includes muscle contractions of the uterus (menstrual cramping) that can precede or accompany menstruation. Some may notice water retention, changes in sex drive, fatigue, breast tenderness, or nausea. Breast swelling and discomfort may be caused by water retention during menstruation. (Karen, *et al*., 2004 and Johnson, 2018) [18, 16]. Usually, such sensations are mild, and some females notice very few physical changes associated with menstruation.

Premenstrual symptoms (PMS) include physical and mood changes that peak premenstrual and resolve shortly following the onset of menstrual bleeding (Bruce, 2000, Leon, etal., 1986, Lester, *et al*., 2003, Nobles *et al*.,2016, Obrien, *et al*.,2014, Algars, *et al*.,2015, Barnard, *et al*.,2000) [8, 20, 21, 24, 5]. This is related to change in body's hormone levels increased or decreased (Pathak, 2014) [26].

Lee, *et al*., (2006) stated that menstrual problems among females are common. Pinola, *et al*., (2012) [29] reported that menstrual disorder at the age 16 is a good marker of hyperandrogenemia and adverse lipid profile was associated with higher androgen level. Also, they found that there was association between menstrual disorder hyperandrogenism, obesity and metabolic risk in adolescence. PMS decrease in the transition to menopausal, depress mood, poor sleep and decrease libido (Freeman, *et al*., 2004, Pinkerton, *et al*, 2010, Jen, *et al*., 2010) [12, 28, 15]. Diet has an important role in prevention of menstrual disorder. This can be relieved by avoiding intake of, Caffeine, salt, sugar, fried and processed food during the two weeks prior to menstrual (Pathak, 2014) [26].

Aim of the study
To investigate the practices, influence characteristics among 1st level nursing adolescent, governmental universities (Khartoum state).

Subjects and Methods
Research design
A university based descriptive cross-sectional design.

Setting
This research was conducted at three governmental universities in Khartoum state (Khartoum, Elneelian, Omdurman Islamic universities / faculties of Nursing).

Subjects
This study was carried out in first level university adolescent who attended menarche, between to 15 – 19 years old, after agreeing to the formal consent. They were invited to answer the questionnaire, which dealt with socio-demographic data, menstrual history, and diet and exercise pattern.

Sample
Purposeful sample was selected so that the total of the girls at the three settings was 287 students distributed as follow Khartoum, Elneelian, Omdurman Islamic Universities (83, 94 and 110 students, respectively).

Inclusion *criteria*
Student girls age between 15-19 years, first level, willing to participate, were free from hormonal diseases that may impact the characteristic of menstruation were included in the study.

Tools for data collection
Formal structural questionnaire tools developed by the researchers after reviewing the related literature. It developed to evaluate the practices that influence menstrual characteristic among participants.

Tool validity and reliability
Validity
The tool was developed by the three researchers and modifications of the content were done according to the researcher's judgment on the clarity of sentences, appropriateness of content and sequence of items.

Reliability
Pilot study was carried out on 29(10%) of the total sample to test the feasibility of the study, applicability of tools, and estimate the time required for filling the questionnaire, the pilot study samples were not included in the sample.

Statistical analysis
A compatible personal computer (PC) was used to store and analyzed data. The collected data are coded, tabulated and summarized then were computerized and analyzed by used the SPSS program (statistical package for the social science) version 23. Also, appropriate descriptive statistics are utilized i.e. frequencies, mean, and standard deviation. Inferential statistical testes are used to test the research questions such as the significance given in standard statistical books was included Chi squire and Pearson correlation coefficient (r) test. The level of significance is accepted at P value <0.05

Ethical considerations
Primary verbal official permission was taken from the three deans of the faculties to conduct the research at faculties of Nursing. Written informed consent was obtained from the adolescences after explaining the aim and nature of the study to them. Adolescences were informed that they have a right to withdrawn from the study without any effect on their studying that provided where the collected data was needed only for research purpose.

Results and Discussion
In the present study a total of 287 adolescent participated, from Omdurman Islamic, Al Neelain, and Khartoum University was 110(38%), 94(33%), and 83(29%) respectively.
Table (1) shows that Ninety nine percent of the participants were Muslim, and majority of them (91%) live in Urban areas. More than half (58%) of them has less than four sisters. Birth order of (39%) of girls were the first followed by second (30%) among her sisters. More than half (52%) of them from nuclear family. Similar finding was reported by Goyal (2018) who studied pattern and feature of menstrual among

adolescent girls in Holdwani, He found that (61%) of girls belong to nuclear type of families. According to parents' occupation majority (74%) of participants mothers were unemployed, while (45%) of fathers were self-employed. Most of them of the study groups (73.9%) of family income more than 751 Sudanese pound / month.

Table 1: Distribution of adolescences' Sociodemographic data

Character	Frequency	Percent
Religion		
Muslim	284	99
Missing	3	1
Current Residence		
Urban	262	91
Rural	25	6
Number of sisters		
1 – 3	167	58
4 - 7	85	30
More than 7	7	2
Arrange among sisters		
Oldest sister	111	39
Middle	85	30
Younger	56	20
Types of family		
Nuclear	150	52
Extended	137	48
Mother occupation		
Unemployed	212	74
Employed	56	19.5
Self employed	13	4.5
Others	6	2
Father occupation		
Unemployed	16	6
Employed	118	41
Self employed	128	45
Others	25	8
Family income: (SDG)		
Less than 500	35	12.2
501 - 750	40	13.9
>751	212	73.9

*some missed answer

Table (2) shows distribution of the students according to their menstrual characteristic. More than half (57%) of the girls had attained menstrual at age 14 – 17 years, followed by (39%) by at age 11 – 13 years. In contrast to the study reported by Ahmed & Yasmin (2008) [1], they found that girls in Bangladesh began to menstruation usually between the age of 9-12 years. Also, found that the main age at menarche in Urban west Bengal (Indian) was 12.1 years. Similar finding was reported by Goyal (2018) [13], who found that the main age menarche adolescent in Halwani (Indian) was 12.94 years.

Table 2: Distribution of the students according to their menstrual characteristics (n=287)

Items	Frequency	Percent
Age of menarche		
< 11 years	3	1
11- 13	113	39
14- 17	164	57
> 17	7	2
Rhythm of Menstrual cycle		
Regular	199	69
Irregular	88	31
Duration of blood flow		
< 3 days	4	1
3-7	266	93
> 7	13	5
Others	4	1
Interval of menstrual cycle / days		
< 21	35	12
21- 35	213	74
> 35	17	6
Others	22	8
Amount of menstrual blood flow		

Scanty	23	8
Moderate	217	75.6
Heavy or excessive	47	16.4
Number of pads changes in excessive day		
2-3	189	66
4-5	77	27
> 5	21	7
Occurrence of abdominal pain with menses		
Yes	200	70
No	87	30
***Sources of information regarding menstruation**		
Family member	109	38
Reading books	70	24
Media/ internet	49	17
School	135	47

*More than one source

Sixty nine percent of participants had regular cycle. In contrast to the study conducted by Sanyal (2008) [32], In adolescents west Bengal he found that (95.3%) of the participants had irregular menstrual cycle.

Ninety three percent of adolescents had menstrual flow for 3 – 7 days. Most of them (74%) of them had had menstrual interval between 21 – 35 days. This similar to the findings reported by the Ambade & Sagdeo (2017) [4], they conducted a study on girls in central Indian, most of participants (76%) had moderate menstrual blood flow. Another study conducted in Iran by Najafi et al., (2018) [22]. They found that (58%) of respondents had moderate menstrual blood flow.

Most (66%) of the participants change their pads 2-3 time / day while (27%) of them change their pads 4 – 5 time / day. Ahmed & Yasmin (2008) [1] reported that (75%) of adolescent girls Bangladesh change their rages 3 time / days. In contrast to the result obtained by Cajetan et al., (2016) [9]. Who conducted a study in Ebony state, Nigeria, result indicated that majority of the girls change material and clean external genitalia once a day.

Seventy percent of participants had abdominal pain with menses. Similar finding was reported by Adinma & Adinma (2008) [2]. They found that (66.2%) of Nigerian secondary school's girls suffered from abdominal pain discomfort. Also, Sanyal (2008) [32], found that more than (50%) of west Bengal adolescents suffered from premenstrual problems. Bachloo et al., (2016) [7] found that (77.6%) of adolescents who participated in a study conducted in Aambala had the same problems. Goyal (2018) [13], found that three- fourth of

adolescents participated in study conducted in Malawi, India, had dysmenorrhea.

Regarding information about menstruation, 109 (38%) of the girls got it from their family,135 (47%) from school, and only 49(17%) got menstrual information from media and internet. Similar findings were reported by (Ramchandra et al., 2016, and Kamath et al., 2013) [17]. They found (33%) and (34%) of adolescents Bangalore and Taluk, (Indian), respectively were aware about menstruation prior menarche. Also Bachloo et al., (2016) [7], found that majority (99, 7%) of girls in a study conducted in Ambala, India, had not heard about menstruation at time of menarche. In contrast Adrija et al., (2012) stated that (72.1%) of urban participants in west Bengal had premenstrual knowledge on menstruation.

Regarding other source of information about menstruation although (98.9%) of respondents missed the answer. Only less than (1%) of them answered that the source was the mother. In contrast to the study conducted by (Ramachandra et al., 2016, Kamath et al., 2013) [17], reported that the main source of information about menstruation among adolescent in India were the mothers of respondents.

Table (3) shows distribution of the students according to change in appetite pre, during, and post menstrual period. One hundred forty-seven (51.2%) of participants had change in appetite during pre-menstruation, (72.8%) of them had decreased appetite. Only (27.2%) of them increased appetite during this phase. In contrast to the study reported by Pathak (2014) [26] and Davidson et al., (2007) [11] reported that increased in appetite is one of PMS.

Table 3: Distribution of the students according to change in their appetite pre; during and post menstrual period (n=287)

Items	Frequency	Percent
Change in Appetite pre-menstruation (n= 147)		
Increase	40	27.2
Decrease	107	72.8
Change in Appetite during menstruation (n= 184)		
Increase	48	26.0
Decrease	136	74.0
Change in Appetite post menstruation (n= 76)		
Increase	28	36.8
Decrease	48	63.2
Change in water intake during menstruation (n= 124)		
Increase	46	37.1
Decrease	78	62.9

During menstruation 184 (64.1%) of participated had a changed in their appetite, (72.8%) of them had decreased in appetite during this phase. Similar finding was reported by Pathak (2014) [26] who found that (82.5%) of girls reported

loss of appetite during menstrual phase.

During post menstrual 124 (43.2%) of participants had changed of their appetite, (63.2%) of them were decreased their appetite.

One hundred twenty-four (43%) of participants change their water consumption during menstruation phase. 62.9% of them decreased water intake. As adequate amount of water each day is important for proper cell function. It is advised to drink more 1 – 2 cups /day of water during menstrual cycle. This will minimize the cramps and pain associated with this phase (Jan, 2018) [14].

Table (4) shows distribution of the students according to their dietary habits. Participants used to consume the following (1-3 times/day) of; black tea, coffee, soda, snacks, and chocolate, were represented by; 138 (48.1%), 110(38.3%), 167 (58.2%), and 188(65.5%) of them respectively. According to Pathak (2014) [26]. Coffee, tea, and chocolate as source of caffeine should be avoided to relieve PMS.

Sixty percent of respondents used to take food with saturated fat, while (51.2%)) sometime take a lot of sugar, and (46.3%) consume salty food. It is clear that participants do not change their food intake during menstrual cycle. In contrast to the study conducted by Pathak (2014) [26], in Pilani, India, he found that majority (80%) of respondents had avoided some food in their diet during menses like pickles, sour food, and fried food.

It is reported Najafi *et al*., (2018) [22], who imply that diet characterized by high consumption of sugar, sweet, desserts, tea and coffee, fruits juice and added fat is associated with an increased risk of dysmenorrheal among women.

Table 4: Distribution of the students according to their dietary habits (n= 287)

Dietary habits	frequency	Percent
Daily frequency intake of black tea		
Never	85	29.6
1-3	138	48.1
≥ 4	64	22.3
Daily frequency intake of coffee		
Never	119	41.5
1-3	110	38.3
≥ 4	58	20.2
Daily frequency intake of soda/cola		
Never	81	28.2
1-3	167	58.2
≥ 4	39	13.6
Daily number of eating snacks		
Never	66	23.0
1-3	188	65.5
≥ 4	33	11.5
Daily number of taking chocolate/cocoa*		
Never	159	55.4
1-3	86	30.1
≥ 4	8	2.8
Regular intake of foods with saturated fat*		
Never	64	22.3
Sometimes	172	60.0
Always	37	13.9
Regular intake of foods with lot of sugar		
Never	25	8.7
Sometimes	147	51.2
Always	115	40.1
Regular intake of foods with lot of salt		
Never	48	16.7
Sometimes	133	46.3
Always	106	36.9

*some missing answers

Table (5) shows distribution of students according to health habits during menstruation. Among participants 218(76%) of them do not practice exercise. Similar finding was reported by Pathak (2015) [26] who found that (52%) of college going girls taking rest and did not practice physical activity during menstruation. Those who practice (24%) used back, abdomen, walking and pelvis exercise.

Table 5: Distribution of the students according to health habits during menstruation (n= 287)

Habits	Frequency	Percent
Perform physical exercise to relief menstrual pain (n=69) *		
Back	10	14.5
Abdominal	18	26.2
pelvic	6	8.7
walking	50	72.5
Increase amount of fluids / liquids intake (n= 272) *		
≤ 1.5 liter	148	54.4
2 liters	72	26.5
> 2 liters	52	19.1
Regularly sleep pattern at night	149	53.6

Increase number of showers	193	69.4
Remove of perennial hair	125	43.5
No medication intake	216	77.7
No restriction of special food	202	72.7
Take vitamins and or minerals	42	15.1
Domestic hot drinks (herbal)	117	42.1

* More than one answer **some missing answer

IT is clear that 148(54.4%) of participation. had an intake of only 1.5 liter or less during menstruation. As taking special fluid is important to avoid dehydration and to minimize cramps and discomfort. Also 149(51.6%) of adolescents used to have regular sleep at night. According to Pinkerton *et al* (2010) [28] insomnia is one of the premenstrual dysphonic disorders. Also, National Sleep Foundation (2007) indicated that women reported worse sleep prior to and during menstruation.

According to the distribution of adolescent's hygiene practices during menstruation most of them (67.2%) increased taking shower per day during menstruation, while in the study conducted by Cajeton *et al*. (2016), they found that (57.6%) of participants in Ebony state, take shower once a day during menstruation.

43.5% of participants in this study remove their perennial hair during menstruation phase.

Most of adolescents 216 (75.3%), don't take any medication during menstruation. Similar finding was reported by Goyal (2018) [13] that majority of adolescents (61.3%) in Halwani, India, who participated in the study had never used analgesics. This is contrast to the study conducted by Cajetan *et al*., (2016) [9] who reported that (76.3%) of adolescent's girls in Ebony State, Nigeria. We're taking pain relievers to reduce menstrual pain. 24.7% of respondent used to take medication which include antispasmodic and anti-inflammatory medication.

According to participants food consumption during menstruation. (70%) did not have special food during this period. This against the recommendation by (Najafi *et al*., 2018 [22] and Barnard *et al*., 2000) that change in the diet should be followed to decrease the risk of dysmenorrheal among young women. In contrast to the study conducted by Pathak (2014) [26] in Pilani town, India, he found that (80%) of respondents used to avoid some food in their diet during menses like pickles, sour food, and fried food.

Conclusion and recommendation
The result of this study included that, family as a sources of information about menstruation was poor; most of participants suffer from abdominal pain with menses. Most of them do not change their food intake during menstruation. They consume food with saturated fats, salt and sugar. About half of participants had irregular sleep and majority of them do not practice exercise.

Recommendation based on this study, education regarding menstruation reproductive health with an emphasis on menstrual hygiene should be taught in the curriculum. Mothers should be functions as a primary source of information of menstruation and they should be skilled to teacher their daughters safe and hygiene practices. There is a need to provide nutrition education to eat suitable food and overcome menstrual problems.

Acknowledgment

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