ORIGINAL RESEARCH

Prevalence of Dysmenorrhea and Associated Factors Among Haramaya University Students, Eastern Ethiopia

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Purpose: Dysmenorrhea is the most common gynecological problem among adolescents and a common cause of school absenteeism. Previously, there was no study conducted on prevalence of dysmenorrhea and associated factors among university students in Ethiopia. Therefore, the aim of this study was to assess prevalence and associated factors of dysmenorrhea among Haramaya university undergraduate regular students in Eastern Ethiopia.

Materials and Methods: An institution-based cross-sectional study design was conducted from February to March 2020. A multistage random sampling technique was applied and a total of 569 participants were included into the study. The total sample size was proportionally allocated based on the total number of students in each departments, and simple random sampling technique was employed to select participants. The data were entered to EPI-info version 3.5.4 and then exported to Statistical Package for Social Science version 23.0 software for analysis. The associations between independent variables and outcome variable were explored using bivariate and multivariable logistic regression models. The results of these analysis were reported as odds ratios with 95% confidence intervals.

Results: The prevalence of dysmenorrhea in this study was 356 (64.7%) 95% CI [60.7, 68.7%]. Premenstrual syndrome (AOR = 5.20:95% CI [2.82, 9.61]), early menarche (AOR = 4.67:95% CI [2.33, 9.37]), history of anxiety (AOR = 4.08:95% CI [2.31, 7.19]), taking of ≥4 glass of tea per day (AOR = 5.69:95% CI [1.49, 21.77]), usually eating fat and oil (AOR = 2.03:95% CI [1.15, 3.59]) and usual use of meat food (AOR = 3.61:95% CI [2.03, 6.39]) were positively and independently associated with the occurrence of dysmenorrhea.

Conclusion: Dysmenorrhea was a common problem among Haramaya University female students. History of anxiety, early menarche, premenstrual syndrome, tea consumption, usual use of fat and oil containing food and usual use of meat food were significantly associated to dysmenorrhea. We recommend Haramaya University to provide accessible and appropriate medical treatment and counseling service for dysmenorrhea affected students.

Keywords: dysmenorrhea, menstruation, Ethiopia, associated factors

Introduction

Dysmenorrhea is a painful menstruation involving cramps in the lower abdomen, groin pain, backache, waist pain and thigh pain occurring just before and/or during menstruation.[1–3] Dysmenorrhea often accompanied by sweating, tachycardia, headache, nausea, vomiting, diarrhea, breast tenderness and mood changes. It is a common gynecological problem among students.[4,5] There are two types of dysmenorrhea: primary dysmenorrhea refers to pain with no obvious pathological pelvic disease or painful menses with normal pelvic anatomy, usually beginning during ovulatory cycles become established. Secondary dysmenorrhea is menstrual pain associated with underlying pathology and its onset usually takes longer years after menarche or it is more common in older age and can occur any time.[4,6,7]

Dysmenorrhea is the most common gynecological problem which affects most of the students in their academic performances and their daily activities. Globally, the prevalence of dysmenorrhea ranges, 16–91% and 10–20% of them suffer from severe dysmenorrhea, which is the leading cause of recurrent School absenteeism, loss of class concentration, not actively participate in class, unable to study and do homework, fall from exam and limited activity.[3,8–11] Early menarche, age less than 20, nullipara, family history of dysmenorrhea, premenstrual syndrome, anxiety, smoking, life style and personal habits, physical exercise and menstrual irregularity (heavy, frequent and longer) were the factors found to be associated with dysmenorrhea in previous studies.[12–16]

Despite previous studies have tried to identify prevalence and factors associated with dysmenorrhea in developed country, limited studies was conducted at university level in Ethiopia. The characteristics of university students is somehow different from the general population. This reason necessitates the need to investigate the prevalence and factors associated with dysmenorrhea among university students. As far as the knowledge of the authors, there was no study published on the prevalence and factors associated with dysmenorrhea in the study area. Therefore this study was done to assess prevalence and associated factors of dysmenorrhea among Haramaya university students, Eastern Ethiopia.

Materials and Methods

Study Period and Area

The study was conducted from February 24 to March 24 /2020 at Haramaya University. Haramaya University is one of the oldest public universities in Ethiopia which was established in 1954. The university is located between Dire Dawa and Harar town 510 kilometer away from east of Addis Ababa.

Study Design and Population

An institution based cross-sectional study design was applied. All female undergraduate regular students at Haramaya University during study period were source population whereas all female undergraduate regular students in selected departments of the three colleges at Haramaya University during the data collection period were study population.

Inclusion and Exclusion Criteria

All regular undergraduate female student in the selected departments had chance to be included in this study and students who were ill and cannot respond to questions were excluded from this study.

Sample Size Determination

Sample size determination for prevalence of dysmenorrhea with the following assumptions:

$n = \dfrac{\left(Z_{\frac{\alpha}{2}}\right)^2 P(1-P)}{d^2}$, with a 95% CI (confidence interval), Z =1.96, P= estimated prevalence of dysmenorrhea and associated factors among Debre Tabor university students, Northwest Ethiopia reveals that about 62.3%.[17]

d= Standard error or precision =0.05, n= sample size

$n = \dfrac{(1.96)^2 0.377(1-0.377)}{(0.05)\times(0.05)} = 361$, Assuming 5% non-response rate and design effect 1.5, the sample size will be:

n =361 +5% = 361 + 18.05 =379, the final sample with design effect is 569.

Sampling Procedure

Multistage sampling technique was used to select participants for this study. From 11 colleges and one school of directorate which coordinates only freshman students of Haramaya University considered as one college for this study. The 3 colleges namely: College of Social Sciences and Humanities, College of Natural and Computational Sciences and College of Health and Medical Science were selected using simple random sampling methods. From these colleges, 13 departments were selected randomly. The total sample size was proportionally allocated based on total female students in each selected colleges and departments and stratified by year of study. Finally, the study participants were selected by simple random sampling using lists (sampling frame) of students from each selected department. First year students by chance not included in this study since they had not specific department and colleges to allocate the sample size proportionally.

518

International Journal of Women's Health 2022:14

Data Collection Tools, Procedure and Quality Assurance

Data collection questionnaire were modified from previous similar studies.[3,10,15,17] Data was collected by using pre-tested and self-administered questionnaire design in English. The tool includes three sections; socio-demographic characteristics, life style and personal habits and reproductive and menstrual pattern were included. The data were collected by 6 BSC midwives and supervised by 2 senior midwives. Data collectors explained the aim of this study to the study participants and have obtained consent from participants before data collection. Repeated visits were made for participants who were not available during the first visit. The questionnaire was pre-tested at Dire Dawa university students. A One day training was given for data collectors and supervisors on objective of the study, methods of data collection, handling of data and ways of approaching the respondents. The supervisors were checking the activities of each data collector and have been checking questionnaires for its completion and clarity daily during data collection period.

Operational Definition

A student was considered to have dysmenorrhea if she says "Yes" about menstrual pain and had one or more of the following complaint; abdominal pain, groin pain, pelvic pain, back pain or thigh pain before and/or during her menstrual periods.[3]

Methods of Data Processing and Analysis

After data collection, data was cleaned and coded before data entry. Epi-Data version 3.1 was used for data entry and exported to SPSS 22 statistical package for analysis. Descriptive summary was used to describe the characteristics of students in terms of frequencies, proportion, mean and standard deviation then information was presented by text and tables. Both bivariate and multivariate analysis logistic regression model were used to identify factors associated with the outcome variable. In bivariate analysis, all variables with p-value less than 0.25 were considered as a candidate for multivariable analysis Hosmer and Lemeshow's goodness-of-fit test was performed to assess whether the required assumptions were fulfilled and variance inflation factors was used to assess the presence of multicollinearity. An adjusted odds ratio with 95% confidence intervals and a p-value less than 0.05 was considered as statistically significant association.

Ethical Consideration

Before data collection started, ethical clearance was obtained from Haramaya University College of Health and Medical Sciences Institutional Health Research Ethics Review Committee (HU-IHRERC). Official letter written to selected colleges and departments/schools heads and they were notified about the study. Participants were informed that participation in the study is voluntary; they have the right to withdraw or refuse to participate in the study at any time. Written and signed informed consent were obtained from each study participant. The data collection procedure was anonymous in order to keep the confidentiality of any information provided by the study participants.

Results

Socio-Demographic Characteristics of Respondents

Out of 569 self-administered distributed questionnaires, 550 female students responded to the questionnaires, yielding a response rate of 96.7%. Fifteen questionnaires were not returned and 4 questionnaires were incomplete and exclude from the analysis. Participants' age ranges from 18–26 with a mean of 21.8 (SD ± 1.7) years. Majority 359 (65.3%) of the participants categorized under age group of 21–24 years. Most of the participants 199 (36.2%) were second year students. Majority of the participants 312 (56.7%) were in CHMS and 351 (63.8%) had more than 300ETB monthly pocket money. More than half 282 (51.3%) of the study participant mother did not attend formal education (Table 1).

Life Style and Personal Habit Characteristics

Most of the participants 388 (70.6%) did not perform regular physical exercise. Among participants who did physical, 95 (58.6%) of them were practicing less than 3 times per week. Only 8 (1.5%) participants smoke cigarette and 250 (45.5%)

Table 1 Socio-Demographic Characteristics, Life Style and Personal Habit of Female Undergraduate Students, at Haramaya University, Ethiopia, 2020

Variables		Frequency	Percent
Age of the students (in years)(n=550)	18–20	161	29.2
	21–24	359	65.3
	≥25	30	5.5
Monthly pocket money of the student's(n=550)	<150ETB	92	16.7
	150–300ETB	107	19.5
	>300 ETB	351	63.8
Academic year of the students (n=550)	2nd year	199	36.2
	3rd year	196	35.6
	4th year	84	15.3
	5th year	34	6.2
	6th year	37	6.7
College of the students (n=550)	CHMS	312	56.7
	CSSH	144	26.2
	CNCS	94	17.1
Educational status of student's mother (n=550)	No formal education	282	51.3
	Formal education	268	48.7
Grade of formal educated mother (n=268)	Primary school	58	21.6
	Secondary school	116	43.3
	College and above	94	35.1
Habit of Physical exercise (n=550)	Yes	162	29.5
	No	388	70.5
Physical exercising per week (n=162)	< 3 times per week	95	58.6
	3 times per week	52	32.1
	>3 times per week	15	9.3
History of smoking (n=550)	Yes	8	1.5
	No	542	98.5
Coffee taking per day (n=550)	Yes	250	45.5
	No	300	54.5
Tea consumption per day (n=550)	No taking at all	34	6.2
	<4 glass per day	436	79.3
	≥4 glass per day	80	14.5
Taking Soft drink per day (n=550)	No at all	101	18.3
	1 bottle per day	442	80.4
	>1 bottle per day	7	1.3
Alcohol taking per week (n=550)	No at all	331	60.2
	<3 serving per week	213	38.7
	3–7 serving per week	6	1.1
Highly fat and oil diet user (n=550)	Yes	337	61.3
	No	213	38.7

(*Continued*)

520

International Journal of Women's Health 2022:14

Table 1 (Continued).

Variables		Frequency	Percent
Meat user (n=550)	Yes	310	56.4
	No	240	43.6
Fruit and vegetable user (n=550)	Yes	305	55.5
	No	245	44.5
Sugar user (n=550)	Yes	31	5.6
	No	519	94.4
History of anxiety (n=550)	Yes	327	59.5
	No	223	40.5

drink coffee. Most of the participants 436 (79.3%) drink less than four glass of tea per day. Majority of participants 442 (80.4%) take one bottle soft drink per day and 331 (60.2%) of participants did not drink alcohol at all. Regarding diet, participants usually ate highly fat and oil diet were 337 (61.3%). Majority of the participants 327 (59.5%) had history of anxiety (Table 1).

Reproductive Characteristics and Menstrual Pattern of Participants

About 205 (37.3%) of participants experienced menarche at the age between 13–14 years and the average age of menarche was 13.9±1.9. About 294 (53.5%) participants had regular menstrual cycle and most of participants 284 (51.6%) have menses within 21–35 days intervals. Regarding the duration of menses, 246 (44.7%) participants had a menstrual flow less than three days and 333 (60.5%) have used less than three pads per day. Furthermore, 316 (88.8%) participants had family history of painful menstruation (Table 2).

Prevalence of Dysmenorrhea and Its Severity

This study identified that 356 (64.7%) 95% CI [60.7, 68.7%] of participants were suffering from dysmenorrhea and 73 (20.5%), 172 (48.3%) and 111 (31.2%) had severe, moderate and mild pain respectively. Among those who had dysmenorrhea, 289 (81.2%) of them reported back pain, 266 (74.7%) lower abdominal pain and 220 (61.8%) pelvic pain. The frequently reported premenstrual pain were, weakness 291 (69.5%) and depression 248 (59.2%). For most of the participants 239 (67.1%) dysmenorrhea pain starts on the first day of menstrual bleeding. Majority of the participants 209 (58.7%) reported the pain started six up to 12 months after the first menstruation (menarche). About 184 (51.7%) of the pain relieved after 8 hours onset of the pain (Table 3).

Dysmenorrhea Consequences on Daily Activities and Coping Mechanisms

Among participants suffered with dysmenorrhea, 266 (74.7%) reported the pain restricted them from their daily activities. The most common reported problem were unable to study 245 (92.1%) and unable to concentrate in class 229 (86.1%). Majority 273 (76.7%) of the participants cope the pain by sleeping (Table 3).

Factors Associated with Dysmenorrhea

History of anxiety, physical exercising, menstrual regularity, eating of highly fat and oil diet, meat eating, vegetable and fruit eating, tea taking, students mother education, average monthly pocket money of students, age at menarche, duration of menses, premenstrual syndrome and academic year were significantly associated with dysmenorrhea in bivariate logistic regression analysis (Table 4). All these variables with a p-value of < 0.25 in the bivariate analysis were entered to multivariable logistic regression analysis.

In multivariable analysis; history of anxiety, eating high fat and oil diet, meat eating, consumption of tea, age at menarche and premenstrual syndrome were the factors independently associated with dysmenorrhea. Students who had

Table 2 Reproductive Characteristics and Menstrual Pattern of Female Undergraduate Students, at Haramaya University, Ethiopia, 2020

Variables		Frequency	Percent
Age at menarche (n=550)	≤12 years	151	27.5
	13–14 years	205	37.3
	≥15 years	194	35.2
History of sexual intercourse (n=550)	Yes	29	5.3
	No	521	94.7
Pregnancy history (n=550)	Yes	10	1.8
	No	540	98.2
History of give birth (n=550)	Yes	7	1.3
	No	543	98.7
Menstrual regularity (n=550)	Yes	294	53.5
	No	256	46.5
Menstrual interval in days (n=550)	< 21 days	257	46.7
	21–35days	284	51.7
	>35 days	9	1.6
Duration of menstrual flow (n=550)	< 3 days	246	44.7
	3–7 days	240	43.7
	>7 days	64	11.6
Number of pads changed per day (n=550)	< 3 pads	333	60.5
	3–7 p ads	199	36.2
	>7 pads	18	3.3
Family history of pain full menstruation (n=356)	Yes	316	88.8
	No	40	11.2

premenstrual syndromes had 5.20 increased odds of dysmenorrhea as compared to students who had no premenstrual syndromes (AOR=5.20, 95% CI 2.82–9.61). Participants who had history anxiety had 4.08 increased odds of dysmenorrhea as compared to who had no history of anxiety (AOR=4.08, 95% CI 2.31–7.19). Students who have seen their first menses (menarche) at the age less than or equal to 12 years had 4.67 increased odds of dysmenorrhea as compared with age of menarche greater than 15 (AOR=4.67, 95% CI 2.33–9.37). Participants who usually consume high oil and fat diet had 2.03 had increased odds of dysmenorrhea as compare to those who have not usually consume fat and oil containing food (AOR=2.03, 95% CI 1.15–3.59) (Table 4).

Participants who usually eat foods prepared from meat had 3.61 times higher odds of developing dysmenorrhea (AOR=3.61, 95% CI 2.03–6.39). Dysmenorrhea was 5.69 times more likely in participants consuming more than or equal to four glasses of tea per day compared with participants who did not consume tea at all (AOR=5.69:95% CI 1.49, 21.77), whereas students who consume less than four glasses of tea per day had 3.042 times more likely to dysmenorrhea when compared to that of non-consumers (AOR=3.04:95% CI 1.23, 7.51) (Table 4).

Discussion

In this study, Prevalence and associated factors of dysmenorrhea among Haramaya University undergraduate regular students was assessed. According to the result, the prevalence of dysmenorrhea was found to be 64.7% and history of anxiety, eating of highly fat and oil diet, meat eating, consumption of tea, age at menarche and premenstrual syndrome were significantly associated with dysmenorrhea.

The overall prevalence of dysmenorrhea in this study was found to be 356 (64.7%) (95% CI: [60.7%, 68.7%]), which means out of hundred students around 65% of students were affected by dysmenorrhea disorder. This prevalence was in line

Table 3 Dysmenorrhea Related Pain Severity, Consequences on Daily Activities and Coping Mechanisms of Female Undergraduate Students, at Haramaya University, Ethiopia, 2020

Characteristics		Frequency	Percent
Severity of the pain (n=356)	Mild	111	31.2
	Moderate	172	48.3
	Severe	73	20.5
Location of the pain (n=356)	Lower abdominal pain	266	74.7
	Pelvic pain	220	61.8
	Back pain	289	81.2
	Groin pain	45	12.6
	Thigh and leg pain	84	23.6
Pain onset (n=356)	The same day to menstrual flow	239	67.1
	One day after menstrual flow	77	21.6
	Two day after menstrual flow	13	3.7
	1–2 weeks before flow and other	27	7.6
Pain started after menarche (n=356)	6–12 month	209	58.7
	1–2 years	107	30.0
	6–2 years	22	6.2
	Not remember	18	5.1
Free from the pain after onset (n=356)	8 hours after	184	51.7
	8–72 hours after	133	37.3
	3 days after and other	39	11.0
Premenstrual syndrome related to menstruation (n=550)	Yes	419	76.2
	No	131	23.8
Premenstrual Syndromes (n=419)	Headache	213	50.8
	Nausea	242	57.8
	Vomiting	208	49.6
	Swelling	56	13.4
	Diarrhea	64	15.3
	Weakness	291	69.5
	Anxiety	241	57.5
	Depression	248	59.2
	Irritability	136	32.5
	Cramping	20	4.8
Pain restrict daily activity (n=356)	Yes	266	74.7
	No	90	25.3
Daily activity restrict (n= 266)	Difficult to study	245	92.1
	Unable to do homework	215	80.8
	Difficult to concentrate in class	229	86.1
	Unable to active participation	146	54.9
	Unable to go to class	72	27.1
	Unable to do sport	64	24.1
	No change from other days	25	9.4
The pain relief (n=356)	By itself	191	53.7
	By sleeping	273	76.7
	By Taking drugs from pharmacy	167	46.9
	By counseling health care provider	50	14
	By using warm bath	227	63.8

Note: Sum of frequency and percent may not give total frequency and 100% respectively, because of multiple answers were possible to choose.

Table 4 Bivariate and Multivariable Analysis of Factors Associated with Dysmenorrhea Among Female Undergraduate Students, at Haramaya University, Ethiopia, 2020

Variables (N = 550)		Presence of Dysmenorrhea		COR (95% CI)	AOR (95% CI)
		Yes	No		
History of anxiety	Yes	274	53	8.89 (5.95, 13.27)	4.08(2.31, 7.19)*
	No	82	141	Ref	Ref
Premenstrual syndrome	Yes	302	115	3.84 (2.56, 5.77)	5.20(2.82, 9.61)*
	No	54	79	Ref	Ref
Age at menarche	≤12 years	125	26	7.63(4.57, 12.73)	4.67(2.33, 9.37)*
	13–14 years	156	49	5.05(3.28, 7.78)	4.25(2.35, 7.69)*
	≥15 years	75	119	Ref	Ref
Physical exercise	Yes	80	82	0.40(0.28, 0.59)	1.54(0.87–2.73)
	No	276	112	Ref	Ref
Menstrual regularity	Yes	168	126	0.48(0.34, 0.69)	1.72(0.94–3.15)
	No	188	68	Ref	Ref
Mother's Education status	No formal	226	56	4.28(2.94, 6.25)	1.07(0.59–1.96)
	Formal	130	138	Ref	Ref
Consumption of glass tea	<4 glass	273	163	2.71(1.32, 5.55)	3.04(1.23, 7.51)*
	≥4 glass	70	10	11.31(4.34, 29.47)	5.69(1.49, 21.77)*
	Not at all	13	21	Ref	Ref
Student's monthly pocket money	<150ETB150-	69	23	2.21(1.32, 3.71)	1.74(0.79–3.86)
	300ETB	85	22	2.85(1.70, 4.77)	1.22(0.56–2.64)
	>300ETB	202	149	Ref	Ref
Duration of menstruation	>7 days	40	24	0.46(0.26, 0.83)	0.93(0.48–1.78)
	3–7 days	123	117	0.29(0.20, 0.43)	0.42(0.17–1.03)
	< 3 days	193	53	Ref	Ref
Usually of fat and oil food	Yes	276	61	7.52(5.08, 11.1 3)	2.03(1.15, 3.59)*
	No	80	133	Ref	Ref
Usually use of meat	Yes	261	49	8.13(5.45, 12.13)	3.61(2.03, 6.39)*
	No	95	145	Ref	Ref
Academic year	2nd year	114	85	0.60(0.42, 0.87)	0.63(0.19–2.06)
	3rd above	242	109	Ref	Ref
Vegetable and fruit user	Yes	153	152	0.21(0.14, 0.31)	1.34(0.74–2.36)
	No	203	42	Ref	Ref

Notes: All variables listed in the table were transferred to multivariable analysis (OR adjusted). 1 = Constant, *Significantly associated at p ≤ 0.05.
Abbreviations: AOR, adjusted odd ratio; COR, crude odds ratio; CI, confidence interval.

with the previous studies conducted in Ethiopia with the prevalence of dysmenorrhea ranges from 62.3–69.3%.[10,11,17] It also in line with previous study conducted in Mexican university (64%).[18] But it was higher than the report from India, China and Canada where the prevalence of dysmenorrhea ranges 45–60%.[19–21] The possible justification of this variation could be the differences of the study groups in pain perception, life style of the students and self-report nature of the pain.[3]

On the other side, the prevalence of current study was lower than the findings of previous studies in Ethiopia, Egypt and Iran.[9,22–25] The possible reasons for the discrepancies of the estimated prevalence might be due to the difference in lifestyle, data collection methods and the absence of universally accepted definition of dysmenorrhea.

In this study, the odds of dysmenorrhea is 5 times higher for women with premenstrual syndrome as compared to those with no premenstrual syndrome. This is consistent to reports in other studies in India, Debre Berhan, China and United States.[10,26–28] This could be due to hormonal change in the luteal phase and mood changes could cause pain. Furthermore, this study showed that, early menarche (≤12 years) associated with increased odds of dysmenorrhea as compared to their counterparts (≥15 years). This finding is consistent with the findings of other studies in China and Ethiopia.[3,17,29,30] This might be due to early menarche exposes a woman to prostaglandins for longer duration that plays a major role in dysmenorrhea through increasing uterine contractility and thereby resulting pain.[31,32]

Drinking four glasses or more tea per day associated with 5.7 times increased the odds of dysmenorrhea than those who did not take tea at all, which is consistent with the previous study in Ethiopia.[9] The relationship between tea intake and dysmenorrhea has been reported in many studies due to its effect on increasing estrogen production which causes vasoconstriction, pelvic pain and causes production of prostaglandin.[33] Students who consume less than four glasses of tea per day had 3.04 times more likely to develop dysmenorrhea when compared to that of non-consumers, which is controversial with previous studies in Ethiopia which reported preventive factor.[9] This variation could be due to by the difference how the pain was measured and lack of standard (universal) measurement of pain.

In this study, having history of anxiety was found to have a significant association with the occurrence of dysmenorrhea which is 4 times more likely to develop dysmenorrhea compared to no history of anxiety. This is consistent to reports in other previous studies in Ethiopia, Iran, China and United States.[7,9,29,34] This could be probably due to physiologically anxiety or stress causes impair in the development of follicle that reduces release of progesterone and increase production of prostaglandin and cause pain.[35,36]

Furthermore, usually eating of highly fat and oil containing diet was found to have a significant association with the occurrence of dysmenorrhea which is 2 times more likely to develop dysmenorrhea compare to non-consume of fat and oil contain food. This is consistent to other previous studies in Iran.[7] The possible explanations for this, high fat and oil diet is associated with a high estrogen level production, increasing estrogen level may lead to more stimulation of the endometrium and more proliferation of endometrium and therefore a higher level of prostaglandins production causes pain during menses and they also cause inflammation in the body of uterus that cause cramps.[32]

This study also found that, usually eating of meat diet was found to have a significant association with the occurrence of dysmenorrhea which is 4 times more likely compare to non-meat eaters. This is consistent with finding of study in Spain.[31] This is could be due to strong positive relationship between high BMI and dysmenorrhea. Meat eater are usually obese women tend to have higher estrogen levels and higher levels of prostaglandin. Both high estrogen and high prostaglandin are probable mechanisms of dysmenorrhea occurrence. It is also contain high in saturated fat, which can cause inflammation that aggravate cramping.[7]

In this study the response rate was high and this helped to minimize the chance of non-response rate. We used standardized and pretested questionnaire to minimize the risk of measurement bias. Since the design used in this study was cross sectional, it is difficult to establish temporal relationship between dependent variables and explanatory variables. We have not used qualitative methods to support the quantitative data we obtain in our study.

Conclusion

Dysmenorrhea was a common problem among Haramaya University female students. The overall prevalence of it was high and negatively affected the students' daily activities. However, only a few students sought medical advice for their menstrual pain. History of anxiety, early menarche, premenstrual syndrome, tea consumption, usually use of fat and oil contain food and usually meat eaters were significantly associated to the occurrence of dysmenorrhea. Haramaya University should

provide accessible and appropriate medical treatment and counseling service for dysmenorrhea affected students. Haramaya University should establish recreational centers and promote females to increase their habits of physical activities. Teachers should provide academic support for the affected students. Similar university longitudinal studies are advantageous to establish causal relationship of factors and better to include all academic year students to establish generalization.

Data Sharing Statement
Data can be provided for all interested persons upon request from Tiruye Tilahun Mesele.

Ethics Approval and Informed Consent
This study was conducted in accordance with the Declaration of Helsinki and it was approved by the Haramaya University institutional health research Ethics review committee. Letter of cooperation was written from Haramaya University, college of health and medical sciences to all colleges. The objectives and purposes of the studies, as well as risks and benefits was explained to the participants. Participants were informed that participation in the study is voluntary; they have the right to withdraw or refuse to participate in the study at any time. Written and signed informed consent were obtained from each study participant prior to interview as it is stated in participant information sheet. The data collection procedure was anonymous in order to keep the confidentiality of any information provided by the study participants.

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Disclosure
All of the authors declare that they have no conflicts of interest in this work.

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