

THE RELATIONSHIP BETWEEN LIFESTYLE, MEDICAL HISTORY AND THE PRESENCE OF DYSMENORRHEA

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**ABSTRACT**

*The aims of this study were to evaluate the prevalence of dysmenorrhea among female medical students and to assess the factors that may be involved in its occurrence. We carried out a prospective, analytical and observational study. We used 59 questions organized in our original questionnaire and we collected information about menstrual cycles, lifestyle and medical history of the students. A p value less than 0.05 represents the limit of significance. An impressive large number of 1720 of students answered to our questionnaire. We found out that 78.4% of participants have dysmenorrhea. Menstrual pain was statistically significant associated with regular coffee consumption ( $p = 0.003$ ). The intensity of pain is not influenced by the use of internal tampons ( $p = 0.205$ ) or by sexual contact during menstruation ( $p = 0.887$ ). The age of the first menstruation did not correlate statistically significant with the intensity of pain ( $p = 0.845$ ). Dysmenorrhea is a very common condition among medical students. There are a lot of risk factors related to lifestyle or medical history that contribute to its occurrence.*

**KEYWORDS:** *dysmenorrhea, students, menstruation, prevalence, risk factors*

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**INTRODUCTION**

Dysmenorrhea is a term used for the presence of painful menstruation [1-4]. Women may experience discomfort or crampy pain in the lower abdomen [5-7]. Many other symptoms may be present such as: lower-back pain, vomiting, headache or diarrhea [2],[8]. The prevalence of dysmenorrhea varies between 16% to 91% in the literature [9-12].

Dysmenorrhea can be divided into two categories: primary (or spasmodic) dysmenorrhea that occurs in the absence of obvious pathology and secondary (or congestive)

dysmenorrhea, associated with the presence of pelvic disorders [6].

Primary dysmenorrhea usually begins with menarche or occurs shortly thereafter (6-24 months). The pain has a predictable pattern and lasts between 8 and 72 hours, with a higher intensity on the first or second day of menstruation. This pain may radiate to the thighs or the lumbar region [13].

Numerous theories have tried to explain what the appearance mechanism of primary dysmenorrhea is. These theories refer to the obstruction of the cervical canal [1], myometrial hyperactivity [14],[15], or ovulatory menstrual cycles [1],[6],[16].

The most accepted explanation for the occurrence of primary dysmenorrhea involves the presence of large amounts of prostaglandins in the uterus. At the end of the luteal phase of the menstrual cycle, the corpus luteum devolves and progesterone synthesis decreases. This decrease in the concentration of progesterone causes the elimination of enzymes from the lysosomal level. The action of phospholipase A2 on membrane phospholipids of endometrial cells causes large amounts of arachidonic acid. Under the action of cyclooxygenase, prostaglandins are formed from arachidonic acid in the endometrium [4],[13],[16]. High concentrations of prostaglandins have been identified in menstrual fluid in women with primary dysmenorrhea, especially PGF<sub>2</sub> $\alpha$  and PGE<sub>2</sub>, which have been associated with the presence of pain [1],[6],[4],[13],[16]. PGF<sub>2</sub> $\alpha$  causes narrowing of the cervical canal and increased uterine contractility, also having a vasoconstrictor effect [4],[13],[17-19]. By the action of 5-lipoxygenase on arachidonic acid, leukotrienes are formed which increase the sensitivity of nerve fibers in the uterus [4].

Secondary dysmenorrhea is caused by a pelvic pathology, most commonly endometriosis [9]. This type of dysmenorrhea can appear after menarche, a few years later [1],[4],[13]. It is associated with other causes like uterine fibroids, ovarian cysts, adenomyosis, pelvic inflammatory disease [1],[20-22].

There are a lot of studies that have identified the risk factors for the presence of painful menstruation, but the association between them remain uncertain [23]. Ju et al. reported that some risk factors for dysmenorrhea are high body mass index, family history of dysmenorrhea, smoking and early age of menarche [10]. Other factors are represented by heavy or longer menstrual bleeding [22]. The presence of dysmenorrhea may be related with the bad lifestyle habits such as not having a regular breakfast or short sleeping hours [24], drinking alcohol and smoking [25], lack of exercise [26] or mental stress [10],[27]. A factor that may decrease the dysmenorrhea is childbirth [28],[22].

## MATERIALS AND METHOD

The aims of this study were to evaluate the prevalence of dysmenorrhea among female medical students and to determine the factors that contribute to its occurrence.

This three-month study is prospective, analytical and observational. Participants were from five Romania medical university centers.

A number of 59 questions were used in our original questionnaire and we collected information about menstrual cycles, lifestyle and medical history of the students. A part of them refer to the same data as in other studies [12],[29-32]. The questionnaire was built using Google Forms and it was shared through social media on specific students' groups.

The students were asked about the foods or drinks they usually consume. Quantitative limits have been defined for each food or drink, in accordance with which consumption was deemed frequent or infrequent: alcoholic drinks (at least 30 g of alcohol in a week - the equivalent of 300 ml of wine or 3 bottles of 330 ml beer), coffee (250 ml of coffee at least 3 times a week), caffeinated soft drinks (250 ml at least 3 times a week), black tea (300 ml at least 3 times a week), chocolate (30 g at least 3 times a week).

A database with all the information was generated by SPSS Statistic software, version 23 (Armonk, New York, USA). Different results like means, standard deviations, frequencies or percentages were calculated using descriptive methods. We used Chi-square, Independent-Samples t Test and one-way ANOVA Test for statistical analysis. The odds ratio (OR) and also the confidence interval (95% CI) were calculated using binary logistic regression. A p value less than 0.05 ( $p < 0.05$ ) represents the test results are statistically significant.

## RESULTS

This study included a total of 1720 medical students between 18 and 30 (mean age  $22.06 \pm 2.01$  years). The students were from five university medical centers from Romania (Figure 1). The age at menarche varied between 8 and 18 years (Figure 2).

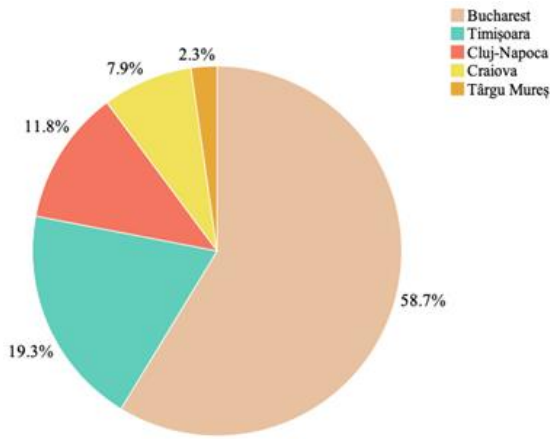


Figure 1 – The distribution of students by university centers

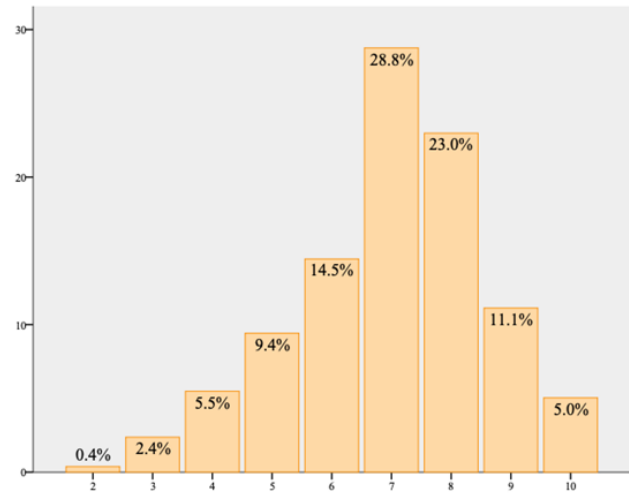


Figure 3 – Pain intensity

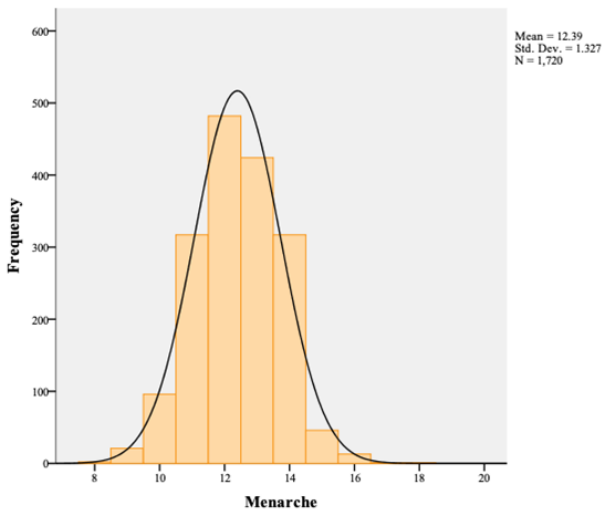


Figure 2 – Age of menarche

Dysmenorrhea was present in 78.4% of participants in this study.

Female students that have menstrual pain need to evaluate its severity. We made a scale from 1 to 10 for pain intensity, where 1 is used for the absence of pain and 10 is assigned to unbearable pain (Figure 3). Through the Independent Samples t Test, we found that the average age at menarche among students without dysmenorrhea was higher than the average for students with dysmenorrhea ( $p = 0.004$ ).

The distribution of students according to the number of births and abortions is presented in Table 1. A number of 6 students out of a total of 9 who have given birth at least once so far, have dysmenorrhea and only one of them considers that the pain has diminished after the first birth.

	Births		Abortions	
	Freq.	%	Freq.	%
0	1711	99.5	1681	97.7
1	8	.5	35	2.0
2	1	0.1	4	0.2
Total	1720	100.0	1720	100.0

Table 1 – Births and abortions

The distribution of students with or without dysmenorrhea, according to the medical history, is presented in Table 2. Following the analysis of this data, it was observed that students with recurrent urinary tract infections ( $p = 0.005$ ,  $OR = 1.652$ ,  $95\% = 1.164-2.346$ ) were more likely to have painful periods. For polycystic ovary syndrome, the value of the test was at the limit of statistical significance ( $p = 0.05$ ). In addition to those shown in Table 2, 39 female students (2.3%) received treatment for Chlamydia trachomatis or Neisseria Gonorrhoeae. Asked “what was the last result of the Pap smear?”, most students answered that they had never performed this test (998 students - 58.02%) (Figure 4).

Asked if they use internal tampons during menstruation, 776 participants (45.1%) say they have never used it, while only 250 participants (14.5%) use internal tampons at each menstruation. We found that the presence of dysmenorrhea is not associated with the use of internal tampons ( $p = 0.116$ ).

The medical history	Dysmenorrhea (%)		Total (%)	$\chi^2$	p	Cramer's V
	No	Yes				
<b>Genital malformations</b>			Fisher's Exact: p = 0.712*			
Yes	3 (0.8)	8 (0.6)	11 (0.6)			
No	368 (99.2)	1341 (99.4)	1709 (99.4)			
<b>Recurrent vaginal candidiasis</b>			1.475	0.225		
Yes	55 (14.8)	236 (17.5)	291 (16.9)			
No	316 (85.2)	1113 (82.5)	1429 (83.1)			
<b>Repeated urinary infections</b>			8.012	<b>0.005</b>	0.068	
Yes	42 (11.3)	235 (17.4)	277 (16.1)			
No	329 (88.7)	1114 (82.6)	1443 (83.9)			
<b>Endometriosis</b>			1.373	0.241		
Yes	3 (0.8)	22 (1.6)	25 (1.5)			
No	368 (99.2)	1327 (98.4)	1695 (98.5)			
<b>Polycystic ovary syndrome</b>			3.844	<b>0.05</b>	0.047	
Yes	69 (18.6)	195 (14.5)	264 (15.3)			
No	302 (81.4)	1154 (85.5)	1456 (84.7)			
<b>Pelvic inflammatory disease</b>			0.006	0.938		
Yes	8 (2.2)	30 (2.2)	38 (2.2)			
No	363 (97.8)	1319 (97.8)	1682 (97.8)			

Table 2 – The medical history (\*Does not meet the conditions for the Chi-square Test

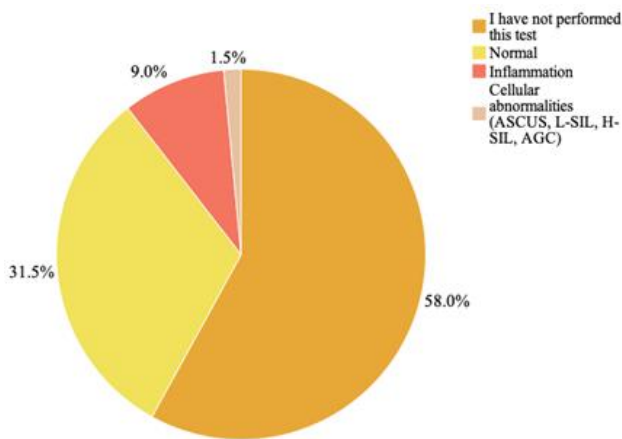


Figure 4 – The result of the last Pap smear

Details about the sexual life of the participants were also obtained. Most participants did not have dyspareunia (45.9%) (Figure 5). It was found that 41 students (2.4%) had sexual intercourse at each menstruation and 1051 students (61.1%) never had sexual intercourse during their menstrual period. The most widely used contraceptive methods by participants were condoms (1033 students), coitus interruptus (396 students), oral

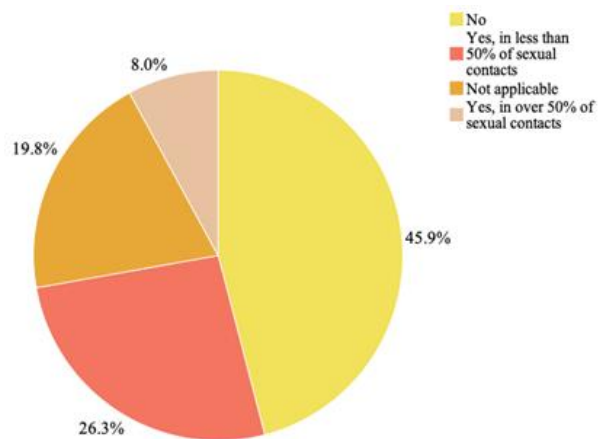


Figure 5 – Dyspareunia

contraceptives (172 students). Only 7 participants had an intrauterine contraceptive device (IUD). We found that the use of oral contraceptives doesn't have a significant impact on menstrual pain intensity (p = 0.818).

Using the one-way ANOVA test, we found that there was no statistically significant difference in pain intensity (rated from 1 to 10) between groups of students, divided according to the use of internal tampons (F (2,1346) = 1.587, p = 0.205) and sexual intercourse at menstruation

(F (2,1346) = 0.120, p = 0.887). But it was observed that there was a statistically significant difference between the groups of students established according to the presence of dyspareunia in terms of pain intensity (F (3,1345) = 5.273, p = 0.001). A post-hoc test from Turkey observed that there was a statistically significant difference in pain intensity between students who had dyspareunia in over 50% of sexual intercourse, and those who did not have dyspareunia (p = 0.003). The age of the first

menstruation did not correlate statistically significant with the intensity of pain (rated from 1 to 10) (p = 0.845).

The analysis of the relationship between the consumption of different foods and drinks is presented in Table 3. Regular coffee consumption was associated with a higher chance of having dysmenorrhea than if coffee consumption was absent (p = 0.003, OR = 1.447, 95% CI = 1.137-1.841).

	Dysmenorrhea (%)		Total (%)	$\chi^2$	p	Cramer's V
	No	Yes				
<b>Coffee</b>				9.107	<b>0.003</b>	0.073
Yes	232 (62.5)	954 (70.7)	1186 (69.0)			
No	139 (37.5)	395 (29.3)	534 (31.0)			
<b>Alcoholic drinks</b>				0.536	0.464	
Yes	61 (16.4)	201 (14.9)	262 (15.2)			
No	310 (83.6)	1148 (85.1)	1458 (84.8)			
<b>Coke or Pepsi</b>				0.005	0.944	
Yes	29 (21.3)	285 (21.1)	364 (21.2)			
No	292 (78.7)	1064 (78.9)	1356 (78.8)			
<b>Black tea</b>				2.901	0.089	
Yes	35 (9.4)	171 (12.7)	206 (12.0)			
No	336 (90.6)	1178 (87.3)	1514 (88.0)			
<b>Chocolate</b>				0.056	0.812	
Yes	222 (59.8)	798 (59.2)	1020 (59.3)			
No	149 (40.2)	551 (40.8)	700 (40.7)			
<b>Spicy foods</b>				0.123	0.726	
Yes	153 (41.2)	570 (42.3)	723 (42.0)			
No	218 (58.8)	779 (57.7)	997 (58.0)			

**Table 3 – The consumption of food and beverages**

## DISCUSSIONS

Our study included 1720 female medical students. Other studies that evaluate de risk factors for dysmenorrhea include a smaller number of participants: 550 students [21], 288 students [7], 647 students [5], 900 participants [26]

Menstrual pain was present in 78.4% of female medical students who answered our questionnaire. A similar prevalence was reported in literature [30],[20], but other studies have shown higher percentages for the presence of dysmenorrhea [33-35].

An association between dysmenorrhea and family history of dysmenorrhea [21],[36-38], menarche age, and menstrual duration have been reported in literature in the past [12],[7].

Menstrual cramps were, statistically, significantly associated with the presence of premenstrual syndrome [9],[10]. Regarding the association between menarche age, menstrual duration and the presence of dysmenorrhea, there is contradictory data that claims that there is no relationship between them [39],[21]. We presented that dysmenorrhea was, statistically, significantly associated with menarche age. In addition, we found an association between dysmenorrhea and the presence of recurrent urinary tract infections.

Midilli et al. found no association between dysmenorrhea and the type of nutrition, exercise, number of hours of sleep, or the consumption of coffee, tea or alcoholic drinks [32]. We found out that drinking coffee influenced the presence of painful menstruation.

This has been reported in other studies [20],[23],[36]

Other studies have shown that coffee consumption is not associated with the presence of dysmenorrhea [31],[38],[29].

Most studies look at the relationship between pain intensity and various characteristics of menstrual cycles, consumption of certain foods, physical activity or smoking. The pain generally occurred throughout the year and a small percentage of students (18.2%) considered it to be more intense in winter [30].

Vlachou et al. reported that pain duration, healthy nutrition, age at menarche, or family history of dysmenorrhea were associated with pain intensity [12]. We did not find that the age of the first menstruation was associated with the intensity of the pain. The focus of this study was on other variables that could influence the severity of dysmenorrhea. We concluded that the intensity of pain was not statistically significantly associated with the use of internal tampons, sexual intercourse during menstruation. Instead, the presence of dyspareunia was associated with the severity of pain. The intensity of dysmenorrhea was higher in students who had dyspareunia in more than 50% of sexual intercourse, than in those who did not have dyspareunia.

In addition, literature presented that nulliparous women have a high probability to be affected by dysmenorrhea than multiparous women. The intensity of pain is lower among multiparous women. A livebirth has a more important effect than a pregnancy which ended with an abortion [10],[40]. The level of prostaglandin secreted by endometrium is lower after a term birth [40]. Another mechanism is that a birth may produce a neuronal degeneration as a result of the decrease in the level of noradrenaline in the uterus in the third trimester of pregnancy. In our study, just one of 6 participants who gave birth at least once and who have dysmenorrhea considered that the pain intensity decreased after giving birth.

A lot of studies have been reported that oral contraceptives have a protective effect for dysmenorrhea [41], but we found out that these pills don't have a significant impact on menstrual pain.

An important risk factor is stress but the association mechanism is unknown. Stress

affects the synthesis of pituitary hormones, with changes in the secretion of progesterone that disturbs the activity of prostaglandins [42].

Dysmenorrhea is an important condition because it affects many women and has a negative effect on their lives. There are still a number of risk factors that have not been discovered. It is also very important for women to understand what happens to their bodies during menstruation. We have to pay more attention to this pathology because it can cause big problems in the management of patients.

## CONCLUSIONS

Menstrual pains are very common among female medical students. The presence of dysmenorrhea is associated with recurrent urinary tract infections. In terms of lifestyle, a regular coffee consumption increases the likelihood of dysmenorrhea. If we identify the factors that can cause menstrual pain, we can better understand this condition. Every woman has a different experience with the menstrual period. The intensity of the symptoms varies a lot and, with it, the degree of discomfort it creates.

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