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The Relationship Between Stress Level During Covid-19 Pandemic with The Intensity Of Dysmenorrhea

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ABSTRACT

Background: One of the modifiable risk factors of dysmenorrhea is stress. The stress level has a bidirectional relationship with dysmenorrhea and can interfere with the student's quality of life. Due to the COVID-19 pandemic, many abrupt changes happened in the psychosocial and socioeconomic sectors might affect the psychological well-being of students, hence exacerbating the menstrual pain.
Objective: The study aims to observe whether there is a positive relationship between stress level and dysmenorrhea intensity among college students in Universitas Gadjah Mada from batch 2019-2021.
Method: Descriptive study with a cross-sectional approach. The sampling was done with simple random sampling with 155 participants in total. This study uses WaLIDD score and PSS-10 questionnaire in an online questionnaire form. Data analysis is done in univariate, bivariate, and multivariate.
Results and Discussion: There is a positive relationship between stress level and dysmenorrhea intensity among female UGM students with a p-value of 0.031 (<0.05).
Conclusion: Higher stress levels are significantly associated with increased dysmenorrhea intensity, indicating that psychological stress during the COVID-19 pandemic may play a pivotal role in exacerbating menstrual pain among female university students.

Keywords: COVID-19; dysmenorrhea; intensity; stress level

ABSTRAK

Latar Belakang: Salah satu faktor risiko yang dapat dimodifikasi dari dismenore adalah stres. Stres memiliki hubungan dua arah dengan dismenore dan dapat mengganggu kualitas hidup siswa. Pandemi COVID-19 telah menyebabkan banyak perubahan pada bagian psikosisal dan sosioekonomi yang dapat memengaruhi kesehatan mental dan memperburuk nyeri menstruasi.
Tujuan: Penelitian ini bertujuan untuk meninjau hubungan positif antara tingkat stres dengan intensitas dismenore pada mahasiswi angkatan 2019-2021 Universitas Gadjah Mada.
Metode: Studi deskriptif dengan pendekatan potong lintang. Sampel diambil dengan metode *simple random sampling* sehingga didapatkan total 155 responden. Penelitian ini menggunakan skor WaLIDD dan kuesioner PSS-10 yang disajikan dalam kuesioner *online*. Analisis data dilakukan secara univariat, bivariat, dan multivariat.
Hasil dan Pembahasan: Terdapat hubungan positif antara tingkat stres dengan intensitas dismenore pada mahasiswi perempuan UGM dengan nilai-p 0.031 (<0.05).
Kesimpulan: Tingkat stres yang tinggi berhubungan secara signifikan dengan peningkatan intensitas dismenore, yang menunjukkan bahwa tekanan psikologis selama pandemi COVID-19 memiliki pengaruh yang cukup vital dalam memperberat nyeri menstruasi pada mahasiswi.

Kata kunci: COVID-19; dismenore; intensitas; tingkat stres

INTRODUCTION

Dysmenorrhea is the presence of pain or cramp before and/or during menstruation from the lower abdomen and radiate to the inguinal area. The pain felt most intense on the first or second day of the menstrual cycle, which corresponds with the released amount of prostaglandin in the body. The prevalence of dysmenorrhea worldwide is still high, ranging from 60%-90% in different studies. [1,22]

Dysmenorrhea is divided into primary and secondary. Primary dysmenorrhea is menstrual pain without the presence of organic diseases. In primary dysmenorrhea, prostaglandin F and the endocrine system play a central role. These prostaglandins cause increased uterine contractility, vasoconstriction, and ischemia, leading to cramping and pain in the lower abdomen. Secondary dysmenorrhea is the result of an underlying disease disorder, including structural abnormalities that are associated with organic factors.[2]

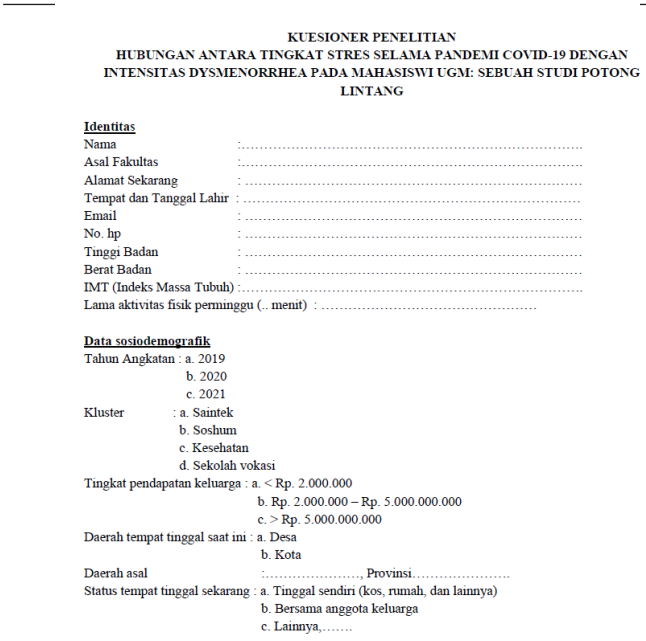
Some of the risk factors of primary dysmenorrhea are age less than 20 years old, nulliparity, weight loss, depression, anxiety, heavy menstrual flow, and lifestyle choices such as smoking & physical activity.[2] Since these risk factors are common among students, this study focuses on primary dysmenorrhea, as the exact cause of this type of menstrual pain is still not fully understood. It is believed that primary dysmenorrhea is the result of multifactorial causes; therefore, this study is done to observe which factor has the most potent effect. Secondary dysmenorrhea was excluded from this study because, regardless of external aggravating factors, the menstrual pain persists if the underlying cause is not treated. The treatment is also different from primary dysmenorrhea.

Many women did not report their incidents with dysmenorrhea and sought treatment, as it is often thought of as something normal. Dysmenorrhea is the most common underdiagnosed and inadequately treated complaint in young females.[18] This demonstrates that the awareness and knowledge of dysmenorrhea are still quite low. However, women need to be aware that dysmenorrhea can be a sign of more serious gynecological issues, emphasizing the significance of recognizing abnormal dysmenorrhea.

Stress is an aversive condition or event that elicits a physical or psychological response from a person. It is one of the risk factors for primary dysmenorrhea.[23] During the COVID-19 pandemic, students experienced many abrupt changes in habits, regulations, interactions, the uncertainty of the future, and academic workload.[3] According to data from the WHO, during the first year of the COVID-19 pandemic, the global prevalence of anxiety and depression increased by approximately 5%. About 25.2% of children and adolescents experienced clinically elevated symptoms of depression, and approximately 20.5% faced clinically significant anxiety symptoms. These rates represent a doubling compared to pre-pandemic prevalence estimates, which were around 12.9% for depression and 11.6% for anxiety among young people. [16,24] Some of the risk factors associated with mental health problems during the pandemic include female gender, younger age group, the presence of chronic or psychiatric illnesses, unemployment, student status, and frequent exposure to social media or news concerning COVID-19. [4,5] When faced with constant stress, the Hypothalamus-Pituitary-Adrenal (HPA) axis will secrete cortisol, a hormone synthesized from cholesterol in the adrenal gland. Cortisol will then inhibit progesterone production, induce the secretion of pro-inflammatory mediators, and exacerbate the pain. The study aims to evaluate whether higher stress levels among students during the COVID-19 pandemic are associated with increased intensity of dysmenorrhea, rather than just an increase in occurrence.

METHOD

This is a descriptive analytic study with a cross-sectional approach. Participants are required to fill in a questionnaire using Google Forms. Participants are required to complete an informed consent form before filling in the questions. The questionnaire is divided into 3 parts: (1) respondents' identity, (2) menstrual characteristics using WaLIDD (working ability, location, intensity, days of pain, and dysmenorrhea) score, and (3) the Perceived Stress Scale, which includes 10 items assessing psychological stress.



KUESIONER PENELITIAN
HUBUNGAN ANTARA TINGKAT STRES SELAMA PANDEMI COVID-19 DENGAN INTENSITAS DYSMENORRHEA PADA MAHASISWI UGM: SEBUAH STUDI POTONG LINTANG

Identitas
Nama :
Asal Fakultas :
Alamat Sekarang :
Tempat dan Tanggal Lahir :
Email :
No. hp :
Tinggi Badan :
Berat Badan :
IMT (Indeks Massa Tubuh) :
Lama aktivitas fisik perminggu (.. menit) :

Data sosiodemografik
Tahun Angkatan : a. 2019
b. 2020
c. 2021
Kluster : a. Saintek
b. Soshum
c. Kesehatan
d. Sekolah vokasi
Tingkat pendapatan keluarga : a. < Rp. 2.000.000
b. Rp. 2.000.000 – Rp. 5.000.000.000
c. > Rp. 5.000.000.000
Daerah tempat tinggal saat ini : a. Desa
b. Kota
Daerah asal :....., Provinsi.....
Status tempat tinggal sekarang : a. Tinggal sendiri (kos, rumah, dan lainnya)
b. Bersama anggota keluarga
c. Lainnya,.....

Figure 1. Identity & Sociodemographic Data

After the participants have provided their basic identity information, they will be categorized into groups based on relevant demographic and lifestyle characteristics, including Body Mass Index (BMI), domicile, and living situation. This grouping allows for analysis of how these factors may relate to the primary variables of interest.

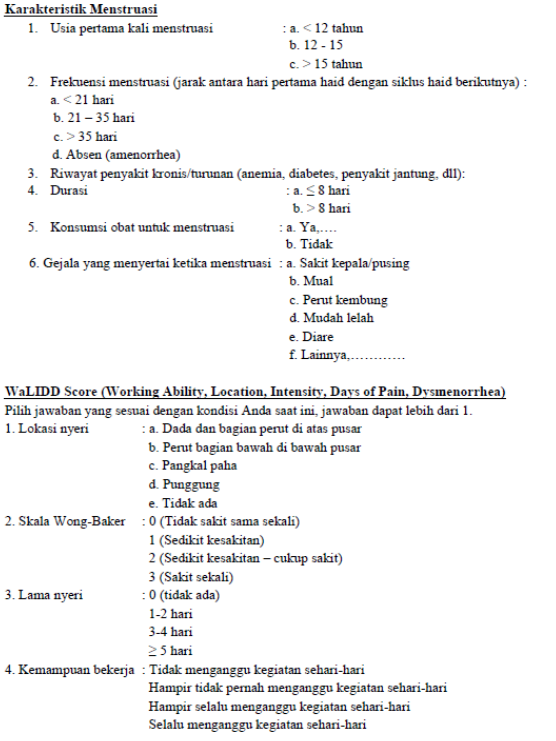
Perceived Stress Scale-10

PSS – 10:
Petunjuk Pengisian
Kuesioner ini bertujuan untuk menanyakan tentang perasaan dan pikiran Ibu/Saudari selama sebulan terkhir. Terdapat lima pilihan jawaban yang disediakan untuk setiap pernyataan, yaitu:
0 : Tidak pernah.
1 : Hampir tidak pernah (1-2 kali).
2 : Kadang-kadang (3-4 kali).
3 : Hampir sering (5-6 kali).
4 : Sangat sering (lebih dari 6 kali).
Selanjutnya, Ibu/Saudari diminta untuk menjawab pertanyaan dibawah dengan cara mengisi salah satu pilihan jawaban yang paling sesuai dengan perasaan dan pikiran Ibu/Saudari selama satu bulan terakhir.

No.	Pertanyaan	0	1	2	3	4
1.	Selama sebulan terakhir, seberapa sering Anda marah karena sesuatu yang tidak terduga					
2.	Selama sebulan terakhir, seberapa sering Anda merasa tidak mampu mengontrol hal-hal yang penting dalam kehidupan Anda					
3.	Selama sebulan terakhir, seberapa sering Anda merasa gelisah dan tertekan					
4.	Selama sebulan terakhir, seberapa sering Anda merasa yakin terhadap kemampuan diri untuk mengatasi masalah pribadi					
5.	Selama sebulan terakhir, seberapa sering Anda merasa segala sesuatu yang terjadi sesuai dengan harapan Anda					
6.	Selama sebulan terakhir, seberapa sering Anda merasa tidak mampu menyelesaikan hal-hal yang harus dikerjakan					
7.	Selama sebulan terakhir, seberapa sering Anda mampu mengontrol rasa mudah tersinggung dalam kehidupan Anda					
8.	Selama sebulan terakhir, seberapa sering Anda merasa lebih mampu mengatasi masalah jika dibandingkan dengan orang lain					
9.	Selama sebulan terakhir, seberapa sering Anda marah karena adanya masalah yang tidak dapat Anda kendalikan					
10.	Selama sebulan terakhir, seberapa sering Anda merasakan kesulitan yang menumpuk sehingga Anda tidak mampu untuk mengatasinya					
	Skor					

Figure 2. PSS-10 Questionnaire

The Perceived Stress Scale-10 (PSS-10) is a widely validated instrument with good internal consistency (Cronbach's alpha ranging from 0.71 to 0.91) and stable test-retest reliability. The WaLIDD score was initially developed and validated by Teherán-Piñeros et al. It has since undergone further validation in various populations, including an Arabic version validated among Lebanese women, demonstrating excellent internal consistency, construct validity, and concurrent validity.[19,21] The PSS-10 questionnaire models two subscales, which are perceived helplessness (items 1,2,3,6,9,10) and lack of self-efficacy (item 4,5,7,8). For item number 1,2,3,6,9,10 the scores are: 0=never, 1=almost never, 2=sometimes, 3=fairly often, 4= very often. For item number 4,5,6, and 8 it is made with positively phrased wording, hence the score is reversed on the Likert scale (0=very often, 1=fairly often, 2=sometimes, 3=almost never, 4=never). Higher scores translate to a higher level of stress. Scores ranging from 0-13 are considered low stress, 14-26 are moderate stress, and 27-40 are high stress.[19] To fulfill the Pearson Chi-Square test requirement, stress levels are grouped into 2, low (0-13) and high stress (14-26).



Karakteristik Menstruasi
1. Usia pertama kali menstruasi : a. < 12 tahun
b. 12 - 15
c. > 15 tahun
2. Frekuensi menstruasi (jarak antara hari pertama haid dengan siklus haid berikutnya) :
a. < 21 hari
b. 21 – 35 hari
c. > 35 hari
d. Absen (amenorrhea)
3. Riwayat penyakit kronis/turunan (anemia, diabetes, penyakit jantung, dll):
4. Durasi : a. ≤ 8 hari
b. > 8 hari
5. Konsumsi obat untuk menstruasi : a. Ya,....
b. Tidak
6. Gejala yang menyertai ketika menstruasi : a. Sakit kepala/pusing
b. Mual
c. Perut kembung
d. Mudah lelah
e. Diare
f. Lainnya,.....

WaLIDD Score (Working Ability, Location, Intensity, Days of Pain, Dysmenorrhea)
Pilih jawaban yang sesuai dengan kondisi Anda saat ini, jawaban dapat lebih dari 1.
1. Lokasi nyeri : a. Dada dan bagian perut di atas pusar
b. Perut bagian bawah di bawah pusar
c. Pangkal paha
d. Punggung
e. Tidak ada
2. Skala Wong-Baker : 0 (Tidak sakit sama sekali)
1 (Sedikit kesakitan)
2 (Sedikit kesakitan – cukup sakit)
3 (Sakit sekali)
3. Lama nyeri : 0 (tidak ada)
1-2 hari
3-4 hari
≥ 5 hari
4. Kemampuan bekerja : Tidak menganggu kegiatan sehari-hari
Hampir tidak pernah menganggu kegiatan sehari-hari
Hampir selalu menganggu kegiatan sehari-hari
Selalu menganggu kegiatan sehari-hari

Figure 3. Menstrual Characteristics and WaLIDD Score

To quantify dysmenorrhea, the WaLIDD score

was used because it provides a multidimensional and validated measure of menstrual pain severity. There are four key components in the WaLIDD score, which are: working ability, pain location, pain intensity, and duration of pain. Each component is scored on a scale from 0 to 3. The working ability item evaluates how menstrual pain affects daily activities, ranging from no impact to complete inability to work or study. Pain location refers to the number of affected sites, with scores increasing as pain affects multiple areas. Intensity is measured using a modified Wong-Baker scale, where 0 indicates no pain and 3 represents the most severe pain. The duration category assesses the number of days the pain lasts during menstruation. The total score is the sum of these four components, yielding a range from 0 to 12. Based on the total score, dysmenorrhea severity is classified as none (0), mild (1–4), moderate (5–7), or severe (8–12). For analysis purposes, dysmenorrhea is grouped into light (0-4) and medium-heavy (5-12).[6]The validation studies showed that the WaLIDD score effectively measures dysmenorrhea severity and its impact on daily activities such as work and study. Its strong psychometric properties, including good test-retest reliability and significant correlations with related constructs like depression, anxiety, and stress, support its use as a reliable tool for assessing dysmenorrhea across different cultural contexts. [20, 21]

Participants

The participants who are eligible for this study are female students enrolled at Universitas Gadjah Mada between the academic years 2019 and 2021. To exclude cases of secondary dysmenorrhea, subjects diagnosed with gynecological diseases such as endometriosis, PCOS, adenomyosis, and others were excluded. Subjects who are pregnant were also excluded from the study.

Sampling

The sample size was calculated based on an established method for comparing two independent groups with categorical outcomes or commonly referred to as the Fleiss formula for two proportions.

From the formula, the minimum difference required to achieve a significant proportion is 20%. It is known that the proportion of students with dysmenorrhea among students without stress is 0.35. The difference in the minimum proportion considered significant is determined by the researcher to be 20%. The type I error set is 5% and the type II error is 20% ($Z\beta$= 0,84). The total sample size calculated was 155 participants, with an equal number required from each group to ensure adequate study power.

Statistical Analysis

Data were analyzed using descriptive statistics to summarize the characteristics of the participants. The association between stress level and dysmenorrhea intensity was tested using the Chi-Square test. Statistical significance was set at a p-value less than 0.05, indicating that any association found is unlikely to be due to random chance and may reflect a true relationship in the study population. All analyses were performed using standard statistical software.

RESULT DAN DISCUSSION

The subject characteristics and distribution are shown in Table 1. Most of the respondents are from the Science cluster (52.3%). The majority engage in less than 150 minutes of physical activity per week (65.8%), and most have a body mass index (BMI) below 25 (83.8%), indicating a predominantly normal body weight distribution. A significant portion of participants fall into the high-stress group (83.9%), while 68.4% experienced medium to heavy dysmenorrhea. Most participants had their first menstruation at 12 years or older (86.5%). Most participants noted a menstrual duration of 8 days or less (86.5%) and menstrual frequency between 21-35 days (82.6%). Only 12.3% are reported to be using drug for pain relief. The majority reside in urban areas (77.4%) and have an income of Rp. 2,000,000 or more (69.7%), indicating a predominantly urban and middle-income sample.

Table 1. Respondent's Characteristic Distribution and Frequency

Variable		Frequency (n)	Percentage (%)
	2019	60	38.7

Batch	2020	43	27.7
	2021	52	33.5
Cluster	Science	81	52.3
	Social Studies	38	24.5
	Health Studies	33	21.3
	Vocational School	3	1.9
Physical Activity	<150 minutes/week	102	65.8
	≥150 minutes/week	53	34.2
BMI	<25	130	83.8
	≥25	25	16.2
Stress level (PSS-10)	Low	25	16.1
	High	130	83.9
Dysmenorrhea	Light	49	31.6
	Medium-Heavy	106	68.4
Menarche	<12 years old	47	30.3
	≥12 years old	108	69.7
Duration	≤8 days	134	86.5
	>8 days	21	13.5
Frequency	<21 days	5	3.2
	21-35 days	128	82.6
	>35 days	21	13.5
	Absent	1	0.6
Drug Consumption	Yes	19	12.3
	No	136	87.7

Domicile	Urban	120	77.4
	Rural	35	22.6
Income	<Rp. 2.000.000	47	30.3
	≥Rp. 2.000.000	108	69.7

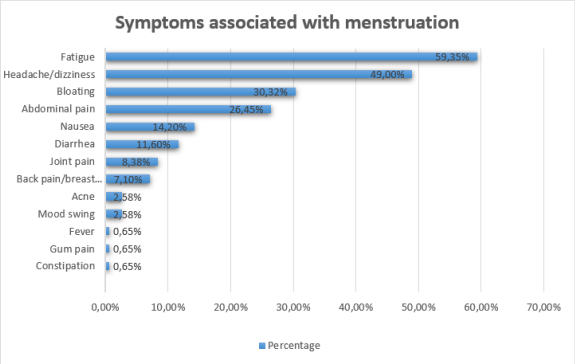


Figure 4. Symptoms during menstruation in subjects

Symptoms during menstruation were also collected in the questionnaire data. Some of the participants present with more than one symptom. The most common symptom presenting with each menstrual cycle is fatigue (59.35%), followed by headache/dizziness (49.00%). Many participants also had complaints in their gastrointestinal system, such as bloating (30.32%), abdominal pain (26.45%), nausea (14.20%), diarrhea (11.60%), and constipation (0.65%). Other organ-specific symptoms include joint pain (8.38%), back pain/breast pain (7.10%), acne (2.58%), and gum pain (0.65%). Mood swings (2.58%) were the only psychological problems that the participants faced.

Table 2. The relationship between variables with the intensity of dysmenorrhea

Variables		Dysmenorrhea		PR	95% CI	*P*
		Light N (%)	**Medium-heavy** N (%)			
Stress (*PSS-10*)	Low stress	13 (52.0%)	12 (48.0%)	1.878	1.176-2.998	***0.031***
	High stress	36 (27.7%)	94 (72.3%)	0.664	0.435-1.012	
Domicile	Urban	37 (30.8%)	83 (69.2%)	0.950	0.727-1.241	0.081
	Rural	12 (34.3%)	23 (65.7%)	1.112	0.654-1.891	
Physical Activities	<150 minutes/week	34 (33.3%)	68 (66.7%)	1.178	0.708-1.959	0.648
	≥150 minutes/week	15 (28.3%)	38 (71.7%)	0.930	0.748-1.156	
BMI	<25	41 (31.5%)	89 (68.5%)	0.986	0.528-1.841	1.000
	≥25	8 (32.0%)	17 (68.0%)	1.007	0.751-1.350	
Menarche	<12 years	16 (34.0%)	31 (66.0%)	1.114	0.683-1.817	0.809
	≥12 years	33 (30.6%)	75 (69.4%)	0.950	0.747-1.208	
Income	<Rp. 2.000.000	10 (21.3%)	37 (78.7%)	0.589	0.322-1.078	0.101

	≥Rp. 2.000.000	39 (36.1%)	69 (63.9%)	1.232	1.003-1.513	
Drug consumption	Yes	2 (10.5%)	17 (89.5%)	0.731	0.867-12.428	0.065
	No	47 (34.6%)	89 (65.4%)	3.283	0.601-0.890	

Note: Significant association found between stress level (PSS-10) and dysmenorrhea intensity (p = 0.031). Low stress was associated with higher odds of light dysmenorrhea compared to high stress.

The highlight from this table was that 72.3% of participants in the high-stress group had medium-heavy dysmenorrhea, while only 27.7% experienced light symptoms. In contrast, among those with low stress, 52.0% reported light and 48.0% reported medium-heavy dysmenorrhea. The analysis yielded a prevalence ratio (PR) of 1.878 (95% CI: 1.176–2.998) for the low-stress group, with a p-value of 0.031, indicating a statistically significant relationship between higher stress levels and greater dysmenorrhea intensity during the pandemic period. These findings highlight the important role of psychological factors, such as stress, in influencing menstrual pain severity in stressful circumstances like a global health crisis.

Table 3. The relationship between dysmenorrhea intensity and variables such as stress level, domicile, income, and drug consumption

Variables		OR	CI 95% For OR	PR	*P*
Stress (PSS-10)	High	2.658	1.083-6.521	2.521	0.033
	Low				
Domicile	Urban	1.162	0.500-2.697	1.040	0.727
	Rural				
Income	<Rp. 2.000.000	0.507	0.223-1.155	0.535	0.106
	≥Rp. 2.000.000				
Drug consumption	Yes	4.170	0.908-19.145	3.450	0.066
	No				

Multivariate analysis was conducted by including the bivariate variables; the p-value of the independent variables should be <0.25 to control potential cofounders and account for factors that might influence dysmenorrhea intensity. The multivariate analysis shows that, after accounting for other variables such as domicile, income, and drug consumption, high stress (measured by PSS-10) remains the only independent predictor of more severe dysmenorrhea with an odds ratio of 2.658 (95% CI: 1.083-6.521; p = 0.033) to higher chances of experiencing more severe dysmenorrhea. This means individuals with high stress are about 2.7 times more likely to experience medium to heavy dysmenorrhea compared to those with low stress. These results highlight the crucial role of psychological stress in exacerbating menstrual pain in this study population, whereas other factors such as economic status, place of residence, and medication use did not demonstrate a statistically significant effect in the adjusted multivariate model.

The Relationship between Stress Level and Dysmenorrhea Intensity

The majority of the participants reported experiencing high stress levels. Among those with high stress, 72.3% suffered from moderate to severe dysmenorrhea, whereas 27.7% experienced milder symptoms. Interestingly, even some individuals with

low stress levels (48%) reported moderate to severe dysmenorrhea. There were also participants whose stress level was low but still experienced medium-heavy dysmenorrhea (48%). There was a statistically significant relationship between stress level and dysmenorrhea intensity (P=0.031). Specifically, individuals categorized in the high stress group were more likely to experience heavier pain compared to those in the low stress group, indicating that elevated psychological stress is a key factor linked to greater dysmenorrhea severity. From the PSS-10 questionnaire, 45 participants (29.0 %) had a low level of stress, 94 participants (60.6 %) had a moderate level of stress, and 16 participants (10.4%) had a high level of stress. Most of the participants in the study experienced a high level of stress (83.9%). From the analysis, stress level had a statistically significant correlation with dysmenorrhea intensity (p=0.031). Stress level was categorized into two groups (low and high), excluding the moderate category, which may have led to oversimplification of the stress-dysmenorrhea relationship. A similar finding was found in a study involving medical students from Universitas Tanjungpura, which found that there is a correlation between dysmenorrhea and stress levels (p=0.025).[8] During the COVID-19 pandemic, there were many lifestyle changes that students experienced that might cause disruption of the menstrual cycle, such as sleeping quality, weight gain, less physical activity due to mobility restrictions, the use of alcohol and smoking, and psychosocial distress which indirectly can affect the menstrual cycle and the presence of dysmenorrhea.[19]

A recent study in 2023 of 95 female medical students in Universitas Muhammadiyah Sumatera Utara reported similar findings, confirming a significant association between stress levels and menstrual cycle disturbances, including dysmenorrhea (P=0.041) [9] which supports the result of this study. But a different result was found in a 2019 study at the Faculty of Medicine, Universitas Sumatera Utara, which reported no significant association between stress levels and the occurrence of primary dysmenorrhea among its students (p=0.617).[10] The variability in outcomes across universities could be attributed to variations in coping strategies among individuals, peer pressure, and academic demands. The timing of COVID-19 pandemic coincided with increased psychological stress, which appears to have intensified dysmenorrhea symptoms during the study period.

The Relationship between Physical Activity and Dysmenorrhea Intensity

Respondents who experienced medium-heavy dysmenorrhea spent less than 150 minutes per week of physical activity (68 respondents). But statistically, there is no significant relationship between the duration of physical activity and dysmenorrhea intensity (p=0.648). The reason might be that there were more participants in the group who did not get enough physical activity compared to the group that had adequate exercise. Engaging in physical activity can help alleviate dysmenorrhea by functioning as a general pain-relieving mechanism by enhancing blood flow to the pelvis and triggering the release of beta-endorphins. This can lead to a reduction in stress and an improvement in overall mood.[17] The result was different in a comparative study focusing on lifestyle and dysmenorrhea in 2018 discovered that there was a significant difference between a group of participants who did exercise and who did not toward dysmenorrhea intensity (p=0.011).[11] Exercise can expedite the metabolism surplus of substances and prostaglandins, leading to a decrease in menstrual pain.[18]

The Relationship between BMI and Dysmenorrhea Intensity

Most of the participants who experienced medium-heavy dysmenorrhea pain had a normal BMI of <25 (72 respondents). Statistically, there is no significant relationship between BMI and dysmenorrhea intensity (p=1.000). Another similar finding was discovered by Tang et al., in their 2020 retrospective case-control study about BMI and endometriosis discovered that there is no statistical difference in the association between BMI and the menstrual cycle (p=0.112). [11] Interestingly, their study mentioned that women with lower BMI who gained weight by an average of 1.7 kg/year have a 30% higher risk of getting dysmenorrhea. Another study to support this notion was found among students across universities in Iraq, which discovered that there was no statistical correlation between BMI and dysmenorrhea (p = 0.172).[12]

The Relationship between Menarche and Dysmenorrhea Intensity

Most respondents who experienced medium-heavy dysmenorrhea had their first menstruation

before 12 years old (75 respondents). Statistically, there was no significant relationship between menarche and the intensity of dysmenorrhea (p=0.809). A study among adolescence in Surabaya showed that there was an association between early menarche and dysmenorrhea with a p-value of 0.022.[13] Women with early menarche are exposed longer to uterine prostaglandin compared to women who had their menstruation later in life. The difference in the results between the study in Surabaya and the current study might be due to a smaller number of participants who had early menarche of <12 years old.

The Relationship between Income and Dysmenorrhea Intensity

Most of the subjects who experienced medium-heavy dysmenorrhea had an income of ≥Rp 2.000.000. The current investigation found no statistically significant association between income and the severity of dysmenorrhea (p=0.101), which contrasts with a previous study among female students in Ethiopia. The study revealed that the risk of primary dysmenorrhea was almost five times greater among students with a monthly income under 9 US dollars compared to those earning more than 18 US dollars per month (p=0.06).[14] The reason for this variative result might be due to differences in culture, ethnicity, and background in each country. There was also a disparity in income between regions in urban and rural areas since in Indonesia there are variability of regional minimum wage standards.

The Relationship between Domicile and Dysmenorrhea Intensity

Respondents who lived in urban areas experienced medium-heavy dysmenorrhea which accounts for 83 respondents (69.2%). However, statistically, there was no significant relationship between domicile and dysmenorrhea intensity (p=0.086). In the rural area, menstruation is considered a cultural taboo, which prevents women from discussing their problems and seeking medical attention.[15] On the other hand, living in an urban area is also one of the stressors for women. The urban area is associated with environmental stressors such as a high-density population, high levels of pollution, fast living pace, economic burden, and higher crime rate.[16] This finding was in line with the previous study on 311 undergraduate students in Iran, which mentioned that there was no significant relationship between dysmenorrhea and domicile.[12]

The Relationship between Drug Consumption for Menstruation and Dysmenorrhea Intensity

Most respondents who did not consume drugs (89 participants) had medium-heavy dysmenorrhea. Only 17 participants who experienced medium-heavy dysmenorrhea consumed medication to relieve the pain. Statistically, there was no significant relationship between drug consumption and the intensity of dysmenorrhea (p=0.065). This is different from a study in Iraq which found that the medication used to treat dysmenorrhea had a statistically significant correlation with dysmenorrhea (p=0.003). In addition, they also mentioned that there is an increase of 13.4% in the usage of medication for relieving dysmenorrhea during the pandemic among their students.[12] Most of the participants (87.7%) in this study did not consume the drug to alleviate their pain. In the group of participants (12.3%) who consume medication, their drug of choice was NSAID (8 respondents), vitamin (3 respondents), paracetamol (7 participants), hormonal drug (1 participant), and bromocriptine (1 participant). In this study, most participants did not consumed drugs to reduce their symptoms, this might be due to a lack of information and the belief that some pharmacological therapies have side effects and cause drug dependency. Many women believed that pain is a normal part of their menstrual cycle and succumbed to traditional relief (reference?). Another reason was that many participants prefer non-pharmacological relief to pharmacological relief but non-pharmacological treatment was not included in this study.

CONCLUSION

Based on the research question regarding the relationship between stress level and dysmenorrhea intensity during the COVID-19 pandemic, both bivariate and multivariate analyses have consistently shown that higher stress levels are significantly associated with increased severity of dysmenorrhea among female university students. The bivariate analysis showed a clear positive correlation between high stress (measured by PSS-10) and medium to heavy dysmenorrhea (measured with WaLIDD score), with a statistically significant p-value (0.031). The multivariate analysis further supported this finding, revealing that high stress independently increases the risk of more severe menstrual pain even after adjusting for other factors such as domicile, income,

and drug consumption.

Further study should incorporate more variables in the questionnaire, such as family history of dysmenorrhea, menstrual flow, and history of gynecological diseases. Other factors related to lifestyles such as alcohol consumption, daily nutrition intake, and smoking status should also be included.

Research Limitations

This study has several limitations, such as data collection relying on self-reported questionnaires, which may initiate recall bias. The timing of questionnaire completion relative to the menstrual cycle could also affect pain perception and reporting. Furthermore, the study used a small sample size, which might not adequately represent the diversity of the population.

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