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Original Article

Impact of Dysmenorrhea on Academic Performance, and Emotional Regulation: A Multifaceted Intervention

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Abstract

Background: Dysmenorrhea is a common gynecological condition and a significant health issue. Among female students, some studies have highlighted a negative impact of dysmenorrhea solely on academic performance, while others found a correlation between emotional suppression and dysmenorrhea.
Objective: This study explored the effects of primary dysmenorrhea on female students' academic performance and emotional regulation, and evaluated the impact of an intervention program.
Methods: This quantitative research study was conducted in different schools and colleges of Karachi between the periods of February to May 2024. A total of 220 female students who experienced menstrual distress were enrolled from different schools and colleges in Karachi. Demographis, menstrual symptom, academic performance and emotional regulation questionnaires were used. Correlation coefficient was applied to explore the impact of dysmenorrhea on academic performance and emotional regulation.
Results: Dysmenorrhea negatively impacts academic performance (p <0.01) and has negative impact on emotion expressive suppression regulation (p <0.05) but did not significantly impact emotional cognitive appraisal (p >0.05). An intervention was further applied on a sample of 12 participants. A significant difference was found in dysmenorrhea, academic performance, emotional regulation- Cognitive appraisal (CA) whereas no significant difference was found in emotional regulation- Expressive suppression (ES) in pre and post intervention results for experimental group. Results also indicate a significant difference in dysmenorrhea, and emotional regulation-CA whereas no significant difference found in academic performance and emotional regulation-ES between Experimental and Control Group.
Conclusion: Pain management, lifestyle adjustments, and emotion regulation abilities are key factors for coping with PD and boosting academic performance. The need to involve healthcare professionals in managing primary dysmenorrhea is eminent.
Key words: Academic performance, emotional regulation, primary dysmenorrhea.

Introduction

Primary dysmenorrhea refers to menstrual pain in females with normal uterine anatomy and functioning. Among young women, it is the most frequently reported menstrual disorder.[1] Studies report that menstrual cycle has various impacts on academic performance, physical condition and social activities of female students.[2] A study reported a notable academic impact, as 20.1% absentees from institute were because of dysmenorrhea and 40.9% of students reported their ability to concentrate or perform well in class has suffered.[3]

Academic performance is assessed by knowledge and educational goals set by teachers and students within a timeframe.[4] Academic performance is significantly affected by menstrual discomfort and associated with school absenteeism, reduced sports participation and lack of socialization with peers.[5]

Dysmenorrhea can also exacerbate stress and emotional tension and these negative emotions as mediators influence interpersonal relationships.[6]

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Authors Contribution

SF & MT conceptualized the project. SF, TA & MT did the data collection. TA, SK & SJ did the literature search. SF, SK, MT & SJ performed the statistical analysis. Drafting, revision & writing of manuscript were done by SF, TA, SK & SJ.

A study conducted on female athletes demonstrated that menstrual pain is the significant factor that affects emotional regulation, tension and anxiety.[7]

The strategies by which the emotions are experienced, controlled, and exhibited are known as emotion regulation.[8] Effective emotional regulation is essential for maintaining mental well-being, building positive relationships, and navigating life challenges.[9] Managing dysmenorrhea requires multifaceted approach to reduce pain and enhance general well-being. Modification in lifestyle like regular physical activity and balanced diet might lessen menstrual pain. Additionally, pain medications can effectively alleviate symptoms.[10] Different findings from studies were delineated, with some indicating negative effect of dysmenorrhea on only academic performance while others just correlating emotional suppression with dysmenorrhea. Furthermore, there is not enough of research on menstrual discomfort and female health concerns in general. Hence, our study aims to overcome the literature gap and to find the relationship and impact of dysmenorrhea on academic performance as well as emotional regulation. The objectives of the study were to study the relationship between dysmenorrhea, academic performance and emotional regulation, additionally to observe the effect of dysmenorrhea on academic performance and emotional regulation between experimental and control group and to observe the effect of pre and post intervention program for dysmenorrhea, emotional regulation and academic performance of experimental group.

Methods

This quantitative research study was conducted in different schools and colleges of Karachi between the periods of February to May 2024. Data were collected through convenience technique. The target population for this study was young and adult females. A power analysis was conducted using G*Power software. To detect a medium effect size (Cohen's d =0.5) with a significance level of α =0.05 and power (1–β) =0.80, the minimum required sample size was approximately 210 participants. To ensure sufficient statistical power and to account for potential attrition, a total of 220 participants were included in the study. Included females were non pregnant, having regular menstrual cycle and were between the age range of 15-30 years. Females suffering from any metabolic or psychiatric disorder or on any medication were excluded. For intervention phase, out of 220 participants, 25 females who scored high range of specific health conditions related to dysmenorrhea and low on academic performance and emotional regulation, were included. They were further divided into experimental (n =12) and control group (n =13). Consent was taken by enrolled participants. For participants aged 18 or below, consent was obtained from their parents.

Demographic form consisted of basic information about age, education, occupation, marital status, socioeconomic status and menstrual cycle details. Menstrual discomfort or symptoms were measured using the MSQ.[11,12] Academic performance of the participants were measured using the academic performance questionnaire APQ.[13] Emotion regulation of the participants were measured using the emotion regulation questionnaire[14] In ERQ scale item 1,3,5,7,8,10 describes the cognitive reappraisal of emotions and item 2,4,6,9 describes the expressive suppression of emotions.

For implementation of intervention plan, research team followed structured approach. First they identified individuals experiencing dysmenorrhea along with related academic and emotional challenges. Next step based on using the key CBT principles[15] and *CBT for beginners* by Jane Simmons and Rachel, the individuals were referred for additional support.[16] This intervention plan supported an individual in managing dysmenorrhea, improving academic performance, and fostering emotional well-being through eight structured sessions: 1: the research team built good relationship, collected essential information and clear, achievable goals were set for the intervention, 2: information about dysmenorrhea was provided, and effective pain management techniques, including relaxation exercises, heat therapy, were taught, 3: impaction of lifestyle factors such as diet, exercise, and stress on dysmenorrhea was recognized. A personalized plan was created to promote healthier lifestyle choices and overall well-being, 4: education on medication options for dysmenorrhea was provided, and importance of consulting a healthcare provider before using any new medication was emphasized, 5: focus was placed on improving study skills, time management, and academic goal-setting, empowering the individual to excel academically, 6: emotional awareness was enhanced, and tools such as mindfulness and cognitive reframing were taught, fostering emotional resilience and better coping with challenges, 7: the individual was encouraged to monitor progress through journaling, tracking dysmenorrhea management, academic performance, and emotional regulation, with necessary adjustments made to the plan, 8: long-term strategies for maintaining progress were

discussed, a relapse prevention plan was created, and ongoing support sources were identified, ensuring continued self-sufficiency and proactive planning for future challenges.

Data were analyzed by SPSS version 26. Descriptive statistics were generated to get a better statistical view of the characteristics of the demographic samples. Correlation coefficients were applied to explore a relationship between dysmenorrhea, academic performance and emotional regulation. Statistical significance was determined using a *p*-value of <0.05.

Results

Table-1 shows the socio demographic characteristics of study participants. Majority of the subjects were between the ages of 15-20 years. Mostly they were unmarried, undergraduate students having middle class background. Menstrual regularity was found in approximately 80% of females while 19% presented with irregular cycles. Hormonal imbalance (64.2%) was the most common cause of irregular cycles as shown in Figure.

Table 1: Socio demographic characteristics of study participants. (n=220)

Characteristics		*n*	*%*
AGE (years)	15-20	117	53.1
	21-25	97	44.0
	26-30	6	2.72
Education	Intermediate	40	18.1
	Undergraduate	168	76.3
	Graduate	12	5.45
Marital status	Unmarried	202	91.8
	Married	18	8.18
Socioeconomic background	Lower class	4	1.81
	Middle class	211	95.9
	Upper class	5	2.27
Regularity of cycle	Regular	178	80.9
	Irregular	42	19.0

Bivariate correlation coefficient shows a significant negative correlation of dysmenorrhea with academic performance (r =-.171, *p* <0.01) and emotional expressive suppression (*r* =-.133, *p* <0.05) in Table-2. Results also revealed that academic performance shows a significant positive correlation with emotional cognitive reappraisal (r =.231, *p* <0.01) and emotional expressive suppression (r =.211, *p* <0.01). Moreover, emotional cognitive reappraisal was also positively correlated with emotional expressive suppression (r =.591, *p* <0.01).

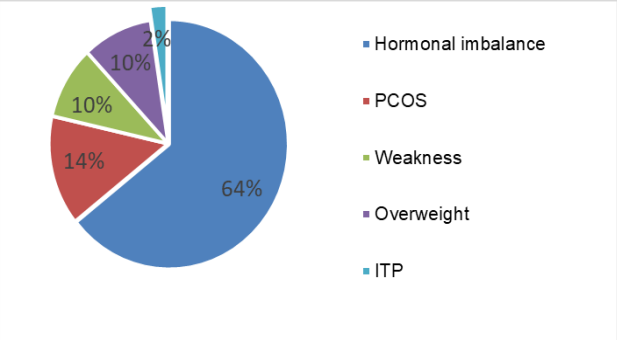

Figure: Cause of irregular cycle

Table-3 indicated a significant difference in dysmenorrhea, and Emotional regulation (cognitive appraisal) whereas no significant difference found in academic performance and Emotional regulation (expressive suppression).

Table-4 indicated a significant difference in dysmenorrhea, academic performance and emotional regulation (cognitive appraisal) pre and post Intervention Program for experimental group, whereas no significant difference found in emotional regulation (expressive suppression).

Discussion

The findings of this study revealed that dysmenorrhea negatively affects academic performance and emotional regulation expressive suppression of the females. In Saudi Arabia study the students who had primary dysmenorrhea reported a negative impact on academic performance; 67% student reported absenteeism from school, 89% concentration deficit and 94% reported a decrease level in their study time.[17] In a Nigerian study, 42.7% students had been absent from the school due to painful periods that affected their academic performance.[18] Similarly a study from Dubai revealed that 33.4% of absentees during every menstrual cycle negatively impacting their academic performance.[19] In Ethiopia, study reveals that 88.3% students reported that primary dysmenorrhea negatively impacts their academic performance.

Previous studies reported negative impact of dysmenorrhea on academic performance. However, the rate of dysmenorrhea impact on academic performance was much lower in the present study then in the above-mentioned studies, possible reasons for the lower rate might be the presence of sociocultural differences of the study participants in the perception of the pain during menstruation and also the difference in the lifestyle.

Table 2: Pearson correlation in dysmenorrhea, academic performance and emotional regulation.

Variable	*n*	*M*	*SD*	*1*	*2*	*3*	*4*
Dysmenorrhea	220	71.74	17.152	-			
Academic performance	220	29.64	4.561	-.171**	-		
Emotional cognitive reappraisal	220	27.51	8.385	-.092	.231**	-	
Emotional expressive suppression	220	17.85	5.855	-.133*	.211**	.591**	-

Note: **. Correlation is significant at the 0.01 level (two-tailed), *. Correlation is significant at the 0.05 level (two-tailed).

Table 3: Independent sample t-test values for experimental (n=12) and control group. (n=13)

Variables	*Group*	*M*	*SD*	*95% CI*		*T*	*p*	*Cohen's d*
				Lower	*Upper*			
Dysmenorrhea	Control	94.92	1.97	-7.83	-2.48	17.69	.005*	26.64
	Experimental	10.08	4.05	-7.81	-2.51			
Academic Performance	Control	30.33	4.18	-1.52	5.57	1.17	.80	0.47
	Experimental	28.31	4.38	-1.52	5.57			
Emotional Regulation-CA	Control	25.08	9.84	1.53	13.55	2.51	.000*	1.02
	Experimental	17.54	3.45	1.08	14.00			
Emotional regulation-ES	Control	12.00	3.79	-3.68	2.33	-.513	.68	0.03
	Experimental	12.77	33.70	-3.87	2.33			

CA: cognitive appraisal ES: expressive suppression

Table 4: Paired sample T-test values for pre and post Intervention program for experimental group. (n=12)

Variables	*Pre test*		*Post test*		*95% CI*		*T (12)*	*p*	*Cohen's d*
	M	*SD*	*M*	*SD*	*Lower*	*Upper*			
Dysmenorrhea	100	4.05	77.15	6.68	18.43	27.40	11.13	.000*	4.13
Academic performance	28.31	4.38	36.08	3.22	-9.76	-5.77	-8.50	.000*	2.02
Emotional regulation-CA	17.54	3.45	26.15	2.19	-9.73	-7.49	-16.79	.000*	2.97
Emotional regulation-ES	12.77	3.7	10.08	1.84	.667	4.71	2.89	0.13	0.92

Furthermore, as this study showed negative impact of dysmenorrhea on emotional regulation expressive suppression, similarly, a study in Iran revealed that the intensity of dysmenorrhea was related to psychological stress,[20] another study in San Diego revealed that those women who had dysmenorrhea have a higher risk of depression[21]. Study in Indonesia reported that women who did not regulate their emotions properly are more likely to experience dysmenorrhea.[14]

It is reported that the underlying cause of primary dysmenorrhea is excessive release of uterine prostaglandins, which are regulated by estrogen and progesterone and additionally, variation in ovarian progesterone and estrogen levels are related with a high risk of depression.[22] Present study and the previous studies reported that dysmenorrhea negatively impacts the emotional regulation of females.

A significant difference was found in pre and post results of experimental group in dysmenorrhea, academic performance and emotional regulation (cognitive appraisal). This shows the effectiveness of intervention as it has been specifically designed to target and alleviate dysmenorrhea and enhance cognitive appraisal. Intervention successfully addressed the underlined causes and lifestyle modification in session 2 and 3 along with pain management strategies, which significantly improved dysmenorrhea. Fernández-Martínez and associates also found pain management techniques useful for dysmenorrhea.[23] At the same time, Rasool & associates reported that lifestyle modification can sufficiently reduce the chances of dysmenorrhea and decrease the severity of menstrual pain.[24] Participants in the experimental group responded differently to the intervention due to individual differences and responsiveness to the strategies due to which the outcome of session 6 improved emotional awareness and regulation. Participants gave a positive response to the emotional regulation techniques of mindfulness, cognitive reframing, and progressive muscle relaxation which led to a more pronounced impact in this specific domain. Also, it has been noticed that participants were adhering more to the intervention protocols. Higher level of adherence and engagement contributed to better outcomes.

Moreover, positive expectations and beliefs about the intervention efficacy can also contribute and influence their subjective experiences. These factors support our results which showed a significant difference in rate of dysmenorrhea and emotional regulation (cognitive appraisal) in experimental and control group.

Academic performance of the experimental group was also increased in post intervention results, as participants reported that development of a study schedule, goal setting techniques and effective study strategies worked for them. But the difference was not statistically significant between experimental and control groups.

No significant differences were found in the results of experimental and control groups in relation to emotional regulation (expressive suppression), which could be due to the reason that emotional regulation is a complex process involving multiple components or maybe the intervention was more effective in addressing cognitive appraisal aspect but less impactful on expressive suppression. Also, research indicates that females are more involved in expressive suppression while experiencing physiological arousal.[25] And since they are habitual of being involved in expressive suppression since the onset of dysmenorrhea, this intervention was not enough and different strategies may be needed to target these distinct facets of emotional regulation (expressive suppression). Overall the focus of the participant at the initial stage of intervention was to bring behavioral change but by the end of the sessions they were able to exert greater emotional regulation (cognitive appraisal) and the management of dysmenorrhea and better academic performance. We believe that we added to the adolescent dysmenorrhea literature on the potential links of dysmenorrhea with academic performance and emotional control through carrying out an interventional research study. Moreover cultural and ethnic diversity may have a substantial impact on research outcomes as cultural patterns of behavior might influence pain perception. Hence, the need for evaluating PD among teenagers in diverse cultures is crucial for better understanding and providing high-quality therapy.

This study is limited by the use of convenience sampling, which restricts generalizability, and a small intervention sample size, reducing statistical power. Hence it further opens the future research options that can employ probability-based sampling and include larger intervention groups to enhance the validity and applicability of the findings.

Conclusion

Pain management, lifestyle adjustments, and emotion regulation abilities are key factors for coping with stressful dysmenorrhea and boosting academic performance. These findings emphasize the need of involving healthcare professionals and the community in managing primary dysmenorrhea.

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Availability of Data: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Approval: The Institutional Review Board of Fazaia Ruth Pfau Medical College, Karachi approved the study via letter no. FRPMC-IRB-2024-51.

Conflict of Interest: None declared.

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