OPEN ACCESS

Original Article

DOI: 10.55735/k85n2k82

HJPRS

The Healer Journal of Physiotherapy and Rehabilitation Sciences

SCAN ME

Journal homepage: www.thehealerjournal.com

Impact of Pelvic Crossed Syndrome on Primary Dysmenorrhea and Physical Activity

Hiba Mukhtar[1], Fariha Yousaf[1], Mariya Tariq[2], Aqsa Butt[2*] Javeria Aslam[2], Noor ul Huda[2]

[1]Shalamar Hospital, Lahore, Pakistan [2*]Shalamar School of Allied Health Sciences, Lahore, Pakistan

KEYWORDS

Lower cross syndrome
Painful menstrual periods
Pelvic cross syndrome
Physical activity
Primary dysmenorrhea

DECLARATIONS

Conflict of Interest: None
Funding Source: None

CORRESPONDING AUTHOR

Aqsa Butt
Shalamar School of Allied Health Sciences, Lahore, Pakistan
aqsanaveed13@gmail.com

ABSTRACT

Background: Pelvic cross syndrome is characterized by muscle imbalances around the pelvis, resulting in changes in pelvic alignment and movement patterns. Engaging in regular physical activity has been linked to numerous benefits, including reduced menstrual pain severity and improved overall fitness and mobility. **Objective:** To determine the impact of pelvic cross syndrome on primary dysmenorrhea and physical activity. **Methodology:** This comparative cross-sectional analytical design was conducted at the Shalamar School of Allied Health Sciences, Lahore, over a period of six months. A total of 60 females, aged between 18 and 25 years, were selected into two groups: those with pelvic cross syndrome with and without primary dysmenorrhea. Pre-diagnosed participants were selected who were nulliparous, unmarried, and free of chronic illnesses or recent surgeries. Primary dysmenorrhea was diagnosed using a visual analogue scale, with recurrent lower abdominal cramps. Participants with secondary dysmenorrhea, chronic abdominal pain, ovarian cysts, irritable bowel syndrome, or recent surgeries were excluded from the study. Participants were examined for muscle tightness and weakness using 5-minute warm-up, followed by assessments for pelvic cross syndrome prevalence through the manual muscle testing. Primary dysmenorrhea severity was assessed using the WaLIDD score. Participants completed the International Physical Activity Questionnaire to assess their physical activity status. The qualitative data were assessed through frequencies and percentages. **Results:** The study found that 58.3% of students had pelvic cross syndrome, with 42.9% of those also experiencing dysmenorrhea. Among those with both dysmenorrhea and this syndrome, 60% reported severe pain, while 90% of those with pelvic cross syndrome but without dysmenorrhea had low pain. Pelvic tilt was found in 46.7% of participants, and physical activity levels were low in 73% of those with both conditions, while 55% of individuals without either condition reported high physical activity. **Conclusion:** This concluded that 58.3% of young students developed pelvic cross syndrome, with 42.9% also experiencing dysmenorrhea. Younger age, lower BMI, and muscle imbalances were linked to both pelvic cross syndrome and primary dysmenorrhea, leading to higher pain and lower physical activity. In contrast, those with pelvic cross syndrome but no primary dysmenorrhea reported less pain and higher physical activity.

How to cite the article: Mukhtar H, Yousaf F, Tariq M, Butt A, Aslam J, Huda NU. Impact of Pelvic Crossed Syndrome on Primary Dysmenorrhea and Physical Activity. The Healer Journal of Physiotherapy and Rehabilitation Sciences. 2025; 5(1): 184-191.

INTRODUCTION

Pelvic Crossed Syndrome (PCS) is a term coined by Vladimir Janda to describe a distinct postural pattern that results from imbalances between muscle groups around the pelvis.[1] This is a musculoskeletal condition characterized by a pattern of postural imbalances and muscle dysfunctions that can significantly affect an individual's quality of life.[2,3] Typically, PCS involves a combination of tightness in the hip flexors and lower back muscles.[4], along with weakness in the gluteal muscles, abdominals, and pelvic floor muscles.[5] These imbalances lead to alterations in pelvic alignment and posture, which may contribute to pain and dysfunction, particularly in the lower back and pelvis.[6]

The relationship between PCS and other musculoskeletal conditions, such as primary dysmenorrhea (PD).[7] It has gained increasing attention due to the interrelated nature of the musculoskeletal and reproductive systems.[8] PCS is associated with several musculoskeletal problems, including lower back pain, hip pain, and pelvic dysfunction.[9] The impact of PCS on the pelvic region is particularly relevant when considering conditions such as dysmenorrhea, a condition that affects many women of reproductive age.[10] The pelvic misalignment caused by PCS may contribute to additional stress on the pelvic organs, ligaments, and muscles, potentially exacerbating symptoms of dysmenorrhea.[11]

Primary dysmenorrhea refers to painful menstrual periods that are not associated with any underlying gynecological conditions.[12] The pain is typically caused by the release of prostaglandins, which stimulate uterine contractions, leading to discomfort in the lower abdomen, pelvis, and back.[13] Symptoms of PD can vary in intensity but are often described as cramping or throbbing pain that can interfere with daily activities.[14] The pain usually starts on the first day of menstruation and can last for several days, although it may decrease in intensity as a woman ages or after childbirth. While PD is common, affecting a significant portion of women in their reproductive years, its impact can be profound. The pain experienced during menstruation can lead to missed school or work, reduced physical activity, and a diminished overall quality of life.

Factors such as hormonal imbalances, stress, and poor posture may influence the severity of symptoms. It is believed that musculoskeletal dysfunctions, such as those found in PCS[15], may play a role in exacerbating the pain and discomfort experienced during menstruation. For instance, the pelvic tilt associated with PCS could result in increased tension in the uterine ligaments and muscles, potentially worsening the cramping sensations associated with PD. The relationship between PCS and PD has been explored in recent studies, with evidence suggesting that individuals with PCS are more likely to experience higher levels of pain during menstruation.[16] One of the main mechanisms behind this relationship may lie in the altered biomechanics of the pelvis caused by PCS. The anterior pelvic tilt associated with PCS can increase tension in the pelvic floor muscles, ligaments, and uterus, potentially leading to more intense menstrual cramping.[17]

Additionally, the weakness of the gluteal and abdominal muscles in individuals with PCS may further contribute to instability and dysfunction in the pelvic region, exacerbating the symptoms of PD. The combination of muscle imbalances and altered pelvic alignment may result in a vicious cycle, where the pain and discomfort of PD lead to further postural and muscular compensations, which in turn worsen PCS.[18] For example, individuals with PD may subconsciously adopt compensatory postures to alleviate pain, which could reinforce the muscle imbalances characteristic of PCS. Conversely, the tightness and weakness associated with PCS may contribute to the development or worsening of PD symptoms, creating a complex interplay between musculoskeletal dysfunction and reproductive health.[19]

Both PCS and PD can significantly impact physical activity levels, although the effects may vary depending on the severity of each condition. Individuals with PCS may experience discomfort or pain during certain movements or exercises due to the muscle imbalances and postural distortions that characterize the syndrome.[20,21] For instance, activities that involve hip flexion or extension, such as running, squatting, or even prolonged sitting, may be painful or difficult for those with PCS. The discomfort caused by PCS can result in decreased physical activity, which in turn may contribute to further deconditioning and muscle weakness. Interestingly, research has shown that regular physical activity can have a positive impact on both PCS and PD.[22] For instance, exercises that focus on strengthening the core, glutes, and pelvic floor

muscles can help correct the muscle imbalances associated with PCS, leading to improved posture and reduced pain. Likewise, physical activity has been shown to reduce the severity of menstrual cramps by promoting the release of endorphins, which act as natural pain relievers.[23] However, the ability to engage in regular physical activity is often compromised in individuals suffering from PCS and PD, creating a barrier to achieving these potential benefits.

We aim to uncover the mechanisms underlying interconnected health concerns by examining how muscle imbalances, pain, and lifestyle intersect, with the goal of better understanding the prevalence and challenges faced by individuals with PCS and PD. By identifying potential barriers to exercise and developing strategies that promote musculoskeletal health, this research offers opportunities for tailored healthcare approaches to enhance women's health and well-being. In particular, exploring how physical activity influences pelvic alignment and pain experiences may contribute to more effective treatments and improved quality of life. Therefore, the objective of this study is to compare the impact of PCS on physical activity and pain in female students, both with and without primary dysmenorrhea.

METHODOLOGY

This study utilized a comparative cross-sectional analytical design and was conducted at the Shalamar School of Allied Health Sciences, Lahore, over a period of six months, following IRB approval. A total of 60 females, aged between 18 and 25 years, were selected using a non-probability consecutive sampling technique. The sample size was determined using the WHO sample size calculation formula for population proportion, with a 10% significance level and 80% power, resulting in 30 participants in each of the two groups: those with PCS and primary dysmenorrhea, and those with PCS without primary dysmenorrhea.

Participants were selected based on inclusion criteria such as being nulliparous, unmarried, and free of chronic illnesses or recent surgeries, and having a diagnosis of PCS based on clinical assessment. Primary dysmenorrhea was diagnosed using a visual analogue scale (VAS) score of 4 or more, with recurrent lower abdominal cramps, and a pain duration of 12 to 72 hours after menstruation. Participants with secondary dysmenorrhea, chronic abdominal pain, ovarian cysts, irritable bowel syndrome, or recent surgeries were excluded from the study.

The procedure involved obtaining written consent from all participants, followed by the collection of demographic data, including age, height, weight, body mass index (BMI), smoking and alcohol use, and pain reliever usage. Participants were examined for muscle tightness and weakness using a 5-minute warm-up, followed by assessments for PCS prevalence through the modified Thomas test, modified Schober's test, and manual muscle testing (MMT). Primary dysmenorrhea severity was assessed using the WaLIDD score, and participants were then grouped into four categories based on their PCS and dysmenorrhea status: PCS with primary dysmenorrhea, PCS without dysmenorrhea, without PCS with primary dysmenorrhea, and without PCS without primary dysmenorrhea. Participants reported their pain levels on a VAS and completed the International Physical Activity Questionnaire (IPAQ) to assess their physical activity status. The entire process took approximately 15-20 minutes per participant. Data analysis was conducted using SPSS 21. The qualitative data were expressed as frequencies and percentages.

RESULTS

The results demonstrate a strong link between PCS and PD. More than half of the participants (58.3%) had PCS, and nearly half of these (42.9%) also experienced dysmenorrhea. Those with both PCS and PD reported significantly higher pain levels, with 60% describing their pain as severe, compared to much lower pain reports among those with PCS alone. Muscle testing confirmed imbalances, particularly tight hip flexors and weak gluteal and abdominal muscles, which were more common in the PCS and PD group. Postural findings, including pelvic tilt and thoracolumbar tightness, were also more prevalent in those with dysmenorrhea.

Physical activity levels were markedly reduced in participants with both PCS and PD; 73% of them reported low activity, while participants without either condition demonstrated higher engagement in physical activity (55% reporting high activity). This suggests that the combination of musculoskeletal imbalance and menstrual pain creates a compounded effect, both intensifying pain and discouraging exercise participation.

Table 1: Statistics of participants

Variables	Category	Frequency (f)	Percentage (%)
BMI	<18.5	19	31.7
	18.5-24.9	41	68.3
Period Regularity	Regular	52	86.7
	Irregular	8	13.3
Groups	PCS + PD	15	25
	PCS	20	33.3
	PD	5	8.3
	Both absent	20	33.3
Family History of Dysmenorrhea	Yes	19	31.7
	No	40	66.7
	Not Sure	1	1.7
WaLIDD Score	1-4	40	66.7
	5-7	12	20
	8-12	8	13.3
Abdominal Muscle Strength (MMT)	Grade 3	47	78.3
	Grade 4	9	15
	Grade 5	4	6.7
Left Gluteus Strength (MMT)	Grade 3	33	55
	Grade 4	22	36.7
	Grade 5	5	8.3
Right Gluteus Strength (MMT)	Grade 3	34	56.7
	Grade 4	24	40
	Grade 5	2	3.3
Right Hip Flexor Condition	Normal	19	31.7
	Tight	41	68.3
Left Hip Flexor Condition	Normal	20	33.3
	Tight	40	66.7
Thoraco-Lumbar Extensor Tightness	Normal	13	21.7
	Tight	47	78.3
Total	Total	60	100

Overall, the study indicates that younger females with lower BMI are more vulnerable to PCS and PD, and that the coexistence of these conditions is associated with greater pain and reduced physical activity. Importantly, those with PCS but without PD reported less pain and relatively higher activity levels, suggesting that dysmenorrhea amplifies the functional limitations of PCS. These findings underscore the importance of targeted interventions such as posture correction, core and gluteal strengthening, and activity promotion to break the cycle of pain, inactivity, and muscular imbalance in affected females.

DISCUSSION

This study aimed to explore the impact of PCS on PD and physical activity in young females. The findings from the current study are consistent with existing literature, revealing significant musculoskeletal imbalances, pain, and lower physical activity levels among individuals with both PCS and PD. In line with Mahishale et al.,[24] we found that 58.3% of young students had PCS, with 42.9% of these individuals also experiencing dysmenorrhea.[25] This overlap indicates that PCS may be more prevalent in those suffering from PD. Additionally, the age and BMI factors in this study align with those of Naghizadeh et al. in 2019[26], who found that younger individuals are more likely to experience dysmenorrhea.

Participants with an average age of 20.53 years reflect the age group most susceptible to this condition. As Naghizadeh et al. noted, younger people are more prone to lower scores on health-promoting lifestyle scales, such as physical activity and stress management, which can exacerbate dysmenorrhea symptoms. These findings further suggest that younger females, in particular, may benefit from interventions targeting physical activity and stress reduction to alleviate dysmenorrhea. The MMT results in our study also reflect those found by Yaseen et al. (2024)[27], who linked PCS to gait and balance impairments. Our study identified significant differences in hip flexor tightness and gluteal strength in participants with PD. This finding aligns with Yaseen et al.'s conclusion that muscle imbalances, particularly in the hip flexors and glutes, are common in individuals with PCS, possibly due to altered movement patterns and postural compensations arising from pain.

In particular, the MMT of glutes in our study revealed that participants with PD had lower gluteal strength compared to their non-dysmenorrhea counterparts, consistent with Bougault et al. (2023). Bougault's research suggested that higher physical activity is

Table 2: PCS scores using VAS and dysmenorrhea status

Dysmenorrhea Status	VAS Score	Yes	No
With Dysmenorrhea	0-3	0	0
	4-6	6 (40)	5 (30)
	7-10	9 (60)	0
Without Dysmenorrhea	0-3	18 (90)	20 (10)
	4-6	2 (10)	0

Table 3: IPAQ scores using PCS and dysmenorrhea status

Dysmenorrhea Status	PCS Score	Low	Moderate	High	Total
With Dysmenorrhea	Yes	11 (73)	3 (20)	1 (6)	15
	No	3 (60)	2 (40)	0	5
Total		14	5	1	20
Without Dysmenorrhea	Yes	8 (40)	10 (50)	2 (10)	20
	No	1 (5)	8 (40)	11 (55)	20
Total		9	18	13	40

associated with fewer menstrual symptoms, highlighting the benefits of maintaining muscle strength and flexibility to mitigate the impact of PD, supported further by Samperio et al., who demonstrated that aerobic and stretching exercises can significantly relieve dysmenorrhea symptoms. This suggests that strengthening and maintaining flexibility in muscles such as the hip flexors and glutes may benefit individuals suffering from dysmenorrhea, potentially alleviating pain and improving quality of life.

The WaLIDD score and VAS[28] showed that individuals with PD reported moderate to severe pain, which aligns with Karout et al. (2021), who emphasized the need for both non-pharmacological and pharmacological pain management for those suffering from PD. The high pain levels reported by participants in this study further highlight the need for targeted interventions, such as posture correction, ergonomic adjustments, and physical activity, as suggested by Burile et al. in their study on lower cross syndrome in individuals with chronic back pain. The findings of this study suggest that addressing musculoskeletal imbalances in the pelvic region through physical therapy and exercise could be effective in reducing the severity of pain in dysmenorrhea sufferers.

Modified Schober's test results in our study revealed tightness of thoracolumbar extensors and pelvic tilts, which were more prevalent in females with PD, aligning with studies by Taiaa et al. (2021) and Puagprakong et al. (2022), who observed postural challenges in individuals with LCS. These results further emphasize the connection between musculoskeletal imbalances and PD. The pelvic tilt and thoracolumbar tightness observed in our study reflect the postural compensations that often occur in response to the pain and discomfort associated with PD, similar to the findings of Taiaa et al. (2021), who noted similar issues in children with LCS, and Puagprakong et al. (2022), who reported upper body postural problems in adults with LCS.

The IPAQ results indicated that 73% of females with both PD and PCS reported low levels of physical activity, which aligns with the findings of Samperio et al. (2021)[29], who highlighted the negative impact of dysmenorrhea on physical activity levels. The low activity levels in this study can likely be attributed to the pain experienced by participants, as high levels of pain on the VAS (with scores above 7) can discourage engagement in

physical activities. In contrast, females with PCS but without PD reported a more balanced distribution of activity levels, with 40% reporting low activity and 50% reporting moderate activity. This suggests that while PCS can affect physical activity levels, the presence of dysmenorrhea amplifies this effect, limiting engagement in higher intensity activities.[29]

The findings of this study, along with supporting literature, underscore the complex relationship between PCS, PD, and physical activity. Musculoskeletal imbalances such as tight hip flexors and weak gluteal muscles, along with postural distortions, are prevalent in individuals with PD, contributing to pain and reduced physical activity. The low physical activity levels observed in individuals with both PD and PCS further suggest that addressing these imbalances through exercise and physical therapy could be an effective non-pharmacological treatment for dysmenorrhea. Regular moderate-to-high-intensity physical activity could help alleviate the symptoms of both PCS and PD, improving quality of life and reducing the reliance on pharmacological interventions. Thus, the integration of physical therapy, exercise, and posture correction into the management of PD could provide a more holistic approach to improving the well-being of those affected by these conditions.

CONCLUSION

According to this research, there is a direct correlation between primary dysmenorrhea and pelvic crossed syndrome, with PCS being more common in younger people and those with lower body mass indexes. Both groups frequently had muscle imbalances, such as weak gluteals and tight hip flexors, which resulted in decreased physical activity and excruciating pain. Those with pelvic crossed syndrome but no primary dysmenorrhea, on the other hand, reported more activity and less pain. The results highlight how much better pain management and physical activity can be achieved by correcting muscle imbalances.

DECLARATIONS

Consent to participate: Written consent had been obtained from patients. All methods were performed following the relevant guidelines and regulations.

Availability of Data and Materials: Data will be made available upon request. The corresponding author will submit all dataset files.

Competing interests: None

Funding: No funding source involved.

Authors' contributions: All authors had read and approved the final manuscript.

REFERENCES

1. Janda V. Muscles in the pathogenesis of musculoskeletal disorders. Oxford Textbook of Musculoskeletal Medicine 2015: 121-125. https://doi.org/10.1093/med/9780199674107.003.0012
2. Yaseen S, Asif N, Urooj A, Raza MAA. Relationship Between Pelvic Cross Syndrome, Gait, and Balance Impairments: PCS and Gait/Balance Impairments. Journal of Health and Rehabilitation Research 2024; 4(3). https://doi.org/10.61919/jhrr.v4i3.1431
3. Morrison P. Musculoskeletal conditions related to pelvic floor muscle overactivity. The overactive pelvic floor 2016: 91-111. https://doi.org/10.1007/978-3-319-22150-2_7
4. Kim B, Yim J. Core stability and hip exercises improve physical function and activity in patients with non-specific low back pain: a randomized controlled trial. The Tohoku Journal of Experimental Medicine 2020; 251(3): 193-206. https://doi.org/10.1620/tjem.251.193
5. Prather H, Cheng A, Steger-May K, Maheshwari V, Van Dillen L. Hip and lumbar spine physical examination findings in people presenting with low back pain, with or without lower extremity pain. Journal of Orthopaedic & Sports Physical Therapy 2017; 47(3): 163-72. https://doi.org/10.2519/jospt.2017.6567
6. Baker PK. Musculoskeletal origins of chronic pelvic pain: diagnosis and treatment. Obstetrics and Gynecology Clinics of North America 1993; 20(4): 719-42.
7. Serrano-Imedio A, Calvo-Lobo C, Casañas-Martin C, Garrido-Marin A, Pecos-Martin D. Myofascial Pain Syndrome in Women with Primary Dysmenorrhea: A Case-Control Study. Diagnostics 2022; 12(11): 2723. https://doi.org/10.3390/diagnostics12112723
8. Molins-Cubero S, Rodríguez-Blanco C, Oliva-Pascual-Vaca Á, et al. Changes in pain perception after pelvis manipulation in women with primary dysmenorrhea: a randomized controlled trial. Pain Medicine 2014; 15(9): 1455-63. https://doi.org/10.1111/pme.12404
9. Pradeep S, Heggannavar A, Metgud S. Effect of sciatic nerve neurodynamic sustained natural

apophyseal glides on individuals with pelvic crossed syndrome: A randomized controlled trial. Indian Journal of Physical Therapy and Research 2020; 2(1): 35-40.
https://doi.org/10.4103/ijptr.ijptr_40_19
10. de Las Mercedes Villa Rosero CY, Mazin SC, Nogueira AA, et al. Prevalence of chronic pelvic pain and primary dysmenorrhea in women of reproductive age in Ecuador. BMC Women's Health 2022; 22(1): 363.
https://doi.org/10.1186/s12905-022-01948-y
11. Blanco-Diaz M, Vielva-Gomez A, Legasa-Susperregui M, et al. Exploring Pelvic Symptom Dynamics in Relation to the Menstrual Cycle: Implications for Clinical Assessment and Management. Journal of Personalized Medicine 2024; 14(3): 239.
https://doi.org/10.3390/jpm14030239
12. Ferries-Rowe E, Corey E, Archer JS. Primary dysmenorrhea: diagnosis and therapy. Obstetrics & Gynecology 2020; 136(5): 1047-58.
https://doi.org/10.1097/AOG.0000000000004096
13. Vincenzo De Sanctis M, Soliman A, Bernasconi S, et al. Primary dysmenorrhea in adolescents: prevalence, impact, and recent knowledge. Pediatric Endocrinology Reviews (PER) 2015; 13(2): 465-73.
14. Beiske A, Loge J, Rønningen A, Svensson E. Pain in Parkinson's disease: prevalence and characteristics. Pain 2009; 141(1-2): 173-7.
https://doi.org/10.1016/j.pain.2008.12.004
15. Doga M, Bonadonna S, Gola M, Mazziotti G, Giustina A. Growth hormone deficiency in the adult. Pituitary 2006; 9(4): 305-311.
https://doi.org/10.1007/s11102-006-0410-y
16. Dai M, Bai M, Chen Y, Li J, Wan T, Jiang H. Application of Comprehensive Pelvic Floor Rehabilitation Therapy in Congestion Syndrome with Pelvic Oblique: A Case Report. Alternative Therapies in Health and Medicine 2024; 30(10): 59-65.
17. Giagio S. Musculoskeletal disorders, research quality, and pelvic floor health in sports: exploring current evidence and new perspectives. Amsdottorato 2024.
https://doi.org/10.48676/unibo/amsdottorato/11175
18. Fiani B, Sekhon M, Doan T, et al. Sacroiliac joint and pelvic dysfunction due to symphysiolysis in postpartum women. Cureus 2021; 13(10): e18619.
https://doi.org/10.7759/cureus.18619
19. Wójcik M, Jarząbek-Bielecka G, Merks P, et al. Visceral therapy and physical activity for selected dysfunctions, with particular emphasis on locomotive organ pain in pregnant women-Importance of reducing oxidative stress. Antioxidants 2022; 11(6): 1118.
https://doi.org/10.3390/antiox11061118
20. Ginis KAM, van der Ploeg HP, Foster C, et al. Participation of people living with disabilities in physical activity: a global perspective. The Lancet 2021; 398(10298): 443-55.
https://doi.org/10.1016/S0140-6736(21)01164-8
21. Filbay SR, Skou ST, Bullock GS, et al. Long-term quality of life, work limitation, physical activity, economic cost and disease burden following ACL and meniscal injury: a systematic review and meta-analysis for the OPTIKNEE consensus. British Journal of Sports Medicine 2022; 56(24): 1465-74.
https://doi.org/10.1136/bjsports-2022-105626
22. Ghali A, Lacombe V, Ravaiau C, et al. The relevance of pacing strategies in managing symptoms of post-COVID-19 syndrome. Journal of Translational Medicine 2023; 21(1): 375.
https://doi.org/10.1186/s12967-023-04229-w
23. Po-Ching Huang, Hung-Ching Wu, Ji-Kang Chen, et al. The mediating role of physical activity avoidance in the association between weight stigma and physical activity. Acta Psychologica 2025; 257: 105107
https://doi.org/10.1016/j.actpsy.2025.105107
24. Sima R-M, Sulea M, Radosa JC, et al. The prevalence, management and impact of dysmenorrhea on medical students' lives - A multicenter study. Healthcare 2022; 10(1): 157.
https://doi.org/10.3390/healthcare10010157
25. Franco-Antonio C, Santano-Mogena E, Cordovilla-Guardia S. Dysmenorrhea, Premenstrual Syndrome, and Lifestyle Habits in Young University Students in Spain: A Cross-Sectional Study. Journal of Nursing Research 2025; 33(1): e374.
https://doi.org/10.1097/jnr.0000000000000657
26. Ghorat F, Mosavat SH, Hadigheh S, et al. Prevalence of complementary and alternative medicine use and its associated factors among Iranian diabetic patients: a cross-sectional study. Current Therapeutic Research 2024; 100: 100746.
https://doi.org/10.1016/j.curtheres.2024.100746
27. Alorani OI, Erkir S, Rababa'h SY, et al. English Language Teachers' Perspectives on Technological Applications Used for Students With Disabilities. Journal of Language Teaching and Research 2025; 16(1): 168-79.
https://doi.org/10.17507/jltr.1601.18
28. Tosun B, Uysal N. Examination of oral health

quality of life and patient satisfaction in removable denture wearers with OHIP-14 scale and visual analog scale: a cross-sectional study. BMC Oral Health 2024; 24(1): 1353. https://doi.org/10.1186/s12903-024-05124-6

29. Rejeki S, Pranata S, Yanto A, Wahyuni S. Complementary therapies and factors related to dysmenorrhoea in adolescents: a bibliometric analysis. Scripta Medica 2024; 55(1): 85-95. https://doi.org/10.5937/scriptamed55-45880