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ORIGINAL ARTICLE

Association between Sacroiliac Joint Dysfunction and Dysmennorhea: A Cross-sectional study

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ABSTRACT

Background
Pelvic pain during menstruation is a common issue for young females, significantly affecting daily activities and quality of life. Sacroiliac joint issues can contribute to pain experienced in lower back and pelvic areas. Hormonal changes during menstruation may weaken ligamentous support around this joint, increasing the risk of instability. Additionally, anatomical differences in females may contribute to higher rates of sacroiliac joint misalignment. Accurate diagnosis and treatment are essential, as misdiagnosis can perpetuate discomfort and negatively impact well-being. Addressing these issues is vital for improving health outcomes for women experiencing menstrual distress.

Methods
Non-probability sampling technique is used, where 314 females participated ranging between 17-24 years. Participants had to fill in a questionnaire, named Medi-Q to assess their level of dysmenorrhea, after which they were tested for SIJ Dysfunction through a series of tests called cluster of Laslett. SPSS version 16.0 was used to analyze data.

Results
The participants who had menstrual distress showed significantly positive sacroiliac joint dysfunction indicating a strong correlation of joint dysfunction with menstrual distress, when associated with the participants who didn't experience menstrual distress.

Conclusion
There could possibly be a connection between sacroiliac joint dysfunction and menstrual distress, given the notable difference in sacroiliac joint dysfunction between individuals who reported menstruation distress and those who did not. In addition to advancing our knowledge of the variables affecting menstruation health, further investigation and study of this relationship may pave the path for specialized treatments or therapies.

Keywords
Dysmenorrhea, sacroiliac joint, dysfunction, menstrual distress, pelvic pain, female population.

LAYMAN SUMMARY

This study examines the relationship between sacroiliac joint (SIJ) dysfunction and menstrual distress in young women. Many women experience pelvic pain during menstruation, which can greatly affect their daily activities and overall well-being. The SIJ, located in the lower back and pelvis, can cause pain if it is not functioning properly.Hormonal fluctuations during menstruation may contribute to ligament laxity around the sacroiliac joint, possibly resulting in joint instability. Additionally, differences in female pelvic anatomy may increase the likelihood of SIJ misalignment, contributing to pain. The study involved 314 women aged 17-25, who were divided into two groups: those with menstrual distress and those without. The researchers used a questionnaire to assess the severity of menstrual symptoms and conducted clinical tests to check for SIJ dysfunction. The findings suggest a strong connection between SIJ dysfunction and menstrual pain, with women who reported menstrual distress also showing signs of SIJ issues. In conclusion, the study indicates that SIJ dysfunction may contribute to the severity of menstrual distress. This highlights the importance of understanding how musculoskeletal issues like SIJ dysfunction may impact menstrual health. The findings suggest that further research is needed to explore this connection in more detail and develop targeted treatments for women suffering from both conditions.

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INTRODUCTION

Background

A disorder known as sacroiliac joint dysfunction affects the joint, which is situated in the pelvis between the sacrum and the ilium bones [1]. The sacroiliac joint, a diarthrodial structure, plays a crucial role in stabilizing the body by transferring loads from the spine to the lower limbs. Pain and dysfunction in this joint often stem from inflammation, abnormal movement, or instability. Localized pain in the lower back, buttocks, and hips that may spread down to the thighs and groin can be brought on by joint dysfunction [2] Due to the anatomical position of sacroiliac joint that is located in close proximity to reproductive organs [3], the dysfunction of the sacroiliac joint may cause dysmenorrhea. Dysmenorrhea (menstrual distress) [4] is the medical term for painful menstrual periods. It is known for abdominal pain that feels cramp-like and comes either before or during menstruation. From mild to severe, the pain may come with additional symptoms like nausea, headaches, and back discomfort. The physiological basis of menstrual distress is well-established and involves an increase in uterine activity that reduces blood flow, as well as an association between prostaglandin and vasopressin hormones and menstrual distress [5]. Menstrual discomfort is caused by the endometriosis contracting too much and the uterus's internal pressure rising as a result of excessive prostaglandin releases.

Rationale of the Research

Menstrual distress affects around 45-95 percent of women during their reproductive years [5]. Menstrual distress related pain and discomfort can be crushing and severely physically uncomfortable. From mild to severe, this pain can hinder daily tasks, work, and exercise. Additionally, it may cause exhaustion and an overall decrease in energy [6]. The SI joint is located in close proximity to the reproductive organs and shares common neural pathways. The Sacroiliac joint, uterus, and other structures all have strong anatomical relationships, which raises the prospect of neurophysiological connections between menstrual distress and sacroiliac joint. In order to reduce pain, people with sacroiliac joint dysfunction may adopt compensatory postures or motions.

These compensatory adjustments may have an impact on pelvic mechanics and may be a factor in the discomfort and tension that are experienced during menstruation. According to research, a study was conducted in which all subjects had three motion palpation procedures performed by examiners to ascertain sacroiliac joint function or dysfunction. Menstrual distress Questionnaire (MDQ) was used to detect dysmenorrhea. Dysmenorrhea and dysfunction of sacroiliac joint motion palpation was found to be strongly correlated [7].

In 2016, research was conducted in which based on the results of a pain evaluation using the Visual Analogue Scale (VAS) and a menstrual distress questionnaire (MDQ), the study categorized participants based on the presence or absence of dysmenorrhea. The comparison between the two groups revealed a distinct difference in pelvic torsion, implying that menstrual discomfort may be related to alterations in pelvic alignment.

Objectives of the Research

- Explore the potential relationship between sacroiliac joint dysfunction and menstrual pain, examining how pelvic biomechanics may influence dysmenorrhea to improve patient care and overall well-being.
- Assess the need for collaboration between gynecologists, orthopedic specialists, and physiotherapists to create targeted, non-invasive treatment approaches with minimal side effects for managing dysmenorrhea.
- Identify at-risk individuals, propose preventive measures such as targeted exercises and lifestyle modifications, and empower individuals through education while addressing the stigma surrounding painful menstruation.

MATERIALS AND METHODS

Study design and study setting

This cross sectional study extended over three months from September to November 2023. It was conducted at the Sindh Institute of Physical Medicine and Rehabilitation, a public sector rehabilitation facility located in Karachi, Sindh, Pakistan.

Study population

This study was conducted on young females aged 17-25, with a sample size of 314.

Sample size estimation:

The sample size was 314 and it was calculated through open EPI version 3.01. Its frequency is 71.4 % and 5% margin of error along with a 95% confidence.

Sampling technique

This cross-sectional study employed non-probability sampling.

Data collection tool

A questionnaire named **Medi Q** was used to identify patients with Dysmenorrhea

The questionnaire comprised of 2 parts:

- Inquiring if participants face certain symptoms at different points in their menstrual cycle
- Further asking to what extent they face these symptoms and if they intervene in their ADLs and recreational activities.

A group of tests were used to identify Sacroiliac joint dysfunction. This group of assessments, known as the Laslett Cluster, comprises the distraction test, thigh thrust test, compression test, and sacral thrust test.

Method of Data collection

Study duration was of three months after the approval of synopsis. Data was collected from those female students who fulfilled the inclusion criteria. A consent form was given to students prior to the questionnaire and application of tests. A total of 314 women participated in this study. The participating population was then divided into two equal groups of 157 participants each. Participants were categorized into two groups based on their total Medi-Q scores: those falling within the positive range, indicating the presence of menstrual distress, and those within the negative range, suggesting its absence. Each participant filled the Medi-Q (menstrual distress questionnaire) and was tested for Sacroiliac joint dysfunction simultaneously. Afterwards, menstrual distress and sacroiliac joint dysfunction in both groups was correlated.

Quality control measures adopted during data collection and data analysis

Married females, or those who had manipulative treatments one month prior to the study were excluded. Females who had any diagnosed gynecological problems or diseases of the uterus, or were on any kind of medication (other than OTC painkillers) were also not a part of the sample population.

Data Analysis

Data was analysed with SPSS version 20. Frequencies and percentages for all categorical variables was calculated. The Chi-square test was applied as a test of significance to find an association between the two categorical variables. Statistical significance was determined at a threshold of $P < 0.05$.

- **Descriptive Statistics:** The average age of the participants was 22.19 years, with a standard deviation of 1.611
- **Statistical Tests:** The chi square test was applied as a test of significance to find out the association between categorical variables such as dysmenorrhea and non-dysmenorrhea.
- **Inferential Statistics:** A P- value less than 0.05 was considered significant

Ethical approval and ethical considerations

This research was approved by the institutional review board of Sindh Institute of Physical Medicine and Rehabilitation on 30th December 2023 with the reference number SIPM&R/IRB/2023/29. The study's purpose was thoroughly explained to all participants and written consent was taken by them/their guardians (in the case of the participant being a minor). The principal of patient privacy was observed by having information obtained by the participants regarding their menstrual cycles and SIJ dysfunction status kept confidential with only the researchers having access to the forms and test results. The privacy and comfort of all subjects was ensured before conducting physical testing.

RESULTS

Demographic Characteristics of the participants

This study associated and analyzed the sacroiliac joint dysfunction of 157 subjects who had menstrual pain and 157 subjects who did not. Equal number of subjects were taken in each group, on the basis of menstrual distress. Participants aged between 17 and 25 years were included in the study, with the average age recorded as 22.19 years.

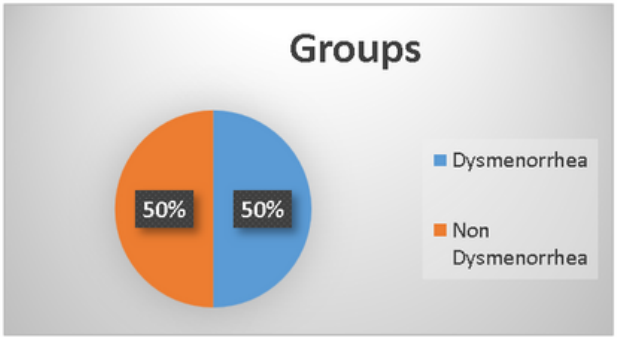
Major findings

The subjects with menstrual distress showed 36% positive sacroiliac joint dysfunction with a statistically significant figure of 0.000 ($p<0.05$). The subjects with no menstrual distress indicated 3% positive joint dysfunction with no significant difference.

Objective specific findings

The results show that subjects with menstrual distress on average had sacroiliac joint dysfunction meanwhile the subjects who did not have menstrual distress showed no significant joint dysfunction.

Figure-1: Distribution of participants in each group

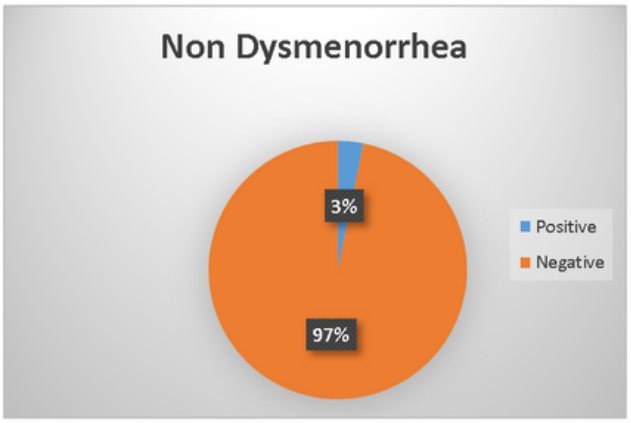


The charts showing equal distribution of partcipants in each group.
· Blue indicates participants with dysmenorrhea .
· Orange indicates participants with no dysmenorrhea.

Table-1: Group of participants

		Frequency	Percent
Valid	dysmenorrhea	157	50.0
	non dysmenorrhea	157	50.0
	Total	314	100.0

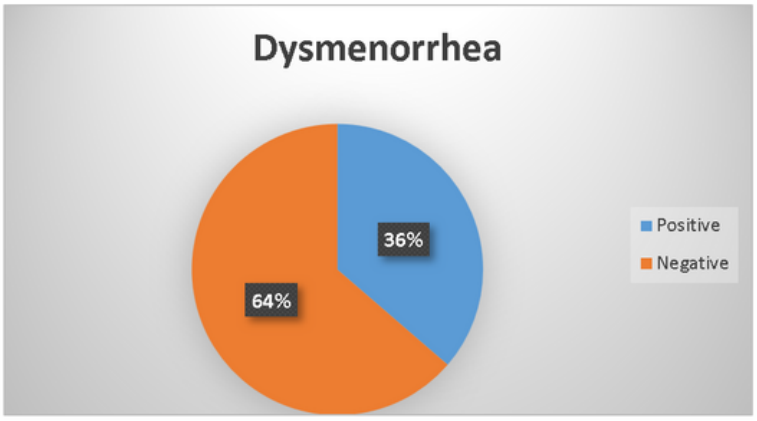
Figure-1: Percentage of abnormal and normal sacroiliac joint among the non- dysmenorrhea group.



The chart displays the percentage of abnormal sacroiliac joint as 3% in the participants who didn't experience dysmenorrhea, meanwhile 97% normal joint function in the same participants.

- Blue indicating abnormal joint function
- Orange indicating normal joint function.

Figure-2 Percentage of abnormal and normal sacroiliac joint among the dysmenorrhea group.



The chart below displays the percentage of normal sacroiliac joint as 36% in the participants who had dysmenorrhea, meanwhile 63.60%, 64% of normal joint function in the same participants.

- Blue indicating abnormal joint function
- Orange indicating normal joint function.

Table no.2 Sacroiliac joint dysfunction,positive indicating an abnormal sacroiliac joint and negative indicating a normal sacroiliac joint.

Valid	Positive	62	19.7
	Negative	252	80.3
	Total	314	100.0

Table no.3 Mean Age of participants

Descriptive Statistics

	N	Mean	Std. Deviation
age of participants	314	22.19	1.611
Valid N (list wise)	314		

Table no.4 Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
GROUPS * SIJDYSFUNCTION	314	100.0%	0	.0%	314	100.0%

Table no.5 GROUPS * SIJDYSFUNCTION Cross tabulation

Count				
		SIJDYSFUNCTION		
		positive	negative	Total
GROUPS	dysmenorrhea	57	100	157
	non dysmenorrhea	5	152	157
Total		62	252	314

Table no.6 Association of sacroiliac joint dysfunction and dysmenorrhea between groups.

Pearson Chi-Square	54.343[a]	1	.000	.000	.000	
Continuity Correction	52.273	1	.000			
Likelihood Ratio	61.995	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	54.170[b]	1	.000	.000	.000	.000
N of Valid Cases	314					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.00.

b. Computed only for a 2x2 table

DISCUSSION

The subjects who had menstrual distress had a statistically significant sacroiliac joint dysfunction. The lumbosacral vertebrae's aberrant restriction of movement causes an increase in body fluid in the pelvis and uterine contraction, which exacerbates the pain experienced by women while menstruating [8]. Likewise, women who displayed sacroiliac joint dysfunction also reported higher levels of menstrual distress. One explanation for this could be that the pelvic imbalance caused the uterus to shift in position, which in turn caused an overabundance of prostaglandin to be released. Women experiencing severe pain during menstruation saw a reduction in pain when their spinal alignment was restored to normal [9]. This was possibly due to an abnormal state of the sacroiliac joint eliciting an imbalance in the amounts of the hormones, oxytocin and prostaglandin. The intricate interactions that occur between the neurological system and the musculoskeletal system may provide one explanation. It is well known that the impression of pelvic pain is influenced by the sacral nerves, which are connected to the sacroiliac joint. Dysregulation in this area may be a factor causing increase in menstrual distress. Additionally, it is also reported according to a study that in women with menstrual disorders, sympathetic activity greatly increased and parasympathetic activity dramatically decreased during the late luteal phase [10]. According to a different study, compared to the luteal phase, healthy women exhibited more parasympathetic nerves in the early to middle follicular stages of the menstrual cycle. This is regarded as sympathetic hyperactivity, and it is thought that the autonomic imbalance increases with the severity of dysmenorrhea [11]. Therefore, it's our opinion that subjects who had positive sacroiliac joint dysfunction had menstrual pain because their spinal alignment was maladjusted. Also, the subjects with dysfunction had a high rate of pain, respectively 36%.

Study strengths and limitations

This research will serve as a primary research on the association between dysmenorrhea and SIJ dysfunction, which is quite an untapped topic in Pakistan. There are certain significant limitations to this study, as demographic factors of the subjects have not been taken into account, and this augments further studies.

FUTURE RESEARCH IMPLICATIONS

Future research should include the following:

• Investigation on how sacroiliac joint dysfunction affects menstrual distress through pelvic biomechanics and shared neural pathways, identifying potential diagnostic markers and treatment targets.

• Evaluating the effectiveness of physiotherapy, pain management, and integrated care involving gynecologists and orthopedic specialists, while also assessing long-term treatment outcomes.

• Future research should account for limitations of this study by incorporating demographic variables such as height, weight, exercise habits, and lifestyle routines to better understand their influence on sacroiliac joint dysfunction and menstrual distress.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the results show that there was a significant difference in sacroiliac joint dysfunction between subjects who had menstrual pain and subjects who did not. This indicates that there is an effect of sacroiliac joint dysfunction on menstrual distress.

SUPPORTING INFORMATION

File 1: https://www.tandfonline.com/doi/epdf/10.1080/09513590.2023.2227275?needAccess=true

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AUTHORS CONTRIBUTIONS

Conceptualization: UF, DJ, MS, KI, U
Data Curation: MS, KI, U, UF, DJ
Formal Analysis: AA
Funding Acquisition: Nil
Investigation: UF, DJ, MS, U, KI
Methodology: UF, DJ, MS, U, KI
Project Administration: AA, UF, DJ, MS, U, KI
Resources: Nil
Software: Nil
Supervision: AA
Validation: -
Visualization: DJ, UF, KI, MS, U
Writing – Original Draft Preparation: UF
Writing – Review & Editing: DJ
AA: Ambreen Asghar; **DJ:** Duaa Javed; **UF:** Urooj Fatima; **KI:** Khadijah Irfan; **U:** Uroosa; **MS:** Maheen Siddiqui

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Key messages

- SIJ dysfunction may contribute to pelvic instability and referred pain, which can overlap with symptoms commonly experienced during dysmenorrhea.
- Women with chronic pelvic or low back pain are more likely to show signs of SIJ dysfunction, suggesting a potential link between musculoskeletal alignment and menstrual discomfort.
- Studies have indicated that manual therapy targeting the SIJ can reduce pain and improve autonomic balance in individuals with primary dysmenorrhea.
- Research highlights the shared neural pathways between the pelvic organs and lumbosacral structures, supporting the idea that SIJ misalignment could exacerbate menstrual pain through somato-visceral reflexes

What does this study adds to the current literature

- Bridges a gap in local data by exploring the SIJ-dysmenorrhea link in a South Asian population, where such research is limited.
- Highlights the clinical importance of musculoskeletal assessment in cases of unexplained menstrual pain, suggesting a broader role for physiotherapists in women's health.
- Supports conservative manual therapy as a potential intervention to alleviate dysmenorrhea symptoms, reducing reliance on pharmacological treatment alone.
- Strengthens the multidisciplinary approach to managing menstrual health by emphasizing the interconnectedness of orthopedic and gynecological factors.