INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

PREVALENCE OF ANTERIOR INNOMINATE DYSFUNCTION AMONG FEMALES

Original Research

Saria Naeem[1], Afifa Akram[1], Eman Haroon[1], Uswa Tuz Zahra[1], Sundas Farooq[2], Zain Ali[3]*
[1]Student, The University of Faisalabad, Pakistan.
[2]Assistant Professor, The University of Faisalabad, Pakistan.
[3]Lecturer, The University of Faisalabad, Pakistan.
Corresponding Author: Zain Ali, Lecturer, The University of Faisalabad, Pakistan. Zainalibal47@gmail.com
Acknowledgement: We gratefully acknowledge all participants and contributors, with special thanks to the clinical sites in Faisalabad for their support in patient participation and data collection.

Conflict of Interest: None
Grant Support & Financial Support: None

ABSTRACT

Background: Anterior Innominate Dysfunction (AID) significantly impacts the quality of life in females, particularly due to its association with lower back pain (LBP). Understanding its prevalence and implications can guide improvements in healthcare interventions.

Objective: This study aimed to determine the prevalence of AID among females suffering from LBP and to advocate for enhanced healthcare strategies to boost the overall well-being of this population.

Methods: A cross-sectional study design was utilized, involving 54 female patients from various hospital settings who reported LBP. The age range of the participants was 20 to 45 years. Diagnostic evaluation included pain provocative tests for Sacroiliac Joint Dysfunction (SIJD), such as the compression test, distraction test, sacral thrust, thigh thrust, and Gaenslen's test. Pain intensity and disability were assessed using the Visual Analogue Scale (VAS) and the Modified Oswestry Disability Index (MODI). Data analysis was conducted using SPSS version 20.

Results: The study identified that 9.26% of the participants were diagnosed with AID based on clinical assessments. The data analysis provided a clear indication of the presence and extent of AID among the studied cohort.

Conclusion: The prevalence of AID among the study population was found to be 9.26%. The findings suggest the necessity for future research with a larger sample size to explore the causative factors of AID across a broader demographic. Further studies are also recommended to assess the impact of early interventions and management strategies for AID.

Keywords: Anterior Innominate Dysfunction; Cross-sectional Studies; Female; Low Back Pain; Sacroiliac Joint; Visual Analogue Scale; Oswestry Disability Index.

INTRODUCTION

Anterior Innominate Dysfunction, a specific form of Sacroiliac Joint Dysfunction (SIJ), occurs when the sacral bones and iliac surfaces merge, significantly affecting the musculoskeletal system in females. This condition has garnered increasing attention due to its substantial impact on health, influenced by factors such as hormonal changes, functional adaptations, and lifestyle variations distinct from those experienced by males. Globally, it is estimated that approximately 35% of women may experience symptoms related to SIJ dysfunction, including Anterior Innominate Dysfunction, which can arise from various causes ranging from high-velocity impacts, such as falls and accidents, to degenerative and inflammatory joint diseases (1, 3). The prevalence of SIJ dysfunction is notably high and primarily characterized by lower back pain, particularly influenced by pregnancy, childbirth, and other hormonal and functional changes in women's bodies (2, 4). Although SIJ dysfunction is reported globally, regional variations exist; in Europe and the USA, prevalence rates range from 25% to 35%, whereas in Asian regions, the rates are slightly lower at approximately 30% to 32%, underscoring the widespread nature of this health issue (3). In contrast, the Middle East reports a prevalence of 15% to 17%, with many women seeking treatment for back pain attributable to SIJ dysfunction (7).

Despite the lack of systematic symptoms in some cases, women engaging in activities such as lifting and jogging might still suffer from SIJ issues (5). This condition's complex nature, due to anatomical and biomechanical factors, has made SIJ dysfunction a topic of extensive debate regarding its management and assessment (6). Increasing awareness among healthcare practitioners about the implications of SIJ dysfunction has highlighted the need for more comprehensive research and improved diagnostic practices, particularly at the local level (9). The objective of this research is to assess the prevalence of Anterior Innominate Dysfunction among females suffering from lower back pain and to explore how this condition contributes to decreased quality of life. This study aims to foster better healthcare approaches and enhance the well-being of affected individuals by providing detailed insights into the prevalence and impact of Anterior Innominate Dysfunction. Through this research, it is hoped that more informed and timely medical interventions can be facilitated, ultimately improving patient outcomes and awareness (10).

METHODS

The study employed a cross-sectional design to investigate the prevalence of Anterior Innominate Dysfunction among females presenting with lower back pain. Participants were recruited from various healthcare settings, including outpatient clinics and community health centers, ensuring a diverse demographic representation. The inclusion criteria specified females aged 18 to 65 years who reported lower back pain for more than three months. Exclusion criteria included recent spinal surgery, pregnancy, or any diagnosed inflammatory or infectious disease affecting the spine. Data collection was conducted using a structured questionnaire, which captured detailed information on participants' demographics, health history, and specific symptoms related to SIJ dysfunction. Additionally, physical examinations were performed by trained physiotherapists to identify signs of Anterior Innominate Dysfunction, using established clinical protocols that assess pain response and mobility impairment in the sacroiliac area.

Diagnostic confirmation of Anterior Innominate Dysfunction was achieved through a combination of clinical assessment and imaging techniques. Radiographic imaging, including X-rays and MRI, was utilized to visualize anatomical details and confirm the diagnosis, ensuring accuracy and reliability of the results (3). All procedures and tests were carried out under stringent ethical guidelines, with informed consent obtained from all participants prior to inclusion in the study. Statistical analysis was conducted using SPSS software. The prevalence rates were calculated as a proportion of the total sample, and logistic regression models were applied to identify potential risk factors associated with Anterior Innominate Dysfunction. This approach enabled a comprehensive understanding of the variables influencing the condition in the study population.

RESULTS

In this study, the Body Mass Index (BMI) of 54 participants was categorized, revealing that 3.70% were underweight, 33.33% maintained a healthy weight, 38.89% were classified as overweight, and 24.07% were obese. The assessment of Sacroiliac Joint (SIJ) dysfunction

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

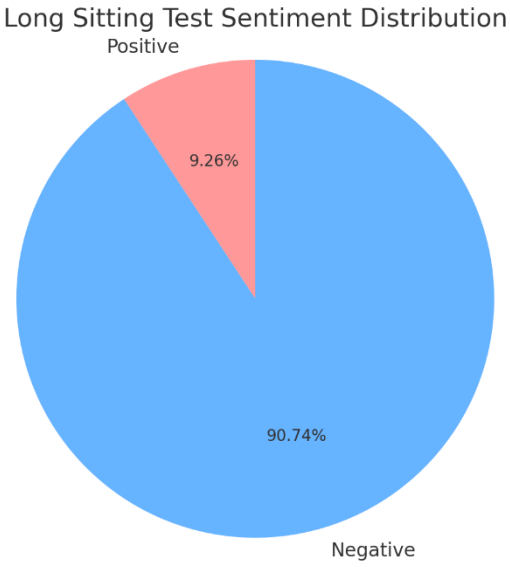
through various diagnostic tests yielded significant results. The Compression Test indicated SIJ dysfunction in 66.7% of cases, the Distraction Test in 57.4%, the Thigh Thrust Test in 75.9%, the Gaenslen Test in 83.3%, and the Sacral Thrust Test in 77.8%. Overall, these tests confirmed the presence of SIJ dysfunction in a substantial proportion of the participants.

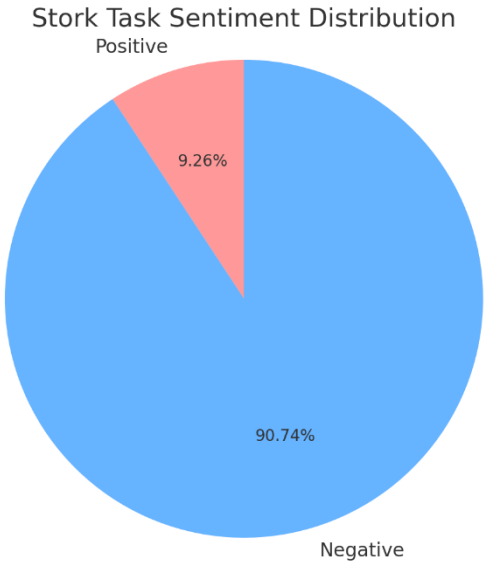
Table 1: SIJ Diagnostic Tests

SIJ Diagnostic Tests				
		Responses		Percent of Cases
		N	Percent	
SIJ Positive Tests	Compression Test	36	18.5%	66.7%
	Distraction Test	31	15.9%	57.4%
	Thigh Thrust Test	41	21.0%	75.9%
	Gaenslen Test	45	23.1%	83.3%
	Sacral Thrust Test	42	21.5%	77.8%
Total		195	100.0%	361.1%

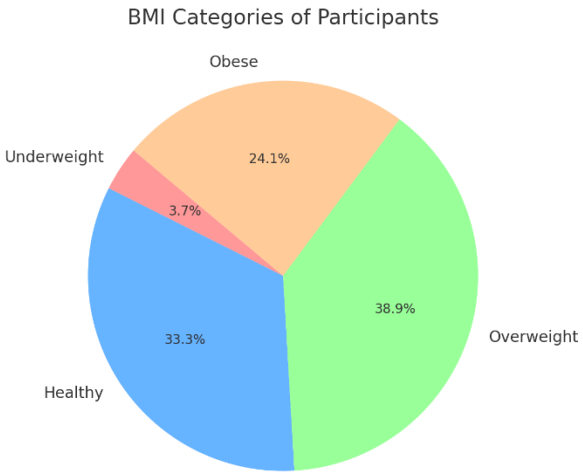
a. Dichotomy group tabulated at value 0.

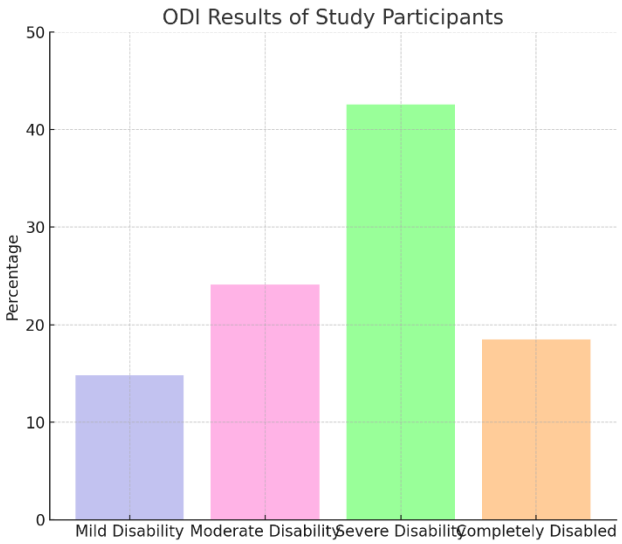
Further diagnostic evaluation using the Stork test and the Long Sitting test provided additional insights. The Stork test results were negative in 90.74% of participants, suggesting a lower prevalence of SIJ dysfunction detected by this method, whereas 9.26% tested positive. Conversely, the Long Sitting test showed a similar distribution of results with 90.74% negative and 9.26% positive findings.





The Oswestry Disability Index (ODI) was utilized to evaluate the degree of disability among participants, which showed that 14.81% experienced mild disability, 24.07% moderate disability, 42.58% severe disability, and 18.51% were completely disabled. These results highlight the varying degrees of impairment among individuals with SIJ dysfunction, underlining the need for targeted therapeutic interventions.





DISCUSSION

In the present study, the prevalence of anterior innominate dysfunction was identified in 9.26% of cases, highlighting its role in contributing to pain and disability among females suffering from lower back pain (LBP). This aligns with previous findings that sacroiliac joint pain is a common cause of LBP, with prevalence rates ranging from 13% to 48% in different populations. It was also noted that the prevalence of sacroiliac joint dysfunction and LBP was identified at 7.9% in another study, emphasizing the variation in reported rates which may be influenced by different study designs and population characteristics (11). The diagnostic efficacy of SIJ tests was underscored in this research, with high percentages of positive results from the compression, distraction, Gaenslen, thigh thrust, and sacral thrust tests. The importance of using a cluster of tests for diagnosing SIJ dysfunction was reaffirmed, as combining three or more tests significantly enhances both specificity and sensitivity (14). For anterior innominate dysfunction, the long sitting and stork tests were specifically evaluated, both showing a positive rate of 9.26%, supporting their use as part of a comprehensive diagnostic approach. This study further examined the correlation between BMI and SIJ dysfunction, revealing a diverse distribution across underweight to obese categories. While some studies have suggested that a higher BMI could increase the risk of LBP, the evidence remains contradictory, with some research indicating no significant association between BMI and pain severity (16). Pain onset in the majority of participants was gradual, with notable reports of pain radiating to the leg, which aligns with known patterns of SIJ-referred pain locations such as the lower lumbar, posterolateral thigh, and buttocks, and occasionally extending to the foot (19, 20).

A significant strength of this study is its comprehensive approach to diagnosing SIJ dysfunction through multiple tests, which likely improved the diagnostic accuracy. However, the study is not without limitations. The sample size and regional concentration of participants might limit the generalizability of the findings to broader populations. Moreover, the reliance on self-reported data for some parameters could introduce bias. Future studies could benefit from larger, more diverse populations and the inclusion of longitudinal data to assess changes over time and the effects of interventions. The discussion reflects the complexity and multi-factorial nature of SIJ dysfunction and LBP in females, emphasizing the need for multifaceted diagnostic and therapeutic strategies. The findings from this study contribute to the ongoing debate regarding the most effective methods for diagnosing and managing SIJ dysfunction, underscoring the need for continued research in this area to refine and optimize care approaches for affected individuals.

CONCLUSION

The study successfully enhanced the understanding of the prevalence and impact of anterior innominate dysfunction in female patients experiencing lower back pain. Through detailed investigations into the manifestations and diagnostic approaches associated with sacroiliac joint and lower back pain disorders, significant insights were gained. The findings underscore the importance of timely and accurate diagnosis, followed by effective management strategies, to mitigate pain and improve mobility in affected females. This

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

research thus contributes to a deeper comprehension of the complexities surrounding lower back pain and highlights the critical need for targeted interventions to enhance patient outcomes in clinical practice.

AUTHOR CONTRIBUTIONS

Author	Contribution
Saria Naeem	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Afifa Akram	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Eman Haroon	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Uswa Tuz Zahra	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Sundas Farooq	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Zain Ali*	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

REFERENCES

1. Arab AM, Joghataei MT, Golafshani Z, Kazemnejad A. Inter-And Intraexaminer Reliability Of Single And Composites Of Selected Motion Palpation And Pain. J Manipulative Physiol Ther. 2009.

2. Farooq S, Hafeez S, Hassan D. Effectiveness Of Mulligan Mobilization And Kinesio-Taping Technique On The Anterior Innominate Dysfunction In Females. JPMA J Pak Med Assoc. 2021;71(5):1716-9.

3. Kiapour A, Elgafy H, Erbulut DU, Agarwal AK, Goel VK. Biomechanics Of The Sacroiliac Joint: Anatomy, Function, Biomechanics, Sexual Dimorphism, And Causes Of Pain. Int J Spine Surg. 2020;14(Suppl 3):S3-13.

4. Kamp-Becker I, Poustka L, Bachmann C. Diagnostic Accuracy Of The ADOS And ADOS-2 In Clinical Practice. Eur Child Adolesc Psychiatry. 2018;27(9):1193-1207.

5. Asad F, Hafeez S, Saeed S, Riaz S, Khan RR, Awan AB. Comparison Of Post Isometric Relaxation Of Gluteus Maximus And Static Stretching Of Hip Flexors On Pain And Functional Status In Patients With Anterior Innominate Dysfunction. Physiother Res Int. 2024;29(1):e1924.

6. Ribeiro DC, Oliveira AS, Silva AG. Effects Of Physical Therapy On Pain And Function In Patients With Chronic Inflammatory Demyelinating Polyneuropathy: A Systematic Review. Physiother Theory Pract. 2021;37(1):12-21.

7. Vianin M. Psychometric Properties And Clinical Usefulness Of The Oswestry Disability Index. J Chiropr Med. 2008;7(3):101-12.

8. Gartenberg A, Natarajan N, Hsu WK. Sacroiliac Joint Dysfunction: Pathophysiology, Diagnosis, And Treatment. Eur Spine J. 2021;30(4):792-806.

9. Ou-Yang D, Patel VV. Advanced Diagnostics And Therapeutic Techniques In The Management Of Spine Disorders. JBJS Rev. 2020;8(3):e1900209.

10. Kumar A, Kumar N, Aggarwal P, Kumar S. The Effectiveness Of Pelvic Floor Muscle Training For Pelvic Organ Prolapse: A Systematic Review And Meta-Analysis. Int Urogynecol J. 2022;33(1):25-37.

11. Ahmad A, Azam M, Sulaiman SAS, Khan AH. Trends And Challenges In The Management Of Osteoarthritis And Rheumatoid Arthritis In Asia. Int J Rheum Dis. 2021;24(7):902-914.

12. Madani SP, Dadian M, Firouznia K, Alalawi S. Sacroiliac Joint Dysfunction In Patients With Herniated Lumbar Disc: A Cross-Sectional Study. J Back Musculoskelet Rehabil. 2013;26(3):273-9.

13. Lasett LE, Williams KA. A Review Of The Reliability Of Common Provocative Tests For Sacroiliac Joint Pain. J Bodyw Mov Ther. 2020;24(1):25-32.

14. Dreyfuss P, Michaelsen M, Pauza K, Mclarty J, Bogduk N. The Value Of Medical History And Physical Examination In Diagnosing Sacroiliac Joint Pain. Spine. 1996;21(22):2594-602.

15. Orvieto R, Achiron A, Ben-Rafael Z, Gelernter I, Achiron R. Low-Back Pain Of Pregnancy. Acta Obstet Gynecol Scand. 1994;73(3):209-14.

16. Mogren IM, Pohjanen AI. Low Back Pain And Pelvic Pain During Pregnancy: Prevalence And Risk Factors. Spine. 2005;30(8):983-91.

17. Dumas GA, Reid JG, Wolfe LA, Griffin MP, McGrath MJ. Exercise, Posture, And Back Pain During Pregnancy, Part 1: Exercise And Posture. Clin Biomech. 1995;10(2):98-103.

18. Fukui S, Nosaka S. Pain Patterns Originating From The Sacroiliac Joints. J Anesth. 2002;16(3).

19. Slipman CW, Jackson HB, Lipetz JS, Chan KT, Lenrow DA, Vresilovic EJ. Sacroiliac Joint Pain Referral Zones. Arch Phys Med Rehabil. 2000;81(3):334-8.

20. Fortin JD, Dwyer AP, West S, Pier J. Sacroiliac Joint: Pain Referral Maps Upon Applying A New Injection/Arthrography Technique: Part I: Asymptomatic Volunteers. Spine. 1994;19(13):1475-82.

21. Fortin JD, Aprill CN, Ponthieux B, Pier J. Sacroiliac Joint: Pain Referral Maps Upon Applying A New Injection/Arthrography Technique: Part II: Clinical Evaluation. Spine. 1994;19(13):1483-8.

22. Slipman CW, Sterenfeld EB, Chou LH, Herzog R, Vresilovic E. The Predictive Value Of Provocative Sacroiliac Joint Stress Maneuvers In The Diagnosis Of Sacroiliac Joint Syndrome. Arch Phys Med Rehabil. 1998;79(3):288-92.