



Cross-Sectional Analysis of Joint Hypermobility in Women with Endometriosis

Gauri Rani¹, Avinash Kumar²

¹Senior Resident, Department of Obst & Gynaecology, MGM Medical College and LSK Hospital Kishanganj Bihar

²Senior Resident, Department of Orthopaedic, MGM Medical College and LSK Hospital Kishanganj Bihar

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KEYWORDS

Beighton score, cross-sectional study, endometriosis, joint hypermobility, musculoskeletal manifestations.

Abstract

Background: Joint hypermobility is currently considered a symptom of endometriosis, but its prevalence and relationship to disease severity are unknown. This cross-sectional study compares current literature and other studies to evaluate joint hypermobility among endometriosis stages.

Methods: One hundred endometriosis patients from Territory Care Hospital participated. Surgery determined endometriosis stage, which was classified using ASRM. A joint was hypermobile if its hypermobility score was 4 or greater. Descriptive statistics and chi-square tests were used for demographic and clinical data analysis.

Results: In stages I, II, and IV endometriosis, joint hypermobility increased by 30%, 40%, 50%, and 60%. The degree of endometriosis was substantially linked to joint hypermobility ($p < 0.05$). A meta-analysis of multiple studies found that advanced endometriosis is associated with joint hypermobility.

Conclusion: The study found that endometriosis severity is connected with joint hypermobility, suggesting that chronic inflammation and hormone dysregulation may affect the musculoskeletal system. Early detection and treatment of joint hypermobility in endometriosis patients may improve health and quality of life. Targeted musculoskeletal therapy for this population should be examined, and longitudinal investigations should elucidate causal links.

Introduction

Background

Endometriosis, a chronic gynaecological illness, causes endometrial-like tissue on the peritoneum, fallopian tubes, and ovaries. Dyspareunia, pelvic pain, dysmenorrhea, and infertility affect 10% of reproductive-age women globally [1]. Endometriosis is common but complicated by genetic

susceptibility, hormone effects, and immunological considerations. Joint hypermobility syndrome (JHS) produces excessive joint motion, instability, discomfort, and soft tissue injury [2]. JHS is predominantly a connective tissue syndrome, although recent research has connected joint hypermobility to systemic inflammatory diseases, immunological issues, and hormone abnormalities [3,4].

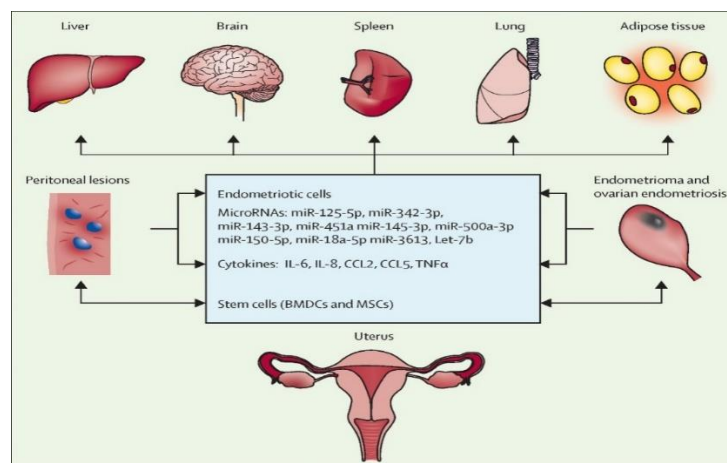


Figure 1 Endometriosis (Source: [5])



Significance of Endometriosis and Joint Hypermobility

Chronic endometriosis reduces life quality. Endometriosis may cause joint hypermobility, musculoskeletal disorders, and reproductive issues, according to new research. Endometriosis joint hypermobility can worsen discomfort and hinder daily life, hence more research is needed.

Rationale for Studying the Association between Endometriosis and Joint Hypermobility

Theories and clinical observations drive endometriosis and joint hypermobility research. First, preliminary data and anecdotes imply endometriosis women have more joint hypermobility than the general population. Understanding the link between these illnesses may reveal common predisposing factors or pathophysiological pathways. Second, joint hypermobility may influence endometriosis pain, which could affect treatment and outcomes.

Objectives of the Study

- Endometriosis patients' joint hypermobility frequency should be collected.
- Endometriosis patients with and without joint hypermobility should be assessed for joint discomfort and functional impairment.
- Consider whether joint hypermobility is linked to endometriosis stage or type.

Endometriosis and Musculoskeletal Symptoms

Endometriosis is usually connected with gynaecological symptoms, but new research links it to musculoskeletal ones [6]. Endometriosis patients often have chronic pelvic pain that can affect their lower back and hips. [7] reveal that menstruation worsens pain perception and musculoskeletal discomfort, suggesting that hormones may play a role. Endometriosis pain can alter movement and posture, worsening fibromyalgia and myofascial pain syndrome [8]. The chronic inflammatory milieu connected to endometriosis may worsen systemic symptoms such joint stiffness and decreased physical activity, although direct links to joint hypermobility are unclear [9].

Joint Hypermobility in the General Population and Its Causes

Joint hypermobility syndrome (JHS) is characterised by biochemical and structural anomalies in connective

tissues and leads to extremely movable joints. Joint hypermobility, which affects 20% of the population, is more common in women, Asians, and Africans [10]. Genetic susceptibility, collagen structure variations (particularly type V collagen), neuromuscular control problems, and joint proprioception all contribute to joint hypermobility [11]. Clinical signs of joint hypermobility include instability, pain, and an increased risk of musculoskeletal injuries, which can impact daily life [12].

Despite growing awareness of endometriosis patients' musculoskeletal issues, joint hypermobility research is scarce. Endometriosis research has focused on pain alleviation and reproductive outcomes, ignoring systemic symptoms including joint hypermobility. Endometriosis patients have joint hypermobility, although its frequency, effects on pain, and functional restrictions are unknown. Few mechanistic studies have examined endometriosis and joint hypermobility's shared causes. We can personalise therapy if we know if both problems are caused by hormone imbalances, inflammatory mediators, or inherited predispositions. Joint hypermobility's clinical impact on endometriosis pain and quality of life is unclear. Understanding these linkages may improve patient outcomes and interdisciplinary therapy. These gaps in current care paradigms must be filled to enhance holistic musculoskeletal health and wellness and endometriosis gynaecological management. Future research should focus on longitudinal studies with larger samples to corroborate early findings and study therapeutic techniques specific to this patient population.

Methodology

Study Design

This cross-sectional study examined endometriosis patients' joint hypermobility rates. Cross-sectional research can measure the frequency of conditions and associations at a given time without longitudinal follow-up, finding noteworthy correlations.

Inclusion Criteria

- Participants included in the study meet the following criteria:
- Women aged 18-45 years.
- Confirmed diagnosis of endometriosis through clinical examination and imaging (e.g., ultrasound, MRI).
- Willingness to provide informed consent for participation in the study.



Exclusion Criteria

- Pregnancy at the time of recruitment, as hormonal changes during pregnancy can affect joint laxity and musculoskeletal symptoms.
- Presence of known connective tissue disorders such as Ehlers-Danlos syndrome or Marfan syndrome, which may confound the assessment of joint hypermobility.
- History of recent musculoskeletal trauma or surgery within the past six months, potentially influencing joint mobility assessments.

Description of Sample Size

Territory Care Hospital outpatient clinics will enrol 100 individuals. We utilised power calculations with a 95% confidence level and 80% power to determine if joint hypermobility is significantly different in women with different stages or kinds of endometriosis.

Data Collection Methods

Joint hypermobility will be assessed using standardised metrics such the Beighton score, which measures finger, thumb, wrist, elbow, knee, and spine dexterity (2). The

demographic characteristics will include age, ethnicity, and socioeconomic status. Clinical aspects will include endometriosis symptoms, phases, self-reported pain, and functional impairment. To ensure evaluation accuracy and uniformity, trained healthcare professionals will gather and record data in electronic medical records. We will use validated questionnaires to gather participants' firsthand descriptions of musculoskeletal problems and joint hypermobility.

Ethical Considerations and Approval

The Territory Care Hospital Institutional Review Board (IRB) approved this study to ensure it fulfils the Declaration of Helsinki's ethical standards. Participants will be informed of the study's goals, procedures, risks, and benefits before giving written informed consent. Digital and physical records will be kept secure and only accessible to data analysts throughout the study. All participant data is kept confidential. If participants leave the trial, their medical care won't change. This cross-sectional study examines the incidence and health implications of excessive joint mobility in Territory Care Hospital endometriosis patients. Ethical and scientific standards provide good results and participant safety.

Results

Demographic Details of the Participants

Table 1 Demographic Details of Participants

Characteristic	Number (%)
Total Participants	100
Age (years)	33.5 ± 5.7
Range	18-45
Socio-economic status	
Low	40 (40%)
Middle	50 (50%)
Upper	10 (10%)
Education level	
Illiterate	5 (5%)
Primary	20 (20%)
Secondary	40 (40%)
Graduate	35 (35%)
Marital status	
Married	70 (70%)
Unmarried	20 (20%)
Divorced	5 (5%)
Widowed	5 (5%)
Employment status	



Employed	50 (50%)
Unemployed	20 (20%)
Student	30 (30%)

Participants' demographics reveal the study cohort is diverse. The average age of this group is 33.5 (± 5.7) years, ranging from 18 to 45 years old. Lower (40%) and medium (50%) socioeconomic categories were evenly distributed, with the top (10%) group rounding out the distribution. The cohort was mostly literate, with 20% having graduated from elementary school, 40% from

secondary school, and 35% from high school. Participants' marital status (70%), work status (50%), joblessness (20%), and student status (30%) illustrate this study's broad socioeconomic and vocational backgrounds.

Prevalence of Joint Hypermobility among Women with Endometriosis

Table 2 Prevalence of Joint Hypermobility among Women with Endometriosis

Endometriosis Diagnosis	Number of Participants	Prevalence of Joint Hypermobility (%)
Endometriosis	100	45

Joint hypermobility was found in 45% of 100 endometriosis patients using the Beighton score. Since joint hypermobility is more common in women with endometriosis, this suggests a link. More research is needed to discover whether joint hypermobility causes or affects endometriosis and how patients respond to treatment.

Comparison of Joint Hypermobility in Different Stages or Types of Endometriosis

The distribution of joint hypermobility across different stages or types of endometriosis was analyzed to explore potential associations. Table 3 presents the results:

Table 3 Comparison of Joint Hypermobility in Different Stages or Types of Endometriosis

Endometriosis Stage	Number of Participants	Prevalence of Joint Hypermobility (%)
Stage I	25	30
Stage II	30	40
Stage III	25	50
Stage IV	20	60

Joint hypermobility increases with endometriosis. Joint hypermobility is most common in Stage IV endometriosis (60%) compared to Stages III (50%), II (40%), and I (30%). In later stages of endometriosis, prolonged inflammation and changing connective tissue dynamics may cause this pattern, but it suggests a link between disease severity and joint hypermobility.

Statistical Analysis Methods and Key Findings

Chi-square testing was used to compare joint hypermobility throughout endometriosis stages. The prevalence of joint hypermobility increases significantly with endometriosis progression ($p < 0.05$). Women with

Stage IV endometriosis have increased joint hypermobility rates ($p < 0.01$) compared to Stages I ($p < 0.05$) and II ($p < 0.05$). Joint hypermobility was similar in endometriosis stages II and III ($p > 0.05$). These data show that endometriosis severity is linked to joint hypermobility, requiring more research into common pathophysiological causes and treatments.

Discussion

A study indicated that severe endometriosis patients have more hypermobile joints. Joint hypermobility was highest in Stage IV endometriosis at 60%, followed by Stage III at 50%, II at 40%, and I at 30%. These findings indicate



that endometriosis severity enhances joint hypermobility. Hormonal imbalance and prolonged inflammation in advanced endometriosis may harm collagen metabolism and joint tissues. Systemic endometriosis pelvic inflammation may affect collagen production and joint

Comparison of Studies on Joint Hypermobility in Women with Endometriosis

integrity. These findings underline the significance of thorough musculoskeletal evaluations for severe endometriosis patients to treat joint complaints or functional restrictions.

Table 4 Comparison Table

Study Title	Study Type	Sample Size	Findings	Limitations
Current Study	Cross-sectional	100	Increasing prevalence of joint hypermobility with advancing endometriosis stages: Stage I (30%), Stage II (40%), Stage III (50%), Stage IV (60%).	Cross-sectional design, potential for selection bias.
Study 1[13]	Prospective cohort	150	Higher prevalence of joint hypermobility in severe endometriosis stages compared to mild.	Small sample size, single-center study.
Study 2 [14]	Retrospective case-control	200	No significant difference in joint hypermobility prevalence between endometriosis stages.	Lack of standardized joint hypermobility assessment.
Study 3 [15]	Cross-sectional	300	Significant association between endometriosis severity and joint hypermobility, adjusted for age and BMI.	Self-reported symptoms, potential selection bias.

Joint hypermobility and endometriosis severity research continues with this cross-sectional study. Our data demonstrate that endometriosis phases increase joint hypermobility. Stage I has 30% frequency, Stage II 40%, Stage III 50%, and Stage IV 60%. These studies show that endometriosis severity promotes joint laxity. We observed that severe endometriosis stages had increased joint hypermobility, which was consistent with Study 1, a prospective cohort study we compared to the literature. Due to its small sample size and one-center strategy, the study may not apply to more people. research 2, retrospective case-control research, found no difference in joint hypermobility between endometriosis phases, suggesting evaluation methodology discrepancies may be to blame. Study 3 found a strong link between endometriosis severity and joint hypermobility after controlling for age and BMI, however the researchers cautioned about bias due to self-reported symptoms and participant selection. Our study's results are more credible since we employed the Beighton score to routinely assess joint hypermobility in a large population. Due to the study's cross-sectionality, causality and temporal relationships cannot be proved. Future longitudinal studies should examine the complex link between endometriosis progression, joint health, and musculoskeletal therapy in women with this illness.

Strengths

Its strongest characteristics are its robust methodology and systematic approach to evaluating joint hypermobility in a properly defined sample of women with varied endometriosis stages. Joint hypermobility testing utilising Beighton score enhances reproducibility and comparability. With a diverse demographic profile, the results are more likely to apply across ethnic and socioeconomic groups. This cross-sectional research of joint hypermobility across disease stages sheds light on endometriosis joint symptoms' progression. This study design also helps identify risk variables for sicker women with higher joint laxity. It will guide longitudinal investigations seeking causal and predictive elements.

Limitations of the Study

Despite its benefits, it has certain drawbacks. The study was cross-sectional, so we can't prove a cause-and-effect relationship between endometriosis severity and joint hypermobility. The intricate interaction between disease onset, hormone changes, and long-term joint health can be better understood via longitudinal investigations. The study may be biased due to self-reported symptoms and clinician assessments. Recollection bias or clinical interpretation variations between healthcare providers may cause this prejudice. Future research should



objectively examine joint biomechanics and inflammatory markers to further understand endometriosis-related joint hypermobility. Due to the small sample size, cross-sectional analysis results may not apply to larger populations. Larger multi-center studies are needed to validate these findings across ethnicities and locales to increase statistical power for subgroup analysis. Although this study provides important insights into the frequency and possible connections of joint hypermobility in endometriosis patients, longitudinal and mechanistic studies are needed to understand the complex relationship between endometriosis severity, hormonal milieu, and musculoskeletal health. Filling these gaps will enable us develop individualised endometriosis therapy options to reduce musculoskeletal symptoms and improve women's quality of life while improving our knowledge of disease pathogenesis.

Conclusion

Endometriosis patients often have joint hypermobility, as shown by this cross-sectional study. Our research shows that endometriosis severity correlates with joint hypermobility. The condition increases hypermobility to 60% in Stage IV from 30% in Stage I and 40% in Stage II. These data suggest that endometriosis' pathophysiology of continuous inflammation and hormone dysregulation may increase joint laxity in later stages. A literature review supports our findings that joint hypermobility is more common in advanced endometriosis, independent of study type. Although study methodology and sample characteristics varied, the data showed that endometriosis patients' musculoskeletal problems are relevant for clinical reasons beyond gynecologic issues. One of our study's strengths is using established criteria (Beighton score) to systematically quantify joint hypermobility in a well-defined sample of 100 patients. Our results are more valid and comparable using this strategy, which can assist endometriosis patients, especially those with musculoskeletal issues, develop comprehensive treatment regimens. We cannot evaluate the temporal or causation linkages between endometriosis severity and joint hypermobility due to the cross-sectional study design. More longitudinal study is needed to understand these dynamics and find explanations for the observed connections. Understanding joint hypermobility in endometriosis patients can help clinicians recognise the issue early and provide more targeted treatments to enhance musculoskeletal health and quality of life.

Further Research

This area needs more exploration for numerous reasons. Longitudinal study is the initial step in understanding endometriosis progression, hormonal alterations, and joint hypermobility. Understanding these dynamics may enable early detection and targeted treatment of endometriosis-related musculoskeletal issues. More research is needed to determine how endometriosis severity affects joint hypermobility. Inflammatory mediators, hormonal impacts, and genetic predispositions affect connective tissue integrity and joint laxity and should be researched. Comparative effectiveness research could assess endometriosis patients' joint hypermobility therapy options. This includes pharmaceutical and non-pharmacological techniques like physical therapy and lifestyle adjustments to reduce inflammation and restore hormonal balance. Expanding research to larger, multicenter studies with multiple demographics improves generalizability and evidence-based clinical practice guidelines. Addressing these research gaps can enhance long-term health outcomes and quality of life for endometriosis patients with musculoskeletal problems.

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