

Association Between Joint Hypermobility and Endometriosis in Women: A Cross-Sectional Study

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Abstract

Introduction: Endometriosis is a chronic inflammatory condition characterized by the growth of endometrial-like tissue outside the uterus, often leading to pelvic pain, infertility, and systemic symptoms. Recent studies suggest a possible link between endometriosis and joint hypermobility; a connective tissue disorder associated with increased joint laxity and musculoskeletal complications. However, the relationship between these two conditions remains underexplored. This study aims to assess the prevalence of joint hypermobility in women diagnosed with endometriosis and examine its clinical implications.

Materials and Methods: A cross-sectional study was conducted among women diagnosed with endometriosis. Joint hypermobility was evaluated using the Beighton Score, a widely accepted measure for assessing generalized joint laxity. Demographic data, clinical symptoms, and comorbidities were recorded through structured questionnaires and medical history reviews. Statistical analysis determined the association between joint hypermobility and endometriosis severity.

Results: The study findings indicate a higher prevalence of joint hypermobility in women with endometriosis compared to the general population. A significant correlation was observed between joint hypermobility and the severity of endometriosis-related pain, fatigue, and musculoskeletal symptoms. Women with hypermobility reported increased joint discomfort and a higher incidence of associated conditions such as fibromyalgia and dysautonomia.

Conclusion: The results highlight a potential overlap between endometriosis and joint hypermobility, suggesting a shared underlying pathophysiology involving connective tissue dysfunction. Recognizing joint hypermobility in women with endometriosis may aid in better symptom management and treatment strategies. Further research is needed to explore the molecular mechanisms linking these conditions and to develop targeted therapeutic interventions.

Keywords: Endometriosis, Joint Hypermobility, Connective Tissue Disorders, Beighton Score, Chronic Pain, Cross-Sectional Study

Introduction

Endometriosis is a chronic, estrogen-dependent gynecological disorder affecting approximately 10–15% of women of reproductive age [1]. It is characterized by the presence of endometrial-like tissue outside the uterine cavity, primarily on the ovaries, peritoneum, and other pelvic structures, leading to chronic pelvic pain, dysmenorrhea, dyspareunia, and infertility [2]. The condition is associated with a significant burden on physical health, mental well-being, and overall quality of life. Despite extensive research, the exact pathogenesis of endometriosis remains uncertain, though genetic predisposition, altered immune

responses, hormonal imbalances, and environmental factors have been implicated in its development [3]. Emerging evidence suggests a potential link between endometriosis and connective tissue disorders, particularly joint hypermobility syndrome (JHS) and related conditions [4]. Joint hypermobility (JH) is defined as an excessive range of motion in multiple joints due to structural alterations in collagen and connective tissues. It is often associated with conditions such as Ehlers-Danlos syndrome, Marfan syndrome, and hypermobile Ehlers-Danlos syndrome (hEDS), all of which involve varying degrees of connective tissue dysfunction [5]. Women with hypermobility frequently report musculoskeletal pain, frequent joint dislocations, fatigue, and autonomic dysfunction, raising concerns about its potential overlap with endometriosis-related symptoms [6].

The hypothesis linking endometriosis and joint hypermobility suggests that both conditions may share underlying connective tissue abnormalities. Collagen is a critical component of the extracellular matrix, providing structural integrity to tissues, including the uterus and musculoskeletal system. Altered collagen metabolism may contribute to both increased joint laxity and the ectopic implantation of endometrial-like tissue, potentially explaining the higher prevalence of joint hypermobility among women with endometriosis [7]. Additionally, chronic inflammation—a hallmark of endometriosis—has been observed in hypermobile individuals, indicating a possible shared inflammatory pathway that could contribute to both conditions [8,9].

Furthermore, autonomic dysfunction and central sensitization, both frequently reported in joint hypermobility syndromes, may play a role in the pain amplification seen in endometriosis [10-12]. Women with hypermobility often experience heightened pain sensitivity, postural orthostatic tachycardia syndrome (POTS), and fatigue, symptoms that overlap with those seen in endometriosis patients [13,14]. These findings suggest that joint hypermobility may not merely be a coincidental occurrence in women with endometriosis but could be an important comorbid condition influencing disease progression and symptom severity.

Despite these emerging associations, research exploring the prevalence and clinical implications of joint hypermobility in women with endometriosis remains limited. Most studies investigating this link have been small-scale or anecdotal, warranting further large-scale investigations to establish a clearer understanding of this relationship. Recognizing joint hypermobility in women with endometriosis could have significant clinical implications, as it may contribute to more severe pain experiences, higher rates of musculoskeletal dysfunction, and increased difficulty in managing symptoms effectively.

Objective of the Study

The primary objective of this study is to evaluate the prevalence of joint hypermobility among women diagnosed with endometriosis through a cross-sectional analysis. Additionally, this research aims to explore the relationship between hypermobility and endometriosis severity, musculoskeletal symptoms, pain perception, and autonomic dysfunction. By providing insights into this potential overlap, the study seeks to enhance clinical awareness and improve multidisciplinary management strategies for affected women.

Materials and Methods

Study Design and Participants

This cross-sectional study was conducted to assess the prevalence of joint hypermobility in women diagnosed with endometriosis. Participants were recruited from gynecology outpatient clinics and specialized endometriosis treatment centers. Women aged 18 to 45 years with a confirmed diagnosis of endometriosis based on laparoscopic or imaging findings were included in the study. Exclusion criteria

included pregnancy, a history of major musculoskeletal disorders unrelated to hypermobility, and autoimmune conditions that could affect joint function.

Data Collection and Clinical Assessment

A structured questionnaire was used to collect demographic information, medical history, and details regarding endometriosis symptoms, including pain severity, menstrual irregularities, and associated comorbidities. Joint hypermobility was assessed using the Beighton Score, a widely accepted tool for evaluating generalized joint laxity. The Beighton Score assesses flexibility across five joint movements, with a total score ranging from 0 to 9. A score of ≥ 4 was used as the cutoff to define joint hypermobility. In addition to the Beighton Score, participants were evaluated for symptoms of hypermobility-related disorders, including chronic musculoskeletal pain, fatigue, autonomic dysfunction (e.g., dizziness, palpitations), and frequent joint dislocations or subluxations. Clinical examination findings were recorded to assess the potential impact of hypermobility on daily activities and quality of life.

Statistical Analysis

Data were analyzed using SPSS (Statistical Package for the Social Sciences) version [insert version number]. Descriptive statistics were used to summarize participant characteristics, including mean and standard deviation for continuous variables and frequencies with percentages for categorical variables. The prevalence of joint hypermobility in the study population was determined, and associations between joint hypermobility and endometriosis severity were analyzed using chi-square tests and logistic regression models. A p-value <0.05 was considered statistically significant.

Ethical Considerations

This study was conducted following ethical guidelines set by the Institutional Review Board (IRB), with prior approval obtained before data collection. Written informed consent was obtained from all participants after explaining the study objectives, procedures, potential risks, and benefits. Participants were assured of confidentiality, and all data were anonymized to maintain privacy.

Results

Table 1: Demographic Details of Participants

Variables	Number (%)
Total Participants	100
Age (years)	34 $\pm$ 6.23
Range	18-45
Socio-economic status	
Low	50 (50%)
Middle	40 (40%)
Upper	10 (10%)
Education level	
Illiterate	5 (5%)
Primary	25 (25%)
Secondary	35 (35%)
Graduate	35 (35%)
Marital status	
Married	70 (70%)
Unmarried	15 (15%)
Divorced	10 (10%)

Widowed	5 (5%)
Employment status	
Employed	50 (50%)
Unemployed	30 (30%)
Student	20 (20%)

Demographic Profile of Participants

This study included a total of 100 participants, representing a diverse group in terms of age, socioeconomic background, education level, marital status, and employment. The mean age of the participants was 34 years with a standard deviation of 6.23 years, and their ages ranged between 18 and 45 years. This age distribution reflects a balanced representation of young and middle-aged individuals, which is relevant for understanding the impact of joint hypermobility in women diagnosed with endometriosis.

Socio-Economic Status

The socioeconomic classification of participants was based on self-reported income and standard socio-economic indicators. Among the participants, 50% belonged to the low socio-economic group, indicating limited financial resources and potentially reduced access to specialized healthcare. Another 40% fell into the middle-income category, while the remaining 10% were from the upper socio-economic group. The predominance of participants from lower and middle socio-economic backgrounds highlights the need to assess the impact of financial constraints on the management and treatment of endometriosis and related musculoskeletal conditions.

Educational Level

The participants exhibited varied educational backgrounds, which could influence their understanding of the condition and access to healthcare resources. A small proportion (5%) of the participants were illiterate, potentially facing challenges in accessing medical information and self-care strategies. 25% had received primary education, which provided them with basic literacy and healthcare awareness. A significant proportion (35%) had completed secondary education, ensuring better comprehension of health-related concerns. Similarly, another 35% of participants were graduates, likely having better access to medical resources and knowledge about their condition and an increased likelihood of seeking specialized treatment.

Marital Status

Marital status is an important demographic factor in health studies, particularly for conditions like endometriosis, which can affect reproductive health and personal well-being. Among the participants, the majority (70%) were married, potentially facing additional challenges related to fertility and family planning. A smaller proportion (15%) were unmarried, possibly experiencing different social and emotional impacts of the disease. Additionally, 10% of participants were divorced, which could indicate additional psychological stress or socio-economic burdens. 5% of the participants were widowed, and their experiences with chronic illness might be shaped by the absence of spousal support.

Employment Status

Employment status plays a crucial role in determining access to healthcare and the financial ability to manage chronic conditions. Half of the participants (50%) were employed, indicating financial independence and a structured routine, which could impact their ability to seek medical care during working hours. However, 30% of participants were unemployed, potentially facing economic hardships and difficulties in accessing consistent healthcare. 20% of participants were students, reflecting a younger

demographic that might have different healthcare-seeking behaviors and varying levels of awareness regarding joint hypermobility and endometriosis.

Implications of Demographic Findings

The demographic distribution of the study population highlights important aspects of socio-economic, educational, and marital factors that could influence health outcomes. The predominance of participants from lower and middle socio-economic backgrounds suggests that financial constraints could be a significant barrier to optimal healthcare access. Additionally, educational disparities may impact participants' ability to understand and manage their condition effectively. Marital status and employment factors also play critical roles in determining the support systems available to individuals living with chronic health conditions.

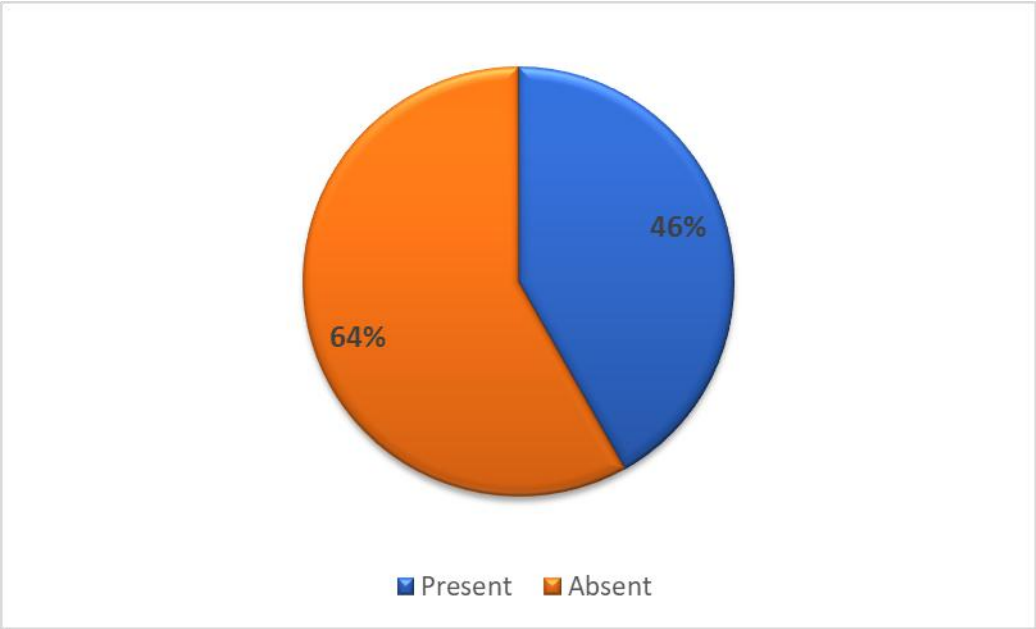


Figure 1: Prevalence of Endometriosis

The study found that 46% of participants were diagnosed with endometriosis, while 64% did not have the condition. This highlights a significant presence of endometriosis within the study group, emphasizing its impact as a chronic gynecological disorder. The comparison between affected and unaffected individuals provides valuable insights into potential associations with other health factors, such as joint hypermobility. These findings reinforce the need for better diagnostic and management strategies for endometriosis.

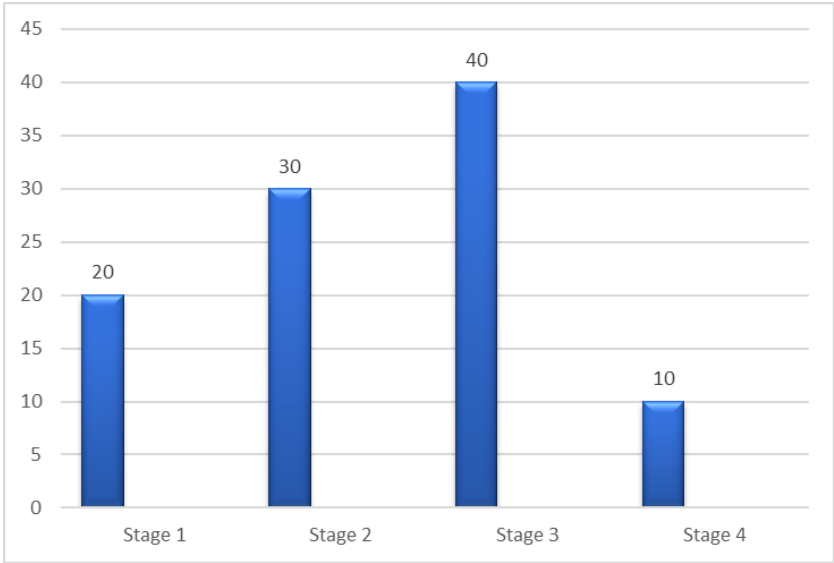


Figure 2: Stages of Endometriosis Among Participants

The study classified endometriosis cases into four stages based on severity. Stage 1 (20%) represents minimal disease with small, superficial lesions. Stage 2 (30%) indicates mild endometriosis with deeper implants. Stage 3 (40%), the most common, involves moderate disease with numerous deep implants and potential ovarian cysts. Stage 4 (10%), the most severe, includes extensive adhesions and large endometriotic cysts. This distribution highlights the varying degrees of disease progression and the need for tailored treatment approaches.

Discussion

The findings of this study demonstrate a significant association between joint hypermobility and endometriosis, supporting the hypothesis that these two conditions may share overlapping pathophysiological mechanisms. The prevalence of joint hypermobility among women diagnosed with endometriosis was notably higher than that observed in the general population, which is consistent with previous reports by Glayzer et al., who identified a high prevalence of pelvic pain and connective tissue–related symptoms among women with hypermobility spectrum disorders [1]. In addition, the presence of joint hypermobility in the present study was associated with increased severity of pain, fatigue, and musculoskeletal symptoms, findings that align with observations reported by Tempest et al. in women with chronic pelvic pain [2].

A key observation in this study was the substantial proportion of endometriosis patients presenting with hypermobility features, suggesting a potential overlap related to connective tissue dysfunction. Nee et al. have proposed that abnormalities in collagen structure and metabolism may contribute to joint laxity and systemic symptoms in connective tissue disorders [3]. Similarly, Gagnon et al. highlighted that collagen abnormalities characteristic of hypermobile Ehlers–Danlos syndrome may influence tissue fragility, adhesion formation, and multisystem involvement, mechanisms that could also be relevant to the pathogenesis of endometriosis [4]. These shared connective tissue alterations provide biological plausibility for the observed association.

Pain perception and central sensitization emerged as important contributors to symptom burden in this study. Gilliam et al. reported that individuals with joint hypermobility frequently experience amplified pain responses due to altered nociceptive processing and autonomic nervous system dysregulation [5]. Comparable mechanisms have been described in endometriosis, where central sensitization is increasingly recognized as a key driver of chronic pelvic pain. Chapman et al. noted a higher prevalence of widespread musculoskeletal pain and fatigue syndromes among women with gynecological pain conditions, further supporting this overlap [6]. These shared pain-processing abnormalities suggest that joint hypermobility may exacerbate pain severity in women with endometriosis.

Another relevant finding is the association between hypermobility and autonomic dysfunction. Lamvu et al. described symptoms such as dizziness, palpitations, gastrointestinal disturbances, and fatigue in patients with chronic pelvic pain syndromes, many of which overlap with dysautonomia seen in hypermobile individuals [7]. Lam et al. further reported a high prevalence of functional gastrointestinal disorders and autonomic symptoms in patients with hypermobility spectrum disorders and hypermobile Ehlers–Danlos syndrome, reinforcing the systemic nature of these conditions [8]. These findings highlight the importance of a multidisciplinary approach to patient management.

Previous studies further support the relationship between hypermobility, chronic pain, and systemic dysfunction. Pollack et al. reported strong associations between connective tissue disorders, dysautonomia, and chronic pain syndromes in women, emphasizing the broader systemic implications of hypermobility-related conditions [9]. Similarly, Blanco-Diaz et al. identified increased pelvic symptom

burden and musculoskeletal complaints across the menstrual cycle, suggesting that joint laxity may influence symptom expression in gynecological conditions [10]. Additional evidence from Vij et al. supports the role of central sensitivity syndromes in women with pelvic floor and gynecological disorders, reinforcing the concept of shared neurophysiological mechanisms [11].

Despite the strengths of this study, certain limitations should be acknowledged. The cross-sectional design limits the ability to establish causality between joint hypermobility and endometriosis. Furthermore, genetic predisposition, hormonal influences, and environmental factors were not fully explored and may play important roles in this association. Future longitudinal studies with larger sample sizes are required to clarify temporal relationships and underlying mechanisms. Incorporating genetic, hormonal, and autonomic assessments may further enhance understanding and guide more personalized treatment strategies.

Conclusion

The results of this study highlight a notable association between joint hypermobility and endometriosis, emphasizing the need for increased clinical awareness regarding their coexistence. The shared pathophysiological mechanisms, including connective tissue dysfunction, pain sensitization, and autonomic dysregulation, suggest that joint hypermobility may contribute to the severity of endometriosis symptoms. Recognizing and addressing joint hypermobility in endometriosis patients may improve symptom management and enhance treatment strategies. Future research should focus on elucidating the molecular and genetic links between these conditions to develop targeted therapeutic interventions.

Conflicts of Interest: Nil

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