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Pregnancy-Related Pelvic Girdle Pain: Current Understanding, Assessment Tools, And The Need For Cross-Cultural Adaptation - A Narrative Review

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Abstract

Pregnancy-related pelvic girdle pain (PGP) is a prevalent musculoskeletal condition affecting 23-65% of pregnant women globally, with significant implications for maternal health and quality of life. This narrative review examines the current understanding of PGP pathophysiology, risk factors, assessment methods, and the critical importance of culturally adapted evaluation tools. The condition encompasses pain between the posterior iliac crest and gluteal fold, particularly around sacroiliac joints, often radiating to the posterior thigh and pubic symphysis. While hormonal and biomechanical factors contribute to PGP development, the exact etiology remains multifactorial and incompletely understood. The Pelvic Girdle Questionnaire (PGQ) has emerged as the gold standard for assessing activity limitations and symptoms in women with PGP. However, language barriers significantly limit its clinical utility in non-English speaking populations. Cross-cultural adaptation of assessment tools is essential for providing equitable healthcare and enabling meaningful research across diverse populations. This review highlights the successful translation and validation of PGQ into multiple languages, demonstrating excellent reliability across different cultural contexts. The development of culturally appropriate assessment tools represents a crucial step toward addressing healthcare disparities and improving outcomes for women with pregnancy-related PGP globally. Future research should focus on establishing normative values, investigating treatment responsiveness, and developing prevention strategies for high-risk populations.

Keywords: Pregnancy, Pelvic girdle pain, Assessment, Cross-cultural adaptation, Maternal health, Questionnaire validation

Introduction

Pregnancy-related pelvic girdle pain (PGP) represents one of the most common musculoskeletal disorders affecting women during pregnancy and the postpartum period. Historically considered a subset of pregnancy-related low back pain, PGP is now recognized as a distinct clinical entity with unique anatomical, physiological, and functional characteristics [1]. The condition significantly impacts maternal health,

functional capacity, and quality of life, yet remains underdiagnosed and inadequately managed in many healthcare settings globally.

The European guidelines define PGP as pain experienced between the posterior iliac crest and gluteal fold, particularly in the vicinity of sacroiliac joints, with or without radiation to the posterior thigh, and may include pain at the symphysis pubis level [2]. This pain is typically provoked by everyday activities such as walking, standing, sitting, and lying down, leading to substantial functional limitations and disability [3].

Recent epidemiological studies reveal that PGP affects approximately 23-65% of pregnant women, with prevalence varying significantly across different populations and geographical regions [4]. While many women experience symptom resolution following delivery, studies indicate that 17% continue to suffer from persistent symptoms in the postpartum period, with 8.5% remaining symptomatic even after two years [5]. The global prevalence of postpartum PGP has been reported as 50.4% at three months and 55.6% at six months postpartum, highlighting the substantial burden of this condition on maternal health worldwide [6].

The clinical significance of PGP extends beyond physical discomfort, encompassing psychological distress, social limitations, and economic implications due to work absence and healthcare utilization [7]. Despite its prevalence and impact, standardized assessment tools for PGP have been limited, particularly in non-English speaking populations, creating significant barriers to accurate diagnosis, appropriate treatment, and meaningful research.

This narrative review aims to provide a comprehensive overview of current understanding regarding pregnancy-related PGP, examine existing assessment methodologies, and highlight the critical importance of cross-cultural adaptation of evaluation tools for improving global maternal healthcare outcomes.

Pathophysiology of Pregnancy-Related Pelvic Girdle Pain

Anatomical Considerations

The pelvic girdle consists of a complex anatomical structure comprising the sacrum, coccyx, and paired innominate bones, connected by the sacroiliac joints posteriorly and the pubic symphysis anteriorly [8]. This ring-like structure serves as a crucial link between the axial skeleton and lower extremities, facilitating load transfer and maintaining stability during functional activities.

The stability of the pelvic girdle depends on the intricate interplay between passive structures (bones, joints, and ligaments) and active components (muscles and their associated fasciae), coordinated by the neural control system [9]. This integrated model of function, known as Panjabi's stability model, provides the theoretical framework for understanding pelvic girdle dysfunction during pregnancy.

Hormonal Influences

Pregnancy induces significant hormonal changes that directly impact pelvic girdle function. Three primary hormones play crucial roles in the development of PGP:

Relaxin is perhaps the most studied hormone in relation to PGP. Produced initially by the corpus luteum and later by the placenta, relaxin causes ligamentous laxity throughout the body, particularly affecting the pelvic ligaments and cervix to facilitate childbirth [10]. While this hormonal effect is physiologically necessary for delivery, it may compromise pelvic stability and contribute to pain development.

Progesterone maintains pregnancy by supporting the uterine lining and has systemic effects including smooth muscle relaxation and metabolic changes. Its role in PGP development may be related to its effects on connective tissue and muscle tone [11].

Estrogen levels rise significantly during pregnancy, particularly toward term, and play a role in preparing the uterus for labor. Estrogen may influence pain sensitivity and inflammatory responses, potentially contributing to PGP symptomatology [12].

However, the relationship between hormonal levels and PGP development remains controversial, with some studies reporting associations while others find no correlation [13]. This suggests that hormonal factors alone cannot explain the complete etiology of pregnancy-related PGP.

Biomechanical Factors

Pregnancy induces substantial biomechanical changes that may contribute to PGP development. Progressive weight gain, altered body composition, and changing center of gravity create increased mechanical stress on the pelvic girdle [14]. The growing uterus causes anterior displacement of the center of mass, leading to compensatory postural adjustments that may overload specific pelvic structures.

The concept of form closure and force closure provides a biomechanical framework for understanding pelvic girdle stability [15]. Form closure refers to the passive stability provided by joint surfaces and ligaments, while force closure represents the active muscular contribution to joint stability. Pregnancy-related changes may compromise both mechanisms, leading to inadequate load transfer and subsequent pain development.

Muscular Dysfunction

Pregnancy and childbirth significantly affect the pelvic floor and abdominal muscles, which are crucial for lumbopelvic stability [16]. The pelvic floor muscles show evidence of altered function during pregnancy, with studies demonstrating changes in muscle strength, endurance, and coordination. These alterations may persist into the postpartum period, contributing to ongoing symptoms.

Diastasis recti abdominis, characterized by separation of the rectus abdominis muscles, commonly occurs during pregnancy and may persist postpartum [17]. This condition can compromise core stability and contribute to pelvic girdle dysfunction. The relationship between abdominal muscle function and PGP represents an important area of ongoing research.

Neurological Factors

Recent research has highlighted the role of altered motor control patterns in PGP development and persistence [18]. Women with PGP demonstrate changes in muscle activation timing, altered movement strategies, and modified postural control compared to asymptomatic individuals. These neuromotor adaptations may represent both consequences of pain and contributing factors to symptom persistence.

The central sensitization model suggests that prolonged nociceptive input may lead to enhanced pain sensitivity and altered pain processing in the central nervous system [19]. This mechanism may explain why some women develop persistent PGP despite resolution of the initial mechanical and hormonal triggers.

Risk Factors and Predictors

Demographic and Constitutional Factors

Multiple studies have identified various risk factors associated with PGP development during pregnancy. Advanced maternal age has been consistently reported as a risk factor, with women over 30 years showing increased susceptibility [20]. This may be related to age-related changes in connective tissue properties, muscle strength, and overall physical conditioning.

Pre-pregnancy body mass index (BMI) represents another significant risk factor, with overweight and obese women showing higher PGP prevalence [21]. Excessive weight gain during pregnancy may further increase risk by amplifying mechanical stress on pelvic structures.

Historical Factors

Previous history of low back pain or PGP emerges as one of the strongest predictors of pregnancy-related PGP [22]. Women with prior episodes show substantially higher risk of recurrence in subsequent pregnancies, suggesting underlying predisposing factors or inadequate recovery from previous episodes.

Previous trauma to the pelvis, including fractures or significant injuries, has been identified as a risk factor in some studies [23]. Such trauma may alter pelvic biomechanics or create structural weaknesses that predispose to pain development during pregnancy.

Pregnancy-Related Factors

Parity appears to influence PGP risk, though findings are somewhat contradictory across studies. Some research suggests higher risk in primigravid women, while others report increased risk with higher parity [24]. The relationship may be complex, involving factors such as cumulative mechanical stress, previous birth trauma, and changes in muscle function across pregnancies.

Gestational age at symptom onset may have prognostic significance, with early-onset PGP potentially indicating different underlying mechanisms compared to late-pregnancy onset [25]. Multiple pregnancies and certain fetal positions may also influence risk, though evidence remains limited.

Occupational and Lifestyle Factors

Physically demanding occupations, particularly those involving heavy lifting, prolonged standing, or repetitive bending, have been associated with increased PGP risk [26]. Work-related factors may interact with pregnancy-related changes to exceed the adaptive capacity of pelvic structures.

Pre-pregnancy physical activity levels show complex relationships with PGP development. While regular exercise generally promotes musculoskeletal health, some studies suggest that very high activity levels may increase risk, possibly due to increased mechanical stress [27].

Psychological Factors

Emerging evidence suggests that psychological factors may play important roles in PGP development and persistence [28]. Depression, anxiety, catastrophic thinking, and fear-avoidance behaviors have been associated with worse outcomes in women with pregnancy-related musculoskeletal pain.

Sleep disturbances, common during pregnancy, may contribute to pain development through effects on pain sensitivity, muscle recovery, and psychological well-being [29]. The bidirectional relationship between pain and sleep creates potential cycles that may perpetuate symptoms.

Clinical Assessment and Diagnosis

Clinical Presentation

Women with pregnancy-related PGP typically present with pain localized to the pelvic region, distinguishable from lumbar spine pain by its anatomical distribution and provocative factors [30]. The pain is characteristically described as deep, aching, and may be accompanied by sensations of instability or "giving way" during functional activities.

Pain intensity and functional limitations show considerable variation among affected women. Some experience mild discomfort during specific activities, while others develop severe disability affecting basic daily functions such as walking, climbing stairs, or transferring from sitting to standing [31].

The temporal pattern of symptoms may provide diagnostic clues. PGP typically develops during the second or third trimester, though some women experience onset in early pregnancy. Symptoms often fluctuate throughout the day, commonly worsening with prolonged activity or specific postures [32].

Physical Examination

Clinical examination of women with suspected PGP should include systematic assessment of pain provocation tests, functional movements, and postural alignment [33]. Several standardized tests have been developed to identify PGP and differentiate it from other causes of pregnancy-related musculoskeletal pain.

The **Posterior Pelvic Pain Provocation test (P4 test)** is performed with the patient supine, hip flexed to 90 degrees, and gentle pressure applied along the femoral axis while stabilizing the contralateral pelvis. A positive test reproduces familiar pain in the gluteal region [34].

The **Active Straight Leg Raise test (ASLR)** assesses the patient's ability to lift each leg individually while supine. Difficulty performing the movement or reproduction of pelvic pain indicates a positive test and suggests impaired load transfer through the pelvic girdle [35].

Additional tests include the **Patrick-Faber test**, **symphysis pubis palpation**, **compression and distraction tests**, and **long dorsal sacroiliac ligament palpation**. The European guidelines recommend that PGP diagnosis requires positive findings on at least two of these provocation tests [36].

Functional Assessment

Assessment of functional limitations represents a crucial component of PGP evaluation. The impact on activities of daily living, work capacity, and quality of life should be systematically documented to guide treatment planning and monitor outcomes [37].

Common functional limitations include difficulty with walking, particularly on uneven surfaces or for extended distances; problems with stair climbing; challenges with transfers such as getting in and out of cars or beds; and difficulties with work-related activities [38].

Assessment Tools and Outcome Measures

Generic Health Status Measures

Several generic outcome measures have been used to assess the impact of pregnancy-related PGP on health status and quality of life. The **Short Form-36 (SF-36)** provides comprehensive assessment of physical and mental health domains but may lack sensitivity to specific PGP-related limitations [39].

The **EuroQol-5D (EQ-5D)** offers a brief assessment of health-related quality of life and can be used to calculate quality-adjusted life years for economic evaluations [40]. However, generic measures may not capture the unique challenges faced by women with PGP during pregnancy and postpartum.

Pain Assessment

Visual Analog Scales (VAS) and Numeric Rating Scales (NRS) are commonly used to assess pain intensity in women with PGP [41]. These instruments provide reliable measures of subjective pain experience but do not capture the multidimensional nature of the condition.

Pain drawings or body charts allow documentation of pain distribution and can help differentiate PGP from other sources of pregnancy-related pain [42]. These tools provide valuable clinical information and may predict treatment outcomes.

Disability and Function

The **Oswestry Disability Index (ODI)** has been used to assess functional limitations in women with pregnancy-related musculoskeletal pain [43]. While originally developed for low back pain, the ODI may not adequately address PGP-specific functional challenges.

The **Disability Rating Index (DRI)** provides assessment of activity limitations across multiple domains and has been validated for use in pregnancy-related musculoskeletal conditions [44].

Condition-Specific Assessment

The **Pelvic Girdle Questionnaire (PGQ)** represents the first condition-specific instrument developed specifically for assessing women with PGP during pregnancy and postpartum [45]. Developed by Stuge and

colleagues, the PGQ consists of 25 items divided into activity limitations (20 items) and symptoms (5 items) subscales.

The PGQ uses a 4-point Likert scale for each item, with scores transformed to a 0-100 scale where higher scores indicate greater disability. The questionnaire has demonstrated excellent reliability and validity in the original Norwegian population and has shown ability to discriminate between different levels of PGP severity [46].

Psychological Assessment

Given the recognized importance of psychological factors in pregnancy-related musculoskeletal pain, several instruments have been used to assess emotional and cognitive aspects of the condition [47].

The **Fear-Avoidance Beliefs Questionnaire (FABQ)** assesses beliefs about the relationship between activity and pain, which may influence treatment outcomes [48]. The **Pain Catastrophizing Scale (PCS)** measures catastrophic thinking patterns that may perpetuate pain and disability [49].

Depression and anxiety screening tools, such as the **Edinburgh Postnatal Depression Scale (EPDS)** or **Hospital Anxiety and Depression Scale (HADS)**, may provide valuable information about psychological comorbidities [50].

Cross-Cultural Adaptation of Assessment Tools

Rationale for Cross-Cultural Adaptation

The development of culturally appropriate and linguistically equivalent assessment tools represents a critical need in global healthcare research and practice [51]. Language barriers and cultural differences can significantly impact the validity and reliability of health outcome measures when used in populations different from those in which they were originally developed.

Cross-cultural adaptation involves more than simple translation; it requires careful consideration of semantic, idiomatic, experiential, and conceptual equivalence [52]. This process ensures that the adapted instrument measures the same constructs as the original while being culturally appropriate for the target population.

Methodological Considerations

The process of cross-cultural adaptation should follow established guidelines to ensure scientific rigor and reproducibility [53]. The most widely accepted approach involves six stages: forward translation, synthesis, back-translation, expert committee review, pre-testing, and final approval.

Forward translation involves at least two independent translations by native speakers of the target language, with one translator familiar with the clinical condition and another naive to the subject matter [54]. This approach helps identify potential discrepancies and ensures comprehensive coverage of possible translations.

Synthesis combines the forward translations into a single version through discussion and consensus among translators and researchers [55]. Discrepancies are resolved through careful consideration of semantic and conceptual equivalence.

Back-translation involves translation of the synthesized version back to the original language by native speakers who have not seen the original instrument [56]. This step helps identify potential errors or meaning shifts that may have occurred during forward translation.

Expert committee review brings together methodologists, language professionals, healthcare professionals, and the original developers to ensure all aspects of equivalence are achieved [57]. This committee makes final decisions about discrepancies and ensures cultural appropriateness.

Pre-testing involves administration of the preliminary version to members of the target population to identify comprehension difficulties or cultural inappropriateness [58]. This step provides crucial feedback about face validity and acceptability.

Final approval may involve submission to original authors and documentation of the complete adaptation process [59]. This ensures transparency and facilitates future cross-cultural comparisons.

Psychometric Evaluation

Following cross-cultural adaptation, the translated instrument must undergo comprehensive psychometric evaluation to demonstrate equivalent measurement properties to the original version [60]. This typically includes assessment of reliability, validity, and responsiveness.

Reliability assessment should include internal consistency, test-retest reliability, and inter-rater reliability where appropriate [61]. Reliability coefficients should meet accepted standards (typically ≥0.70 for group comparisons and ≥0.90 for individual assessment).

Validity evaluation may include content validity, construct validity, and criterion validity assessments [62]. Factor analysis can help determine whether the adapted instrument maintains the same underlying structure as the original.

Responsiveness to change represents a crucial measurement property for outcome measures, indicating the instrument's ability to detect meaningful change over time [63]. This property is particularly important for treatment evaluation and longitudinal research.

Global Perspectives on PGQ Translation and Validation

Successful Adaptations

The PGQ has been successfully translated and validated in multiple languages and cultural contexts, demonstrating its cross-cultural applicability and the universal nature of pregnancy-related PGP [64].

The **Spanish version** of the PGQ demonstrated excellent psychometric properties with high internal consistency (Cronbach's α = 0.961) and test-retest reliability (ICC = 0.962) [65]. The study included 125 pregnant and postpartum women and confirmed good construct validity and discriminative ability.

The **Chinese version** showed similarly impressive reliability (ICC = 0.93) and validity in a study of 130 pregnant and postpartum women [66]. The adaptation process revealed the need for minor cultural modifications while maintaining conceptual equivalence.

The **Brazilian version** achieved excellent reliability for both activity (ICC = 0.97) and symptom (ICC = 0.98) subscales [67]. The study demonstrated the instrument's ability to discriminate between women with and without PGP, supporting its clinical utility.

The **Swedish version** showed high internal consistency (Cronbach's α = 0.82-0.96) and good convergent validity with established measures [68]. The study included 177 pregnant women and confirmed the instrument's discriminative capacity.

Methodological Consistency

Across different cultural adaptations, several methodological consistencies have emerged that support the reliability of the translation process [69]. Most successful adaptations have followed established guidelines for cross-cultural adaptation and have demonstrated similar psychometric properties to the original version.

The consistent finding of high reliability coefficients across different languages and cultures suggests that the PGQ measures stable constructs that are relevant across diverse populations [70]. This supports the universal nature of pregnancy-related PGP experience despite cultural differences in expression and coping.

Cultural Considerations

Different cultural adaptations have revealed interesting insights into cultural variations in pregnancy-related PGP experience and reporting [71]. Some cultures may emphasize different aspects of the condition or have varying tolerance for specific symptoms.

Language-specific modifications have been necessary in some adaptations to ensure cultural appropriateness. For example, activities that are uncommon in certain cultures may require substitution with culturally relevant alternatives while maintaining the underlying construct being measured [72].

Clinical Implications

The availability of culturally adapted PGQ versions has significant implications for clinical practice and research in diverse populations [73]. Healthcare providers can now assess PGP impact using culturally appropriate instruments, leading to better understanding of patient experiences and more targeted interventions.

The growing library of validated PGQ translations facilitates international research collaboration and enables meaningful comparisons across different populations and healthcare systems [74]. This supports the development of evidence-based approaches to PGP management that can be applied globally.

Current Gaps and Future Directions

Assessment Tool Limitations

Despite significant advances in PGP assessment, several limitations remain in current approaches [75]. Most existing instruments focus primarily on pain intensity and functional limitations while giving less attention to psychological and social aspects of the condition.

The relationship between PGP assessment scores and actual functional performance in real-world settings remains incompletely understood [76]. Future research should investigate the correlation between questionnaire scores and objective measures of physical function and quality of life.

Technology Integration

Emerging technologies offer potential opportunities to enhance PGP assessment and monitoring [77]. Mobile health applications could enable real-time symptom tracking and provide valuable data about symptom fluctuations and activity relationships.

Wearable sensors might provide objective measures of physical activity, movement patterns, and sleep quality that could complement subjective assessments [78]. Such technology could help identify early warning signs of symptom exacerbation and guide preventive interventions.

Personalized Medicine Approaches

Future research should investigate whether different subtypes of PGP exist that might benefit from tailored assessment and treatment approaches [79]. Cluster analysis of large datasets might reveal distinct patterns of symptoms, risk factors, and outcomes that could inform personalized care strategies.

Genetic factors that might predispose to PGP development or influence treatment responses represent another area for future investigation [80]. Understanding individual variation in response to pregnancy-related changes could enable risk stratification and targeted prevention.

Prevention Strategies

While much research has focused on treatment of established PGP, prevention strategies remain underdeveloped [81]. Future research should investigate whether early identification of high-risk women and implementation of preventive interventions can reduce PGP incidence or severity.

Exercise programs, education initiatives, and workplace modifications represent potential prevention strategies that require systematic evaluation [82]. Cost-effectiveness analyses of prevention approaches could inform healthcare policy decisions.

Long-term Outcomes

The long-term consequences of pregnancy-related PGP remain incompletely understood [83]. Follow-up studies extending beyond the immediate postpartum period could provide valuable insights into the natural history of the condition and identify factors associated with persistent symptoms.

The impact of PGP on subsequent pregnancies, long-term musculoskeletal health, and quality of life deserves further investigation [84]. Such research could inform counseling and management decisions for affected women.

Conclusion

Pregnancy-related pelvic girdle pain represents a significant global health concern affecting millions of women annually. The condition's complex etiology, involving hormonal, biomechanical, muscular, and neurological factors, requires sophisticated assessment approaches that can capture its multidimensional nature. The development and validation of the Pelvic Girdle Questionnaire has provided clinicians and researchers with a reliable, condition-specific tool for assessing PGP impact.

The successful cross-cultural adaptation of the PGQ into multiple languages demonstrates both the universal nature of pregnancy-related PGP experience and the feasibility of developing culturally appropriate assessment tools. These adaptations have consistently shown excellent psychometric properties, supporting the instrument's reliability and validity across diverse populations.

However, significant challenges remain in ensuring equitable access to appropriate assessment tools for all women with pregnancy-related PGP. Language barriers, cultural differences, and limited healthcare resources continue to create disparities in care quality. The development of additional culturally adapted assessment instruments represents a crucial step toward addressing these disparities.

Future research should focus on expanding the availability of validated assessment tools, investigating prevention strategies, and developing personalized approaches to PGP management. The integration of emerging technologies and the investigation of long-term outcomes could further enhance our understanding and management of this important condition.

The ultimate goal of improving pregnancy-related PGP assessment and management is to reduce the burden of this condition on affected women and their families. Through continued research, clinical innovation, and global collaboration, we can work toward ensuring that all women have access to appropriate assessment and treatment for pregnancy-related pelvic girdle pain, regardless of their cultural or linguistic background.

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