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DISCOVERY SCIENTIFIC SOCIETY

Pelvic Floor Dysfunction During and After Pregnancy: Pathophysiology, Risk Factors and Current Management Strategies

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ABSTRACT

Pelvic floor dysfunction (PFD) is a frequent yet underrecognized complication of pregnancy and the postpartum period. It includes stress urinary incontinence, fecal incontinence, pelvic organ prolapse, chronic pelvic pain, and sexual dysfunction, all of which may persist long-term and significantly impair quality of life. The pathophysiology is multifactorial. The pelvic floor's foundation is often already under significant strain well before delivery, as the growing uterus and rising abdominal pressure slowly stretch and weaken its support. This baseline vulnerability is usually pushed to the limit during a vaginal birth—especially if labor is slow or instruments like forceps are needed—which can lead to serious injuries like levator ani avulsion or nerve damage. While we know that factors like maternal age, obesity, and the baby's weight drive the risk higher, it's a mistake to think a C-section is a perfect shield. It might reduce the likelihood of certain issues, but it certainly doesn't eliminate the risk entirely. While prevention is now the gold standard, largely thanks to the proven benefits of antenatal PFMT, the clinical focus must pivot to specialized rehab the moment a disorder is identified. We're no longer guessing at the extent of the damage, either. The integration of high-resolution imaging—think pelvic floor ultrasound and MRI—now allows for a granular look at structural integrity, giving doctors the precision they need to guide effective treatment. Raising clinical awareness and implementing early management can lessen the long-term burden of PFD, improving quality of life and reproductive health outcomes for women.

Keywords: Pelvic floor dysfunction, pregnancy, postpartum, urinary incontinence, physiotherapy

1. INTRODUCTION

Pelvic floor dysfunction (PFD) during pregnancy and the postpartum period is a prevalent, multifactorial medical condition that significantly affects the quality of life of women but is usually overlooked in routine perinatal care. The pelvic floor is a dynamic and complicated group of muscles, ligaments, and connective tissues that form the pelvic basin and support the bladder, uterus, and rectum, among other vital organs. Its integrity is required to preserve urinary and fecal continence,

supply organ support, facilitate childbirth, and support sexual function and core stability (Tim and Mazur-Bialy, 2021).

Pregnancy significantly changes the architecture of the pelvic floor, and this change is the result of both physical and hormonal factors. The constant downward pressure of the growing fetus on the pelvic floor is a mechanical factor that results in the stretching of the supportive structures of the pelvic floor. However, the mechanical factor alone is not the only factor that results in the weakening of the pelvic floor; there is also the role of hormones, which results in the physiological weakening of the supportive structures of the pelvic floor, leading to a significant decrease in their tensile strength. For this reason, the pelvic floor is already weakened before the mechanical trauma of childbirth begins (Daneau et al., 2025). The real breaking point, though, comes in the course of labor itself. If the second stage of the process takes too long, or if tools such as forceps must be used to deliver a larger baby, these structures, which have already been weakened, can reach their maximum limit. This explains why the postpartum period is so frequently marked by pelvic symptoms that, for many, don't just disappear with time.

The actual scale of this issue is often lost in the noise of general maternal care. The actual prevalence of these conditions is often underestimated in clinical settings. According to the data, stress urinary incontinence isn't an outlier—it affects between 30% and 40% of women after a vaginal birth (Moossdorff-Steinhauser et al., 2021). The risk profile shifts sharply when we look at patients who sustained severe perineal lacerations or sphincter damage; in these cases, the incidence of fecal incontinence climbs to a significant 10–15%. These figures highlight a clear disconnect between the frequency of these injuries and the level of attention they typically receive during postpartum follow-ups. (Sharma and Rao, 2020). Then there is pelvic organ prolapse—a frequent consequence of delivery that is notorious for staying 'under the radar' for years before symptoms finally flare up. Perhaps the biggest hurdle is that these symptoms are so frequently dismissed as 'just part of motherhood' by both clinicians and patients, creating a cycle of silence and chronic underdiagnosis. It's estimated that over 50% of women presenting with pelvic floor symptoms never go for medical assessment or treatment, either because they are embarrassed or because they believe that these symptoms are a natural part of having given birth (Fante et al., 2019).

Apart from the physical symptoms, PFD has a significant effect on psychosocial health. Lower self-esteem, socially or physically evading activities, compromised sexual relationships, and reduced global quality of life are the most frequent experiences in PFD women. These effects are particularly concerning during the postpartum period, which is already an emotionally and physically demanding period (Verbeek and Hayward, 2019). Research has also linked PFD to increased risk of postpartum depression and anxiety, theorizing a bidirectional relationship between somatic symptomatology and mental health. Furthermore, yet to be resolved pelvic floor problems can cause long-term morbidity, affecting the woman's health far beyond the immediate postpartum period and even into menopause (Swenson et al., 2018).

There is also the clinical misconception that pelvic floor disorders are related only to vaginal childbirth. It may be that choosing to have a C-section reduces the statistical probability of certain acute injuries from occurring, but this is hardly a guarantee (Handa et al., 2011). The fact of the matter is that the pelvic structure starts to change long before the actual process of childbirth ever begins. By the second trimester, many women experience the urge to urinate or actual leakage of urine—thus demonstrating that the sheer physical burden of pregnancy alone is enough to cause dysfunction. According to a review of the National Guideline Alliance, risk factors for developing PFD are numerous and include maternal age over 30, obesity, chronic constipation, high parity, fetal position during labour, and prior pelvic floor injury. There is also growing interest in the role of genetic predisposition and tissue composition in determining individual susceptibility.

Despite the growing literature on the subject, though, there continues to be a deficit to translate this information into routine clinical practice. Antenatal management will generally focus on fetal health and labor preparation, and little thought is given to preservation of the pelvic floor. Follow-up postpartum, especially beyond the traditional six-week visit, rarely includes a systematic assessment of pelvic function unless overtly symptomatic. However, there is mounting evidence that early intervention with supervised PFMT, patient education, and one-on-one physiotherapy can reduce the occurrence and severity of PFD symptoms when implemented during pregnancy or shortly after delivery (Woodley et al., 2020).

The significance of pelvic floor health as a key component of women's reproductive health is becoming more acknowledged. Professional associations such as the International Urogynecological Association and the American College of Obstetricians and Gynecologists have in recent times emphasized the importance of routine screening, counseling, and management of the disorders. As the global burden of pelvic floor disorders speeds up in tandem with increasing maternal age and obesity, evidence-based methods must be incorporated into standard obstetric and postpartum care pathways urgently.

This review aims to provide a entire summary of the available evidence on the subject of pelvic floor dysfunction in pregnancy and its status postpregnancy. It will discuss the pathophysiological mechanisms, modifiable and non-modifiable risk factors, current diagnostic methods, and management of the condition. Emphasis will be placed on the detection, prevention, and management of preterm births to improve the outcomes of the affected women. By optimizing clinical vigilance and anticipatory care, clinicians can reduce the burden of pelvic floor disorders and optimize women's physical and psychological recovery during the perinatal period.

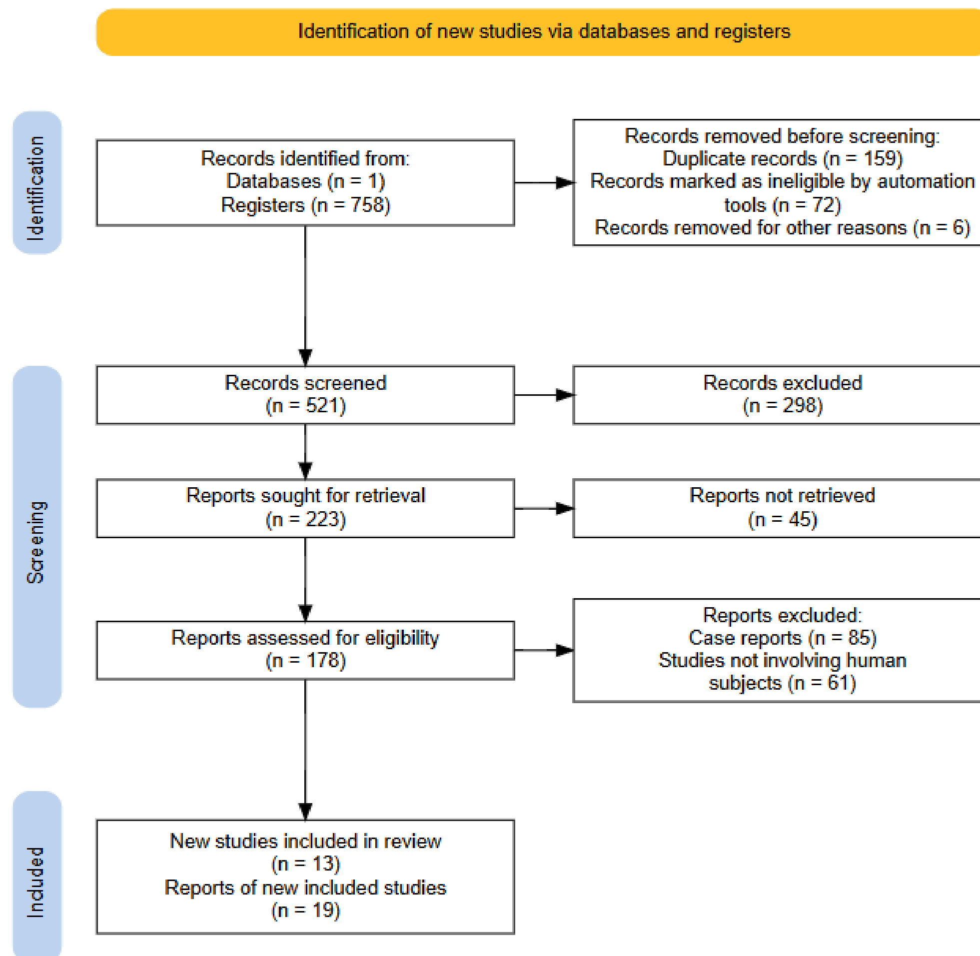

Figure 1. Flow chart

2. REVIEW METHODS

This systematic review is based on a systematic and specific search of peer-reviewed medical literature on pelvic floor dysfunction in pregnancy and the postpartum period. It was with the aim of exploring the pathophysiological mechanisms, risk factors, clinical presentation, and modern treatment modalities, with special focus on urinary incontinence and physiotherapeutic management.

Research articles published in the open-access medical databases, mostly PubMed, with various combinations of the keywords "pelvic floor dysfunction," "pregnancy," "postpartum," "urinary incontinence," and "physiotherapy" were considered for the review. The articles published between January 2001 and February 2025 were considered, giving more importance to original research articles, systematic reviews, meta-analysis, and clinical guidelines published in the English language. Titles and abstracts were reviewed for relevance of topic, and full-text articles were read where relevant.

The included publications were selected based on their direct relevance to the physiological and clinical aspects of pelvic floor disorders during and after pregnancy. Emphasis was placed on current evidence that may inform best practices in early diagnosis, prevention, and conservative management. The primary reason for the bias in this study may be the limited number of participants. A relatively small sample size may limit the generalizability of the findings. Additionally, the restricted number of available studies on this topic and the lack of randomization in some of the included research may introduce potential bias (Figure 1).

3. RESULTS AND DISCUSSION

Classification of Postpartum Pelvic Floor Disorders

Stress urinary incontinence

Stress urinary incontinence is the leakage of urine that happens when a person coughs, sneezes, or exercises. According to the study, stress incontinence resulted in 16.6% of the women experiencing it within 3 to 6 months after delivery. The risk factors were the number of child deliveries, perineal damage, high infant birth weights, and hard physical job activities. SUI had a statistically significant negative impact on women's sexual satisfaction. Despite common assumptions, it also affects young women, not just the elderly. Preventive measures like pelvic floor muscle exercises (e.g., Kegel's) are recommended to mitigate symptoms and improve quality of life (Stadnicka et al., 2019).

Pelvic organ prolapse (POP)

Pelvic organ prolapse (POP) is a condition where pelvic organs, including the bladder, uterus, or rectum, fall into or out of the vaginal canal due to weak pelvic floor muscles. According to the study, 4.9% of the women involved were experiencing symptoms of POP, which are best described as a bulge or sensation of something falling out of the vagina. POP was found to be significantly associated with higher parity, i.e., the number of vaginal births, as well as increased body mass index (BMI). However, it was not found to be associated with age, smoking, or co-morbidities. Although some women presented for medical care, only a small percentage underwent surgical procedures, and the symptoms persisted even after surgery (Gabra et al., 2022).

Perineal pain and dyspareunia

Dyspareunia, or painful vaginal sex, is a common problem among women in pregnancy as well as in the postpartum period. In the present study, first-time mothers were followed from mid-pregnancy to 24 months postpartum, and two distinct patterns of pain were identified: minimal and moderate dyspareunia. About 21% of participants experienced moderate levels of pain, which peaked at three months postpartum and then declined, but often persisted up to two years. Biomedical variables such as delivery mode and breastfeeding did not have a significant predictive effect on pain levels. Psychological variables, such as pain catastrophizing at three months postpartum, were strongly linked to the presence of moderate dyspareunia, which suggests the need to assess psychological variables early in the postpartum period (Rosen et al., 2022)

Diastasis recti abdominis and its impact on the pelvic floor

Diastasis recti abdominis (DRA) is the pathological separation of the muscles of the rectus abdominis caused by weakening and lengthening of the linea alba, which is the connecting tissue along the abdominal midline. DRA is most commonly associated with conditions that increase intra-abdominal pressure, such as pregnancy, obesity, or old age. DRA, as an inter-rectal distance (IRD) > 2 cm at 3 cm above the navel, in 57% was found in the general population of adults in this study. Risk factors identified included older age, higher BMI, and parity. The study suggests revising current diagnostic thresholds to avoid overtreatment (Kaufmann et al., 2022).

Table 1. Classification of Postpartum Pelvic Floor Disorders and Associated Clinical Features

Type of disorder	Definition / Description	Prevalence / Key Findings	Risk Factors	Reference
Stress urinary incontinence (SUI)	Involuntary leakage of urine during activities that increase intra-abdominal pressure (e.g., coughing, sneezing, exercise).	16.6% prevalence within 3–6 months postpartum. Significantly impacts sexual satisfaction.	Parity, perineal trauma, high birth weight, and physically demanding work.	Stadnicka et al., 2019

Pelvic organ prolapse (POP)	Descent of pelvic organs (bladder, uterus, rectum) into the vaginal canal due to weakened pelvic support structures.	4.9% reported POP symptoms. Associated with a bulging sensation. Surgery is sought by few women.	High parity, elevated BMI.	Gabra et al., 2022
Perineal pain and dyspareunia	Pain during vaginal intercourse. Often begins after childbirth and may persist long term.	21% experienced moderate dyspareunia. Symptoms peak at 3 months, persist up to 24 months.	Psychological factors (e.g., pain catastrophizing) are not a delivery mode.	Rosen et al., 2022
Diastasis recti abdominis (DRA)	Separation of the rectus abdominis muscles along the linea alba, leading to abdominal wall weakness and potential pelvic floor impact.	Present in 57% of the general adult population (IRD > 2 cm). Common in postpartum women.	Older age, higher BMI, parity.	Kaufmann et al., 2022

Diagnostics of Pelvic Floor Dysfunction

Importance of medical history and questionnaires

A thorough medical history is central to the diagnosis of pelvic floor disorders (PFDs). It unmasks patterns of symptoms, risk factors such as delivery or surgery, and impacts on functioning. It helps in further evaluation, selection of diagnostic tests, and creation of a treatment plan tailored to the patient (Table 1).

Apart from that, the Pelvic Floor Disability Index (PFDI-20) and the Pelvic Floor Impact Questionnaire-Short Form 7 (PFIQ-7) are validated self-report instruments used extensively in the clinical assessment and research of pelvic floor disorders (PFDs). The PFDI-20 is aimed at detecting the presence and degree of targeted pelvic floor symptoms in three categories: pelvic organ prolapse (POPDI-6), colorectal-anal dysfunction (CRADI-8), and urinary symptoms (UDI-6). Each item is scored from 0 to 4 based on the degree of bother, such that clinicians can tally symptom burden and modify management accordingly. The PFIQ-7, however, measures the impact of bladder, bowel, and vaginal symptoms on a woman's quality of life in terms of everyday activities, travel, social relationships, and emotional state. Responses in the PFIQ-7 are recorded across three domains—urinary, colorectal-anal, and vaginal/pelvic impact—and use a scale from “not at all” to “quite a bit,” with scores calculated to reflect the extent of life disruption caused by pelvic floor dysfunction. Together, these tools provide a comprehensive understanding of both the symptomatology and the psychosocial consequences of PFDs. They play an important role in the diagnostic process and in the evaluation of results in clinical trials and practice, making it possible to devise the therapeutic strategy and evaluate the efficacy of the therapeutic intervention. The complementary nature of the PFDI-20, which focuses on symptoms, and the PFIQ-7, which focuses on quality of life, highlights the importance of the two questionnaires in the holistic assessment of the pelvic floor health.

Physical examination – POP-Q scales, Kegel muscle strength assessment (Oxford scale)

Pelvic Organ Prolapse Quantification (POP-Q) is a standard and objective method for evaluating and grading the degree of pelvic organ prolapse. Based on the article, the method includes precise measurements made at exact points on the vaginal wall during a physical exam, using the hymen as a landmark. The method quantitatively measures the degree of organ prolapse in centimeters and grades the prolapse from no prolapse (Stage 0) to complete evertion of the vagina (Stage IV). POP-Q enhances reproducibility and

communication between clinicians and is considered the gold standard for evaluating and documenting the severity of pelvic organ prolapse (Persu et al., 2011)

It also has the Modified Oxford Scale, a clinical tool applied in pelvic floor muscle (PFM) strength testing by digital vaginal examination. It scores contractions between 0 (no contraction) to 5 (firm contraction), enabling diagnosis and follow-up of pelvic floor dysfunction by objectively measuring muscle function.

The importance of ultrasound in diagnostics

Ultrasound scanning, especially three- and four-dimensional transperineal ultrasonography, is central to the diagnosis of pelvic floor disorders, as it offers the opportunity for the objective assessment of the integrity of the levator ani muscle (LAM). The imaging technique employed for the detection of the relevant defects in the levator ani muscle was tomographic ultrasonography, as the relevant defects include complete or partial avulsion of the muscle from the pubic bone, an established risk factor for pelvic organ prolapse. Ultrasound scans were also done at 6 weeks and 1 year postpartum to assess the reduction in the prevalence of defects over time, which was observed to be 50%. This implies that early postpartum assessment may overstate the extent of damage, likely due to transient tissue changes and false positives in the early postpartum period. Chronic LAM defects were associated with established obstetric risk factors such as vacuum delivery, prolonged second stage of labor, and heightened neonatal birthweight. The study highlights the importance of ultrasound use in longitudinal monitoring, accurate diagnosis, and explanation of natural healing of pelvic floor damage, thereby informing both prognosis and tailored postpartum management plans (Halle et al., 2020).

Conservative Management

Urogynecological physiotherapy

Physiotherapy plays a critical and diverse part to play in the management of pelvic floor dysfunction (PFD) as suggested by the findings of both studies in question. Pelvic floor muscle training (PFMT), neuromuscular electrical stimulation (NMES), and behavior treatment have been found to be effective physiotherapeutic interventions.

The study done by Kurt et al., (2024) aimed at evaluating the effect of external NMES on female participants experiencing urgency urinary incontinence (UUI), a pelvic floor dysfunction. The results obtained from this study indicated that NMES had a positive effect on urinary symptoms, pelvic floor muscle strength (PFMS), quality of life (QoL), as well as sexuality, showing excellent patient satisfaction. These improvements were likely to be the result of enhanced reeducation of muscles and neural modulation with NMES, which may affect detrusor hypersensitivity and cortical control mechanisms.

In parallel, the systematic review analyzed physiotherapy approaches in children with monosymptomatic nocturnal enuresis (a condition related to pelvic floor dysfunction). They found that interventions like electrostimulation, PFMT, and behavioral therapy—especially when combined—resulted in significant improvements in bladder volumes and reductions in enuretic episodes. These strategies, including transcutaneous and intra-anal electrical stimulation, enhanced pelvic floor neuromuscular control and contributed to bladder function normalization (Pinto et al., 2024).

Together, the studies underline that physiotherapy—through structured exercises, neuromodulation, and behavioral management—offers a safe, non-invasive, and effective option in managing various forms of pelvic floor dysfunction.

Biofeedback

Biofeedback pelvic floor muscle training (PFMT) plays a significant role in the conservative treatment of pelvic floor dysfunction, particularly in women with dysfunctional voiding (DV). This study confirmed the effectiveness of a systematic biofeedback PFMT program over 3 months, with successful outcomes for over 80% of participants based on clinical symptoms, quality of life, and uroflowmetry values. The treatment program used electromyographic feedback in real time to ensure relaxation and contraction of the pelvic floor muscles. The exercises were also tailored for the patients to relieve muscle hypertonicity. The treatment program resulted in a significant increase in maximum urinary flow rate, voided volume, bladder capacity, and voiding efficiency. The treatment also resulted in a decrease in voiding time and an improvement in the pattern of the urine flow curve. Nonetheless, a history of recurrent urinary tract infections within the past year was associated with poorer outcomes, suggesting the need for patient-specific treatment in those cases. Overall, biofeedback PFMT is a successful, non-invasive treatment option for female pelvic floor dysfunction (Chiang et al., 2021).

Surgical treatment

Surgical repair of pelvic floor dysfunction (PFD) is reserved for women who present with the major symptoms, particularly in those cases where conservative therapy has failed or whose quality of life is being affected by important anatomical defects. Frequently, symptomatic organ prolapse of stage II or more, incontinence that persists despite pelvic floor muscle training, and severe enterocele or rectocele with obstructed defecation are the indications. Recurrence of the prolapse or a failed repair is also an indication to be offered surgery to the patient (Barbier et al., 2023).

Colporrhaphy, both anterior and posterior, continues to be one of the most common native tissue repairs, especially in the management of cystocele and rectocele. It has a low morbidity rate and a good success rate in selected cases (Yamada et al., 2001). Pessary therapy is also a common alternative or bridge to surgical management. Pessaries can effectively reduce prolapse symptoms and are often recommended in women who are poor surgical candidates or wish to delay operative intervention (Jones and Harmanli, 2010).

Synthetic mesh is now a component of the reconstructive surgery of the pelvis, particularly for apical prolapse. Sacrocolpopexy, and more so by the abdominal or laparoscopic approach, has been described as the most significant in securing anatomical success with uterine or vault prolapse (Ganatra et al., 2009). Still, the trend in the use of transvaginal mesh has been controversial owing to complications associated with it, such as mesh erosion, infection, dyspareunia, and reoperation (Shah and Badlani, 2012).

Due to these risks, the present guidelines are to limit vaginal mesh use to only carefully selected high-risk patients and to have experienced surgeons who can offer adequate patient counseling perform procedures. While mesh may reduce anatomical recurrence compared to native tissue repair, functional outcomes such as quality of life and sexual function are not considerably different (Ellington and Richter, 2013).

Surgically, PFD treatments must be tailored in accordance with the severity and type of dysfunction, patient preference, comorbidities, and risk tolerance. This requires a multidisciplinary strategy that incorporates urogynecology, physiotherapy, and counseling to optimize long-term outcomes.

Prevention and Peripartum Care

Education of pregnant women

One of the preventive measures is education. Pregnant women need to be educated regarding anatomy, normal risks of pelvic floor dysfunction, as well as self-care techniques, which need to be incorporated during routine prenatal care visits. NICE guidelines have emphasized the need to create awareness among pregnant women regarding the risks of pelvic floor dysfunction using printed materials, electronic media, as well as routine antenatal care to reduce the lifetime risks of pelvic floor dysfunction, as stated in the London (NICE, 2021) guidelines.

Pelvic floor muscle training during pregnancy and postpartum

Pelvic floor muscle training (PFMT) is recommended to be conducted during and after pregnancy. Antenatal PFMT has been found to have a 62% reduced risk of urinary incontinence during late pregnancy and a 29% reduced risk up to six months postpartum when supervised, according to systematic reviews (Salmon et al., 2020). According to the Cochrane data, PFMT is recommended for the management of urinary incontinence and pelvic organ prolapse, especially when started early, to prevent the conditions from developing (NICE, 2021). Group-based PFMT conducted by midwives or physiotherapists is effective and helps build muscle strength and muscle coordination (Yang et al., 2022). For the early postpartum period, electrical stimulation and biofeedback methods are used to promote recuperation through the provision of the best muscle reeducation (Selman et al., 2022).

Importance of optimal delivery management

The method and manner of labor are critical in determining outcomes in the pelvis. Antenatal perineal massage and pelvic floor preparation at 32 weeks have been shown to decrease rates of episiotomies and severe perineal trauma (Leon-Larios et al., 2017). Decreasing perineal trauma during delivery helps in quick recovery and minimizes complications in the pelvis.

Roles of midwives and physiotherapists in prevention and early intervention

Antenatal and postnatal care provided by midwives as well as physiotherapists is also essential. The midwife-led program is effective in improving the compliance rate of PFMT as well as reducing cases of urinary incontinence following delivery (MacArthur et al.,

2025). Physiotherapists can provide useful in vivo observations for ensuring proper technique is employed during training as well as for the prevention of muscle tone abnormalities such as hypertonicity. Moreover, it is noted that the application of the dual model for nursing education as well as PFMT for older age groups is effective in ensuring the best results for the recovery of the pelvic floor muscles. The model is effective in ensuring the best results for the patient experiencing PFD symptoms as it also provides a better patient experience (Huang et al., 2024).

4. CONCLUSION

This review aims to provide an overview of the existing evidence regarding diagnosis, management, and prevention of PFDs in the postpartum period. Most common PFDs include stress urinary incontinence, pelvic organ prolapse, dyspareunia, and diastasis recti abdominis. The incidence of SUI was identified to affect 16.6% of the population within 3–6 months after delivery and was associated with parity, perineal trauma, higher infant birth weight, and physically demanding work, which had a negative impact on sexual satisfaction. Similarly, the incidence of POP was identified to affect 4.9% and was significantly associated with higher parity and higher BMI. Dyspareunia had two patterns: the incidence of moderate dyspareunia was identified to affect 21% of the population, and psychological factors such as pain catastrophizing were related to the incidence of dyspareunia up to 24 months postpartum. DRA was identified to affect 57% of the population and was related to age, BMI, and parity.

To make the diagnosis, there is a need to adopt a holistic approach that includes medical history, questionnaires such as PFDI-20 and PFIQ-7, physical examination tools like the POP-Q system and the Modified Oxford Scale, and imaging techniques. Transperineal ultrasound allows the integrity of the levator ani muscle to be evaluated, with longitudinal studies showing a decline in the incidence of defects from 6 weeks to 1 year after delivery.

Conservative management is strongly encouraged. Physiotherapy of the pelvic floor, such as pelvic floor muscle training, neuromuscular electrical stimulation, behavioral therapy, and biofeedback have all been proven to be effective in the management of symptoms, muscle strength, quality of life, and neuromuscular coordination. Surgical management of pelvic floor disorders is indicated in women who have severe symptoms and anatomical abnormalities and whose condition does not respond to conservative management. Preventive management includes antenatal education, supervised pelvic floor muscle training, and delivery techniques.

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Authors' Contributions

Conceptualization: Sara Hassan, Szymon Bienia
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Writing – review & editing: Sara Hassan, Szymon Bienia
All authors have read and agreed with the final, published version of the manuscript.

Informed consent

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Ethical approval

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Conflict of interest

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Data and materials availability

All data associated with this study will be available based on the reasonable request to corresponding author.

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