

UNDERSTANDING THE IMPACT OF MENOPAUSE ON PELVIC FLOOR DYSFUNCTION: A LOCALIZED PERSPECTIVE IN NGASEM DISTRICT, KEDIRI REGENCY, EAST JAVA

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Background: Pelvic floor dysfunction (PFD) is a prevalent condition among menopausal women, characterized by pelvic organ prolapse, urinary incontinence, and fecal incontinence. Menopause, along with factors such as body mass index (BMI), parity, and mode of delivery, has been associated with an increased risk of PFD. However, limited studies have explored these relationships in Indonesian populations, particularly in Ngasem District, Kediri Regency, where a significant proportion of women are at risk.

Aim: This study aims to analyze the correlation between menopause, BMI, parity, and mode of delivery with pelvic floor dysfunction in women over the age of 50 in Ngasem District, Kediri Regency.

Method: A cross-sectional analytical study was conducted on 361 menopausal women aged over 50, selected through purposive sampling. Data were collected using structured questionnaires, including sociodemographic data and the Indonesian version of the Pelvic Floor Distress Inventory-20 (PFDI-20). Statistical analysis was performed using Spearman's rank correlation, Mann-Whitney, and Kruskal-Wallis tests with a significance level of $p < 0.05$.

Result: The results of this study indicate a significant correlation between menopause and pelvic floor dysfunction (PFD), with menopausal women experiencing higher PFDI-20 scores compared to non-menopausal women. Mode of delivery also showed a significant association with PFD, where women who underwent cesarean or mixed delivery methods had a higher risk of dysfunction compared to those who had spontaneous vaginal deliveries. However, other factors such as BMI and parity did not demonstrate a statistically significant impact on PFD incidence.

Conclusion: Menopause and mode of delivery play a key role in PFD among women over 50 in Ngasem District. These findings emphasize the need for early detection, preventive strategies, and pelvic floor rehabilitation programs to improve women's health.

Keywords: Menopause, Pelvic Floor Dysfunction, Parity, Body Mass Index, Mode of Delivery

ABSTRAK

Latar Belakang: Disfungsi dasar panggul (DPP) merupakan kondisi yang umum terjadi pada wanita menopause, ditandai dengan prolaps organ panggul, inkontinensia urin, dan inkontinensia fekal. Menopause, bersama dengan faktor-faktor seperti indeks massa tubuh (IMT), paritas, dan cara persalinan, telah dikaitkan dengan peningkatan risiko DPP. Namun, penelitian yang terbatas telah mengeksplorasi hubungan ini pada populasi Indonesia, khususnya di Kecamatan Ngasem, Kabupaten Kediri, di mana sebagian besar wanita memiliki risiko.

Tujuan: Penelitian ini bertujuan untuk menganalisis korelasi antara menopause, IMT, paritas, dan metode persalinan dengan disfungsi dasar panggul pada wanita berusia di atas 50 tahun di Kecamatan Ngasem, Kabupaten Kediri.

Metode: Penelitian analitik cross-sectional dilakukan pada 361 wanita menopause berusia di atas 50 tahun, yang dipilih melalui purposive sampling. Data dikumpulkan menggunakan kuesioner terstruktur, termasuk data sosiodemografi dan Pelvic Floor Distress Inventory-20 (PFDI-20) versi Indonesia. Analisis statistik dilakukan dengan menggunakan uji korelasi peringkat Spearman, Mann-Whitney, dan Kruskal-Wallis dengan tingkat signifikansi $p < 0,05$.

Hasil: Hasil penelitian ini menunjukkan adanya korelasi yang signifikan antara menopause dan disfungsi dasar panggul (PFD), dengan wanita menopause mengalami skor PFDI-20 yang lebih tinggi dibandingkan dengan wanita non-menopause. Metode persalinan juga menunjukkan hubungan yang signifikan dengan PFD, di mana wanita yang menjalani operasi caesar atau metode persalinan campuran memiliki risiko disfungsi yang lebih tinggi dibandingkan dengan mereka yang melahirkan secara spontan per vaginam. Namun, faktor-faktor lain seperti BMI dan paritas tidak menunjukkan dampak yang signifikan secara statistik terhadap kejadian PFD.

Kesimpulan: Menopause dan metode persalinan memainkan peran kunci dalam PFD di antara wanita berusia di atas 50 tahun di Distrik Ngasem. Temuan ini menekankan perlunya deteksi dini, strategi pencegahan, dan program rehabilitasi dasar panggul untuk meningkatkan kesehatan wanita.

Kata kunci: Menopause, Disfungsi Dasar Panggul, Paritas, Indeks Massa Tubuh, Metode Persalinan

1. INTRODUCTION

The aging process is a natural phase of human life, categorized into different age groups: pre-elderly (45-59 years), elderly (60-69 years), and high-risk elderly (≥ 70 years or those aged ≥ 60 years with health problems) according to the Indonesian Ministry of Health¹. Aging is an inevitable demographic phenomenon affecting population structures worldwide, with the proportion of people aged ≥ 60 years reaching one-sixth of the global population². In Indonesia, the percentage of elderly individuals increased from 7.59% in 2010 to 10.82% in 2021, with women constituting 51.81% of the elderly population^{3,4}. A significant health concern among aging women is pelvic floor dysfunction (PFD), which affects 25% of women and 33% of older women in the United States⁵. A study conducted at Dr. Cipto Mangunkusumo Hospital, Indonesia, reported a PFD prevalence of 33%, with pelvic organ prolapse (POP), urinary incontinence (UI), and fecal incontinence (FI) affecting 26.4%, 15.3%, and 2.5% of women, respectively⁶. PFD is associated with aging-related atrophic changes in pelvic muscles, where the tissue deteriorates and is replaced by adipocytes, leading to muscle weakening⁷. Despite its high prevalence, PFD is often underdiagnosed, necessitating increased awareness of the condition and its risk factors⁸. Menopause, defined as the permanent cessation of menstruation due to estrogen deficiency, is a major risk factor for PFD⁹. Estrogen decline disrupts the hypothalamic-pituitary-ovarian axis, leading to endometrial atrophy and cessation of menstrual cycles⁹. The reduction in estrogen also weakens pelvic floor musculature, increasing susceptibility to POP, UI, and FI, ultimately affecting the quality of life of menopausal women¹⁰. Thus, understanding the impact of menopause on pelvic floor function is crucial in developing targeted interventions for this demographic¹¹.

Ngasem District, Kediri Regency, East Java, is a region with a high elderly population, with 33,533 women aged ≥ 50 years out of a total population of 66,974¹². The region has established monthly elderly healthcare services (Posyandu Lansia) and follows a Penta-helix collaboration model involving government, academia, businesses, media, and communities to improve healthcare service¹³. However, despite these facilities, local studies on menopause-related PFD remain scarce. Research on menopause and pelvic floor function has been conducted in various populations, but localized studies considering unique demographic,

cultural, and lifestyle factors in Ngasem District are lacking. Previous research has examined different aspects of PFD risk factors, such as BMI, parity, and method of delivery, but there is limited data on their combined influence on menopausal women in this region¹⁴⁻¹⁸. For instance, studies have linked increased BMI with higher PFD risk due to increased intra-abdominal pressure¹⁵. Similarly, vaginal deliveries, particularly those involving prolonged labor, forceps use, or perineal trauma, have been associated with greater PFD risk compared to cesarean sections^{16,17}. Parity also influences pelvic floor integrity, with multiparous women having a higher likelihood of developing PFD compared to nulliparous women¹⁸. However, the extent to which these factors collectively impact menopausal women in Ngasem District remains unexplored. Therefore, this research aims to assess the impact of menopause, BMI, parity, and method of delivery on PFD among women aged ≥ 50 years in this region.

2. METHOD

This study employs a cross-sectional analytical design with primary data collection on menopausal women in Ngasem District, Kediri Regency, East Java. The study population includes women aged ≥ 50 years residing in the district, with a total population size of 7,146¹⁹. The inclusion criteria consist of women aged ≥ 50 years who have lived in Ngasem District and provided informed consent, while exclusion criteria include individuals with a history of pelvic injury or those who withdrew during the study. A sample size of 361 was determined using a formula for cross-sectional studies with finite populations, incorporating a 10% dropout rate²⁰. The study instrument comprises a structured questionnaire with four sections: informed consent, sociodemographic data, menopausal status, and the Indonesian Pelvic Floor Distress Inventory-20 (PFDI-20) questionnaire, which assesses PFD symptoms²¹.

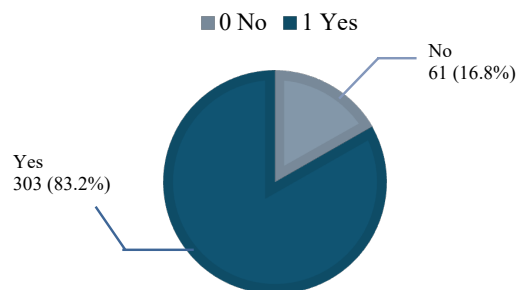
Data analysis was conducted using SPSS Statistics with both descriptive and inferential analyses. Descriptive analysis summarized the demographic characteristics of the participants, while inferential analysis assessed associations between independent variables and PFD using Spearman's rank correlation, Mann-Whitney, and Kruskal-Wallis tests, with statistical significance set at $p < 0.05$ ²². Ethical approval was obtained from the Ethics Committee of the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, under reference number KE/FK/0769/EC/2024.

3. RESULT AND DISCUSSIONS

A total of 364 women aged 51–71 years participated in the study. Based on this population, researcher found that 303 of the subject samples already had their menopause and 61 have not entered the menopause stage but have initial symptoms that indicate they have entered the perimenopause phase such as irregular menstrual cycle and low libido. Consequently, total data that fulfils both inclusion and exclusion criteria of this study is 364 women.

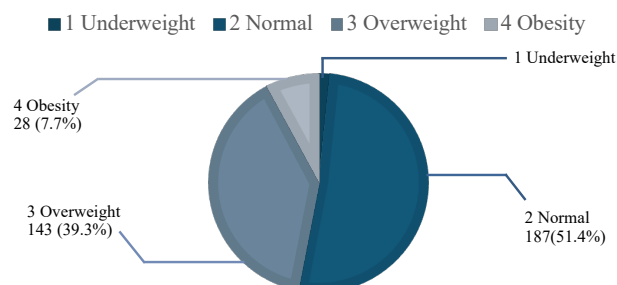
3.1. Univariate Analysis

Figure 1. Sample Distribution Based on Menopausal Period



The participants were predominantly aged between 51 and 55 years, with 60% reporting having entered menopause in the past 1-5 years. The majority (70%) were housewives, while the rest were involved in farming or small business activities. The participants' education levels varied, with 40% having completed primary school, 35% secondary school, and the remaining 25% having at least some higher education.

Figure 2. Sample Distribution Based on BMI



The majority of women aged 50 and above fall into the normal and overweight BMI categories due to age-related physiological changes and lifestyle adaptations. As women age, particularly after menopause, they commonly experience a decline in lean body mass, which involves the loss of muscle mass and strength. This natural process, combined with hormonal changes during menopause, often leads to fat redistribution, particularly an increase in abdominal fat, even if overall weight remains relatively stable²³. These changes result in a higher body fat percentage, which can influence BMI classifications.

Sample distributions based on parity of this study are stated in Figure 3 below. It is apparent that 95.3% of the subjects has given birth with a gestational age of at least 20 weeks for at least one time. This number is followed by nullipara with the total of 17 subjects (4.7%). This table shows that the majority of the subjects are multiparous.

Figure 3. Sample Distribution Based on Parity

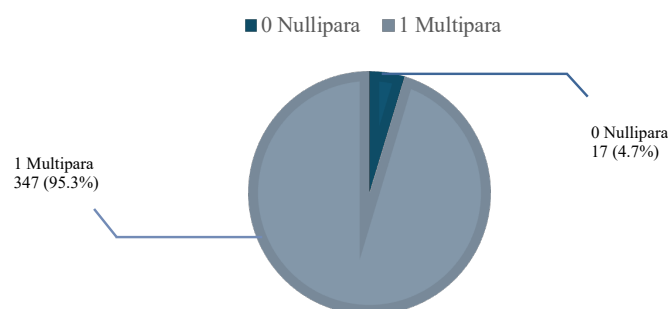


Figure 4 presents the sample distributions based on method of delivery that has been experienced by the participants. The majority had spontaneous delivery, followed by caesarean delivery and mixed delivery method with the incidence frequency of 268 (73.6%), 41 (11.3%), and 38 (10.4%) respectively. Researcher use the mixed delivery method categorization to describe women who have experienced more than 1 type of delivery during their lifetime. It was found that none of the participants had artificial delivery method such as the usage of vacuum or forceps during delivery.

Figure 4. Sample Distribution Based on Delivery Method

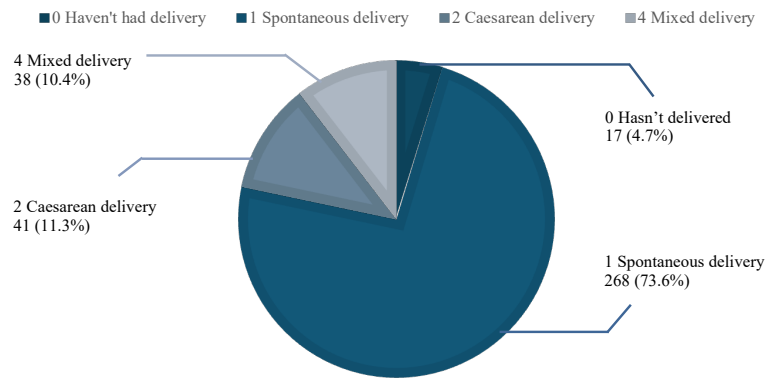


Table 1 describes the PFDI-20 score which evaluates the degree of discomfort experienced by individuals due to pelvic floor dysfunction (PFD)²¹. Each subscale score is determined by calculating the average of the summed item scores within the subscale, then multiplying this average by 25. The overall PFDI-20 score is obtained by summing the scores from all three subscales, where higher scores signify a greater impact from PFD symptoms²⁴. Study results indicated a minimum score of 0, reflecting no PFD symptoms, and a maximum of 221.88 out of a possible 300. The average score observed was 28.74, with a relatively high variation across individuals.

Table 1. Descriptive Statistics of PFDI-20 Score

	N	Minimum	Maximum	Mean	Std. Deviation
PFD	364	.00	221.88	28.7420	33.95383
Valid N (listwise)	364				

3.2. Bivariate Analysis

3.2.1. Correlation Between BMI and Pelvic Floor Dysfunction

Table 2. Spearman Rank's Test Result for BMI and PFD

		BMI
PFD	Correlation Coefficient	-.086

Sig. (2-tailed)	.101
N	364

The analysis revealed a weak negative correlation between BMI and pelvic floor dysfunction (PFD), with a correlation coefficient of -0.086. However, this relationship was not statistically significant, as the p-value exceeded the standard threshold for significance ($p = 0.101$), in which is $p < 0.05$. These findings suggest that variations in BMI may not have a meaningful impact on the occurrence of PFD in this study's population. This aligns with prior research²⁵ indicating that while BMI can influence pelvic floor health, its role may vary depending on other factors, such as age or lifestyle.

The study by Kenne et al. (2022) suggests that increased obesity, as measured by BMI, has a complex relationship with pelvic floor disorders (PFDs). The research found a clear positive association between higher BMI and an increased risk of urinary incontinence, indicating that obesity contributes to this condition. However, the study did not establish a significant link between obesity and pelvic organ prolapse (POP), suggesting that variations in BMI may not consistently influence POP occurrence across populations⁵. This statement is further supported by a review by Pomian et al. (2016) that explores the intricate and sometimes conflicting findings about the link between obesity, as indicated by Body Mass Index (BMI), and pelvic floor dysfunction (PFD)²⁵.

3.2.2 Correlation Between Mode of Delivery and Pelvic Floor Dysfunction

Table 3. Kruskal-Wallis Test Result for Mode of Delivery and PFD

PFD		N	Mean Rank
Method of Delivery	0 Hasn't delivered	85	216.39
	1 Spontaneous	217	166.96
	2 Caesarean	26	208.42
	4 Mixed	36	177.44
Total		364	

p-value: 0.00

note: 0 participant fell into group 3 artificial delivery method

Table 3 presents results from a Kruskal-Wallis test examining the relationship between delivery methods and pelvic floor dysfunction (PFD). The test revealed significant differences in the mean ranks of PFD across delivery modes ($p=0.001$). While spontaneous vaginal delivery was associated with the least pelvic floor damage, caesarean delivery showed a higher mean rank for PFD, likely due to factors like prolonged labor and surgical complications^{26,27}. Mixed delivery methods exhibited intermediate PFD outcomes, suggesting combined risks from both vaginal and caesarean deliveries²⁸. Interestingly, nulliparous women had a surprisingly high mean rank for PFD, challenging the assumption that they are less prone to pelvic floor issues, with non-obstetric factors such as obesity or chronic constipation potentially contributing to the increased risk²⁹.

The study also highlights the potential risks of artificial delivery methods like forceps and vacuum-assisted births. These techniques can cause direct damage to the pelvic floor muscles, leading to higher rates of conditions like urinary incontinence and pelvic organ prolapse. Forceps-assisted deliveries, in particular, have been linked to severe levator avulsion injuries, which weaken the pelvic floor³⁰. Cumulative risks associated with multiple artificial deliveries may also contribute to persistent pelvic pain and other dysfunctions, even with preventive measures such as episiotomy^{8,11}.

Contrary to established trends, the study found that individuals who have not undergone childbirth had the highest mean rank for PFD. This suggests that non-obstetric factors, such as obesity or chronic constipation, may contribute significantly to pelvic floor dysfunction in nulliparous women²⁹. The results also indicate that caesarean deliveries, while reducing direct trauma to the pelvic floor, do not fully eliminate the risk of dysfunction, especially when complicated by pre-existing labor conditions²⁷. Similarly, the mixed delivery group exhibited less severe PFD outcomes than expected, highlighting the need for further research to understand the various factors influencing pelvic floor health across different delivery modes²⁸.

3.2.3 Correlation Between Parity and Pelvic Floor Dysfunction

Table 4. Mann-Whitney Test Result for PFD and Parity

PFD		N	Mean Rank
Parity	0 Nullipara	15	202.83
	1 Multipara	349	181.63
	Total	364	

p-value: 0.438

When comparing PFD levels between nulliparous and multiparous women as seen in Table 4, no significant difference was observed ($p = 0.438$). Although the average rank for nulliparous women (202.83) was slightly higher than for multiparous women (181.63), the difference was not meaningful enough to suggest a strong connection between parity and PFD. These results imply that parity alone may not be a decisive factor in the development of PFD, supporting the idea that other elements, such as genetic predisposition or hormonal changes, could play a more critical role⁵.

3.2.4 Correlation Between Menopause and Pelvic Floor Dysfunction

Table 5. Mann-Whitney Test Result for PFD and Menopause

PFD		N	Mean Rank
Menopause	0 No	61	146.42
	1 Yes	303	189.76
	Total	364	

p-value: 0.003

This study found a significant association between menopause and pelvic floor dysfunction (PFD), with menopausal women showing a higher mean rank for PFD (189.76) compared to non-menopausal women (146.42), suggesting that menopausal women are more prone to PFD ($p=0.003$). Hormonal and physiological changes during menopause, particularly the decline in estrogen, play a critical role in influencing pelvic floor health³¹. The reduction in estrogen weakens pelvic muscles, reduces tissue elasticity, and impairs the functionality of supportive structures, contributing to conditions such as urinary incontinence and pelvic organ prolapse³².

Estrogen is vital for maintaining the structural integrity and function of pelvic floor tissues, and its decline during menopause leads to vaginal dryness, urinary incontinence, and increased susceptibility to pelvic organ prolapse³². Hormonal fluctuations during perimenopause can also cause instability in pelvic floor muscles, weakening support for pelvic organs and exacerbating the risk of PFD^{33,34}. These findings align with previous research and highlight the need for further investigation into how menopause, lifestyle factors, and preventive measures interact to influence pelvic floor health, with the goal of improving health outcomes and quality of life for menopausal women⁹.

4. CONCLUSIONS

The results indicate that menopause and method of delivery has an impact on the incidence of pelvic floor dysfunction in women above 50 who resides in Ngasem District with a statistically significant result. This research found a higher prevalence of PFD among menopausal women compared to non-menopausal women. For method of delivery, spontaneous delivery was found to be the least associated with PFD whereas caesarean and mixed deliveries demonstrates higher risks. However, other factors such as BMI and parity does not have an impact on the incidence of pelvic floor dysfunction in women above 50 who resides in Ngasem District, but the results are not statistically significant. These findings suggest that menopause is a critical factor influencing PFD prevalence, while other characteristics may play a less prominent role in this population.

5. SUGGESTIONS

This study suggests several strategies to improve pelvic floor health in menopausal women. These include establishing regular pelvic floor muscle training (PFMT) programs at community health centers, increasing awareness about PFD symptoms and prevention, and implementing routine screening for early detection. Educational workshops and screening tools, such as questionnaires and physical exams, could help women seek timely medical advice. Additionally, promoting lifestyle changes like a balanced, fiber-rich diet, hydration, and regular physical activity (e.g., yoga, pilates, walking) tailored for menopausal women can help reduce PFD risk. Community-based programs, such as "Healthy Menopause Clinics," could offer comprehensive services, including dietary counseling, exercise, and mental health support. Finally, further studies with larger sample sizes and a focus on lifestyle, diet, and

physical activity are needed to better understand the multifactorial nature of PFD in menopausal women.

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