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Comprehensive Survey of Pelvic Floor Dysfunction in Women in Rural Area of Jaipur: Insights from the PFDI-20

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ABSTRACT

Background: Among women, pelvic floor dysfunction (PFD) is a significant health issue, especially in rural environments where access to healthcare is restricted. Using the Pelvic Floor Distress Inventory-20 (PFDI-20), this extensive survey evaluated the frequency and insights into pelvic floor dysfunction among rural Jaipur, India, residents.

Methods: A cross-sectional study was conducted among women residing in rural areas of Jaipur. It involved 94 women, who gave important information on the degree and features of PFD in this population. The study aimed to assess the prevalence and impact of pelvic floor dysfunction using the validated Pelvic floor dysfunction inventory (PFDI-20) Questionnaire.

Results: Ninety-four women participated in the survey. The mean total PFDI-20 score was 23.5 ± 37.39, with subscale scores of 9.35 ± 16.09 (UDI-6), 5.32 ± 12.06 (CRAD-8), and 8.82 ± 15.11 (POPDI-6). Symptom severity analysis showed that 51% had no symptoms, 19% mild, 19% moderate, and 10% severe. Strong correlations were found between total and subscale scores (POPDI-6: $r = 0.90$, CRAD-8: $r = 0.82$, UDI-6: $r = 0.86$; $p < 0.001$). Urinary symptoms contributed most to the overall burden. No significant correlation was found between age and PFDI-20 scores ($p > 0.005$).

Conclusion: This study emphasizes how urgently better healthcare access and PFD awareness are needed in rural Indian communities. The information gathered will form the basis for creating focused treatments and instructional campaigns aimed at pelvic floor dysfunction in underprivileged groups, improving health outcomes and quality of life for impacted women.

Keywords: Pelvic Floor Dysfunction, Pelvic Organ Prolapse, Urinary Incontinence, Sexual Dysfunction.

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INTRODUCTION

The term pelvic floor dysfunction (PFD) refers to a group of conditions that ensue when the muscles and connective tissues of the pelvic floor become weakened, which can further result in the inability to support the pelvic organs adequately [1]. The rectum, urinary bladder, and uterus are supported by a complex structure known as the pelvic floor, which comprises muscles, ligaments, and fascia [1,2].

Clinical conditions like urinary incontinence, fecal incontinence, and pelvic organ prolapse can give rise to PFD. One of the primary causes of urinary incontinence is stress or urge incontinence [2]. If the pelvic floor structures experience weakness or wear out, it can eventually lead to pelvic organ prolapse, which includes uterine prolapse, rectocele, and cystocele [3].

Since PFD is multifactorial, it has a compound etiology, including childbirth, aging, obesity, and prolonged strain on pelvic floor muscles. A sedentary lifestyle has become another primary concern in present times that also leads to PFD. People also refrain from discussing PFD due to myths, stigmas, and ignorance, which often keep people from reaching out for appropriate medical care [3,4].

The prevalence of pelvic floor dysfunction (PFD) among women in India is a rising public health concern that requires scrupulous investigation [4]. Even though these conditions have profound implications on women's health, quality of life, and socioeconomic well-being, there is still a pervasive lack of awareness and understanding that surrounds PFD in the Indian population [5].

A Demographic Insight

Age and PFD: Increasing age, especially 40 years old, along with the hormonal changes experienced during menopause, makes women more susceptible to having PFD. Numerous studies have reported that the prevalence of PFD, along with pelvic organ prolapse and urinary incontinence, is common among older women [5-7].

Socio-economic factors: Another primary concern is the populations falling in low socio-economic status are more vulnerable to developing pelvic floor dysfunction. Other contributing factors are poor nutrition and arduous physical labor [6].

Obstetric factors: The leading cause of PFD is childbirth, particularly vaginal delivery. Studies have found a high prevalence rate among multiparous women who had an increased likelihood of getting pelvic floor trauma due to multiple pregnancies and deliveries [7]. Other risk factors that can contribute to PFD are lack of maternal care during gestation and postpartum periods.

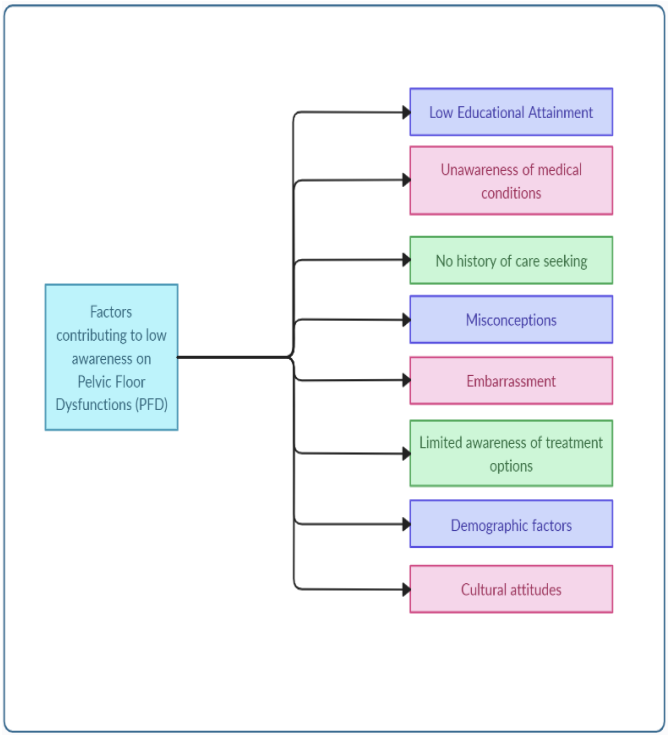

Figure 1: Factors contributing to low awareness of Pelvic Floor Dysfunctions (PFD)

What contributes to Pelvic Floor Dysfunctions?

Numerous factors can contribute to the development of pelvic floor dysfunctions in women. These factors can be categorized into lifestyle, chronic diseases, surgical history, mental health, and personal/social factors [8].

Lifestyle factors include the increasing lack of physical activities and a sedentary lifestyle. A sedentary lifestyle leads to obesity, which causes excessive stress on pelvic floor muscles due to increased intra-abdominal pressure [7,8]. PFD correlates with chronic health conditions like diabetes mellitus and respiratory conditions. Diabetic neuropathy can affect the pelvic floor's nerve function, leading to muscle insufficiency [5]. Chronic cough imposes repeated strain on the pelvic floor muscles in patients with respiratory conditions [6].

Hysterectomies or corrective surgeries for urological issues in women have shown a high incidence rate for PFD.8 Pelvic or abdominal surgeries that compromise the structural integrity of the pelvic floor can also put patients at risk of developing PFD. Depression, anxiety, and low quality of life have been reported in women suffering from chronic pelvic pain or the symptoms of PFD. PFD can also cause sexual dysfunction, and incontinence adds tension to marital relationships, leading to increased discord and reduced intimacy [9]. In a conservative society like India, such women often feel isolated and stigmatized from discussing their conditions.

PFD can induce sexual dysfunction and incontinence that cause tension in marital relationships, leading to increased discord and reduced intimacy [9]. In India, such women often feel isolated and ostracized to discuss their conditions. There is a clear and extensive research gap in rural India about pelvic floor dysfunction (PFD). This

distinction emphasizes the necessity for targeted research to understand the issues faced by rural women whose sociocultural aspects include stigma and lack of awareness, which further limits the access to care and disclosure of symptoms and appropriate healthcare [9,10].

Furthermore, while studies have highlighted the high frequency of PFDs in rural areas of other nations like Ethiopia, there is little to no similar data for rural India. Extrapolating data from other countries may not accurately reflect the situation in India, given the different demographic, cultural, and socioeconomic traits of rural Indian women. Furthermore, particular risk factors affecting rural Indian communities contribute to the incidence of PFDs, including manual labor, greater rates of childbirth without adequate maternal healthcare, and limited access to nutrition and preventive care.

As a result, there is a significant gap in understanding and measurement of pelvic floor dysfunction among women in rural India, particularly in Jaipur. Using the Pelvic Floor Distress Inventory-20 (PFDI-20) as a validated tool, this survey seeks to address this disparity by thoroughly investigating the frequency and characteristics of PFDs in this population. This study aims to give an insightful understanding of the specific needs of rural Indian women suffering from PFD and to lead the development of appropriate healthcare therapies as a result.

METHODOLOGY

This study used a cross-sectional survey design to investigate the prevalence and impact of pelvic floor dysfunction (PFD) among women residing in rural areas of Jaipur, India. Data on PFD symptoms, including pelvic organ prolapse, urinary incontinence, and fecal incontinence, were collected through the Pelvic Floor Distress Inventory-20 (PFDI-20), a validated self-report questionnaire.

Participant Criteria

The survey included 94 women aged 18 and above who lived in rural Jaipur. Participants were selected through convenience sampling, with recruitment facilitated by local healthcare centers and community health workers.

Inclusion criteria

The participants were included if they were (a) women aged 18 years or older, (b) residents of rural areas in Jaipur, India, (c) willing to provide informed consent and participate in the survey, and (d) capable of understanding and completing the PFDi-20 questionnaire independently or with the assistance of a surveyor.

Exclusion Criteria

The participants were excluded if they were (a) pregnant women, (b) women who had pelvic surgery within the last six months, (c) women diagnosed with neurological disorders that could affect pelvic floor function, (d) individuals unable or unwilling to provide informed consent and (e) women with mental health issues or cognitive impairments that could interfere with understanding or responding to the questionnaire.

Data collection

Data collection was conducted over two months in collaboration with rural healthcare facilities. Participants were briefed on the study's objectives and provided informed consent before completing the questionnaire. Trained surveyors assisted illiterate participants by reading questions and recording responses to ensure accuracy.

The PFDI-20 consists of 20 items across three subscales:

PODDI-6: Pelvic Organ Prolapse Distress Inventory of Colorectal-Anal Distress: CRADI-8 Inventory of Urinary Stress (UDI-6)

Each item is rated on a Likert scale from 0 (no symptoms) to 4 (severe symptoms), with higher scores indicating greater distress.

Ethical approval

The study received approval from the Institutional Ethics Committee (IEC) of the University of Engineering and Management, Jaipur, under the document number UEMJ/IEC/2024/123. Participant responses were kept confidential, and participation was entirely voluntary, with participants having the option to withdraw at any time.

Data Analysis

The collected data were securely stored in a protected database for subsequent analysis. Descriptive statistics were used to calculate the frequency of various forms of pelvic floor dysfunction. Mean scores for the PFDI-20 and its subscales were computed to assess the severity of symptoms. Pearson's correlation coefficient was used to examine correlations between demographic variables and PFDI-20 scores. Statistical analysis was conducted using SPSS software (version 26), with significance defined by $p < 0.05$.

RESULTS

Ninety-four women participated in the survey. Their mean age was 21.34 years (SD=4.55). The total score and score of subscales (UDI-6, POPDI-6, and CRAD-8) were statistically analyzed. The mean total score is 23.5 (SD=37.39). The mean score of UDI-6 is 9.35 (SD=16.09), CRAD-8 is 5.32 (SD=12.06), and POPDI-6 is 8.82 (SD= 15.11).

The severity analysis shows that 51% of the participants had reported no symptoms (total score=0), 19% had reported mild symptoms (total score ≤ 33), 19% had moderate symptoms (33 < total score ≤ 66), and 10% had reported severe symptoms (total score> 66).

There were strong positive correlations observed between the subscales and total score; the correlation between POPDI-6 and the total score was 0.90 ($p<0.001$), between CRAD-8 and the total score was 0.82 ($p<0.001$), and between UDI-6 and the total score was 0.86 ($p<0.001$). Moderate correlations were found between the individual components, indicating the co-occurrence of symptoms across domains.

The Friedman test revealed significant differences in symptom severity between the three subscales, suggesting that urinary symptoms contributed the most to the overall burden, followed by prolapse and colorectal symptoms. No significant linear correlation was found between age and PFDI-20 scores ($p>0.005$), indicating that symptom severity is not strongly age-dependent in this population.

Table 1: Presents the age and frequency of the participants.

S. No.	Age (in years	Frequency
1	17-22	76
2	23-28	11
3	29-34	5
4	35-40	1
5	40-45	1

Table 2: Presents the mean and standard deviation of participants' ages, scores on the subscales POPDI-6, CRAD-8, and UDI-6, and the total score of PFDI-20.

S. No.	Metric	Mean±SD
1	Age	21.34 ± **4.55**
2	POPDI-6	8.82 ± **15.11**
3	CRAD-8	5.32 ± **12.06**
4	UDI-6	9.35 ± **16.09**
5	Total Score	23.49 ± **37.39**

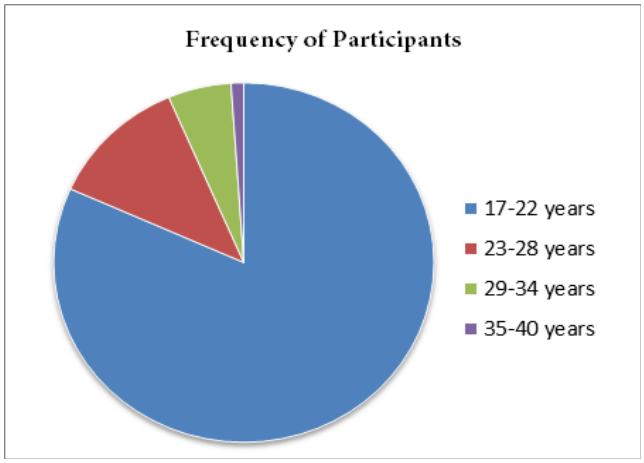

Figure 2: Shows the age and frequency of the participants.

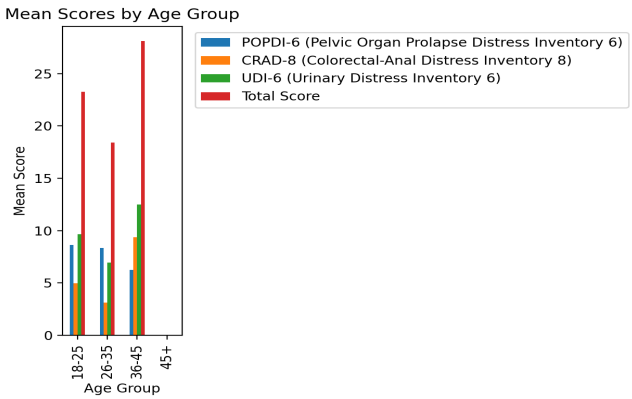

Figure 3: Shows mean scores of subscales POPDI-6, CRAD-8, UDI-6, and total scores across different age groups.

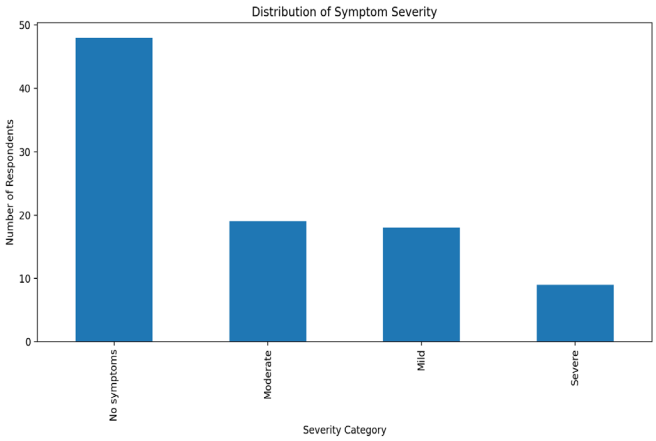

Figure 4 shows the severity distribution among the participants.

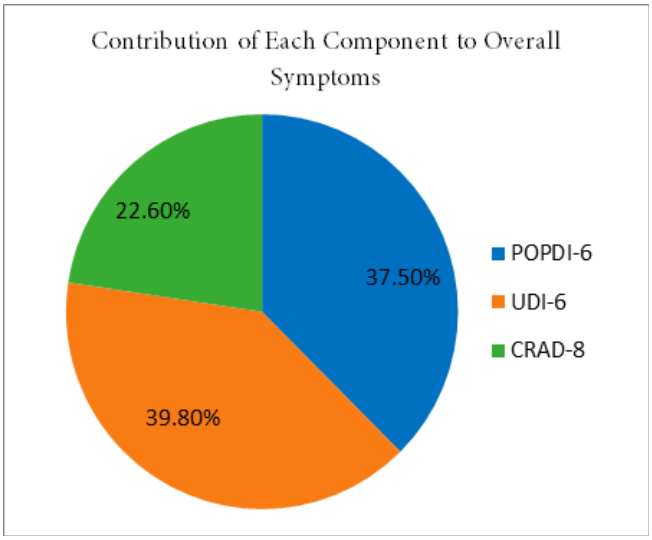

Figure 5 shows the relative contribution of each component to the total symptom burden. POPDI-6: Pelvic Organ Prolapse Distress Inventory 6, CRAD-8: Colorectal-Anal Distress Inventory 8, and UDI-6: Urinary Distress Inventory 6.

Table 3 represents the response percentage of all the questions of PFDI-20, which comprises the subscales POPDI-6, CRAD-8, and UDI-6. POPDI-6 stands for Pelvic Organ Prolapse Distress Inventory 6, CRAD-8 for Colorectal-Anal Distress Inventory 8, and UDI-6 for Urinary Distress Inventory 6.

S. No.	Category	Question Number	Questions	Not at all (%)	Somewhat (%)	Moderately (%)	Quite a bit (%)
1	CRAD-8	CRAD-8-Q1	Do you feel you need to strain too hard to have a bowel movement?	91.5	0	7.4	1.1
2	CRAD-8	CRAD-8-Q2	Do you feel you have not completely emptied your bowels at the end of a bowel movement?	87.2	1.1	9.6	1.1
3	CRAD-8	CRAD-8-Q3	Do you usually lose stool beyond your control if your stool is well formed?	91.5	2.1	5.3	1.1
4	CRAD-8	CRAD-8-Q4	Do you usually lose stool beyond your control if you stool is loose or liquid?	89.4	1.1	7.4	2.1

5	CRAD-8	CRAD-8-Q5	Do you usually lose gas from the rectum beyond your control?	86.2	2.1	7.4	3.2
6	CRAD-8	CRAD-8-Q6	Do you usually have pain when you pass your stool?	93.6	0	5.3	1.1
7	CRAD-8	CRAD-8-Q7	Do you experience a strong sense of urgency and have to rush to the bathroom to have a bowel movement?	87.2	4.3	2.1	6.4
8	CRAD-8	CRAD-8-Q8	Does part of your stool ever pass through the rectum and bulge outside during or after a bowel movement?	94.7	0	3.2	1.1
9	POP-DI-6	POP-DI-6-Q1	Do you usually experience pressure in the lower abdomen?	80.9	2.1	7.4	6.4
10	POP-DI-6	POP-DI-6-Q2	Do you usually experience heaviness or dullness in the lower abdomen?	78.7	1.1	8.5	6.4
11	POP-DI-6	POP-DI-6-Q3	Do you usually have a bulge or something falling out that you can see or feel in the vaginal area?	88.3	0	4.3	4.3
12	POP-DI-6	POP-DI-6-Q4	Do you usually have to push on the vagina or around the rectum to have a complete bowel movement?	90.4	0	2.1	6.4
13	POP-DI-6	POP-DI-6-Q5	Do you usually experience a feeling of incomplete bladder emptying?	86.2	3.2	5.3	0
14	POP-DI-6	POP-DI-6-Q6	Do you ever have to push up in the vaginal area with your fingers to start or complete urination?	96.8	0	2.1	1.1
15	UDI-6	UDI-6-Q1	Do you usually experience frequent urination?	79.8	2.1	6.4	4.3
16	UDI-6	UDI-6-Q2	Do you usually experience urine leakage associated with a feeling of urgency; that is, a strong sensation of needing to go to the bathroom?	87.2	0	3.2	5.3
17	UDI-6	UDI-6-Q3	Do you usually experience urine leakage related to laughing, coughing or sneezing?	87.2	6.4	1.1	2.1
18	UDI-6	UDI-6-Q4	Do you usually experience small amounts of urine leakage (that is, drops)?	83	2.1	6.4	4.3
19	UDI-6	UDI-6-Q5	Do you usually experience difficulty emptying your bladder?	90.4	1.1	7.4	1.1
20	UDI-6	UDI-6-Q6	Do you usually experience pain of discomfort in the lower abdomen or genital region?	85.1	2.1	6.4	4.3

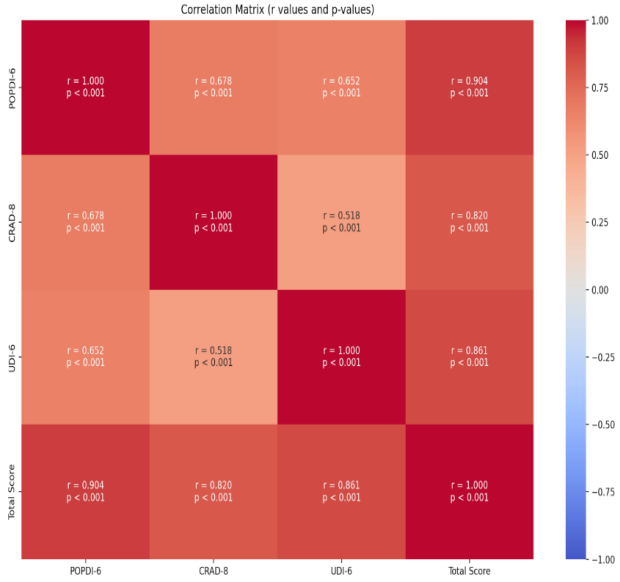

Figure 6: The correlation heat map visually represents the correlation matrix among the PFDI scores. The color intensity indicates the strength of the relationship (ranging from -1 to +1), while annotations in each cell display the detailed r value (Pearson's Correlation Coefficient) and corresponding p-values. The darker color indicates stronger positive correlations. POPDI-6: Pelvic Organ Prolapse Distress Inventory 6, CRAD-8: Colorectal-Anal Distress Inventory 8, and UDI-6: Urinary Distress Inventory 6.

	POPDI-6	CRAD-8	UDI-6	Total Score
POPDI-6	r=1.000, p<0.001	r=0.678, p<0.001	r=0.652, p<0.001	r=0.904, p<0.001
CRAD-8	r=0.678, p<0.001	r=1.000, p<0.001	r=0.518, p<0.001	r=0.820, p<0.001
UDI-6	r=0.652, p<0.001	r=0.518, p<0.001	r=1.000, p<0.001	r=0.861, p<0.001
Total Score	r=0.904, p<0.001	r=0.820, p<0.001	r=0.861, p<0.001	r=1.000, p<0.001

Table 4: Presents the correlation coefficients (r) along with their corresponding p-values for each pair of scores from PFDI-20 questionnaire. POPDI-6: Pelvic Organ Prolapse Distress Inventory 6, CRAD-8: Colorectal-Anal Distress Inventory 8 and UDI-6: Urinary Distress Inventory 6.

DISCUSSION

The survey conducted in rural Jaipur, using Pelvic Floor Distress Inventory-20 (PFDI-20) revealed a significant prevalence of pelvic floor dysfunction among women in this community. Approximately 49% of participants reported mild to severe symptoms, with urinary symptoms being the most prevalent, followed by prolapse and colorectal symptoms. This aligns with findings from Lukacz et al. (2017), who highlighted urinary incontinence as the most common manifestation of PFD in women [4]. Additionally, Quaghebeur et al. (2021) noted a substantial overlap of symptoms across pelvic floor dysfunction subdomains, which is reflected in the present study, where 31 participants experienced symptoms in two or more

subscales. Interestingly, age did not significantly correlate with symptom severity, indicating that PFD affects women across various age groups. This observation differs from a study by Dieter et al. (2015), which identifies aging as a primary risk factor [10,11].

The findings give emphasis to the substantial burden of PFD in this rural population, exacerbated by limited access to healthcare services, socioeconomic challenges, and low levels of awareness about pelvic health, factors previously discussed by Good & Solomon (2019) [1]. The symptoms co-occurring across subscale domains emphasize the prerequisite for comprehensive assessment strategies which should be included in further studies, as de Arruda et al. (2022) also emphasized the importance of structured classification when using PFDI-20 diagnostic scores [2].

From a public health perspective, these results reinforce the need for targeted healthcare policies to address PFD in economically disadvantaged rural populations. The American College of Obstetricians and Gynecologists (2019) emphasized the importance of accessible treatment strategies for pelvic organ prolapse, which aligns with the current study's recommendation for educational campaigns, community-based interventions, and individualized treatment plans to bridge the gap in care [6].

Limitations

Despite its important findings, this study was confined to a specific rural region of Jaipur, India, which may limit the generalizability of the findings to other rural or urban populations. The data on the symptoms were collected using the PFDI-20, making the study vulnerable to recall bias and the possibility of underreporting or misinterpretation of symptoms. Additionally, potential factors such as parity, mode of delivery, lifestyle habits and comorbid conditions were not extensively analyzed, limiting the ability to determine precise risk factors.

Future Studies

Future research should aim to expand the sample size to include diverse rural and urban populations, allowing for broader comparisons. Additionally, including clinical assessments, such as urodynamic studies, ultrasound imaging, and pelvic muscle evaluations, would provide more ample understanding of PFD severity and underlying causes. Longitudinal studies trailing symptom progression over time could offer insights into age related changes and intervention effectiveness.

CONCLUSION

In conclusion, the understanding derived from this PFDI-20 survey fortifies the urgent need for integrated healthcare systems and education programs designed for the rural Jaipur population that genuinely serve the community. By addressing the specific challenges and barriers faced by these women, healthcare interventions can significantly enhance their quality of life, reduce the burden of pelvic floor dysfunction, and contribute to comprehensive communal health improvements.

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