

Article

Gender, Poverty and Pelvic Floor Dysfunction: Unmet Needs Among Informal Sector Women Workers in Pakistan

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Abstract

Background: Pelvic floor dysfunction (PFD)—encompassing urinary incontinence, pelvic organ prolapse, and anorectal dysfunction—imposes a disproportionate burden on women in low- and middle-income countries (LMICs). Within Pakistan, informal sector women workers constitute one of the most structurally vulnerable populations, yet their experience of PFD remains almost entirely undocumented. This study examines the prevalence, occupational and socioeconomic correlates, and self-reported barriers to PFD care among this population, through analysis of associations between structural disadvantage and pelvic floor health outcomes. **Methods:** A cross-sectional, community-based survey was conducted across five informal occupational cohorts—brick kiln workers, domestic workers, street vendors, textile home pieceworkers, and agricultural labourers—recruited from peri-urban and low-income areas of Lahore and Sheikhpura districts. A total of 412 women aged 18-55 years who had ever been pregnant were enrolled using stratified purposive sampling within predefined occupational strata. Data were collected through interviewer-administered structured questionnaires incorporating validated Urdu-adapted instruments: the ICIQ-SF for urinary incontinence, the PFDI-20 for prolapse and colorectal symptoms, and the PHQ-4 for psychological distress. Multivariate logistic regression was employed to identify independent predictors of symptomatic PFD. **Results:** The overall prevalence of at least one PFD symptom was 68.9% (95% CI 64.3-73.2%). Urinary incontinence was present in 46.2%, pelvic organ prolapse symptoms in 31.7%, and anorectal dysfunction in 16.3%. Significant independent predictors included grand multiparity (aOR 3.41; 95% CI 2.18-5.34), strenuous occupational posture (aOR 2.87; 95% CI 1.79-4.59), prior obstetric injury (aOR 2.64; 95% CI 1.63-4.27), daily household income below PKR 500 (aOR 2.19; 95% CI 1.38-3.47), and absence of a female gynaecologist within 10 km (aOR 1.93; 95% CI 1.22-3.06). Of those with symptomatic PFD, 84.7% had never sought formal healthcare. **Conclusions:** PFD affects nearly seven in ten informal sector women workers surveyed in this study, and 84.7% of those affected have never consulted a healthcare provider. These findings indicate substantial unmet need across financial, geographic, and gender-related dimensions of healthcare access, and support the case for targeted community-based and policy-level interventions.

Keywords

Pelvic floor dysfunction, Informal economy, Women workers, Pakistan, Intersectionality, Social determinants of health, Gender inequality, Poverty, Health inequity, Urinary incontinence, Pelvic organ prolapse

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1. Introduction

Pelvic floor dysfunction (PFD) is an umbrella designation for a cluster of conditions—urinary incontinence (UI), pelvic organ prolapse (POP), anal incontinence, chronic pelvic pain, and sexual dysfunction—that arise from structural or functional disruption of the pelvic floor musculature, fascial supports, and innervation. Globally, PFD affects an estimated one in three women at some point in their lifetime, with prevalence rising sharply after childbirth and with increasing age [1,2]. Despite this magnitude, PFD remains deeply underreported, frequently normalised as an inevitable consequence of childbearing, and consistently deprioritised within health systems operating under resource constraints—particularly in low- and middle-income countries (LMICs) settings [3].

Pakistan presents a context of particular clinical and epidemiological significance. With a total fertility rate of approximately 3.6, high rates of home delivery and unsupervised labour, limited access to skilled obstetric care in rural and peri-urban areas, and a workforce in which 72% of employed women are engaged in informal, unregulated, and physically demanding occupations, the structural conditions for a high burden of PFD are firmly in place [4,5]. Yet the published literature on PFD within Pakistan remains sparse, largely hospital-based, and rarely stratified by socioeconomic or occupational characteristics [6]. Each of these structural features—high parity, physically demanding informal labour, limited skilled obstetric care, and constrained healthcare engagement—independently increases the risk of pelvic floor injury and dysfunction, making Pakistan a high-burden context in which formal epidemiological data among the most vulnerable occupational groups are almost entirely absent.

The informal economy employs an estimated 73% of all non-agricultural workers in Pakistan, with women concentrated in its lowest-paid, most physically hazardous segments: brick kilns, domestic service, street vending, home-based textile piecework, and seasonal agricultural labour [7]. These women share a convergence of risk factors each independently associated with PFD: high parity, prolonged physical exertion involving heavy lifting and sustained standing or squatting postures, nutritional deficiency, chronic dehydration, absence of workplace toilet access, and severely limited engagement with preventive or reproductive health services [8,9]. These occupational and sociodemographic factors share a common pathophysiological pathway to PFD: each elevates or sustains intra-abdominal pressure, impairs pelvic floor neuromuscular integrity, or delays treatment of pelvic floor injury in women whose pelvic support structures have already been compromised by high parity and unattended or poorly attended deliveries.

An intersectional framework—developed by Crenshaw [10] and elaborated within global health by Hankivsky and Christoffersen [11]—informs the interpretation of findings in this study. Intersectionality is employed here as a conceptual lens for interpreting convergent patterns in the data—specifically, for understanding why socioeconomic class, occupational hazard, and gendered power inequalities co-occur and compound risk—rather than as a formal quantitative analytical method. The analytical approach used in this study is multivariate logistic regression, which identifies independent associations between predictors and PFD; the intersectional framework is then applied post-analytically to contextualise those statistical findings within their social structural meaning. We acknowledge that a formal intersectional analysis—such as statistical interaction modelling or a mixed-methods qualitative component—was beyond the scope of this cross-sectional survey. Recent global health literature has increasingly applied intersectional frameworks to reproductive and pelvic health inequities in LMIC contexts [12].

The present study was designed to address three interlinked research questions. First, what is the prevalence of PFD symptoms across five informal occupational categories of women workers in Lahore and Sheikhupura districts? Second, which occupational, obstetric, and socioeconomic variables independently predict symptomatic PFD in this population? Third, what structural, financial, and gendered barriers prevent affected women from seeking and receiving appropriate care? The policy implications of the findings are discussed in Section 4.

2. Methods

2.1 Study Design and Setting

This was a community-based, cross-sectional descriptive analytical study conducted between March and September 2023 in Lahore and Sheikhupura districts, Punjab, Pakistan. These two districts were selected because they host significant concentrations of all five targeted occupational groups and together represent a spectrum from peri-urban industrial zones to inner-city low-income settlements and peri-urban agricultural margins. These districts represent contrasting but complementary peri-urban and low-income contexts common to many Punjab cities and, more broadly, to South Asian urban informal economies. However, findings cannot be directly generalised to rural Punjab, to other Pakistani provinces (particularly Khyber Pakhtunkhwa, Balochistan, or interior Sindh, where occupational patterns and healthcare access differ materially), or to other South Asian LMICs. The study is intended as an in-depth characterisation of a previously undocumented population in a specific peri-urban context.

2.2 Study Population and Eligibility

The target population comprised adult women currently engaged in informal sector employment. Inclusion criteria were: female sex; age 18-55 years; engagement in one of five defined informal occupational categories; history of at least one

pregnancy; and informed verbal consent. Exclusions were: current pregnancy, within six weeks postpartum, known neurological condition affecting bladder or bowel control, inability to communicate in Urdu or Punjabi. Pregnant women were excluded because pregnancy acutely alters pelvic floor anatomy and symptom patterns, and their inclusion would conflate prevalent PFD with pregnancy-related physiological changes. Women within six weeks postpartum were excluded on the same basis. We acknowledge that these exclusions may result in modest underestimation of total PFD burden in a population with a total fertility rate of 3.6, and limit comparability with studies that include pregnant women.

2.3 Sampling Strategy

The study employed stratified purposive sampling, in which five occupational groups were defined a priori as the sampling strata. Within each stratum, all eligible women present at identified congregation points during enumeration visits were invited to participate, constituting purposive (non-probability) within-stratum selection. This approach is appropriate for community-based research targeting hard-to-reach occupational populations where sampling frames do not exist [13]. Community mapping was conducted in each district to identify congregation points: brick kiln compounds, domestic worker recruitment points, roadside vending sites, home-based textile networks, and agricultural cooperative areas. Multiple visits on different days and times were made to each cluster to maximise within-stratum coverage. The use of purposive sampling means that findings are generalisable only to informal sector women workers in similar peri-urban low-income settings in Punjab, and should not be extrapolated to rural workers, formally employed women, or other provinces without further validation.

2.4 Sample Size Calculation

Assuming a PFD prevalence of approximately 40% based on analogous South Asian studies [1,6], a 95% confidence level, a 5% margin of error, and a design effect of 1.3, the minimum required sample size was 389. Accounting for 6% non-response, a target of 415 was set; 412 complete questionnaires were obtained.

2.5 Data Collection Instruments

Data were collected by three trained female research assistants using structured Urdu interviewer-administered questionnaires. The ICIQ-SF assessed urinary incontinence severity (score range 0-21; score ≥ 1 indicates at least minimal incontinence) [14,15]. The PFDI-20 quantified pelvic floor symptom burden across three subscales: UDI-6, CRADI-8, and POPDI-6, each scored 0-100 [16]. The PHQ-4 screened for psychological distress (score ≥ 3 on either subscale considered clinically significant) [17]. A structured barrier checklist was pre-tested in 25 pilot participants.

Several sources of measurement bias should be noted. First, interviewer-administered questionnaires on sensitive pelvic floor symptoms carry an inherent social desirability bias: participants may under-report symptoms perceived as shameful or normal, leading to underestimation of true prevalence. Second, all research assistants were female and trained in culturally sensitive interviewing, which was intended to reduce—but cannot eliminate—this effect. Third, interviewer bias is possible given research assistant awareness of study hypotheses; this was mitigated by the use of fixed-response validated questionnaire items rather than open-ended clinical assessment.

2.6 Ethical Considerations

Formal ethics committee review was not obtained prior to data collection, as this study was initiated as a community health needs assessment exercise. The author acknowledges this as a limitation of the study. All procedures met the substantive ethical standards of the Declaration of Helsinki [18]. All participants received a full verbal explanation of study purpose, voluntary participation, right to withdrawal, and data confidentiality. Verbal consent was chosen over written consent because 54.6% of participants had no formal education, and written documentation could be coercive and meaningless in this context. A trained female research assistant served as a witness for every consent encounter and countersigned the consent log for each participant. Participant comprehension was confirmed through a teach-back process before enrolment. No personal identifiers were collected [19]. Data were stored in password-protected files accessible only to the principal investigator.

2.7 Statistical Analysis

Data were entered double-blind into SPSS version 26.0 and verified for consistency. The primary outcome—symptomatic PFD—was defined as ICIQ-SF score ≥ 1 or a score above zero on any PFDI-20 subscale. Bivariate associations were examined using chi-squared or Fisher's exact test. Variables significant at $p < 0.10$ entered a multivariate binary logistic regression model (enter method). Results are reported as aOR with 95% CI; significance was set at $p < 0.05$. Model fit was assessed using the Hosmer-Lemeshow goodness-of-fit test ($\chi^2 = 7.83$, $df = 8$, $p = 0.45$, indicating adequate fit) and Nagelkerke R^2 (0.41). Variance Inflation Factor (VIF) values were all below 3.0, confirming absence of problematic multicollinearity. Model classification accuracy was 79.4% (sensitivity 81.2%; specificity 76.3%).

3. Results

3.1 Sociodemographic and Occupational Characteristics

A total of 412 women were enrolled: brick kiln workers (n=83), domestic workers (n=84), street vendors (n=81), textile home pieceworkers (n=82), and agricultural labourers (n=82). Mean age 32.7 years (SD 8.4). 54.6% had no formal education. Median daily household income PKR 450 (IQR 300-650). Median parity 4 (IQR 2-6); 38.1% grand multiparous. See Table 1.

Table 1. Sociodemographic characteristics by occupational category (N = 412).

Characteristic	Brick (n=83)	Kiln	Domestic (n=84)	Street (n=81)	Vendor	Textile (n=82)	Agricultural (n=82)
Mean age (years)	31.4±7.9		34.1±9.2	30.8±7.4		33.2±8.7	34.6±8.1
No formal education, n (%)	51 (61.4)		47 (56.0)	43 (53.1)		42 (51.2)	42 (51.2)
Median daily income (PKR)	350		480	420		380	310
Median parity	5 (IQR 3-7)		4 (IQR 2-5)	3 (IQR 2-5)		4 (IQR 2-6)	5 (IQR 3-7)
Grand multiparity ≥5, n (%)	38 (45.8)		28 (33.3)	24 (29.6)		31 (37.8)	36 (43.9)
Home delivery (last birth), n (%)	62 (74.7)		41 (48.8)	38 (46.9)		44 (53.7)	58 (70.7)
Daily work hours ≥8, n (%)	74 (89.2)		67 (79.8)	59 (72.8)		63 (76.8)	71 (86.6)

3.2 Prevalence of Pelvic Floor Dysfunction

Overall prevalence: 68.9% (284/412; 95% CI 64.3-73.2%). UI 46.2%, POP symptoms 31.7%, anorectal dysfunction 16.3%. Figure 1 shows prevalence by occupational category. Stress incontinence was the dominant UI subtype (58.9%). These rates are higher than community-based South Asian estimates of 25-38% [1,20].

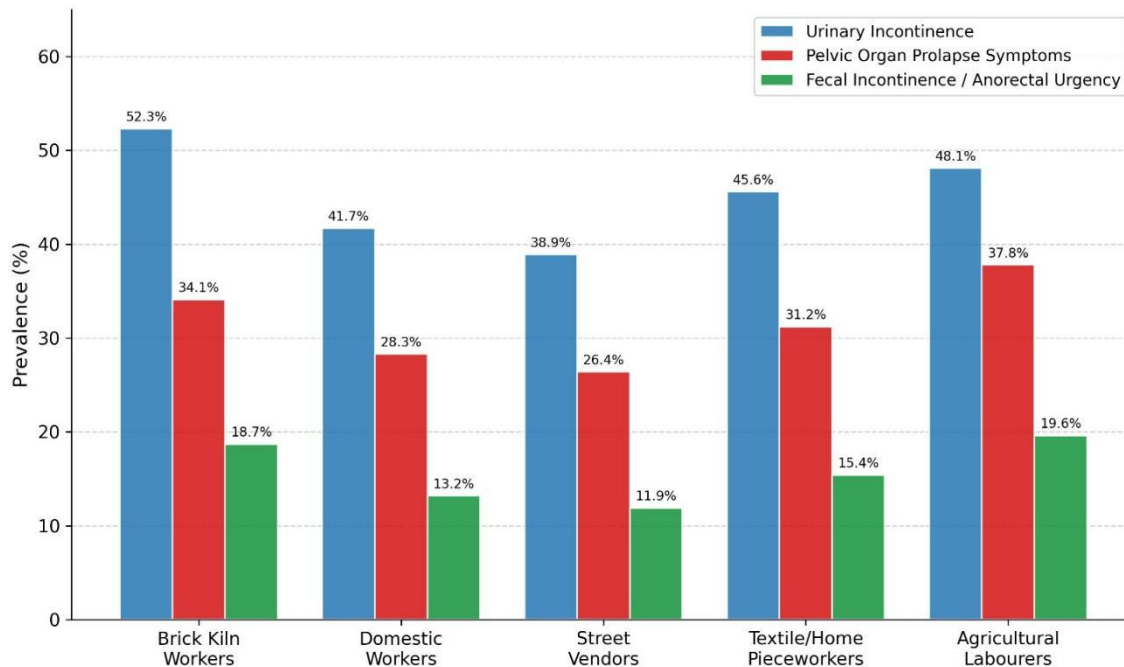


Figure 1. Prevalence of PFD symptoms by occupational category (N = 412).

3.3 Instrument-Specific Outcome Scores

Table 2 presents summary scores for each validated instrument across the full sample and by occupational category. Mean ICIQ-SF scores were highest among brick kiln workers (10.2 ± 4.3) and agricultural labourers (10.6 ± 4.5), consistent with the greater physical loading in these occupations. PFDI-20 subscale scores followed the same occupational gradient, with UDI-6 and POPDI-6 scores highest among brick kiln and agricultural groups. PHQ-4 positive screens were elevated across all strata, with brick kiln workers (47.0%) and agricultural labourers (48.8%) recording the highest rates of clinically significant psychological distress [17,21].

Table 2. Summary scores for validated outcome instruments by occupational category (N = 412).

Instrument / Subscale	Full Sample (N=412)	Brick Kiln (n=83)	Domestic (n=84)	Street Vendor (n=81)	Textile (n=82)	Agricultural (n=82)
ICIQ-SF mean score (0-21)	8.4±4.1	10.2±4.3	7.1±3.8	6.9±3.7	8.0±4.0	10.6±4.5
ICIQ-SF positive (score ≥1), n (%)	190 (46.2)	43 (51.8)	35 (41.7)	32 (39.5)	37 (45.1)	43 (52.4)
PFDI-20 UDI-6 mean (0-100)	41.3±18.6	49.1±19.2	36.4±17.1	34.7±16.9	40.2±18.3	50.3±20.1
PFDI-20 POPDI-6 mean (0-100)	28.9±15.2	35.6±16.1	24.8±14.3	23.1±13.7	28.4±14.8	36.9±16.7
PFDI-20 CRADI-8 mean (0-100)	14.7±9.8	18.3±10.6	12.1±8.9	11.4±8.4	14.2±9.4	19.1±10.9
PHQ-4 ≥3 (clinical distress), n (%)	150 (36.4)	39 (47.0)	30 (35.7)	28 (34.6)	33 (40.2)	40 (48.8)

Note: UDI-6, Urinary Distress Inventory; POPDI-6, Pelvic Organ Prolapse Distress Inventory; CRADI-8, Colorectal-Anal Distress Inventory. Values mean ± SD unless stated.

3.4 Predictors of Symptomatic PFD: Multivariate Analysis

Grand multiparity was the strongest predictor (aOR 3.41; 95% CI 2.18-5.34; $p < 0.001$) [22]. Strenuous occupational posture (aOR 2.87; 95% CI 1.79-4.59; $p < 0.001$) [9], obstetric perineal injury (aOR 2.64; 95% CI 1.63-4.27; $p < 0.001$), household income < PKR 500/day (aOR 2.19; 95% CI 1.38-3.47; $p = 0.001$), and absence of female gynaecologist within 10 km (aOR 1.93; 95% CI 1.22-3.06; $p = 0.005$) were all independently significant (Table 3).

Table 3. Multivariate logistic regression: Independent predictors of symptomatic PFD (N = 412).

Predictor Variable	aOR	95% CI	p-value
Grand multiparity (parity ≥5)	3.41	2.18-5.34	< 0.001
Strenuous occupational posture ≥4 hrs/day	2.87	1.79-4.59	< 0.001
Obstetric perineal injury / obstructed labour	2.64	1.63-4.27	< 0.001
Daily household income < PKR 500	2.19	1.38-3.47	0.001
No female gynaecologist within 10 km	1.93	1.22-3.06	0.005
Age > 40 years	1.78	1.11-2.86	0.017
BMI ≥ 30 kg/m ²	1.61	1.04-2.49	0.032
Primary education only (vs. none)	0.82	0.51-1.31	0.41 (NS)

Note: aOR, adjusted odds ratio; CI, confidence interval; NS, not significant; Hosmer-Lemeshow, $\chi^2=7.83$, $p=0.45$; Nagelkerke $R^2=0.41$; accuracy 79.4%.

3.5 Healthcare-Seeking Behaviour and Barriers

Of 284 symptomatic women, only 43 (15.1%) had ever consulted a formal provider. 72.1% had attended a Basic Health Unit; 41.9% reported dismissal without examination [20]. Figure 2 presents self-reported barriers. Financial constraint (78.4%), fear of income loss (71.2%), and absence of a female provider (63.9%) were the most common [6,23].

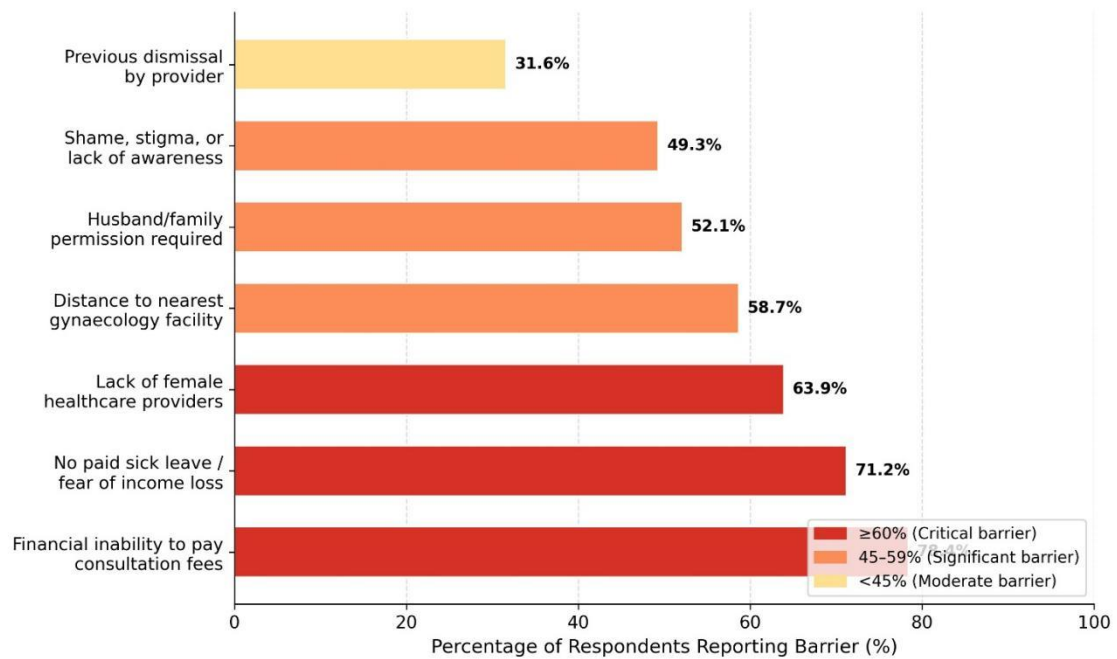


Figure 2. Barriers to healthcare-seeking among symptomatic women (N = 284).

3.6 Functional Impact of PFD

Moderate or severe work productivity loss: 63.5%. Physical mobility restriction: 56.0%. PHQ-4 positivity: 52.8% among PFD-affected vs. 19.4% without PFD ($p < 0.001$) [17,21,24], see Figure 3.

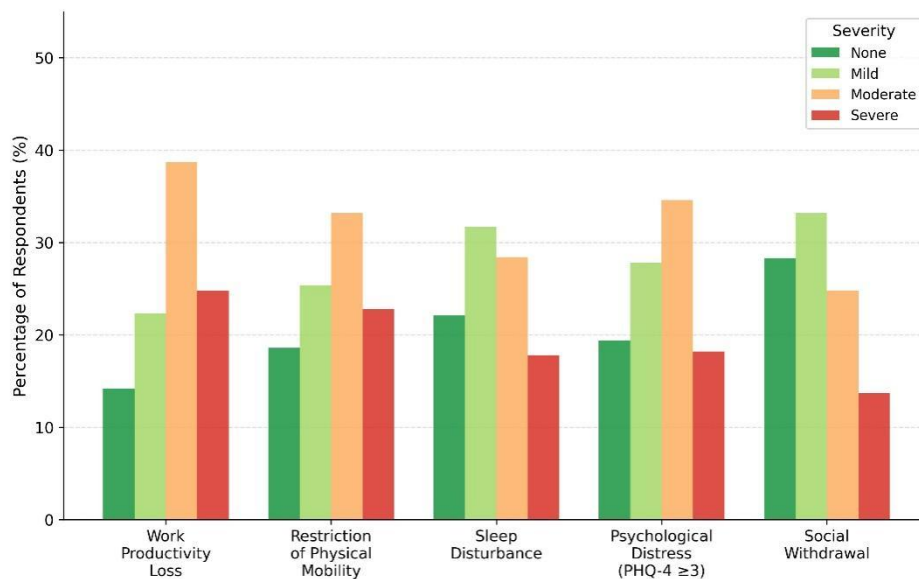


Figure 3. Functional impact of PFD on work productivity and daily life (N = 412).

3.7 Intersectional Risk Profiling

Composite risk scores across six social determinant domains are shown in Figure 4. Women with the highest PFD burden showed markedly elevated scores across nearly all domains simultaneously. These patterns are consistent with an intersectional interpretation—that is, they suggest that multiple structural disadvantages co-occur and may compound one another—although the study design does not permit formal testing of interaction effects between these domains [12].

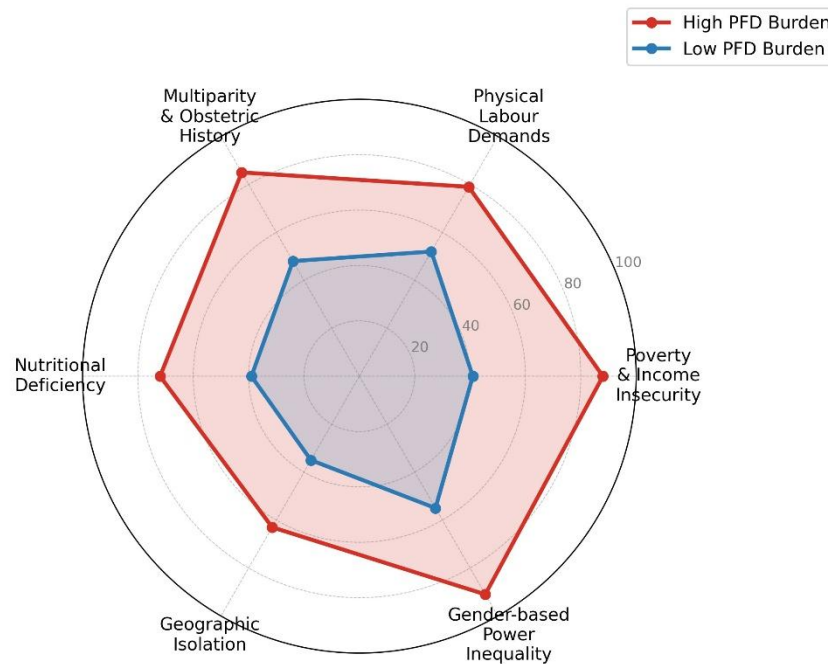


Figure 4. Intersectional risk profile: Social determinant scores by PFD burden group (n = 412).

4. Discussion

4.1 Interpretation of Primary Findings

This study documents the prevalence, occupational determinants, and care-seeking barriers for PFD among informal sector women workers in urban and peri-urban Pakistan. Nearly seven in ten women carried at least one PFD symptom, and fewer than one in six had ever consulted a healthcare provider. The prevalence of UI at 46.2% is substantially higher than estimates from hospital-based Pakistani studies [25,26], consistent with the well-described underrepresentation of economically marginalised women in facility-based research [12]. The occupational gradient confirms that brick kiln workers and agricultural labourers bear the greatest burden, consistent with evidence linking sustained intra-abdominal pressure to pelvic floor musculofascial stress [8,9,27].

The multivariate regression identifies several independently associated predictors—grand multiparity, strenuous occupational posture, obstetric injury, poverty, and absence of female providers—that cluster within this population. These findings are consistent with an intersectional interpretation in that multiple structural disadvantages are simultaneously elevated in women with the highest PFD burden. However, the regression model identifies independent associations, not interactions; it does not formally test whether the combination of these disadvantages produces a compounding effect greater than the sum of their parts, as intersectionality theory would predict. The intersectional reading is therefore an interpretive framework applied post-analytically to contextualise statistical findings within their social structural meaning, rather than a product of the analysis itself. Characterising these findings as evidence of intersectionality is therefore a theoretical proposition rather than a statistical conclusion, and we present it as such.

4.2 Comparison with Existing Literature

The 84.7% non-consultation rate reflects structural barriers—economic exclusion, gendered healthcare norms, and geographic inaccessibility—each of which independently reduces care-seeking, with multiplicative effects when combined [6,23]. The 41.9% provider dismissal rate among those who did seek care represents a documented failure pattern in South Asian LMIC settings [20]. PHQ-4 positivity of 52.8% is consistent with recent evidence that PFD-associated psychological morbidity is substantially underestimated in LMIC populations [17,21,24].

4.3 Limitations

The following limitations should be considered when interpreting these findings. First, the cross-sectional design precludes causal inference; the direction of associations between income and PFD severity, for example, cannot be established from these data. Second, stratified purposive sampling limits generalisability to similar peri-urban informal sector populations in Punjab; findings cannot be extrapolated to rural settings, other provinces, or other countries. Third, formal ethics committee review was not obtained prior to data collection, which is acknowledged as a limitation of this study. Fourth, social desirability bias may have led to underestimation of stigmatised symptoms. Fifth, objective clinical examination—which would enable precise prolapse staging and levator ani assessment—was not feasible in this community setting. Sixth, the regression analysis identifies independent associations but does not test statistical

interactions between predictors; the intersectional interpretation is therefore conceptual rather than analytically derived. Future research employing mixed methods designs, including formal intersectional analysis and objective clinical assessment, is needed.

4.4 Policy Implications

The findings from this study carry several policy-relevant observations, which we offer as hypotheses to be tested rather than as established recommendations. Integration of pelvic floor screening into Pakistan's Lady Health Worker programme could improve case identification at community level [28]. Telemedicine funded through the Sehat Sahulat Programme could address the dual barriers of distance and financial cost [29]. Occupational health provisions in the informal sector—including rest periods, load limits, and toilet access—could reduce the pelvic floor burden of heavy physical labour [7]. Community-based pelvic floor rehabilitation has demonstrated effectiveness in recent LMIC trials [22] and could be piloted through district health authorities. Each of these represents a feasible, targeted response to specific barriers documented in this study.

5. Conclusion

Pelvic floor dysfunction is prevalent, functionally disabling, and almost universally untreated among informal sector women workers in peri-urban Pakistan. The findings of this study are consistent with a pattern in which multiple structural disadvantages—poverty, high parity, physical occupational demands, and gendered barriers to care—co-occur in the same population and compound one another's effects on pelvic floor health. Addressing this burden will require multi-axis responses that simultaneously target financial access, provider availability, occupational health, and community-level case identification.

Author Contributions

Author conceptualised the study, designed the data collection instruments, supervised field data collection, performed statistical analysis, and drafted and revised the manuscript.

Funding

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Conflicts of Interest

The author declares no conflict of interest.

Data Availability

Anonymised data available from the corresponding author on reasonable request.

Ethics Statement

Formal ethics committee review was not obtained prior to data collection, as this study was initiated as a community health needs assessment exercise. The author acknowledges this as a limitation. All procedures met the substantive standards of the Declaration of Helsinki. Verbal informed consent was obtained from all participants, documented by witness countersignature.

Figure Originality Statement

All four figures are original, generated by the author from primary study data using Python (matplotlib). High-resolution JPEG and TIFF files submitted as supplementary materials.

Generative AI Statement

The author declares that no generative AI tools were used in the creation of this manuscript.

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