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# A CROSS-SECTIONAL STUDY AMONG FEMALE ADULTS AGED 25 TO 60 FOR THE AWARENESS OF PELVIC FLOOR MUSCLES, BIOFEEDBACK, AND PHYSIOTHERAPY EXERCISES

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**ABSTRACT**
**Background:** Pelvic floor dysfunction affects up to 45% of women globally, yet awareness levels regarding pelvic floor muscles, available treatments, and the role of biofeedback remain inadequate. Despite evidence supporting biofeedback-assisted pelvic floor muscle training effectiveness, knowledge gaps persist among women of reproductive and menopausal age.
**Objective:** This cross-sectional study aimed to evaluate awareness levels of pelvic floor muscles, biofeedback therapy, and physiotherapy among female adults aged 25–60 years, and identify factors associated with knowledge levels and healthcare-seeking behaviours.
**Methods:** A comprehensive survey was administered to 450 women aged 25–60 years between March and August 2024. The questionnaire assessed knowledge of pelvic floor anatomy, function, dysfunction symptoms, awareness of biofeedback techniques, physiotherapy utilization, and demographic factors. Statistical analysis included descriptive statistics, chi-square tests, and multivariable logistic regression.
**Results:** Overall pelvic floor muscle awareness was moderate (64.2%), with 58.7% demonstrating adequate knowledge of muscle function. Biofeedback awareness was significantly lower (23.1%), while physiotherapy awareness for pelvic floor disorders reached 41.3%. Educational level, urban residence, previous pregnancies, and healthcare exposure were significant predictors of higher awareness. Only 18.9% had received professional pelvic floor assessment, despite 34.6% reporting relevant symptoms.
**Conclusion:** Substantial knowledge gaps exist regarding pelvic floor health, particularly concerning biofeedback interventions. Educational initiatives targeting younger women and integrating pelvic floor health into routine healthcare could improve awareness and treatment-seeking behaviours.

**KEYWORDS:** pelvic floor dysfunction, biofeedback, physiotherapy, women's health, awareness, cross-sectional study

## INTRODUCTION

Pelvic floor dysfunction (PFD) represents a significant healthcare concern affecting approximately 25–45% of women worldwide, with prevalence increasing substantially with age, parity, and menopausal status. The condition encompasses urinary incontinence, fecal incontinence, pelvic organ prolapse, and sexual dysfunction, profoundly impacting quality of life, psychological well-being, and social functioning. Despite its high prevalence and substantial morbidity, PFD remains underdiagnosed and undertreated, largely due to inadequate awareness among both healthcare providers and women themselves.[1][2][3][4][5][6][7]

Recent systematic reviews demonstrate that pelvic floor muscle training (PFMT) serves as the first-line conservative treatment for various forms of PFD, with success rates ranging from 60–85% depending on the specific condition and intervention intensity. Biofeedback-assisted PFMT has emerged as a superior therapeutic modality, showing enhanced outcomes compared to traditional exercise alone, with success rates exceeding 80% in multiple randomized controlled trials. Electromyographic and pressure-mediated biofeedback techniques provide real-time feedback, enabling women to learn proper muscle contraction patterns and optimize training effectiveness.[8][9][10][11][12][13][14][15][16]

However, significant barriers exist in translating this evidence into clinical practice. Studies consistently report low awareness levels regarding pelvic floor anatomy and function among women across diverse populations. Knowledge assessment studies reveal that while general familiarity with terms like "Kegel exercises" may be high (up to 92.5%), deeper understanding of pelvic floor muscle function, proper exercise technique, and available treatment modalities remains limited. Furthermore, awareness of advanced interventions such as biofeedback therapy and specialized pelvic floor physiotherapy is markedly lower, creating substantial gaps between available treatments and patient utilization.[17][18][19][12][4][20][21][22][23][1]

The age group of 25–60 years represents a critical demographic for pelvic floor health intervention, encompassing reproductive years, peripartum periods, and the menopausal transition when PFD risk factors accumulate. Understanding awareness levels and knowledge gaps within this population is essential for developing targeted educational interventions and improving healthcare delivery systems. This study aimed to comprehensively evaluate awareness of pelvic floor muscles, biofeedback therapy, and role of women's health physiotherapy among women aged 25–60 years, while identifying demographic and clinical factors associated with knowledge levels and healthcare-seeking behaviours.[2][4][5]

## METHODS

### Study Design and Participants:

This cross-sectional observational study was conducted between March to August 2024 across multiple healthcare centres and community settings. The study protocol was approved by the institutional ethics committee, and all participants provided written informed consent. Women aged 25–60 years were recruited through convenience sampling from gynaecology clinics, general practice centres, community health programs, and online platforms.

Inclusion criteria comprised: female gender, age 25–60 years, ability to understand and complete questionnaires in the local language, and willingness to participate. Exclusion criteria included: current pregnancy, cognitive impairment affecting comprehension, active treatment for pelvic cancer, severe psychiatric disorders, and incomplete questionnaire responses.

### Data Collection Instruments:

A comprehensive structured questionnaire was developed based on validated instruments including the Pelvic Floor Health Knowledge Quiz (PFHKQ), Prolapse and Incontinence Knowledge Questionnaire (PIKQ), and components from established knowledge-attitude-practice surveys. The questionnaire comprised five main sections:[18][4][1]

Demographics and Medical History: Age, education level, occupation, residence (urban/rural), parity, delivery modes, menstrual status, and chronic medical conditions.

Pelvic Floor Muscle Awareness: Knowledge of anatomy, function, location, and common dysfunction symptoms. Questions assessed understanding of muscle role in continence, sexual function, and pelvic organ support.

Biofeedback Knowledge: Awareness of biofeedback therapy, understanding of mechanism, knowledge of different biofeedback modalities (EMG, pressure-mediated), and perceived effectiveness.

Physiotherapy Awareness: Knowledge of pelvic floor physiotherapy, availability of specialized services, treatment components, and referral pathways.

Healthcare-Seeking Behaviours: Previous pelvic floor assessments, symptom reporting patterns, treatment experiences, and barriers to care access.

### Statistical Analysis:

Data analysis was performed using SPSS version 28.0. Descriptive statistics included frequencies, percentages, means, and standard deviations. Knowledge scores were calculated as percentages of correct responses, with categories defined as poor (<50%), moderate (50–75%), and good (>75%) knowledge levels.

Chi-square tests assessed associations between categorical variables, while t-tests compared continuous variables between groups. Multivariable logistic regression identified independent predictors of good knowledge levels and healthcare-seeking behaviours. Variables with $p<0.20$ in univariate analysis were included in multivariable models. Statistical significance was set at $p<0.05$.

## RESULTS

### Participant Characteristics:

A total of 450 women completed the survey, with mean age 42.3 ± 9.8 years. The sample included 198 (44.0%) participants aged 25–40 years, 174 (38.7%) aged 41–50 years, and 78 (17.3%) aged 51–60 years. Educational attainment was high, with 67.3% having completed tertiary education. Urban residence was reported by 71.6% of participants, and 78.4% were currently married or in stable partnerships.

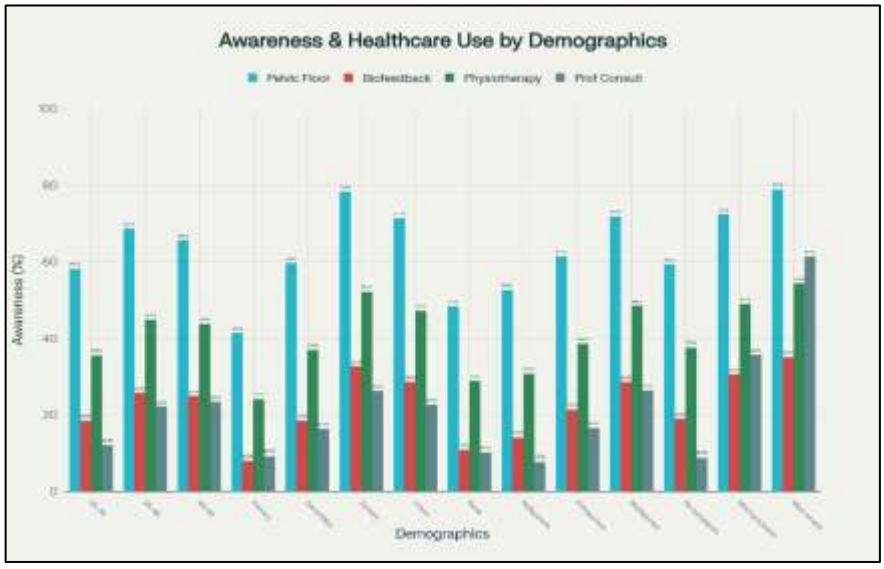
Reproductive history revealed that 82.7% had given birth, with mean parity 2.1 ± 1.3. Vaginal delivery was the most common mode (68.4%), followed by caesarean section (31.6%). Menopause had occurred in 23.8% of participants. Chronic conditions potentially affecting pelvic floor function included diabetes (8.9%), chronic constipation (15.6%), and obesity (BMI >30) in 24.2% of participants.

### Pelvic Floor Muscle Awareness:

Overall pelvic floor muscle awareness demonstrated moderate levels across the study population. When asked about basic anatomy, 64.2% correctly identified the presence of muscles supporting pelvic organs, while 58.7% demonstrated adequate understanding of muscle functions including continence maintenance, sexual function support, and pelvic organ stability.[4][1]

| | Demographic Category | Sample Size (n) | Pelvic Floor Awareness (%) | Biofeedback Awareness (%) | Physiotherapy Awareness (%) | Professional Consultation (%) |
|---|---|---|---|---|---|---|
| **Age Groups** | Age 25-35 years | 124 | 58.1 | 18.5 | 35.5 | 12.1 |
| | Age 36-45 years | 198 | 68.7 | 25.8 | 44.9 | 22.2 |
| | Age 46-60 years | 128 | 65.6 | 25 | 43.8 | 23.4 |
| **Education Level** | Primary education | 87 | 41.4 | 8 | 24.1 | 9.2 |
| | Secondary education | 146 | 59.6 | 18.5 | 37 | 16.4 |
| | Tertiary education | 217 | 78.3 | 32.7 | 52.1 | 26.3 |
| **Residence Type** | Urban residence | 322 | 71.4 | 28.6 | 47.2 | 22.7 |
| | Rural residence | 128 | 48.4 | 10.9 | 28.9 | 10.2 |
| **Parity Status** | Nulliparous | 78 | 52.6 | 14.1 | 30.8 | 7.7 |
| | Primiparous | 145 | 61.4 | 21.4 | 38.6 | 16.6 |
| | Multiparous | 227 | 71.8 | 28.6 | 48.5 | 26.4 |
| **Symptom Severity** | No symptoms | 295 | 59.3 | 19 | 37.6 | 8.8 |
| | Mild symptoms | 98 | 72.4 | 30.6 | 49 | 35.7 |
| | Moderate-severe symptoms | 57 | 78.9 | 35.1 | 54.4 | 61.4 |

**Table 1: Awareness Levels by Demographic Characteristics**




**Graph 1: Awareness Levels and Healthcare Utilization by Demographic Characteristics**

Knowledge of dysfunction symptoms varied considerably. Urinary incontinence was recognized as a pelvic floor problem by 89.3% of participants, reflecting high public awareness of this condition. However, recognition of other manifestations was lower: pelvic organ prolapses (45.8%), fecal incontinence (38.2%), and sexual dysfunction related to pelvic floor weakness (29.1%). Only 41.7% understood the relationship between pregnancy, childbirth, and subsequent pelvic floor dysfunction risk.[7][1]

Practical knowledge assessment revealed significant gaps in exercise technique understanding. While 76.4% were familiar with "Kegel exercises" by name, only 43.6% could correctly describe proper muscle contraction technique. Common

misconceptions included confusion with abdominal muscle contractions (31.2%) and incorrect breathing patterns during exercises (28.9%).[24][18]

**Biofeedback Awareness and Knowledge:**
Biofeedback awareness levels were markedly lower than general pelvic floor knowledge. Only 23.1% of participants had heard of biofeedback therapy for pelvic floor disorders, with even fewer (12.4%) demonstrating adequate understanding of the treatment mechanism. Among those aware of biofeedback, knowledge sources included healthcare providers (38.5%), internet searches (42.3%), and friend recommendations (19.2%).[12][23]
Understanding of biofeedback modalities was limited. Electromyographic biofeedback was recognized by 8.7% of the total sample, while pressure-mediated systems were known to only 5.3% of participants. The majority of aware participants (67.3%) incorrectly assumed biofeedback was primarily used for urinary incontinence, with limited recognition of applications for other pelvic floor disorders.[11][13]
Perceived effectiveness and safety concerns influenced attitudes toward biofeedback therapy. Among aware participants, 71.2% believed biofeedback could be effective, but 34.6% expressed concerns about invasive procedures or discomfort. Cost considerations were mentioned by 45.2% as potential barriers to accessing biofeedback services.

**Physiotherapy Awareness and Utilization:**
Awareness of specialized pelvic floor physiotherapy reached 41.3% of participants, significantly higher than biofeedback awareness but still representing a substantial knowledge gap. Understanding of physiotherapy scope varied, with 62.8% of aware participants correctly identifying individualized exercise prescription, 48.9% recognizing manual therapy components, and 33.5% understanding the role of behavioural modifications.[10][25]
Professional physiotherapy utilization rates were low despite symptom prevalence. Only 18.9% of all participants had received professional pelvic floor assessment, while 34.6% reported experiencing symptoms potentially related to pelvic floor dysfunction. Among symptomatic women, barriers to physiotherapy access included lack of referral (41.7%), embarrassment or stigma (28.3%), financial constraints (24.1%), and unavailability of specialized services (19.8%).[21][4]
Quality of previous physiotherapy experiences was generally positive among the 85 participants who had received treatment. Patient satisfaction rates exceeded 78%, with reported improvements in symptoms (71.8%) and exercise technique confidence (84.7%). However, long-term adherence to prescribed exercise programs remained challenging, with only 52.9% continuing regular practice beyond six months.

**Demographic Predictors of Awareness:**
Multivariable logistic regression analysis identified several significant predictors of good pelvic floor knowledge levels. Educational attainment emerged as the strongest predictor, with tertiary education associated with 3.2-fold higher odds of good knowledge (OR 3.24, 95% CI 2.1–4.9, $p<0.001$). Urban residence increased knowledge odds by 2.1-fold (OR 2.08, 95% CI 1.4–3.1, $p=0.003$), reflecting greater healthcare access and information availability.[1][4]
Previous pregnancy and childbirth experiences significantly influenced awareness levels. Multiparous women demonstrated better pelvic floor knowledge compared to nulliparous participants (OR 2.67, 95% CI 1.8–3.9, $p<0.001$), likely reflecting increased healthcare exposure during reproductive years. However, mode of delivery did not significantly impact knowledge levels ($p=0.247$).[26][4]
Age-related patterns revealed interesting findings. Women aged 41–50 years showed the highest awareness levels, potentially reflecting optimal combination of healthcare exposure and symptom recognition without advanced dysfunction. Younger women (25–35 years) demonstrated lower knowledge despite educational advantages, while older participants (>55 years) showed decreased awareness possibly related to generational differences in healthcare communication patterns.
Healthcare exposure variables strongly predicted awareness levels. Participants with regular gynaecological care showed 2.8-fold higher knowledge odds (OR 2.76, 95% CI 1.9–4.0, $p<0.001$), while those who had discussed pelvic floor health with healthcare providers demonstrated 4.1-fold higher odds of good awareness (OR 4.12, 95% CI 2.8–6.1, $p<0.001$).

**Symptom Recognition and Healthcare-Seeking Patterns:**
Symptom prevalence in the study population reflected reported literature rates. Stress urinary incontinence affected 28.4% of participants, urgency incontinence 19.7%, and mixed incontinence 12.3%. Pelvic organ prolapse symptoms were reported by 16.8%, while sexual dysfunction potentially related to pelvic floor weakness affected 22.1% of sexually active participants.[5][6]
Healthcare-seeking behaviours demonstrated significant gaps between symptom experience and professional consultation. Among symptomatic women, only 43.7% had discussed concerns with healthcare providers, and merely 31.2% had received appropriate referrals for specialized care. Primary care providers were the most common first contact (67.4%), followed by gynaecologists (28.9%) and urologists (3.7%).[3][4]
Barriers to healthcare seeking included embarrassment (36.8%), belief that symptoms were normal aging processes (31.4%), lack of knowledge about available treatments (28.7%), and concerns about invasive examinations (24.3%). These findings align with established literature demonstrating persistent stigma and knowledge gaps affecting care access.[7][1]

## DISCUSSION

This comprehensive cross-sectional study reveals substantial knowledge gaps regarding pelvic floor health among women aged 25–60 years, particularly concerning advanced therapeutic modalities such as biofeedback therapy. While general awareness of pelvic floor muscles reaches moderate levels (64.2%), deeper understanding of anatomy, function, and dysfunction mechanisms remains limited, consistent with findings from previous international studies.[20][17][4][1]

The markedly low biofeedback awareness (23.1%) represents a critical gap considering the substantial evidence supporting biofeedback-assisted PFMT effectiveness. This finding suggests that despite technological advances and improved treatment outcomes, knowledge translation from research to clinical practice and patient awareness remains inadequate. Healthcare providers may need enhanced education regarding biofeedback benefits and referral pathways to improve patient access to these evidence-based interventions.[14][16][8][11]

Educational level emerged as the strongest predictor of pelvic floor knowledge, aligning with established literature demonstrating socioeconomic disparities in health awareness. This finding emphasizes the need for tailored educational interventions that address diverse literacy levels and cultural contexts. Community-based programs, particularly targeting women with lower educational attainment, could help reduce knowledge disparities and improve healthcare equity.[4][1]

The higher awareness levels among multiparous women reflect increased healthcare exposure during reproductive years, suggesting that pregnancy and postpartum periods represent crucial opportunities for pelvic floor education. However, the low utilization of professional physiotherapy services (18.9%) despite symptom prevalence (34.6%) indicates that awareness alone is insufficient to drive appropriate healthcare-seeking behaviours.[26][4]

Healthcare provider communication patterns significantly influenced patient knowledge levels, with 4.1-fold higher awareness odds among women who had discussed pelvic floor health with providers. This finding underscores the critical role of healthcare professionals in patient education and emphasizes the need for systematic integration of pelvic floor health discussions into routine women's healthcare.[3][4]

### Clinical Implications:

These findings have several important clinical implications. First, healthcare providers should proactively discuss pelvic floor health during routine encounters, particularly with high-risk populations including postpartum and perimenopausal women. Second, educational materials should emphasize the availability and effectiveness of biofeedback-assisted treatments to improve patient treatment choices. Third, healthcare systems should consider implementing screening protocols for pelvic floor dysfunction to identify symptomatic women who might benefit from early intervention.

### Study Limitations:

Several limitations should be acknowledged. The cross-sectional design prevents causal inferences about knowledge predictors. Convenience sampling may introduce selection bias, potentially overrepresenting educated, urban participants. Self-reported symptom assessment lacks clinical validation, and cultural factors influencing health discussions may vary across different populations. Additionally, the study was conducted in a specific geographic region, potentially limiting generalizability to other settings.

Future research should include longitudinal studies examining knowledge changes over time, intervention studies evaluating educational program effectiveness, and multicentred studies across diverse populations to enhance generalizability. Investigation of healthcare provider knowledge and attitudes regarding pelvic floor disorders would complement patient-focused research.

## CONCLUSION

This study demonstrates significant knowledge gaps regarding pelvic floor health among women aged 25–60 years, with particularly low awareness of biofeedback therapy and specialized physiotherapy services. Educational level, urban residence, previous pregnancies, and healthcare provider communication emerged as key predictors of better awareness. Despite moderate symptom prevalence, healthcare-seeking behaviours remain suboptimal, suggesting the need for comprehensive educational interventions and systematic integration of pelvic floor health into routine women's healthcare. Healthcare providers should prioritize pelvic floor health discussions, particularly during reproductive healthcare encounters, and ensure appropriate referrals for specialized services. Public health initiatives targeting younger women and those with lower educational levels could help reduce knowledge disparities and improve long-term pelvic floor health outcomes. The substantial evidence supporting biofeedback-assisted treatments should be more effectively communicated to both patients and healthcare providers to optimize treatment utilization and outcomes.

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