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Antenatal pelvic floor muscle exercise in Ethiopia: A Cross sectional study in Jimma Zone Public Hospitals

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Abstract

Background: Pelvic floor disorders, frequently arising from muscle damage during pregnancy and childbirth, represent a significant global health concern. Although pelvic floor muscle exercises are recommended to alleviate discomfort, there exists a substantial lack of knowledge and practice among pregnant women in Ethiopia.

Objective: To assess knowledge and practice of antenatal pelvic floor muscle exercise and its associated factors among pregnant women attending antenatal care at Jimma zone public hospitals, southwest Ethiopia 2024.

Method: An institutional-based cross-sectional study was conducted from January to March 2024 among 422 pregnant women attending antenatal care in Jimma Zone public hospitals using interviewer administered structured questionnaire. Trained data collectors systematically enrolled, using systemic random sampling at predetermined intervals. The data analysis approach was conducted using binary logistic regression to assess associations between dependent and independent variables, considering P-values less than 0.05 as statistically significant.

Result: Out of the total study participants, one third of pregnant women 32.0% (95%CI: 27.5–36.5) had good knowledge of pelvic floor muscle exercises, and one third of pregnant women 9.5% (95%CI: 6.6–12.6) had good practice of these exercises. Knowledge of pelvic floor muscle exercises was statistically associated several factors: age (AOR=2.61; 95% CI: 1.05, 6.48), educational status (AOR=4.83; 95% CI: 1.72, 13.53), residence (AOR=2.56; 95% CI: 4.76, 26.52), gravidity (AOR=4.78; 95% CI: 2.25, 10.16), and previous caesarean section (AOR=6.15; 95% CI: 2.46, 15.36). Similarly, the practice of pelvic floor muscle exercises was found to be statistically associated with educational status (AOR=4.37; 95%CI: 1.53, 12.49), residence (AOR 3.76; 95%CI: 1.69, 8.36)), gravidity (AOR 2.6; 95% CI: 1.1, 6.39), and previous caesarean section (AOR 2.86; 95%CI: 1.34, 6.1).

Conclusion and Recommendations: There is low proportion of pregnant women with adequate knowledge and practice of pelvic floor muscle exercises. . Knowledge of these exercises was significantly associated with factors such as age, educational level, residence, gravidity, and previous history of cesarean section. Similarly, the practice of these exercises was significantly correlated with educational level, residence, gravidity, and prior cesarean delivery. Targeted educational interventions are recommended to improve awareness and adherence. Healthcare providers should integrate structured counseling on pelvic floor exercises into routine antenatal care. Future studies should consider employing qualitative or mixed methods research designs to explore antenatal exercise from diverse perspectives.

Keywords: Pelvic floor muscle exercises; Pregnancy; Knowledge; Practice; Antenatal care.

Introduction

The pelvic floor muscles, which support the pelvic organs, attach to the posterior base of the spine and the anterior pubic bone[1]. These muscles undergo many changes throughout a woman's lifetime [2]. They play a crucial role in supporting the intestines, uterus, and bladder, controlling urinary and fecal incontinence, and improving sexual function by supporting the pelvic and abdominal organs [3]. Pelvic floor muscle exercise is a conservative therapy method used for mild pelvic organ prolapse and various female urinary disorders [4]. The aim of PFME is to enhance the strength of the striated muscles in the

urogenital sphincter, effectively obstructing the urethral lumen when contracted properly. PFME can strengthens and tones pelvic organs, prevents prolapse, and improves bladder control and urinary incontinence [5]. These exercises represent a cost-effective approach for preventing and managing pelvic floor issues and are considered a non-invasive, low-risk therapy preventing and treating pelvic floor dysfunction [6].

Pelvic floor disorders are a significant global public health issue, affecting approximately 37% of women worldwide[7]. The burden is particularly high in Sub-Saharan Africa, where around 20% of individuals report dysfunction, with urinary incontinence and genital prolapse prevalence varying widely across these regions. In Ethiopia, the problem is even more pronounced, with 41.1% of women suffering from pelvic floor disorders-most commonly urinary incontinence (32.8%), followed by pelvic organ prolapse (25.5%) and fecal incontinence (4.2%)[8]. These disorders arise primarily from muscle damage and weakness during pregnancy and childbirth[9], severely impacting women's social, economic, physical, and psychological well-being [10]. Given their detrimental effects on quality of life and productivity, addressing pelvic floor disorders remains a critical healthcare priority.

Despite the effectiveness of pelvic floor muscle exercise in preventing and reducing pelvic floor disorders during and after delivery, global practice rate for these exercises remain low. Studies conducted across different countries reveal varying percentages of pelvic floor muscle exercise practices: Newcastle, NSW, Australia (54.5%)[11]; East Coast Malaysia (54.5%) [12]; Al Madinah Al Munawarah, Saudi Arabia (38.5%)[13]; Jazan, Saudi Arabia (38.8%); Thailand (10.7%)[14]; University Sains Malaysia Hospital (10.7%) [15]; Lahore, Pakistan (6.5%) [16]; Enugu Metropolis, Nigeria (38.8%) [17]; and Ethiopia (7.2%) [18]. Conversely, knowledge of pelvic floor muscle exercises among pregnant women varies by countries: In Lahore, Pakistan (64.16%), Sultan Ahmad Shah Medical Center in Malaysia (52%) [19], University Sains Malaysia Hospital in Malaysia, (51.8%); and Ethiopia (42%).

Despite the significant burden of pelvic floor muscle disorders in Ethiopia, there have been limited studies on pelvic floor muscle exercises among pregnant women. This study aims to assess the level of knowledge regarding pelvic floor muscle exercises and the actual practice of these exercises, as well as the associated factors among pregnant women in public hospitals in the Jimma Zone, Oromia region, Ethiopia.

Methods and Materials

Study Setting, Period and Design

An institutional-based cross-sectional study was conducted among pregnant women receiving antenatal care at public hospitals in the Jimma Zone, specifically at Jimma University Medical Center, Shenen Gibe General Hospital, Seka Chekorsa Hospital, and Agaro General Hospital, from January 1 to March 1, 2024. The study period was strategically chosen to optimize data collection by avoiding major religious holidays that could potentially decrease patient attendance, as well as seasonal challenges, such as heavy summer rains that hinder travel to hospitals. Additionally, this timeframe ensured operational feasibility by aligning with periods of stable staffing and resource availability across the participating facilities.

Jimma Zone comprises nine public hospitals, three private hospitals, and 120 health centers, including one referral hospital, three general hospitals, and five primary hospitals. Notably, the zone is home to Ethiopia's oldest hospital, the Jimma University Medical Center (JUMC), which serves a population of over 15 million people. Additionally, the newly established Sheen Gibe General Hospital features 80 inpatient beds and six delivery couches. Agaro General Hospital provides a range of services, including dentistry, ophthalmology, medicine, surgery, gynecology, obstetrics, and pediatrics. Seka Chekorsa Hospital, a district hospital, is located in Seka Chekorsa town, 18 kilometers south of Jimma Town [20,21].

Study Population

The study encompassed all pregnant women attending antenatal care in public hospitals within the Jimma Zone who consented to participate. Participants were women from the selected hospitals who fulfilled the inclusion criteria, which mandated that they be mentally and physically capable of participation and currently receiving antenatal care at Jimma Zone Public Hospital. Women exceeding 32 weeks of gestation or those with high-risk conditions including incompetent cervix, preeclampsia, premature membrane rupture, twin pregnancy, preterm labor, antepartum hemorrhage, or a history of preterm labor or haemorrhage were excluded from the study.

Simple size determination

The sample size for this study was calculated using a single population proportion formula. This calculation incorporated a 5% margin of error, a 95% confidence interval, a significance level (α) of 0.05, and an assumed proportion (P) of 47% of pregnant women who are knowledgeable about pelvic floor muscle exercises, as indicated by a study conducted in northwest Ethiopia, the formula $n = (Z\alpha/2)^2 P (1 - P) / d^2$ produced an initial sample size of 383, which was subsequently adjusted to 422 to account for a 10% non-response rate.

Sampling technique

The study was conducted in four public hospitals selected through simple random sampling from a total of eight public hospitals in the Jimma zone, ensuring unbiased representation. Researchers obtained data on the number of pregnant women attending antenatal care (ANC) at each hospital during the two months preceding data collection. The total sample size was

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proportionally allocated to each hospital based on ANC attendance, with larger hospitals contributing more participants. Within each hospital, participants were selected using systematic random sampling: the sampling interval (K) was calculated as K = N/n, where N represented the total eligible pregnant women (1,484) and n the required sample size (422). This yielded K = 1,484 ÷ 422 ≈ 3.516, rounded to 4. The first participant was chosen via the lottery method, followed by every 4th woman until the sample size was met.

Variables and Measurements

The dependent variable was knowledge and practice of pelvic floor muscle exercise. The knowledge was measured by 12 items that had only one correct possible response. The correct response was coded '1' and the incorrect response was coded '0'. Then the sum score was computed resulting in '0' as minimum possible score and '12' as maximum possible score. The respondents who got overall knowledge score more than or equal to half (≥6) were considered as had 'good knowledge' while those scored less than half (<6) were considered as had 'poor knowledge. The practice was measured by 7 items that had only one correct possible response. The correct response was coded '1' and the incorrect response was coded '0'. Then the sum score was computed resulting in '0' as minimum possible score and '7' as maximum possible score. The respondents who got overall knowledge score more than or equal to half (≥4) were considered as had 'good practice' while those scored less than half (<4) were considered as had 'poor practice' [22].

Data Collection and Quality Control

The data collection instrument was adapted after reviewing of relevant literatures (4,6,23–28,12–19). The questionnaire has both open and close-ended items. The structured questionnaire was initially prepared in English and translated to the regional languages, Afaan Oromo and Amharic; it was then translated back to English to ensure consistency with the help of language experts proficient in both languages. The reliability of the tools were checked by Cronbach Alpha, which yielded value of 0.813 for knowledge questions and 0.807 for practice questions, indicating a good level of internal consistency. Modifications were made to the arrangement of questions based on the specific objectives they addressed.

A pre-test was conducted with 5% of the total sample size, leading to further refinement of the tools. Data collection was carried out through face-to-face interviews by four BSc midwife data collectors and one BSc midwife supervisor, all of whom received two days training on the study purpose and tool. Interviews were conducted in private, quiet rooms to minimize distractions and ensure participant comfort. Confidentiality was maintained through informed consent, the anonymization of identifiers with coded linkages for follow-ups, secure storage, and strict compliance with Institutional Review Board (IRB) guidelines. Consent forms were stored separately, with access restricted to authorized personnel only. The principal investigators and supervisors reviewed the collected data daily for completeness.

Data management and Analysis

After data collection, all questionnaires were reviewed for completeness, coded, and entered into EPI Info 7 software. Subsequent analysis was conducted using IBM Statistical Package for Social Sciences (SPSS) version 25. Frequency tables were generated to illustrate the distribution of respondents' socio-demographic and obstetric histories. Knowledge items comprised 12 questions with three possible responses: Yes = 1, No = 2 and I don't know = 3. Each correct answer (Yes) was assigned a score of "1," while incorrect answers (No) or unsure responses were combined and assigned a score of "0." The knowledge scale total score ranged from 0 to 12. Participants who answered at least half of the knowledge questions correctly (≥6) were classified as having good knowledge of pelvic floor muscle exercises. The practice of pelvic floor muscle exercises was assessed using a five-point Likert scale consisting of 7 items, where pregnant women indicated their levels of practice. The practice score ranged from 0 to 7, with values assigned as follows: 1 for "never," 2 for "seldom," 3 for "usually," 4 for "frequently," and 5 for "always." In the analysis, "never" and "seldom" were combined and scored as "0," representing incorrect responses, while "usually," "frequently," and "always" were merged and scored as "1," representing correct responses. The total score was calculated for each participant, with those scoring at least half (≥4) classified as having good practice of pelvic floor muscle exercises.

To assess the association between independent variables and the outcome variable, both bivariable and multivariable logistic regression analyses were performed using forward/backward selection. Variables from the bivariable model with a p-value less than 0.25 were included in the multivariable logistic regression to mitigate the impact of confounding factors. Statistical significance was established at $p<0.05$. The magnitude of association between independent variables and the outcome variable was measured using odds ratios (OR) with a 95% confidence interval (CI). A collinearity diagnostic test was performed, confirming no severe multicollinearity, as variance inflation factors (VIF) were less than 10 and the Tolerance Test exceeded 10%. Normality checks revealed no outliers in the data. Model goodness-of-fit was assessed using the Hosmer and Lemeshow test, which indicated a good fit for factors associated with both knowledge (P-value = 0.678) and practice (P-value = 0.635). Finally, the results were presented in tables, figures, and text.

Results

Socio-demographic characteristics of pregnant women

We conducted interviews with 422 pregnant women, achieving a 100% response rate. Among the study participants, 155 (36.7%) were aged under 20 years. A significant majority, 266 (63.0%),

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identified as Muslim. Regarding marital status, the majority of participants, 354 (83.9%), were married. Less than one-third, 149 (35.3%), had no formal education. The majority of pregnant women, 333 (78.9%), worked a minimum of 13 hours per day. Nearly half of the respondents, 197 (46.7%), were housewives, and more than half, 228 (54.0%), resided in rural areas. (Table 1) Religion*: Wakefata, non-religious, and other African religions.

Table 1: Socio-demographic characteristics of pregnant women attending antenatal care in Jimma zone public hospital, 2024(n=422)

Variable	Category	Frequency	Percent
Age Category	≤20	155	36.70%
	21-30	59	14.00%
	31-40	91	21.60%
	≥40	117	27.70%
Religion	Muslim	266	63.00%
	Orthodox	103	24.40%
	Protestant	23	5.50%
	Catholic	20	4.70%
	Others*	10	2.40%
Marital status	Single	9	2.10%
	Married	354	83.90%
	Divorced	43	10.20%
	Widowed	16	3.80%
Residence place	Urban	194	46.00%
	Rural	228	54.00%
Educational status	No formal education	149	35.30%
	Primary school	90	21.30%
	Secondary school	105	24.90%
	College or university	78	18.50%
Occupation	Housewife	197	46.70%
	Self-employee	125	29.60%
	Government employee	100	23.70%
Time spent in work per day	1-5 hrs.	11	2.60%
	6-12 hrs.	78	18.50%
	≥13hrs.	333	78.90%

Table 2: Obstetric and Clinical Condition of pregnant women attending antenatal care in Jimma zone public hospital, 2024(n=422)

Variable	Category	Frequency	Percent
Gravidity	Primigravida	168	39.80%
	Multigravida	254	60.20%
Previous caesarean delivery	No	343	81.30%
	Yes	79	18.70%
Number of vaginal deliveries	No previous vaginal delivery	144	34.10%
	2-Jan	98	23.20%
	4-Mar	126	29.90%
	>4	54	12.80%
How is your general health?	Very good	385	91.20%
	Medium strength	37	8.80%

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Table 3: Frequency distribution of Knowledge of Pelvic Floor Muscle Exercises among pregnant women attending antenatal care at Jimma zone public hospital, 2024, (n=422)

Variables	Category		
	Yes n (%)	No n (%)	Unsure n (%)
Have you heard exercises for the muscle in the pelvic	153(36.3)	247(58.5)	22(5.2)
Have you been taught how to do PFMEs	64(15.2)	333(87.9)	25(5.9)
Have you been taught about Kegel exercise	27(6.4)	380(90.0)	15(3.6)
Have you been taught about Pillow squeeze Exercises	12 (2.8)	400(94.8)	10(2.4)
Have you been taught about Bridging Exercises	17 (4.0)	280(66.4)	125(29.6)
Does pelvic floor muscle exercise have the Benefit	151(44.3)	146(26.1)	125(34.5)
Can PFMEs Prevent Urine Leak	148(35.0)	124(29.4)	150(35.6)
Can PFMEs Enhance sexual activity	139(32.9)	133(31.5)	150(35.6)
Can Pelvic Floor Muscle Exercises control the leakage of stool and gas from the anus	148(35.0)	113(26.8)	161(38.2)
Can Pelvic Floor Muscle exercises reduce the risk of Pelvic organ prolapse	146(34.6)	125(29.6)	151(35.8)
Can you perform pelvic floor muscle Exercises while performing daily activity	118(28)	203(48.1)	101(23.9)
Pelvic Floor Muscle exercises should be done at least 3 times a day	79(18.7)	183 (43.4)	160(37.9)
Overall knowledge	Good N (%)		135(32%)
	Poor N (%)		287(68%)

Obstetric and Clinical Condition of participants

Among the study participants, more than half (65.9%) were multigravida. The majority of the participants (81.3%) did not undergo a cesarean delivery in their previous childbirth. (Table 2)

Knowledge of Pelvic Floor Muscle Exercises among pregnant women

Among the total study participants, approximately one-third, 135(32%), of participant's demonstrated good knowledge of pelvic floor muscle exercises, with a 95% confidence interval of 27.5–36.5. (Table 3)

Practice of Pelvic Floor Muscle Exercises of pregnant women

One-tenths, 40 (9.5%) of participants had good practice of pelvic floor muscle exercise with 95%CI: 6.6%, 12.6 %.(Table 4)

Reasons for not practicing pelvic floor muscle exercises among pregnant women

The majority of the study participants did not engage in pelvic floor muscle exercises; specifically, 65.1% reported that they were unaware of pelvic floor muscle exercises. Additionally, 92.89% of participants indicated a lack of motivation to perform these exercises (Figure1).

Factors associated with Knowledge of Pelvic Floor Muscle Exercises among pregnant women

In bivariate logistic regression analysis, factors such as age, educational status, residence, total number of deliveries, previous history of cesarean section, and occupation were identified at p-value <0.25. In multivariable logistic regression analysis, six factors were significantly associated with the outcome variable at a p-value <0.05.

The odds of having good knowledge of pelvic floor muscle exercises among pregnant women aged 40 years or older were 2.6 times higher compared to pregnant women aged 20 years or younger (AOR =2.61; 95%CI=(1.05,6.48)) at (P- value =0.038).The odds of having good knowledge of pelvic floor muscle exercises among pregnant with college or university degree was 4.83 times higher compared to pregnant women with no formal education (AOR= 4.83; 95%CI: (1.72,13.53)) at (P- value =0.003).

Urban resident pregnant women had 11 times higher odds of having good knowledge of pelvic floor muscle exercises compared to rural counterparts (AOR= 11.23; 95%CI: (4.8, 26.5)) at p-value=0.001). The odds of having good knowledge of pelvic floor muscle exercises among multigravida women were 4.78 times higher compared to primigravida women (AOR= 4.78; 95%CI:(2.25,10.16)) at (P- value =0.001). Pregnant women with previous caesarean section had 6.15 higher odds of having a good knowledge of pelvic floor muscle exercises compared to those with no history of caesarean section (AOR= 6.15; 95%CI: (2.46,15.36)) at (P- value =0.001). (Table 5)

Factors associated with Pelvic Floor Muscle Exercises Practice of among pregnant women

Bivariate logistic regression analysis identified four factors with p value 0. 25, educational status, residence area, total number of pregnancies, previous history of cesarean section. In multivariable logistic regression analysis revealed four factors were significantly associated with the practice of pelvic floor muscle exercises at p-value <0.05.

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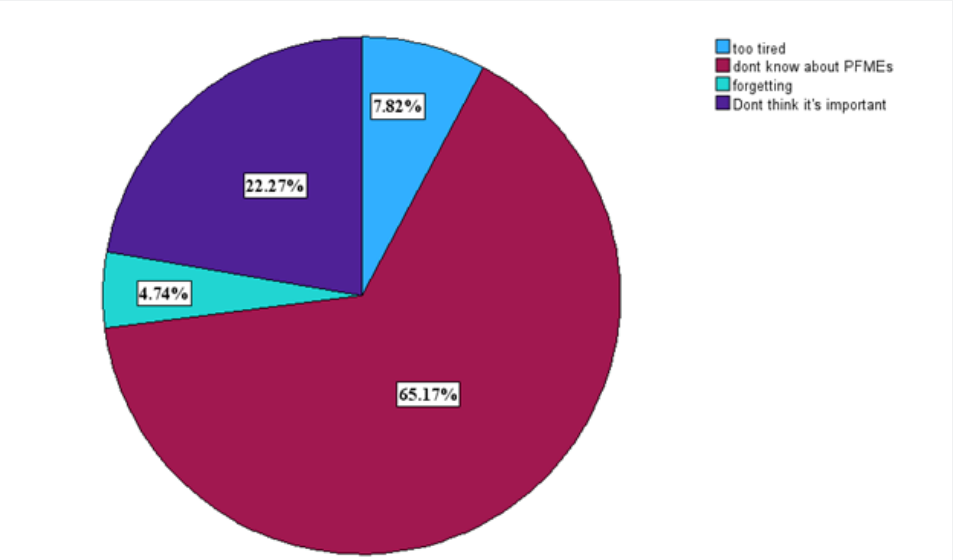

Figure 1: Reasons for not performing pelvic floor muscle exercises among pregnant women attending antenatal care at Jimma zone public hospital, 2024.

Pregnant women with college or university degree were 4.37 times more likely to practice pelvic floor muscle exercises compared to those with no formal education (AOR= 4.37; 95%CI: (1.53,12.49)) at (P- value = 0.006). Pregnant women with a primary level education were 3.16 times more likely to practice pelvic floor muscle exercises compared to those with no formal education (AOR= 3.16; 95%CI:(1.08,9.23)) at (P- value =0.036).

The urban residence pregnant women were 3.76 times more likely to practice pelvic floor muscle exercises compared to rural resident pregnant women AOR=3.76; 95%CI:(1.69,8.36)) at (P-value=0.001). Pregnant women with a previous caesarean section were 2.86 times more likely to practice pelvic floor muscle exercises compared to those without history of caesarean section (AOR= 2.86 95%CI:(1.34,6.07) at (P-value=0.001). (Table 6)

Table 4 : Practice of pelvic floor muscle exercises of pregnant women attending antenatal care at Jimma zone public hospital, 2024 (n=422)

Variable	Category n (%)				
	Never	Seldom	Usually	Frequently	Always
I have performed PFME when I'm pregnant.	340 (80.6%)	39 (9.2%)	20 (4.7%)	18 (4.3%)	5 (1.2%)
I have spent time to perform PFME.	335(79.4%)	51 (12.1%)	16 (3.8%)	18 (4.3%)	2 (0.5%)
I have tried to contract and relax the pelvic floor muscles.	340 (80.6%)	41 (9.7%)	19 (4.5%)	16 (3.8%)	6 (1.4%)
I have tried to quickly squeeze and release pelvic floor muscles.	286(67.8%)	106(25.1%)	19 (4.5%)	8 (1.9%)	3 (0.7%)
I have tried to lift my hips off the floor while lying back.	217(51.4%)	172(40.8%)	26 (6.2%)	5 (1.2%)	2 (0.5%)
I have discussed PFME with friends.	222(52.6%)	118(28.0%)	44(10.4%)	25 (5.9%)	3 (0.7%)
I have tried to search for information about PFME.	222(51.6%)	163(38.6%)	1 (0.2%)	70(16.6%)	4 (0.9%)
Overall practice	Good	382(90.5%)			40(9.5%)
	Poor				

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Table 5: Factors associated with knowledge of pelvic floor muscle exercises among pregnant women attending antenatal care at Jimma zone public hospital, 2024(n=422)

Variables	Category	Knowledge of PFMEs		COR (95%CI)	AOR(95%CI)	P-value
		Good	Poor			
Age	≤20	56(36.1%)	99(63.9%)	1	1	
	21-30	23(39%)	36(61%)	1.13(.61,2.09)	1.69(.53,5.48)	0.375
	31-40	25(27.4%)	66(72.6%)	.670(.381,1.18)	2.73(.85,8.74)	0.091
	≥40	31(26.5%)	86(73.5%)	.64(.38, 1.08)	2.61(1.05,6.48)	0.038
Educational status	No formal education	44(29.5%)	105(70.5%)	1	1	
	primary school	23(25.6%)	67(74.4%)	.82(.45,1.478)	1.41(.55,3.62)	0.476
	secondary school	33(31.4%)	72(68.6%)	1.94(1.10,3.43)	1.750(.69,4.42)	0.236
	college or university	35(44.9%)	43(55.1%)	1.82(1.04,3.21)	4.83(1.72,13.53)	0.003
Occupation	Housewife	51(25.8%)	146(75.2%)	1	1	
	Self-employed	38(30.4%)	87(69.6%)	1.25(.761,2.06)	.343(.145,.812)	0.015
	Government employed	46(46%)	54(54%)	2.44(1.47,4.05)	.427(.17,1.098)	0.077
Residence	Urban	91(46.9%)	103(53.1%)	3.70(2.40,5.70)	11.23(4.8, 26.5)	0.001
	Rural	44(19%)	184(81%)	1	1	
No of births	Primigravida	38(22.6%)	130(77.4%)	1	1	
	Multigravida	97(38%)	157(62%)	2.11(1.36,3.29)	4.78(2.25,10.16)	0.001
Previous Cesare-an section	No	106(31.7%)	237(68.3)	1	1	
	Yes	29(36.7%)	50(63.3%)	1.30(.78,2.16)	6.15(2.46,15.36)	0.001

Table 6: Factors associated with practice of pelvic floor muscle exercises among pregnant women attending antenatal care at Jimma zone public hospital, 2024, (n=422)

Variable	**Category**	**Practice of PFMEs**		**COR (95%CI)**	**AOR (95%CI)**	**P-Value**
		Good	**Poor**			
Educational status	No formal education	6(4.0%)	143(96%)	1	1	
	Primary school	11(12.2%)	79(87.8%)	3.32(1.18,9.31)	3.16(1.08,9.23)	0.036
	Secondary school	9(8.6%)	96(91.4%)	2.23(.77,6.48)	2.18(.724,6.58)	0.165
	College or university degree	14(17.9%)	64(82.1)	5.21(1.91,14.18)	4.37(1.53,12.49)	0.006
Residence	Urban	31(16.2%)	163(83.8)	4.63(2.14,9.98)	3.76(1.69,8.36)	0.001
	Rural	9(3.9%)	219(96.1%)	1	1	
Total number of pregnancies	Primigravida	7(4.2%)	161(95.8%)	1	1	
	Multi gravida	33(13%)	221(87%)	3.43(1.48,7.96)	2.60(.91,7.45)	0.037
Previous cae-sarean section	No	23(6.7%)	320(93.3%	1	1	
	Yes	17(21.5%)	62(78.5%)	3.82(1.93,7.56)	2.86(1.34,6.07)	0.001

Discussion

The current study findings revealed that while one-third of the participants had good knowledge of pelvic floor muscle exercises, only one-tenth of the participants consistently practiced these exercises. Several factors were significantly associated with both knowledge and practice of pelvic floor muscle exercises. Knowledge was linked to age, educational level, residence area, gravidity, and previous history of cesarean sections. Practice was associated with gravidity, residence, educational status, and previous history of cesarean sections. The low level of knowledge about PFME (32%) is concerning. This lack of knowledge could be attributed

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to the relatively low level of consistent practice of PFME (9.5%). This knowledge gap may hinder motivation to engage in these exercises, which are crucial for preventing pelvic floor disorders. Without appropriate interventions, this could lead to significant social, economic, physical, and psychological consequences for women, affecting their quality of life and productivity. The current study's findings were consistent with a study conducted in Pune, India, and Gujarat, Pakistan. (32%) and Gujrat, Pakistan(32.8 %).The current study's finding on knowledge of PFME (32%) were higher than those reported in studies conducted in, Gujrat, Punjab Pakistan (24.9%) and Thailand (27.9%).This discrepancy could be attributed to various factors, including differences in educational level, experience with physical exercise before pregnancy, study area, sample size, and study period.

The current study's findings were lower than those reported in studies conducted in, Lahore, Pakistan (64.16%), Sultan Ahmad Shah Medical Center Malaysia(52%), University Sains Malaysia Hospital, Malaysia (51.8%), Al Madinah Al Munawarah Saudi Arabia (62.7%), East Coast, Malaysia (80.1%), Egypt (76.5%) [23] and Northwest Ethiopia (42%). This difference may be attributed to several factors, including the limited access to services, a lack of healthcare provider counselling on antenatal exercise, limited information, and the relatively lower literacy levels of the study participants compared to other countries where antenatal exercise was emphasized. Overall, the lack of antenatal exercise guidelines and classes could also contribute to lower practice rates observed in the current study. The study revealed a concerningly low rate of consistent pelvic floor muscle exercise practice among pregnant women receiving antenatal care at Jimma Zone Public Hospitals, with only 9.5% of participants engaging in these essential exercises. This lack of practice could lead to weakened pelvic floor muscle during pregnancy and childbirth, increasing the risk of various pelvic floor dysfunctions after delivery. These dysfunctions can have long-term consequences for women's social, economic, physical, and psychological well-being, ultimately impacting their quality of life and productivity.

This finding is lower than those reported in studies conducted in several other countries, including, Newcastle, NSW, ,East Coast Malaysia (54.5%) Al Madinah Al Munawarah Saudi Arabia (38.5%) [24], Jazan, Saudi Arabia (38.8%), Thailand (10.7), University Sains Malaysia Hospital (10.7%), Egypt(32%) and Enugu Metropolis, Nigeria (38.8%). The observed discrepancy could be attributed to various factors, such as socio-demographic differences, disparities in healthcare infrastructure, and variations in study design and methodology[25,26]. This current study found a higher rate of consistent PFME practice compared to studies conducted in, Gujrat, Pakistan (6.5%) [27], and Gonder, Northwest Ethiopia (7.2%). The observed discrepancy could be resulted from difference in sample size study setting, and study period. Previous studies using observational methods may have yielded more accurate data on PFME practice, while the current study's reliance on interviewer-based questionnaire may have introduced responder bias. Additionally, the current study's larger sample size, and inclusion of multiple hospitals may have contributed to the higher observed practice rate. Furthermore, the current study's participants had a higher proportion with secondary education and college or university degrees compared to previous studies, which may explain the higher PFME practice rate. [28]

The study also found that pregnant women with a higher level of education were more likely to have knowledge about PFME, aligning with findings from, Malaysia, which concluded that having a tertiary level of education was associated with greater knowledge [29]. Multi-gravida mothers were also found to be more knowledgeable about PFME compared to primigravida mothers, supporting findings from Pune, India and Belgium which showed there was a significant lack of knowledge about pelvic floor muscles and training among primiparous women. The study also found that pregnant women with a college or university degree and urban residents were more likely to practice PFME, supporting finding from studies conducted in, northwest Ethiopia. The higher practice rate among women with a previous cesarean section may be due to increased counselling about PFME during postpartum care. Overall, this finding highlights the importance of considering various factors when comparing studies on PFME practice and underscore the need for targeted interventions to improve knowledge and practice of PFME among pregnant women, particularly those with lower levels of education and residing in rural areas.

Strength and Limitation of the study

This study contributes valuable insights into the knowledge and practice of pelvic floor muscle exercises among pregnant women in Ethiopia, particularly within Jimma Zone. The studies' strength lies in its large sample size and multi-centre study area (four hospitals). However, the study's limitations include its focus solely on expectant mothers receiving antenatal care at government hospitals, excluding private medical facilities and Cross-sectional design presents challenges in establishing temporality and may introduce potential recall bias.

Conclusion and Recommendations

The study identified a significant disparity between knowledge and practice of pelvic floor muscle exercises among pregnant women receiving antenatal care at public hospitals in Jimma Zone. While one-third of participants exhibited a strong understanding of these exercises, only one-tenth engaged in consistent practice. Notable factors influencing knowledge of pelvic floor muscle exercises included age, educational level, area of residence, gravidity, and previous cesarean sections. In contrast, the practice of these exercises was significantly associated with educational level, gravidity, area of residence, and prior history of cesarean sections. This study highlights a significant gap between knowledge and practice of pelvic floor muscle exercises (PFME) among pregnant women in Jimma Zone Public Hospitals. Despite

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one-third of participants demonstrating good knowledge of PFME, only a small fraction actively engaged in regular practice. The identified factors such as age, education, residence, gravidity, and prior cesarean sections suggest that targeted interventions are needed to bridge this gap. Improving awareness through structured antenatal education and addressing barriers to practice could enhance maternal health outcomes and reduce pregnancy-related pelvic floor complications.

The findings underscore the need for healthcare providers to prioritize PFME counseling during antenatal visits, particularly for high-risk groups such as multiparous women and those with lower education levels. Future research should explore effective strategies to promote consistent PFME practice, including community-based programs and digital health interventions. Addressing these gaps can empower pregnant women to adopt beneficial pelvic floor exercises, ultimately improving their overall well-being and reducing the burden of pelvic floor dysfunction.

Ethics approval and consent to participate

Before data collection, ethical approval and clearance to conduct the study was obtained from the Institutional Review Board (IRB) of Jimma University; Institute of Health with reference number of: JUIH/IRB/455/23. An official letter of permission was obtained from each hospital. Written informed consent was obtained from each mother prior to participation in the study, following a comprehensive explanation of the study's objectives. Privacy and confidentiality were maintained throughout the interview process. The interviewee's name and address were not recorded in the questionnaire. The right to refuse participation or withdraw from the study at any time was fully respected. The questionnaire used for interview took average of 30 minutes to complete.

Informed Consent

Written informed consent was obtained from each study participant prior to their participation. The objectives of the study were thoroughly explained to all participants.

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