



# Magnitude of pelvic floor dysfunctions among women, western Ethiopia; 2022: Community based study

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## Keywords

Symptomatic, Pelvic floor dysfunction, Women, Magnitude, Western Ethiopia

## Abbreviations

AI: Anal Incontinence, BMI: Body Mass Index; BOA: Bladder over Active; CI: Confidence Interval; CS: Caesarean Section; ETB: Ethiopian Birr; FI: Fecal Incontinence; GC: Gregorian calendar; HH: House Hold; ICS: International Continence Society; IUGA: International Urogynecological Association; LMIC: Low and Middle Income Country; PFD: Pelvic Floor Disorder; POP: Pelvic Organ Prolapse; QoL: Quality Of Life; UI: Urgency Incontinence; UTI: Urinary Tract Infection; VBAC: Vaginal Birth After Previous Caesarean Section

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## Abstract

**Background:** Pelvic floor dysfunction is a condition that primarily affects women. It is widespread and affects the quality of life of at least one-third of adult women and is a growing part of women's health care. Recognizing and supporting these needs is a major public health issue with a strong psychosocial and economic base.

**Objectives:** - To assess symptomatic pelvic floor dysfunction and associated factors among women in the, western Ethiopia, 2022.

**Methods and materials:** A community-based cross-sectional study design was employed, and participants were selected by using a systematic random sampling technique. We used EPI data version 3.1 software for data entry and cleaning and the Statistical Package for the Social Sciences version 26 for analysis. The 95% confidence interval was predicted, and the factor with a p value of less than 0.05 was considered statistically significant multivariate logistic regression analysis.

**Result:** - Over the magnitude of symptomatic pelvic floor dysfunction was 37.7% [(95% CI (31.7-42.5)]. Overactive bladder is the most commonly reported form of pelvic floor dysfunction, in which 135 of all participants reported this symptom. Pelvic organ prolapse was, accounting for 92 (30.4%), and four factors significantly associated with pelvic floor dysfunction were identified. In this study, age  $\geq 55$  years [(AOR = 2.1; 95% CI: (1.52-6.42)], history of weight lifting greater than 10 kg [(AOR = 3.21; 95% CI: (1.86-5.72)] greater than 5 vaginal deliveries [(AOR = 4.03; 95% CI: (2.20-8.27)], respectively.

**Conclusion:** The prevalence of symptomatic PFD was higher than the other studies done in Ethiopia. Heavy weight lifting, low socio-economic status, repetitive vaginal deliveries, chronic cough, and menopause were factors significantly associated with pelvic floor dysfunction. Screening and treating pelvic floor dysfunction should receive attention in collaboration with regional and zonal health bureaus.

## Background

Pelvic floor disorder (PFD) is a gynecologic health problem containing a variety of clinical diagnoses, and the most prevalent problems are pelvic organ prolapse (POP), faecal incontinence (FI), overactive bladder and urinary incontinence (UI). The International Urogynecological Association (IUGA) and International continence Society (ICS) jointly defined UI as the complaint of any involuntary loss of urine and FI as a complaint of involuntary loss of solid or liquid feces, and pelvic organ prolapse is the downwards displacement of one of the pelvic organs from its normal location that results in vaginal wall protrusion or bulge. Pelvic organ prolapse occurs when the pelvic floor no longer supports the proper positioning of the pelvic organs, i.e., the vagina, bladder, rectum or uterus.

The terms cystocele, cysto-urethrocele, uterine prolapse, rectocele, and enterocele have traditionally been used to describe the protrusion location of pelvic organ prolapse. In specifying an organ, these terms imply that a vaginal bulge is to certainty caused by a herniation of the bladder, bladder/urethra, uterus, rectum, or small bowel.

Patients with POP often have concurrent urinary symptoms, including stress urinary incontinence (SUI), urge urinary incontinence, frequency, urgency, urinary retention, recurrent urinary tract infection, or voiding dysfunction. Their symptoms can span from slight embarrassment to intolerable social and psychological problems and common debilitating health problems among women throughout the world.

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According to International Continence Society guidelines, urinary incontinence is a symptom, sign, and condition. In the case of stress urinary incontinence (SUI), a patient may complain of involuntary urine leakage on exertion or with sneezing or coughing; concurrently with these events, involuntary leakage from the urethra synchronous with these events may be a documented sign noted by a provider. With urge urinary incontinence, women have difficulty postponing urination urges and generally must promptly empty their bladder on cue and without delay .

Commonly, women with PFD experience sexual dysfunction specifically; those with advanced POP experience conflict in their marriage, and some of them end up in divorce due to sexual dysfunction. Anal incontinence (AI) is an involuntary loss of flatus, liquid, or solid stool that causes a social or hygienic problem (Abrams, 2005). Atrophy of Paradoxical contraction muscles has been associated with fecal incontinence (Bharucha, 2004). Importantly, urge-related AI should be differentiated from incontinence without awareness, as these may be associated with different underlying pathologies. Additionally, urgency without incontinence may reflect the inability of the rectal reservoir to store stool rather than a sphincter disorder.

Early identification of pelvic floor dysfunction and its related factors is important to take appropriate management, which consequently improves quality of life and increases the chance of curative rates.

Pelvic floor disorders affect millions of women worldwide; one in nine American women has had surgery for pelvic floor dysfunction at some point in her life, with 30% of women having the possibility of needing another surgery for the same condition. In addition, the prevalence of POP is increasing much more rapidly in low-income countries, recently reported at approximately 20%, and its complications impose a significant economic burden on the affected individual . Approximately 11% of American women have surgery for POP or incontinence before the age of 79, with 29.2% of women having the option of additional surgery .

In LMICs, it is deemed that women are more likely to suffer from POP than women in high-income countries owing to social stigma, poor access to treatment, and economic constraints . Pelvic floor dysfunction exposes women to extreme shame, humiliation, and fear because of their health . Women with advanced POP and UI have decreased body image and lower quality of life, and some may isolate themselves from society and hinder them from performing their daily activities, such as sitting down on the toilet, walking long distances, or lifting heavy materials .

Women with POP have difficulties with sexual intimacy due to the sensation of prolapse, which then affects their reproductive capacity and relationship with their partner. Urinary and anal incontinence are socially debilitating problems that cause severe emotional distress. Rural women cannot manage incontinence directly because of a lack of underwear, disposable pads, and limited access to washing facilities, causing problems with cleanliness and odor . This condition can lead to social isolation, embarrassment, loss of employment, failure to engage in daily activities, and impact on personal and intimate relationships, sometimes leading to divorce and isolation.

In Ethiopia, only 17% of women with POP receive treatment based on reasons such as fear of disclosure due to social stigma

and lack of money . The overall prevalence of symptomatic prolapse was 46.7% (217 out of 464). Of these, 41.0%, 42.8%, and 3.2% accounted for stages II, III, and IV, respectively.

## Literature review

### Prevalence of symptomatic pelvic floor dysfunction

One in every nine American women underwent surgery for a pelvic floor disorder in her lifetime, with 30% of women having a chance of requiring additional surgery for the same condition. Studies in low- and middle-income countries showed that the mean incidence of pelvic organ prolapse is 19.7%, with an estimated range from 3.4 to 56.4%. Another study conducted in Turkey and Australia reported that the prevalence of pelvic floor disorder was 67.5% and 47.2%, respectively .

Moreover, most studies were small and not population-based; as a result, the methods of ascertaining PFD and definitions have varied; therefore, the prevalence of pelvic floor disorder is different among African countries. In the Republic of Congo, the prevalence is 30.5%. Two studies in Nepal reported that one out of three women reported at least one symptom of pelvic floor dysfunction, and utero-vaginal prolapse was the most common (70.5%) type of genital prolapse. A study in Bangladesh reported (35.5%).

Even in Ethiopia, symptomatic pelvic floor disorder varies across the region; two studies were conducted in Amhara, Dabat (11.9%), and Kersa (20.5%) . According to a study conducted in south-central Ethiopia, the overall prevalence of pelvic floor disorders was 41.1% of participants who reported one or more symptoms of pelvic floor dysfunction, of which urinary incontinence had the highest prevalence (32.8%), followed by pelvic organ prolapse (25.5%) and fecal incontinence.

The prevalence of symptomatic pelvic floor dysfunction in southwest Ethiopia, Dawaro zone, and symptomatic and anatomical uterine prolapse was 6.66% and 5.9%, respectively and in northwest Ethiopia, the overall prevalence of symptomatic prolapse was 46.7%. The relevant prevalence of pelvic floor dysfunction is difficult to assess because women are often reluctant to disclose their symptoms, especially in countries where women with urinary or fecal incontinence are disapproved by the community or isolate themselves from embarrassment.

### Impact of pelvic floor dysfunction and its associated factors

The global burden of pelvic floor disorder is increasing due to the increasing age of the population. Accordingly, many modifiable factors identified are those pelvic floor disorders; women who suffer from a protruding mass inside or outside the vagina, accompanied by difficulty sitting, standing up, walking, and lifting. The most important are factors that increase intra-abdominal pressure, difficult labor and delivery, malnutrition, old age, connective tissue disorders, heavy exercise, and pelvic trauma. A history of weight lifting, vaginal delivery, and menopause were identified as possible contributing factors in the development of pelvic floor disorders. Different studies have reported that menopausal women and those who have a history of abortion and vaginal deliveries are more prone to developing pelvic floor dysfunctions.

Most women with symptomatic pelvic floor dysfunction are affected by different factors and seek health care services. Factors such as embarrassment to see health care providers of any gender, belief that POP is normal among women, especially older women, hope for spontaneous resolution of

POP, embarrassment to see a male doctor, unawareness of the existence of medical treatment, financial constraints, studies exploring the reasons for low levels of help-seeking find that embarrassment, lack of knowledge of treatments.

A study in Ethiopia identified factors such as high parity, older age, obesity, pregnancy and vaginal delivery, menopause, constipation, persistent coughing, early age at first delivery, forceps delivery, prolonged second-stage labor, and prolonged heavy lifting as the revealed contributing factors causing strain to the pelvic floor.

Another study shows that misattribution of cause is some of the reasons for not consulting a physician, and the degree of bother and perceived impact on quality of life are important predictors of health seeking, which consequently increase the complication of symptoms. Moreover, the literature briefs that the age of the woman affects the health-seeking behavior of symptomatic pelvic floor disorders, having other relieving techniques, such as replacing the uterus back by inserting the finger, and family-related issues, such as the lack of support and cooperation of close family members or prioritizing family needs over the woman's own needs and level of literacy, also affects the health-seeking behavior of symptomatic women. Therefore, the impact of pelvic floor dysfunction on a woman's quality of life is so high, but due to the sensitivity of the problem, most of the woman's discloses and struggles with affected quality of life .

The common factors related to pelvic floor dysfunctions reported by different studies are increasing age, increasing parity, and lifting/carrying heavy objects, and older age at last delivery was also associated with anatomical prolapse and was significantly associated with pelvic floor dysfunctions .

## Objectives

- To determine the prevalence of symptomatic pelvic floor dysfunction among a woman residing in the Assosa zone, western Ethiopia, 2021.
- To identify factors affecting symptomatic pelvic floor dysfunction among women residing in the Assosa zone, western Ethiopia, 2021.

## Materials and method

### Study area and period

The Assosa Zone is one of the 3 zones in the Benishangul Gumuz region located 640 km west of the Addis Ababa capital city of Ethiopia. It is bordered by Sudan to the west, includes Bambasi Woreda to the east, includes Mange North and includes Mao-komo special Woreda to the south. The Zone consists of 2 hospitals, 5 health centers, and 44 health posts located as a whole. Sherkole refugee camp housing 9,526 displaced people from Sudan and South Sudan is also located in Homosha. There are 417,500 total populations in the Assosa Zone. Of these, only 30,434 were males. The populations' main means of livelihood is agrarian and semi agriculture and some of them are traded.

The Assosa Zone contains a total of eight woreda, namely, Assosa, Bambasi, Homosha, Menge, Undulu, Sherkole, Kurmuk and Oda Buldiglu. This study was conducted from December 26/2021 to March 27/2022.

### Study Design

A community-based cross-sectional study design was conducted.

### Population

**Source population:** - The source population was all women residing in the Assosa zone for the last 6 months.

**Study population:** All women who resided in the selected kebeles of the Assosa zone were considered the study population.

**Study unit:** - Randomly selected woman resides in selected households from selected kebeles.

### Eligibility criteria

#### Inclusion criteria

Woman who was resident for at least 6 months in the study area

#### Exclusion criteria

Severe psychiatric or cognitive problems

Seriously ill.

### Sample size determination

The sample size was determined by using a single proportion formula, with the assumptions of 5% margin of error and 95% CI;  $Z_{\alpha/2}$  = critical value =1.96, 10% nonresponse rate and a design effect of 2 for the two-stage sampling step.

where n= required sample size. A total of 41.1% of women reported symptoms of pelvic floor disorder.

$$\begin{aligned} n &= (Z_{\alpha/2})^2(1-p)/d^2 \\ &= (1.96)^2 (0.411)*(0.059)/(0.05)^2 \\ &= 3.841*0.241/(0.05)^2 \\ &= 372 \text{ by using design effect } 2; n=372 \times 2 \\ n &= 744, \text{ Adding a } 10\% \text{ nonresponse rate} \\ &= 744+ (744*10\%) \\ &= 818 \end{aligned}$$

Therefore, the final sample size was 818

### Sampling procedure

A multistage random sampling technique was performed. The Assosa Zone has eight districts, namely, Assosa, Bambasi, Homosha, Menge, Undulu, Sherkole, Kurmuk and Oda Buldiglu. Randomly, the required number of kebeles was selected. Then, the calculated sample size (818) was proportionally allocated to each selected kebeles. Finally, a simple random sampling technique will be used to select households, and an eligible woman will be recruited from each household. When there was more than one woman in one household who could fulfill our eligibility criteria, we used a lottery method to select one of them (Figure 2).

### Operational definitions

**Symptomatic pelvic floor dysfunction (PFD)** was assessed in terms of whether the woman reported one or more of the symptoms, such as urine incontinency (UI), fecal incontinency (FI) and pelvic organ prolapse (POP). For the purposes of this study, women who had at least one of the UI, FI, and POP were considered to have symptomatic PFD.

**Overactive bladder:** it was assessed if the woman with you rushed to urinate, experienced frequent urination, and experienced urine leakage related to a feeling of urgency.

**Stress urine incontinency (UI):** When there was involuntary leakage of urine associated with both urgency and stress UI.

**Anal incontinence (AI):-** Anal incontinence is considered if the woman responded with any involuntary loss of solid or liquid fecal matter at least monthly over the last year.

**Pelvic organ prolapse (POP):** Pelvic organ prolapse is assessed if the woman reports a feeling of bulging/pressure or something seems to be coming down through the vagina and having a visible mass protruding via the vagina.

**Income level:-**The level of annual income determined to the sum of each family resource.

**Study variables**

*Dependent variables:*

- Symptomatic pelvic floor dysfunction

*Independent variables:*

- Sociodemographic variables (i.e., Age, marital status, education, occupation, residence, wealth index).

- General health conditions (i.e., recurrent UTI, diabetes mellitus, depression, lung disease, neurologic disease, use of diuretics, chat chewing, caffeine, heavy weight lifting >10 kg).
- Obstetric and gynaecologic factors, i.e.,gravity, parity, miscarriage, current pregnancy, place of delivery, age at first delivery, number of vaginal deliveries, vacuum/ forceps delivery, perennial tear, CS, VBAC, menopause, hysterectomy, contraception, and family history of PFD.
- Individual related factors (Knowledge, source of information, fear of stigma, Believing POP as normal, attitude towards to quality of service, embarrassment and lack of support).

**Table 1.** Socio-demographic characteristics of the participants

	Variable (n=798)	Frequency	Precent %
Age	15-24	128	16
	25-34	247	31
	35-44	223	28
	45-54	104	13
	55+	96	12
Marital status	Never married	61	7.6
	Married and living together	621	78
	Divorced/separated	88	11
	widowed	27	3.4
Educational status	Un able to read and write	255	32
	able to read and write	191	24
	Primary complete(1-8)	136	17
	Secondary complete(9-12)	112	14
	College and above	104	13
Occupation	House wife	430	54
	Employee	112	14
	Merchant	176	22
	Other (students, daily labourer)	80	10
Recidenece	Urban	223	28
	Rural	575	72
Heavy labour work	yes	427	53.5
	No	371	46.5
Monthly income	<2000	231	29
	2000-2999	287	36
	3000-4999	168	21
	5000+	112	14
Heavy physical work	yes	399	50
	no	303	38
	Couldn't estimate	96	12
Years of heavy physical work	<10 year	120	30
Age in years			
In come by Ethiopian birr (EB)			

**Procedure**

The data will be collected using a pretested structured and interviewer-administered questionnaire that is adopted after reviewing different studies and modified depending on the local situation and the research objective. It was initially developed in English and then translated into Amharic and back translated into English to check its consistency. The questionnaires contained questions on pelvic floor dysfunction, health-seeking behaviors, demographic and socioeconomic factors, individual-related factors, general health-related factors and obstetrics- and gynecologic-related factors.

**Data quality assurance**

The appropriateness of the questionnaire on content, consistency, language, and organization will be checked thoroughly and modified in line with standards, guidance, and comments from investigators and data collectors during the pretest to assure data quality, and the relevancy of the objective of the study will look carefully. Data collectors will be trained for two days on the data collection process, accuracy and completeness. During data collection, the supervisor reviewed every questionnaire for completeness and logical consistency, which was again checked by the principal investigator. When data collection is conducted, supervision will be undertaken on a daily basis by supervisors and the principal investigator, and each questionnaire will be checked by supervisors.

**Table 2.** General health condition of the participants

Variable (n=794)		Frequency	percentage
Diabetes mellitus	yes	88	11
	no	710	89
Hypertension	yes	104	13
	no	694	87
Recurrent UTI	yes	167	21
	no	630	79
Chronic cough	yes	120	15
	no	678	85
Chat chewing	yes	128	16
	no	670	84
Caffeine utilization	yes	702	88
	no	96	12

**Table 3.** Obstetrical and Gynecological characteristics of participants

Variable (n=794)		Frequency	precents
Ever had pregnancy	yes	766	96
	No	32	4
Number of pregnancy	4 and less than	594	77.5
	5 and More	249	32.5
Ever had child birth	Yes	674	88
	No	92	12
Mode of delivery at first child birth.	Vaginal delivery	657	97.5
	Caesarean section	17	2.5
Ever had vaginal delivery	yes	662	98
	No	12	2
Inter-pregnancy interval	< 2 years	452	59
	≥ 2 years	314	41
Home delivery	Ever at home	148	22
	Never delivered	526	78
Episiotomy during delivery	yes	252	38
	No	410	62
Caesarean section delivery	yes	12	1.5
	No	786	98.5
Number of vaginal delivery	<5 deliveries	298	45
	≥ 5deliveries	364	55
Age at last delivery	≤36 years	485	72
	>36 years	189	28
Menopause	Yes	168	21
	No	630	79

**Table 4.** Associated factors of Pelvic floor dysfunctions

Variables	Pelvic floor dysfunction		COR (95% CI)	AOR (95% CI)
	Yes (%)	No (%)		
Age				
15-24	29	99	1	1
25-34	81	166	1.66 (1.08-4.56)	1.17(0.55-3.93)
35-44	90	133	2.31(1.04-6.39)	1.8(0.95-6.69)
45-54	66	38	5.92(0.98-10.03)	3.34(0.87-8.94)
55+	42	48	2.99(1.23-7.18)	2.1(1.52-6.42)
Educational status				
Un able to read and write	116	142	1.05(0.76-3.84)	0.78(0.35-2.09)
able to read and write	89	102	1.12(1.08-5.39)	1.36(0.87-5.52)
Primary complete(1-8)	56	80	0.9(0.27-4.33)	0.67(0.25-9.08)
Secondary complete(9-12)	49	63	1	1
Marital status				
Never married	11	50	0.28(0.18-2.01)	0.48(0.27-6.39)
Married and living together	222	399	0.69(0.32-3.26)	0.89(0.46-9.41)
Divorced/separated	58	30	2.42(1.14-6.52)	2.03(0.95-8.04)
widowed	12	15	1	1
Occupation				
House wife	165	268	1.30(0.98-2.98)	1.86(0.98-8.91)
Employee	43	70	1.29(0.87-2.57)	1.02(0.37-5.07)
Merchant	73	104	1.48(0.94-9.16)	2.31 (0.68- 8.10)
Other (students, daily labor)	27	57	1	1
Heavy labor work				
<10 year	45	75	1	1
≥11 year	201	78	4.29(2.04 -7.08)	3.21(1.86-5.72)
History of chronic cough				
yes	69	51	1.71(1.13-3.47)	2.13(1.95-4.28)
no	299	379	1	1
Age at first delivery				
<18 years	223	450	1.12(0.98-2.28)	1.19(0.68-6.01)
≥18 years	38	86	1	1
Number of vaginal delivery				
<5 deliveries	88	210	1	1
≥ 5deliveries	215	149	3.44(2.08-7.18)	4.03(2.20-8.27)
Ever had Miscarriage				
Yes	24	68	0.54(0.35-4.32)	0.83(0.36-11.64)
No	279	427	1	1
Menopause				
Yes	99	69	4.67(2.75-7.84)	3.61(2.04-9.98)
No	148	482	1	1

## Data processing and analysis

Data were coded, cleaned, entered into Epidata version 3.1 and analysed by SPSS Version 26. Moreover, collinearity was checked. Variables with a P value  $\leq 0.2$  in bivariate logistic analysis were transferred into multivariate logistic analysis. Frequency, percentages, proportions, and odds ratios were computed. Adjusted odds ratios with the 95% confidence interval at p value of less than 0.05 considered a significant association between the outcome and the independent variables.

## Ethical considerations

Before the actual data collection, ethical clearance was taken from the Ethics Review Committee of Assosa University. Having a formal letter from Assosa University, a supportive letter was distributed to the respective offices and kebeles. Oral and written consent was obtained after explaining the objective of the research. The information obtained from the respondents was identified by their code numbers for confidentiality. There was no risk and no direct benefit to the participants for their participation.

## Results

### Socio-demographic characteristics of the participants.

Eight hundred eighteen women were planned for the interview, and 798 participated in this study, resulting in a 97.5% response rate. The ages of the participants ranged from 15-74 with a mean age of 36 years (IQR = 18). Most (78%) of them were married and living together, and more than half (54%) were housewives (Table 1).

Fifty percent of the participants reported having engaged in heavy labor work in the present or in the past, and seventy-two percent of the participants lived in rural areas. They cited fetching water from a distance with more than 10-liter containers, collecting and cutting firewood, carrying heavy objects to and from the market, and other farming activities as heavy labor work in their daily activities.

### General health condition of the participants

Fifty percent of the participants had a current history of chronic cough, 11% had diabetes, 104 participants were hypertensive, 13% (167) had recurrent urinary tract infections, and sixteen% (128) were chat chewers.

## Obstetrical and gynecological characteristics of participants

Seven hundred sixty-six percent (96%) ever got a pregnant woman, 88% ever gave birth, and fifty-nine percent of them got pregnant with a short interpregnancy interval (less than 2 years). More than a quarter (77.5%) of them became pregnant more than four times. Twenty-two percent of the participants had a history of home delivery, 55% had a history of more than 5 vaginal deliveries and of the participants, and twenty-one were menopausal.

### Magnitude of pelvic floor disorders

Four pelvic floor disorders were considered in this study. Among 798 participants, three hundred three 37.7% [(95% CI (31.7-42.5)] reported at least one type of pelvic floor disorder during the study period, and two hundred thirty 28.8% (22.6-37.5) reported the co-occurrence of two and more than two pelvic floor disorders. Overactive bladder is the most commonly reported form of PFD, with 135 of all participants reporting symptoms. Pelvic organ prolapse was the second most reported, accounting for 92 (30.4%), and fecal incontinence was the least reported (Figure 1).

### Factors Associated with Pelvic floor dysfunction

All variables were evaluated separately in bivariate logistic regression, and variables with a p value less than 0.2 were included in the multivariable logistic regression analysis. The model was well fitted according to a Hosmer-Lemshow test of goodness (sig. = 0.236). Heavy labor work, number of deliveries, and number of vaginal deliveries were inserted into linear logistic regression for collinearity diagnostics. Based on this test, the variance inflation factor (VIF) was 3.214, 11.113, and 7.802 for gravidity, parity, and number of vaginal deliveries, respectively. Hence, the number of vaginal deliveries was included in the regression model for further analysis with the other variables. Among the variables entered into a multivariable logistic regression, four showed a significant association with pelvic floor dysfunction. In this study, age  $\geq 55$  years [(AOR = 2.1; 95% CI: (1.52-6.42)], history of heavy labor work  $\geq 10$  years [(AOR = 3.21; 95% CI: (1.86-5.72) greater than 5 vaginal deliveries [(AOR = 4.03; 95% CI: (2.20-8.27)], respectively.

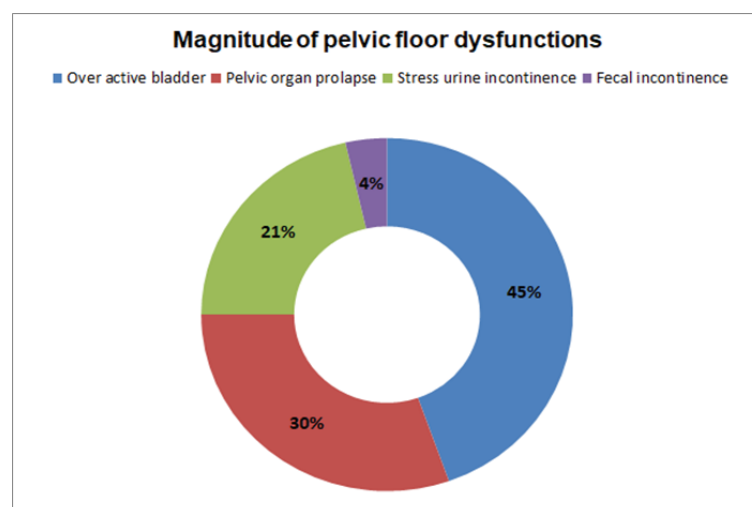


Figure 1. Prevalence of Pelvic floor dysfunction

## Discussion

The total prevalence of symptomatic pelvic floor dysfunction was 37.5% [95% CI (31.7-42.5)] in this study. This finding was lower than those of studies conducted in Australia (47.2%) and Turkey (67.5%). The difference can be explained by the difference in socio-demographic and sample size. The Australian study included only women aged 65-79 years. On the other hand, PFD prevalence was higher in the current study than in studies in Bangladesh (35.5%), the US (25%), India (21%), Kersa (20.5%) and Dabat (11.9%). The variation in characteristics of the study population may partially explain this difference. A higher proportion of grand multiparty and more than five vaginal deliveries in the current study compared to studies from Saudi Arabia and Australian women could explain this discrepancy. The higher prevalence of PFD in the current study compared to studies in the Gurage Zone and Kersa can be explained by the high proportion of women doing heavy physical work in the current study, including carrying heavy objects and walking long hours in markets, which are already expected.

Stress urinary incontinence and POP accounted for 21% and 30%, respectively. The results were slightly higher than the median prevalence found in a review by Walker and Gunasekera on the prevalence and risk factors for pelvic organ prolapse and incontinence in developing countries, which was 28.7% and 19.7% for UI and POP, respectively. In the above review, the occurrence of SUI ranged from 70.8% and POP from 56.4%, and the mean prevalence of FI stated in the review was higher than that in this study. On the other hand, it is consistent with a systematic review and meta-analysis in low- and middle-income countries. The POP questions used in the current study were highly correlated with the second or more severe stage of POP based on the Pelvic Organ Prolapse Quantification Test (POP-Q), and the questions had higher specificity than sensitivity. In addition to these aspects, such problems are perceived as embarrassing. Therefore, many women do not want to share their health status. These reasons could explain the low proportion of symptomatic POPs compared to the studies that used the objective method of POP assessment. The limitation of this study is the use of only one questionnaire to record POPs, as the instrument may not be available in mild cases. One direction for future research would be to use an objective assessment method (physical examination) in addition to an interview questionnaire in the study population of interest.

According to the severity index, 7.4% had moderate to severe urinary incontinence, while 25.5% had mild incontinence. The prevalence of OAB and stress incontinence was 45% and 21%, respectively, and 14% of women had mixed type. This result was largely consistent with a study conducted in Norway, which reported an 8.7% prevalence of moderate or severe incontinence and a 12.2% prevalence of stress urinary incontinence. The prevalence of urge incontinence and mixed incontinence was 1.8% and 5.9%, respectively, lower than in the current study. This difference may be because the Norwegian study excluded women over 65 years old, women with more than four vaginal deliveries, and women with a history of both vaginal and caesarean deliveries regularly at an increased risk of developing PFD symptoms. This was consistent with studies conducted in Sweden, Dabat, Bahirdar, Mizan, and a systematic review conducted in low- and middle-income countries. Heavy weight lifting and chronic cough increase intra-abdominal pressure, which is thought to play a role in the pathogenesis of PFD (particularly POP). In the current study, more than half of the

women live in rural areas, and most of them engage in heavy physical labor, such as carrying heavy objects from house to market and from market to house, which are stressful activities.

According to the current study, mothers who had five or more vaginal deliveries were 4 times more likely to have PFD than those who had no vaginal deliveries. This compares with a study conducted in the Gurage zone, which showed that five or more vaginal deliveries were associated with PFD compared to four or fewer vaginal deliveries. Similarly, studies conducted in the USA, Sweden, and Bahirdar reported that 4-parity multiparous women had a higher risk of developing PFD than nulliparous women. Similarly, two cohort studies showed that vaginal delivery was significantly associated with an increased risk of incontinence and prolapse compared with women who only received cesarean section.

Another prospective study of 5,000 black women in sub-Saharan Africa also reported that women with a history of vaginal delivery were approximately twice as likely to report urinary leakage. The association of repeated vaginal delivery with PFD may result from direct injury to the pelvic muscles and connective tissue. With repeated vaginal delivery, direct injury to the pelvic muscles, connective tissue, and nerve damage due to trauma and overstretching can lead to pelvic floor dysfunction. Because high parity is a common trend in developing countries, we recommend reducing the number of pregnancies and thereby reducing the risk of PFD due to excessive stretching and trauma during childbirth. To achieve this, national and international family planning efforts should be intensified.

In this study, postmenopausal women reported more symptoms of PFD. Menopausal women are 3 times more likely to develop pelvic floor dysfunction than menstruating women in stages. The physiological aging process, the degenerative process, and hypoestrogenism produce urogenital atrophy and weaken the supporting structures of the pelvic organs. As a result, the risk of PFD is increased. Reproductive hormones can be critical for normal urinary function and maintenance of the connective tissues that support the pelvic organs. This could explain the link between PFD and menopause. We recommend considering estrogen replacement therapy for postmenopausal women, if needed. In addition, health institutions and other concerned bodies should promote and provide health education about Kegel exercises for women. Kegel exercise can reduce the risk of PFD by strengthening the pelvic floor muscles.

## Limitations of the study

This study focused on interview-based pelvic floor dysfunction detection, which may not quantify the degree of POP. Therefore, researchers can better focus on clinical-based pelvic floor dysfunction study through pelvic examination to quantify the degree of pelvic floor disorders even though it requires high budget allocation and experienced gynecologists.

## Conclusion and Recommendations

The magnitude of symptomatic PFD was higher than that in other studies in Ethiopia. Heavy weight lifting, repetitive vaginal deliveries, chronic cough, and menopause were factors significantly associated with pelvic floor dysfunction. Screening and treatment of pelvic floor disorders should receive attention in collaboration with regional and zonal health departments. In addition, health education about Kegel exercises and promoting family planning could also be beneficial. For the local government and other stakeholders, we recommend planning regular campaigns to screen women and connect them to health



facilities for further diagnosis and treatment of the problem. Educating health workers on common risk factors and screening and linking suspected cases to nearby hospitals could support risk reduction and treatment efforts for PFD cases.

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### Authors' contributions

All authors equally contributed to all works required to conduct this research.

### Ethics approval

Ethical clearance was obtained from the Institutional Review Board of Assosa University. Permission letters were obtained from the Benishangul Gumuz Health Bureau. Name of Ethical review board: Assosa University institutional research Ethical review Board.

### Consent for publication

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The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Competing interests

The authors declare that they have no competing interests.

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