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SCHOOL OF HEALTH SCIENCES

DEPARTMENT OF EPIDEMIOLOGY

**DETERMINANTS OF PELVIC ORGAN PROLAPSE AMONG WOMEN
VISITING GYNECOLOGY OPD OF PUBLIC HOSPITALS IN WEST
HARARGE, EASTERN ETHIOPIA, 2025**

BY

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NEKEMTE, ETHIOPIA

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As members of the examining the final MPH thesis open defense, we certify that we have read and evaluated the thesis prepared by Daba Kumera Gotaye under the title Determinants of pelvic organ prolapse among women visiting Gynaecology OPD of public hospitals in West Hararge, Eastern Ethiopia, 2025 and recommended that the thesis be accepted as fulfilling the requirement of the degree of Master of Public Health in Epidemiology.

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ABBREVIATION AND ACRONYM

AOR	:	Adjusted Odds Ratio
BMI	:	Body Mass Index
COPD	:	Chronic Obstructive Pulmonary Disease
CI	:	Confidence Interval
COR	:	Crude Odds Ratio
ICS	:	International Continence Society
IUGA	:	International Urogynecology Association
ORHB	:	Oromia Regional Health Bureau
OPD	:	Outpatient Department
POP	:	Pelvic Organ Prolapse
POP-Q	:	Pelvic Organ Prolapse Quantification
ROC	:	Receiver Operating Characteristics
UVP	:	Utero-Vaginal Prolapse
VIF	:	Variance Inflation Factor

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Abstract

Introduction: Pelvic organ prolapse is the downward displacement of pelvic organs such as the uterus, bladder, small bowel, and large bowel through the vaginal wall or anal canal. Women with prolapse have a variety of other symptoms and functional complaints that adversely affect daily living, including incontinence, pain, sexual dysfunction, and impaired body image.

Objective: The study aims to identify determinant factors of pelvic organ prolapse among women visiting gynecology outpatient departments of public hospitals in West Hararge, Eastern Ethiopia, 2025.

Methods: An unmatched case-control study was conducted among gynecologic patients in Chiro General Hospital, East Ethiopia, from January 20 to February 30, 2025. A total of 311 women (selected from outpatient departments) were included in the study. Cases (80) (clients with any stage of pelvic organ prolapse) and controls (240) (who were declared free of any stage of pelvic organ prolapse) were identified by physicians using the Pelvic Organ Prolapse Quantitative Examination tool. Data analysis was carried out by version 27 of the Statistical Package for Social Sciences. Descriptive, bivariate, and multivariable logistic regression analyses were performed. Statistical differences were considered at a P value <0.05 .

Results: pelvic organ prolapse causes 9.3% of Gynecologic outpatient department visits and leads to 3.2% of hospital admissions in Chiro General Hospital during the study period. This research identified that women older than 40 (AOR=12.76 [95% CI: 3.08–52.93]), rural residence (AOR=5.7 [95% CI: 2.48–12.90]), patients who experienced instrumental delivery (AOR=4.90 [95% CI: 2.14–11.20]), those who lifted heavy weights (AOR =3.69 [95% CI: 1.46–9.33]), intestinal obstruction (AOR =8.73 [95% CI: 3.39–22.49]) and being overweight $\geq 25 \text{ Kg/m}^2$ (AOR =4.84 [95% CI: 1.57–14.91]), were significantly associated with pelvic organ prolapse.

Conclusion: In this study, rural residency, instrumental delivery, intestinal obstruction, carrying heavy objects, Overweight $\geq 25 \text{ kg/m}^2$, and age ≥ 40 years are independent determinants of pelvic organ prolapse. Therefore, weight management programs, improvements in obstetric care, pelvic floor muscle training, and health education counseling regarding avoidance of heavy lifting should be incorporated into maternal and reproductive health services.

Keywords: pelvic organ, prolapse, determinant, hospital.

1. INTRODUCTION

1.1 Background

Pelvic organ prolapse (POP) is the downward displacement of pelvic organs such as the uterus, bladder, small bowel, and large bowel through the vaginal wall or anal canal (1,2). Although not life-threatening, women with prolapse have a variety of other symptoms and functional complaints that adversely affect daily living, including incontinence, pain, sexual dysfunction, and impaired body image (3).

According to the International Urogynecological Association (IUGA) and the International Continence Society (ICS), pelvic organ prolapse (POP) is graded using the Pelvic Organ Prolapse Quantification (POP-Q) system, which measures the position of pelvic structures relative to the hymen in centimeters. The system defines four stages of prolapse: The stage ranges from 0 to 4; Stage-0 means all organs are in their normal anatomical position with no prolapse, Stage-1-the most distal prolapsed part of the prolapsed organ is more than 1 cm above the level of the system, Stage-2-the most distal part of the prolapsed part is within 1 cm above or below the hymen, Stage-3-the prolapsed organ descends more than 1 cm below the hymen but does not completely evert or does not protrude fully outside the vaginal opening, Stage-4-complete eversion of the vaginal walls, with the prolapsed organ extending entirely outside the vaginal canal (12–14).

Globally, the prevalence of POP ranges from approximately 3% to 50%, influenced by factors such as age, childbirth history, and diagnostic methods. For instance, studies have reported a prevalence of 3–6% when defined by symptoms and up to 50% when based on vaginal examination (4). The prevalence of POP in African countries is reported to be higher than the global average, with some studies estimating rates between 15% and 30% among women attending gynecological clinics (5).

In Ethiopia, the prevalence of POP is notably high (6). A study revealed that the overall national prevalence of POP in Ethiopia was 23.52%. Another study found that the prevalence of POP was 22.70%, indicating a significant burden of the condition among Ethiopian women (7).

The causes of POP include pregnancy, vaginal childbirth, menopause, obesity, chronic coughing, and heavy lifting, all of which contribute to weakening the pelvic floor. There are several types, including cystocele (bladder prolapse), rectocele (rectal prolapse), uterine prolapse, and enterocele (small intestine prolapse) (8).

Treatment options depend on the severity of the condition and the patient's preferences. The choice of treatment usually depends on the severity of the symptoms and the degree of prolapse consistent with the patient's general health, desire for reproductive functions, desire for preservation of coital function, and level of activity (9). Conservative treatments include pelvic floor exercises (e.g., Kegel exercises), vaginal pessaries, and lifestyle modifications like weight loss and avoiding heavy lifting. For severe cases, surgical options, such as vaginal mesh repair or hysterectomy, may be necessary. Advances in minimally invasive surgeries have also improved outcomes for women with POP, offering better recovery times and fewer complications (10,11).

1.2 Statement of the Problem

Globally, the estimated prevalence of POP ranges from 30% to 50% among parous women, with nearly 20% requiring surgical intervention by the age of 80 (15,16). Forty percent of participants in the women's health initiative trial in the United States had some degree of prolapse. Uterine prolapse was found in 14% of women enrolled in the study. The study done by the Oxford Family Planning Association in the United Kingdom showed that the annual incidence of hospital admission with prolapse was 20.4/10000, and the annual incidence of surgery for prolapse was 16.2/10000 for women aged 25-39(17,18). A study done in Turkey on the general female population revealed the prevalence of pelvic organ prolapse at 27.1% (19).

Studies from various African countries reveal a substantial burden. In a population-based study conducted in Gambia, approximately 46% of women aged 15 and older experienced some form of POP (6). In Nigeria, retrospective studies have shown that the prevalence of utero-vaginal prolapse accounted for 3.4% (20). In sub-Saharan Africa, women often lack access to adequate antenatal care, suffer prolonged labor, and endure home births, all of which contribute to pelvic floor damage and increase the risk of POP (21).

Studies conducted in Ethiopia have reported a prevalence of 23.5% among women attending Jimma University Specialized Hospital and accounted for 40.7% and 15% of all gynecologic surgeries in Jimma and St. Paul's Millennium Medical College hospitals, respectively (7,22). In Ethiopia, gynecological problems are important health problems affecting maternal health outcomes and women's productivity. In clinical setups, pelvic organ prolapse accounted for 40.7% of major gynecological operations in Jimma University Specialized Hospital (7,23). In Northwest Ethiopia, around 20% of women are affected by pelvic floor disorders, including POP, particularly in older women and those with multiple deliveries (24).

POP severely affects women's quality of life in several ways. It has socioeconomic, psychological, and health consequences, affecting overall health and sexual function. The physical problems they experienced were pain, inability to work, difficulty in performing tasks, sexual dysfunction, discharge, infection, and tissue decay. The psycho-social problems they faced were stress, emotional isolation, abandonment by their husband or divorce, ridicule and shame, lack of economic support, risk of violence and abuse, and more notably, discrimination (25,26).

POP significantly impacts women's quality of life, leading to physical symptoms such as pelvic discomfort, urinary incontinence, bowel dysfunction, and sexual dissatisfaction. These symptoms often result in emotional distress, anxiety, depression, and social isolation, further reducing overall well-being (4).

For families, POP can impose a significant burden, as affected women may struggle to perform household tasks or caregiving roles. This often leads to shifts in family dynamics, with other members—typically children or elderly relatives—assuming responsibilities traditionally handled by the affected woman (5).

From a healthcare perspective, the burden of POP strains already overstretched systems, particularly in resource-limited settings like Ethiopia. Women with advanced stages of POP require medical interventions, including surgical procedures, which may not be readily accessible or affordable. In many cases, the need for repeated surgeries due to complications or recurrence further exacerbates healthcare costs (6). For mothers, these costs are substantial, including direct expenses for treatment, transportation to healthcare facilities, and long-term management of symptoms. Additionally, the loss of productivity and income due to disability or inability to work adds to the financial burden (7).

Risk factors for POP are not well studied in Ethiopia using primary data. Previously published studies in the country relied on patient records to assess risk factors for POP. Hence, these studies might be subjected to information bias due to incompleteness and poor quality of secondary data at health institutions (7,22). Several factors are associated with POP, including parity, age, menopause, overweight, intestinal obstruction, chronic coughing, heavy lifting, and genetic predisposition (8).

The rationale of this study is to fill a significant evidence gap on determinants of pelvic organ prolapse using primary data and the incorporation of less explored variables in the Ethiopian context. By focusing on this, the study seeks to improve women's health outcomes by identifying modifiable risk factors, thereby informing targeted healthcare interventions. The findings will serve as a crucial baseline for future research in this area and beyond.

1.3 Significance of the study

This study will provide useful information to patients regarding the cause of the development of pelvic organ prolapse (POP). Awareness of these risk factors (such as pregnancy practices, physical strain, and being elderly) will enable women to take action to cut back on their risk. For people who know they are already experiencing symptoms, this then helps to motivate them to get early medical care and to follow preventive advice, as well as to lead healthier lifestyles. In doing so, women can seek care earlier, preventing progression to severe stages and reducing suffering, disability, and stigma.

The findings of this study are useful for hospitals, especially hospitals with gynecological services. Health workers can develop targeted education programs to inform women about the dangers of risk factors and neglecting symptoms.

For researchers, this study offers important basic information about what causes POP. It creates a strong starting point for more studies, helping health professionals explore new ways to prevent or treat the condition in different settings or groups of women.

2. LITERATURE REVIEW

2.1 The magnitude of pelvic organ prolapse

POP affects nearly 200 million women worldwide, with many cases remaining undiagnosed due to social stigma, lack of healthcare access, and cultural barriers. Globally, approximately 50% of women who have given birth are estimated to experience some degree of POP, with the prevalence varying widely depending on diagnostic criteria and population demographics (14). For instance, studies have reported prevalence rates ranging from 3% to 6% when based on self-reported symptoms but as high as 30% to 50% when assessed through vaginal examinations (16).

In Africa, POP is particularly prevalent due to several socio-economic and healthcare challenges. Studies suggest that the prevalence of symptomatic POP ranges between 18% and 56% across different African countries, reflecting a higher burden compared to many high-income nations. For example, a study conducted in rural Uganda reported that 29% of women had symptoms suggestive of POP, while in South Africa, prevalence rates of 48% have been documented among women attending gynecological clinics (27,28).

In Ethiopia, POP poses a significant public health challenge, with prevalence rates higher than the global and African averages in some regions. Prevalence of POP in Ethiopia is 22.7%, affecting nearly one in five women of reproductive and post-reproductive age (7). Regional studies further illustrate the severity of the problem. For instance, in a study conducted in northwest Ethiopia, 24% of women were found to have clinically significant POP, while in the southern regions, rates as high as 31% have been documented (8,9).

2.2 Determinant factors for pelvic organ prolapse

2.2.1 Socio-demographic factors

The age of women was found to be a risk factor for the development of pelvic organ prolapse. For instance, a review conducted in developing countries showed that advanced age, with women aged 45–54 years, has almost twice the odds of prolapse compared to 15–24-year-olds. Increasing age was also reported to be a significant risk factor for POP in a community-based study done in Lebanon (29). Studies indicate that the risk of symptomatic prolapse increases by 40-50% in women aged 50 years and older. Aging impairs the structural integrity of the pelvic floor due to loss of collagen, predisposing older women to organ descent (16,30).

Studies have shown that women aged 50 years and older are at a significantly higher risk of POP. Women in this age group are approximately 3 to 4 times more likely to develop POP compared to younger women. Additionally, the prevalence of POP tends to increase with each decade of life, with the highest rates observed in women aged 60 and above (31).

In Ethiopia, evidence from different studies showed that there was a strong association between advanced age and pelvic organ prolapse. A case-control study conducted in southern Ethiopia found that women aged 50 years and above were 3.1 times more likely to develop POP compared to those below 30 years. A community-based cross-sectional study in northwest Ethiopia reported that the prevalence of POP among women aged 45–49 years was 27%, while it increased to 35% among women aged 50 and above (8,32,33).

A case-control study done in Nepal showed that bivariate analysis of the educational status of women was strongly associated with POP. It was found that illiterate women were 2.167 times more likely to have POP than literate women (34). A study done in Bahir Dar revealed that women's non-attendance of formal education increases the chance of developing POP by 4.3 times compared to their counterparts. (32).

Some literature showed the association between residence and utero-vaginal prolapse. For instance, a study done at Jimma University Specialized Hospital revealed that living in rural areas was significantly associated with utero-vaginal prolapse. Women living in rural areas showed the chance of developing UVP by 8.6 compared to those living in urban areas (33).

Following menopause, there is withdrawal of the ovarian hormones, and this renders the pelvic tissues and ligaments atrophic and unable to perform their supportive roles. A study done in South Korea among women attending the urogynecology clinic of Yonsei University Medical Center between March 1999 and December 2005 revealed that menopausal women are 7.84 times more likely to develop pelvic organ prolapse compared to their counterparts (35). A community-based study done in Ghana showed that menopausal women had significantly increased odds of prolapse compared with non-menopausal women by 4.4 times compared to those who are non-menopausal (5).

Occupation has been identified as a significant risk factor for pelvic organ prolapse (POP), particularly in occupations involving heavy physical labor. In Ethiopia, studies have shown that women engaged in physically demanding jobs, such as agricultural work, manual labor, and

carrying heavy loads, are at increased risk of developing POP. Women who frequently lifted heavy objects were 2.5 times more likely to experience POP compared to those in less physically strenuous occupations (1). This increased risk is attributed to the repetitive strain on the pelvic floor muscles, leading to their weakening over time. Similarly, rural women, who are often involved in labor-intensive activities, had higher rates of POP compared to their urban counterparts (2)

2.2.2 Obstetric characteristics

Age at first marriage is an important social determinant of pelvic organ prolapse (POP), particularly in regions where early marriage is common. Early marriage often leads to early childbearing, which exposes young girls to obstetric complications, such as prolonged or obstructed labor, increasing their risk of POP later in life. Studies from Ethiopia have shown a significant association between early marriage and POP. A study found that women who married before the age of 18 were 2.8 times more likely to develop POP compared to those who married later, as early childbearing increases physical strain on the pelvic floor muscles and ligaments before they are fully developed (36,37).

A cross-sectional analysis of women who enrolled in the Women's Health Initiative trial in the United States revealed that parity was strongly associated with increased risk for uterovaginal prolapse. Multiparous women have a 2.13 times chance of developing utero vaginal prolapse compared to nulliparous and this chance will increase by 1.10 for the subsequent birth (31). A systematic review in Western developed countries on risk factors for pelvic organ prolapse and its recurrence showed that parity was a confirmed risk factor for the development of pelvic organ prolapse (38).

A descriptive study done in Nigeria to find out the contributing factors of utero -vaginal prolapse among women attending Bharatpur Hospital showed that multiparity was a risk factor for UVP (39). A cross-sectional community-based study conducted in Hai, Rombo, and Same Districts, Kilimanjaro Region, Tanzania showed that high parity / having delivered five times or more, has 10.2 times developing severe pelvic organ prolapse compared to those who gave less than 5 births (40). An unmatched case-control study conducted among gynecologic patients in Bahir Dar city, North West Ethiopia, from July to October 2014 to identify the determinant factors of POP revealed parity (≥ 4) was significantly associated with prolapse by the chance of 4.5 when compared to parity of less than 4 (32).

A systemic review in Western developed countries on risk factors for pelvic organ prolapse and its recurrence showed that vaginal delivery was a confirmed risk factor for the development of pelvic organ prolapse (38). A study done in Turkey to assess the prevalence and the related factors of pelvic organ prolapse (POP) in a female population found the cesarean rate was significantly lower in women with prolapse by 10.6 times compared to women without prolapse (41). A matched case-control study done to identify the determinants of pelvic organ prolapse (POP) among the women of the western part of Nepal, showed a significant association between several vaginal deliveries with POP after adjusting for the educational status of the women, carrying heavy loads and type of usual work (34).

Hysterectomy is considered a significant risk factor for pelvic organ prolapse, particularly when performed without sufficient pelvic floor repair. The removal of the uterus can disrupt the support structures in the pelvic cavity, allowing adjacent organs such as the bladder and rectum to shift downward (17). Studies show that women who undergo hysterectomy, especially at a younger age, are at increased risk of developing prolapse later in life (42). The risk is particularly high in cases of total hysterectomy where uterine support ligaments are severed (43). A meta-analysis revealed that the risk of prolapse after hysterectomy increases by approximately 30% (44).

The place where a birth takes place matters, as it has been related to the development of pelvic organ prolapse (POP). Being cared for by a trained professional during childbirth greatly cuts the risk of complications for the mother and infant. Unlike in hospitals, home deliveries usually do not have appropriate monitoring, so the chance of prolonged birthing, obstetric injury, and complications goes up. The study showed that women who gave birth at home had a 2.65 times higher chance of pelvic organ prolapse than those who delivered at a health facility (45).

Studies have shown that perineal tear during childbirth increases the risk of pelvic floor trauma, including pelvic organ prolapse. Perineal tear may weaken the muscles and tissues that help keep the pelvic organs intact. Women who had perineal tears during childbirth were found to be almost four times more likely to get pelvic organ prolapse compared to those with no perineal damage (AOR = 3.95). 95% CI: 1.75–8.91) (46).

Women who have their first child at a young age face higher risks of pelvic organ prolapse since it often occurs with the early development of pelvic structures and a higher chance of

having many children. In Ethiopia, early pregnancy has been linked to a higher risk of prolapse caused by a high amount of obstetric stress. The study in Bench Sheko Zone public hospitals found that women who became mothers for the first time before they turned 20 had an increased risk of pelvic organ prolapse, being more than three times as likely to experience this Compared to women whose first pregnancy was after age 20 (AOR = 3.62; [95% CI: 1.79–7.33]) (47).

Short times between pregnancies are considered unsafe as they do not give enough recovery time to key pelvic areas, upping the chances of POP in women. When women have their babies too close together, the repeated stresses from childbirth can lead to issues and harm the pelvic floor, making it less able to support them. According to a well-designed case-control study done in public hospitals of South Wollo Zone, women who took less than two years between pregnancies had a higher likelihood of developing POP (AOR = 2.3; 95% CI: 1.21–4.39) (48).

2.2.3 Factors related to Comorbidity and Medical Condition

Chronic conditions that increase intra-abdominal pressure, such as constipation, chronic coughing, and heavy lifting, contribute to POP by repeatedly straining the pelvic floor muscles. Women with chronic obstructive pulmonary disease (COPD) or persistent constipation are at higher risk (30,49).

A descriptive study done in Nigeria to find out the contributing factors of utero -vaginal prolapse among women attending Bharatpur Hospital reported 16% of the women had a history of chronic cough (39). A hospital-based retrospective study conducted to assess the magnitude of pelvic organ prolapse and risk factors for POP in Jimma University Specialized Hospital revealed chronic cough (20.9%) as a risk factor for prolapse (33).

A population-based, cross-sectional study in Stockholm women done to identify non-obstetric factors associated with symptomatic POP revealed that the presence of constipation, hard stools, or difficult evacuation is 2.1 times associated with the presence of symptomatic prolapse compared to those who have not experienced the symptoms (50). A community-based cross-sectional study conducted in Nepal to determine the prevalence of uterine prolapse and to explore factors affecting women with uterine prolapse revealed that constipation was found to be significantly associated with the prevalence of utero-vaginal prolapse (51). A hospital-based retrospective study conducted to assess the magnitude of pelvic organ prolapse and risk factors

for POP in Jimma University Specialized Hospital revealed constipation (30.2%) as a risk factor for prolapse (33).

A cross-sectional community-based study conducted in Tanzania to assess POP and associated risk factors revealed that carrying heavy objects for >5 hours increases the risk of developing severe POP by 4.7 times compared to those who carry for less than 5 hours (40). An unmatched case-control study conducted among gynecologic patients in Bahir Dar City, Northwest Ethiopia, from July to October 2014 to identify the determinant factors of POP revealed that the history of carrying heavy objects is associated by 3.1 times with POP (32).

Chronic intestinal obstruction can lead to persistent increases in intra-abdominal pressure. Prolonged increases due to difficulty passing stool can weaken pelvic floor muscles and connective tissues. This weakening predisposes individuals to POP as the pelvic organs lose the structural support they need to stay in place (52). The sustained abdominal pressure and straining contribute to pelvic floor damage, increasing the likelihood of pelvic organ prolapse (53).

A chronically distended bladder increases intra-abdominal pressure, which places additional stress on the pelvic floor muscles and connective tissues. Constant bladder distension and pressure create a mechanical load on the pelvic organ structures, which can lead to weakening of the pelvic floor and eventual prolapse of one or more pelvic organs, particularly the bladder (54).

2.2.4 Body Mass Index

A systematic review of risk factors for pelvic organ prolapse reported that higher BMI was a risk factor for POP (38). A population-based cross-sectional study done in Stockholm women to identify non-obstetric factors associated with symptomatic POP showed that a BMI of 25 or more was found to be significantly associated with symptomatic prolapse (50). A study done in Lebanon also reported that a body mass index higher than 25 kg/m² was found to be a significant risk factor for POP (29). However, a study done in Ethiopia in Bahir Dar town hospitals and Bench-Maji Zone revealed that a body mass index of less than 18.5 kg/m² was significantly associated with prolapse (8,32).

2.3 Conceptual framework

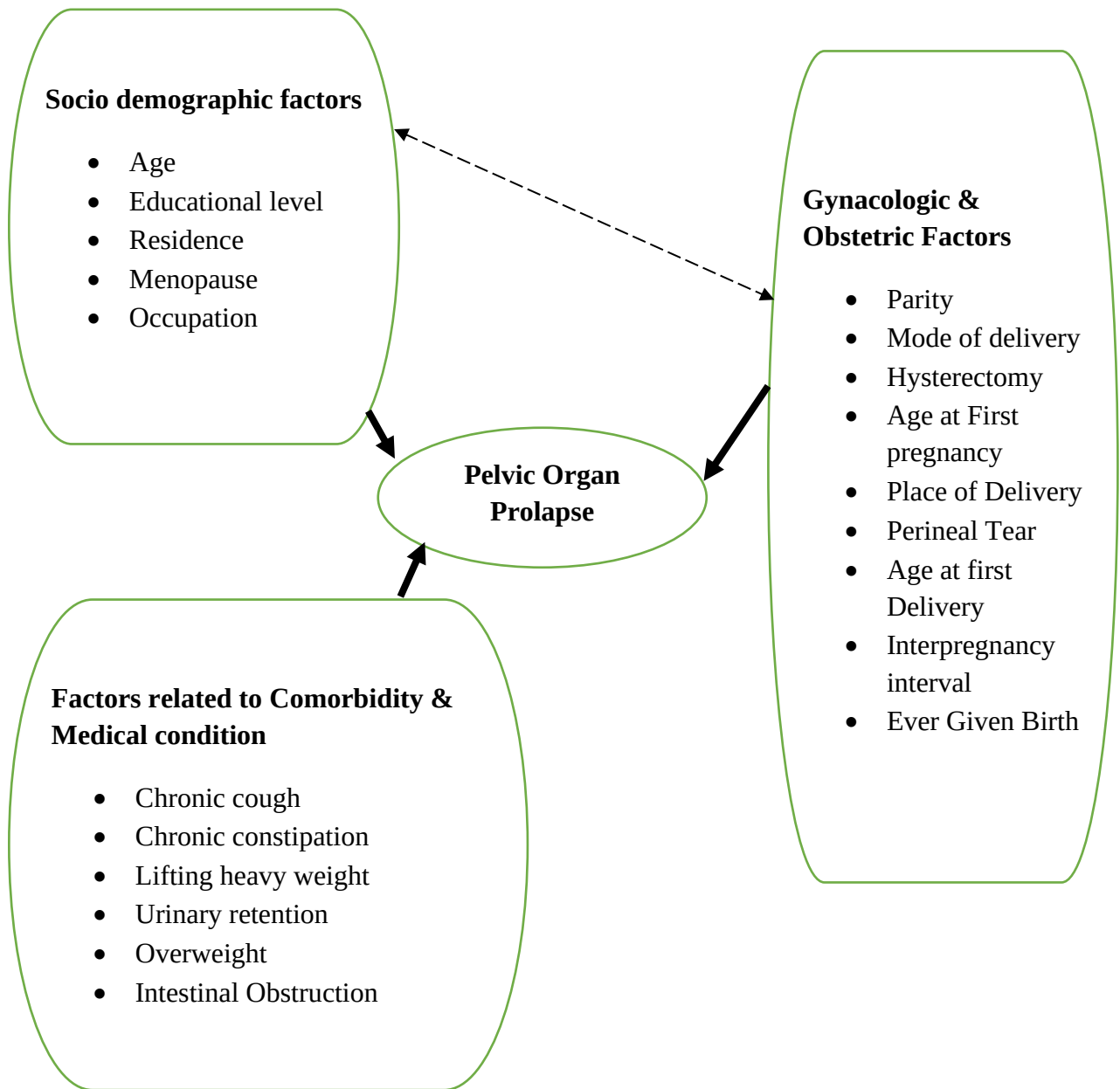


Figure 1. Conceptual framework of pelvic organ prolapse developed based on literature review (1,2,4,22,25,56).

3. OBJECTIVE OF THE STUDY

3.1 General Objective

The study aims to identify determinant factors of pelvic organ prolapse among women who visit gynecology OPD of public hospitals in West Hararge, Eastern Ethiopia, 2025.

4. METHODS AND MATERIALS

4.1 Study area and period

The study was conducted at Chiro General Hospital in West Hararge Zone, Oromia region, Ethiopia, from January 20 to February 30, 2025. Chiro, the Capital of the Zone, is located 328 km to the East of Addis Ababa, the capital city of Ethiopia. By 2024, the Zone has a total population of 2,828,336. The zone has 15 districts and 2 city administrations. There are a total of seven public hospitals, 84 public health centers, and 482 health posts in the zone. The zone has 2 referral Hospitals and 5 district Hospitals. These hospitals serve the catchment populations and serve as referral sites for adjacent Woredas and Zones. The selected hospital is Chiro General Hospital. This hospital provides surgical interventions for Pelvic Organ prolapse. The hospital has five gynecologists, six anesthetists, 8 midwives, and 20 nurses. At Chiro General Hospital, the previous year's gynaecology outpatient department (OPD) recorded a total of 7348 visits, among which 475 cases were diagnosed with varying stages of pelvic organ prolapse (POP).

4.2 Study Design

A hospital-based unmatched case-control study was carried out.

4.3 Population

4.3.1 Source Population

Cases: All women who visit the gynecology OPD with stage I and above POP at public hospitals in the West Hararge Zone.

Controls: All women who visit the gynecology OPD with no history of POP at the public hospitals West Hararge Zone.

4.3.2 Study Population

Cases: Women who visit the gynecology OPD with stage I and above POP at Chiro General Hospital, West Hararge Zone, during the study period.

Controls: Women who visit the gynecology OPD with no history of POP at Chiro General Hospital, West Hararge Zone, during the study.

4.4 Eligibility Criteria

4.4.1 Inclusion criteria

Cases: All gynecological patients with stage I and above POP treated at the gynecology ward and aged ≥ 18 years was included.

Controls: All gynecological patients with no current or history of POP was included.

4.4.2 Exclusion criteria

Cases: Women with endometrial cancer such as delivered myoma, cervical cancer, uterine fibroids, polyp, cervical elongation, vaginal cysts, chronic uterine inversion, and women with mental disorders was excluded from the study.

Controls: All gynecological patients with no current history of POP, those with mental disorders, and those unwilling to give a response, and those critically ill was excluded from the study.

4.5 Sample Size Determination

The sample size for this study was calculated using Epi-info software version 7.2 using sample size determination for unmatched case-control studies. The parameters that were used to calculate sample size were: Confidence level 95%, power 80%, control to case ratio 3:1, the proportion of controls with exposure 29.9%, and the proportion of cases with exposure 49.2%. It was calculated from the study conducted in Northeastern Ethiopia, taking the Place of delivery at home as one of the main exposure variables for pelvic organ prolapse that provides the maximum sample size (1). Therefore, that yields a minimum sample size of 73 cases and 218 controls. Adding a 10% non-response rate, the final sample size required was 80 cases and 240 controls. A summary of sample size calculation for each main exposure variable has been shown in Table 1 below.

Table 1. Summary of sample size calculation for the main exposure variables associated with POP in a study conducted at Bahir Dar town Hospitals main exposure variables associated with POP in a study conducted at Bahir Dar town Hospitals.

The main exposure variable taken	Proportion of exposure in controls %	Odds Ratio (OR)	Proportion of exposure in cases (%)	The ratio of controls to cases	Power (%)	Confidence interval (%)	Cases required (n)	Controls required (n)	Total sample size (n)	Reference
Age (50-64)	15.1	2.68	49.1	3:1	80	95	68	202	270	(58)
History of Intestinal Obstruction	7.1	4.8	27	3:1	80	95	40	118	158	(1)
Number of Parity > 4	41.1	2.53	63.9	3:1	80	95	56	166	222	(59)
Home Delivery	29.9	2.68	49.1	3:1	80	95	73	218	291	(47)

4.6 Sampling Procedure

Chiro General Hospital was selected from the West Hararge zone by the purposive sampling method. This hospital is serving as a referral site for the respective districts & zones. Then Consecutive sampling technique was used to select 80 cases, and 240 controls were selected for the study by the systematic random sampling technique from gynecologic outpatient departments. The report from the hospital shows that there were an average of 1422 visits to the gynecology outpatient OPD in the last 2 months. A total of 240 controls were selected by using six as the sampling interval. The third woman was selected from the first six by using a lottery method. After selecting every ninth woman, 240 controls were selected until the necessary sample size was met.

4.7 Data Collection Tool and Procedure

Data was collected from the participants by an interviewer-administered questionnaire and physical measurements, which were prepared in English. The interviewer-administered questionnaire, which contains four parts, namely socio-demographic characteristics, obstetric history, factors related to increased intra-abdominal pressure, and history of previous pelvic surgery, was prepared from different articles to address the research objective. Data collectors were two BSc nurse professionals, and close supervision by the principal investigator. Physical measurement was used to obtain data on the weight and height of women. In this regard, the weight of each woman was measured using a balanced beam in kg, and height was measured using a measuring tape to the nearest 0.1 cm.

4.8 Data Quality Assurance

The prepared English version of the questionnaire was translated to Afaan Oromoo by language experts before the data collection process and retranslated after data collection to the English language to keep consistency. The data collectors were trained for two days to have a common understanding of the data collection process. The structured questionnaires were explained to data collectors to avoid unclear points. The pretest of the questionnaire was conducted on 5% of patients outside the study area. A total of 16 participants were recruited, among whom four of them are cases and twelve were controls. The study area was Hirna Woreda, which is located 45 km to the east of Chiro Town.

4.9 Study Variables

4.9.1 Dependent Variable

- Pelvic Organ Prolapse

4.9.2 Independent Variables

- Socio-demographic factors: - age, educational status, residence, occupation, menopause,
- Obstetric history: - age at first pregnancy, age at first marriage, parity, inter-pregnancy interval, mode of delivery, perineal tear, place of delivery, hysterectomy,
- Factors related to medical conditions: - overweight, chronic cough, heavy weight lifting, constipation, urinary retention, Intestinal Obstruction

4.10 Operational Definitions

- **Interpregnancy interval:** the length of time, expressed in years, between two successive live births or pregnancies.
- **Menopause:** naturally not experiencing menstruation for 12 consecutive months.
- **Heavy weight lifting:** regularly lifting more than 10 kg of weight, which could be water, firewood, farming equipment, or similar as daily activities.
- **Chronic cough:** A cough that lasts for more than 3 weeks.
- **Chronic constipation:** self-reported problems with bowel movements, including difficulty in stool passing, straining, and fewer bowel movements than usual, lasting more than 3 months.
- **Determinants of pelvic organ prolapse:** Sociodemographic, reproductive, medical, and lifestyle-related factors that are linked with the development of pelvic organ prolapse (1).
- **Pelvic organ prolapse:** When one or more organs in the pelvic area (bladder, cervix, uterus or rectum) move down or bulge into or out of the vaginal canal (58).

4.11 Data Processing and Analysis

The collected data were checked for completeness, coded, and entered into Epi-data 4.6 and then exported to SPSS version 27.0 statistical software for further analysis. Descriptive statistics such as frequency distribution and percentages were used for the predictor variables. To identify factors associated with each predictor variable and the outcome variable, Binary logistic regression was used. To recruit the candidate variables for the multivariable model, the Crude Odds Ratio (COR) with a 95% confidence interval was calculated. Those variables with a P-value <0.25 from the bivariate analysis were considered for multivariable analysis. Multicollinearity was checked for independent variables for the presence of correlation using the Variance Inflation Factor (VIF) and Tolerance value. Adjusted Odds Ratio (AOR) with 95% CI was calculated for each independent variable to check the adjusted association between independent variables and POP. The final fitted model was assessed for goodness of fit using the Hosmer-Lemeshow test. Data was finally presented and interpreted at a P-value < 0.05 to be considered statistically significant in multivariable logistic regression.

4.12 Ethical Considerations

Ethical clearance was obtained from the Wallaga University Institute of Health Sciences ethical review board. Additionally, a letter of cooperation was written to Chiro General Hospital by the Wallaga University School of Graduate Studies. The confidentiality of patients was kept, and the information was used only for this study

4.13 Dissemination of findings

The findings of the study will be presented to the Wallaga University School of Health Science, Department of Epidemiology, and will also be sent to Chiro General Hospital & West Hararge Zonal Health Department, ORHB, and other stakeholders. Presentations in scientific conferences and seminars will also be considered. The findings of the study will be published in a reputable journal to reach the wider scientific community.

5. RESULTS

5.1 Socio-Demographic Characteristics of Study Participants

A total of 311 respondents (79 cases and 232 controls) were interviewed with a response rate of 97.2% based on the total sample size. Study participants had a mean age of 55.81 (± 11.51 SD) in cases and 43.13 (± 12.49 SD) in controls. A higher proportion of older age women (age ≥ 40) was seen among cases, 72 (91.1%), compared to controls, 127 (54.7%). Most study participants in cases and controls were Oromo by ethnicity, Muslim by religion, and married. Forty (50.6%) cases and 58 (25.0%) controls were can't read and write. Thirty-five (44.3%) cases, 125 (57.6%) controls) of participants were housewives. From a total of women involved, 31 (39.2%) of cases and 158 (68.1%) of controls were urban residents (**Table 2**).

Table 2: Socio-demographic characteristics of the respondents among women attending gynecology OPD of Chiro General Hospital, 2025 (N=311)

Characteristics of the respondents (n=311)	Category	Cases n=79 (%)	Controls n=232 (%)
Age	<40 Years	7 (8.9%)	105 (45.3%)
	≥ 40 Years	72 (91.1%)	127 (54.7%)
Ethnicity	Oromo	57 (72.2%)	188 (81.0%)
	Amhara	17 (21.5%)	30 (12.9%)
	Other	5 (6.3%)	14 (6.0%)
Religion	Muslim	48 (60.8%)	141 (60.8%)
	Protestant	11 (13.9%)	45 (19.4%)
	Orthodox	14 (17.7%)	38 (16.4%)
	Catholic	6 (7.6%)	8 (3.4%)
Occupation	Housewife	35 (44.3%)	125 (53.9%)
	Merchant	30 (38.0%)	79 (34.1%)
	Government Employee	4 (5.1%)	16 (6.9%)
	Daily Laborer	5 (6.3%)	5 (2.2%)
	Farmer	5 (6.3%)	7 (3.0%)

Marital Status	Married	30 (38.0%)	104 (44.8%)
	Divorced	24 (30.4%)	66 (28.4%)
	Widowed	25 (31.6%)	62 (26.7%)
Education	Can't read and write	40 (50.6%)	58 (25.0%)
	Can read and write	22 (27.8%)	78 (33.6%)
	Grade 5-8	5 (6.3%)	18 (7.8%)
	Grade 9-12	7 (8.9%)	52 (22.4%)
	College and above	5 (6.3%)	26 (11.2%)
Residence	Urban	31 (39.2%)	158 (68.1%)
	Rural	48 (60.8%)	74 (31.9%)
Menopause	Yes	58 (73.4%)	87 (37.5%)
	No	21 (26.6%)	145 (62.5%)

5.2 Obstetrics-Related Characteristics of the Study Participants

From the total study participants, 12 (15.2%) of cases and 29 (13.1%) of controls were married at the age of twenty-five and above. Greater than three-fourths of cases 46 (58.2%), and half 110 (50.0%) of controls had parity of greater than or equal to four. Thirteen (16.5%) of cases and 38 (17.3%) of controls had given birth at home. Forty-eight (60.8%), 28 (35.4%) and 3 (3.8%) of cases had spontaneous Vaginal delivery, instrumental delivery, and cesarian section respectively. Whereas 186 (84.5%), 29 (13.2%), and 5 (2.3%) controls had spontaneous Vaginal delivery, instrumental delivery, and cesarian section respectively. The proportion of women who experienced perineal tear during the last delivery was 3 (3.8%) among cases and 5 (2.3%) among controls (**Table 3**).

Table 3: Obstetrics-related characteristics of women attending gynecology OPD of Chiro General Hospital, 2025 (N=311)

Characteristics of the respondents (n=311)	Category	Cases n=79 (%)	Controls n=232 (%)
Place of Delivery	Home	13 (16.5%)	38 (17.3%)
	Health Facility	66 (83.5%)	182 (82.7%)
Delivery Assistant	Unskilled Attendant	13 (16.5%)	38 (17.3%)
	Skilled Attendant	66 (83.5%)	182 (82.7%)
Mode of delivery	Spontaneous Vaginal Delivery	48 (60.8%)	186 (84.5%)
	Instrumental Delivery	28 (35.4%)	29 (13.2%)
	Cesarian Section	3 (3.8%)	5 (2.3%)
Perineal tear	Yes	3 (3.8%)	5 (2.3%)
	No	76 (96.2%)	215 (97.7%)
First Marriage age	< 25	67 (84.8%)	193 (86.9%)
	≥ 25	12 (15.2%)	29 (13.1%)
First Pregnancy age	< 25	43 (54.4%)	114 (51.4%)
	≥ 25	36 (45.6%)	108 (48.6%)
Parity	<4	33 (41.8%)	110 (50.0%)
	≥ 4	46 (58.2%)	110 (50.0%)

5.3 Medical and comorbidity conditions of Study participants

Of study participants, 42 (53.2%) of cases and 116 (50.0%) of controls had a history of chronic cough. Sixty-six (83.5%) of cases and 150 (64.7%) of controls had a history of carrying heavy objects. Among women involved in the study, 7 (8.9%), 29 (36.7%), and 11 (13.9%) of cases experienced chronic constipation, Intestinal obstruction, and urinary retention, respectively. Whereas 9 (3.9%), 19 (8.2%), and 34 (14.7%) of controls experienced chronic constipation, Intestinal obstruction, and urinary retention, respectively. Regarding participants' BMI, 62 (78.5%) of cases and 204 (87.9%) of controls had a BMI of 18.5-24.9 kg/m² (Table 4).

Table 4: Factors related to comorbidity and medical condition of women attending gynecology OPD of Chiro General Hospital, 2025 (N=311)

Characteristics of the respondents (n=311)	Category	Cases n=79 (%)	Controls n=232 (%)
Experienced Chronic Cough	Yes	42 (53.2%)	116 (50.0%)
	No	37 (46.8%)	116 (50.0%)
Experienced Chronic Constipation	Yes	7 (8.9%)	9 (3.9%)
	No	72 (91.1%)	223 (96.1%)
Heavy Weight Lifting	Yes	66 (83.5%)	150 (64.7%)
	No	13 (16.5%)	82 (35.3%)
Diagnosed with Intestinal Obstruction	Yes	29 (36.7%)	19 (8.2%)
	No	50 (63.3%)	213 (91.8%)
Diagnosed with urinary retention	Yes	11 (13.9%)	34 (14.7%)
	No	68 (86.1%)	198 (85.3%)
Undergone Hysterectomy	Yes	5 (6.3%)	9 (3.9%)
	No	74 (93.7%)	223 (96.1%)
BMI	Underweight (< 18.5 Kg/m ²)	1 (1.3%)	14 (6.0%)
	Normal (18.5-24.9 Kg/m ²)	62 (78.5%)	204 (87.9%)
	Overweight (≥ 25 Kg/m ²)	16 (20.3%)	14 (6%)

Correlation, Interaction, and Confounder assessment.

The assessment of variable collinearity in the model was carried out through SPSS linear regression diagnostics, which employed the Variance Inflation Factor (VIF) and Tolerance methods. The analysis indicators for multicollinearity consisted of VIF levels below 10 and Tolerance measurements above 0.1. The VIF values and Tolerance levels for all predictor variables remained below 10 and above 0.1 points, respectively.

The identification of potential confounders occurred through a literature review combined with bivariate screening. A confounding variable qualified for inclusion in the logistic regression model when adding it to the analysis resulted in a 10% or greater change to the exposure-outcome association odds ratio shown in the unadjusted model. After bivariate analysis, the final model included Chronic cough and the presence of chronic constipation as confounders.

The logistic regression model was used to identify the significance of interaction terms to evaluate effect modification. All interaction terms lost their statistical significance, so they were excluded from the final model.

5.4 Determinant factors of pelvic organ prolapse

In bivariable logistic regression analysis, variables having a P-value of less than 0.25 were selected for multivariable logistic regression analysis. These variables were the age of the patient, residence, educational status, menopause, parity, heavy weight lifting, intestinal obstruction, weight of the patient, mode of delivery, and body mass index. In multivariable logistic regression after controlling for potential confounders, age of the patient, residence, mode of delivery, lifting of heavy weights, intestinal obstruction, and body mass index were significantly associated factors at P-value <0.05 (**Table 5**).

The study finding demonstrated age as a determinant influencing the development of POP. Women over 40 years old presented a 12.76 times greater odds of POP development compared to women aged less than 40 (AOR=12.76, [95% CI: 3.08–52.93], $p<0.001$). The research findings demonstrated that BMI functioned as a main predictor of POP occurrence. Women in the overweight categories demonstrated a 4.84 times higher odds of POP development compared to women with normal BMI values (AOR=4.84, [95% CI: 1.57–14.91], $p=0.006$).

Women with intestinal obstruction diagnosis in their lifetime faced an 8.73 times greater odds of POP occurrence compared to women without this history (AOR=8.73, 95% [CI: 3.39–22.49], $p<0.001$). The method of baby delivery demonstrated a significant relationship with POP development. Women who received instrumental vaginal delivery assistance during birth showed 4.90 times greater odds of POP development than those who had spontaneous deliveries (AOR=4.90, [95% CI: 2.14–11.20], $p<0.001$).

The study findings revealed heavy weight lifting as a determinant factor for POP development. Women who performed regular heavy lifting activities showed 3.69 times greater odds of developing POP when compared to women who did not participate in heavy lifting activities (AOR=3.69, 95% CI: 1.46–9.33, $p=0.006$). The place of residence between urban and rural areas was another determinant of POP. Rural women were found to have a 2.53 times greater odds of POP development compared to urban women (OR = 2.53, [95% CI: 1.48–4.32], $p<0.001$).

Table 5: Determinant factors of pelvic organ prolapse among women attending gynecology OPD of Chiro General Hospital, 2025 (N=311)

Characteristics of the respondents (n=311)	Category	Cases n=79 (%)	Controls n=232 (%)	Crude OR (95% CI)	Adjusted OR (95% CI)	P-value	
Age	<40 Years	7 (8.9%)	105 (45.3%)	1	1		
	≥40 Years	72 (91.1%)	127 (54.7%)	8.5 (3.75-19.29)	12.76 (3.08-52.93)	<0.001	*
Education	Illiterate	40 (50.6%)	58 (25.0%)	3.08(1.81-5.24)	1.32 (0.60-2.92)	0.487	
	Literate	39 (49.4%)	174 (75.0%)	1	1		
Residence	Urban	31 (39.2%)	158 (68.1%)	1	1		
	Rural	48 (60.8%)	74 (31.9%)	3.31 (1.95-5.61)	5.66 (2.48-12.90)	<0.001	*

Menopause	Yes	58 (73.4%)	87 (37.5%)	4.60 (2.62-8.10)	2.06 (0.85-5.00)	0.110	
	No	21 (26.6%)	145 (62.5%)	1	1		
Parity	<4	33 (41.8%)	110 (50.0%)	1	1		
	≥ 4	46 (58.2%)	110 (50.0%)	1.39 (0.83-2.34)	0.48 (0.22-1.06)	0.07	
Mode of Delivery	Spontaneous Vaginal Delivery	48 (60.8%)	186 (84.5%)	1	1		
	Instrumental Delivery	28 (35.4%)	29 (13.2%)	3.99 (1.73-9.23)	4.90 (2.14-11.20)	<0.001	*
	Cesarean Section	3 (3.8%)	5 (2.3%)	0.00 (0.00-	0.30 (0.04-2.31)	0.249	
Heavy Weight Lift	Yes	66 (83.5%)	150 (64.7%)	2.78 (1.45-5.33)	3.69 (1.46-9.33)	0.006	*
	No	13 (16.5%)	82 (35.3%)	1	1		
Diagnosed with Intestinal Obstruction	Yes	29 (36.7%)	19 (8.2%)	5.24 (2.77-9.91)	8.73 (3.39-22.49)	<0.001	*
	No	50 (63.3%)	213 (91.8%)	1	1		
BMI	Underweight	1 (1.3%)	14 (6.0%)	0.26 (0.03-1.82)	-	0.998	
	Normal weight	62 (78.5%)	204 (87.9%)	1	1		
	Overweight	16 (20.3%)	14 (6%)	3.76 (1.74-8.13)	4.84 (1.57-14.91)	0.006	*

* P-value is significant at 0.05 in multivariable logistic regression analysis

The model showed a Cox and Snell R Square value of 0.383, together with a Nagelkerke R Square value of 0.563, indicating a 56.3% variation in POP likelihood, which could be explained by the selected predictors. The computed -2 Log Likelihood value equaled 194.269, indicating a better overall fit when compared to the null model.

The Hosmer and Lemeshow test indicated fit adequacy during the goodness-of-fit assessment with a chi-square value of 4.823, 8 degrees of freedom, and a p-value of 0.776. The test results demonstrate that the model properly fits the collected data because the computed p-value remains above 0.05.

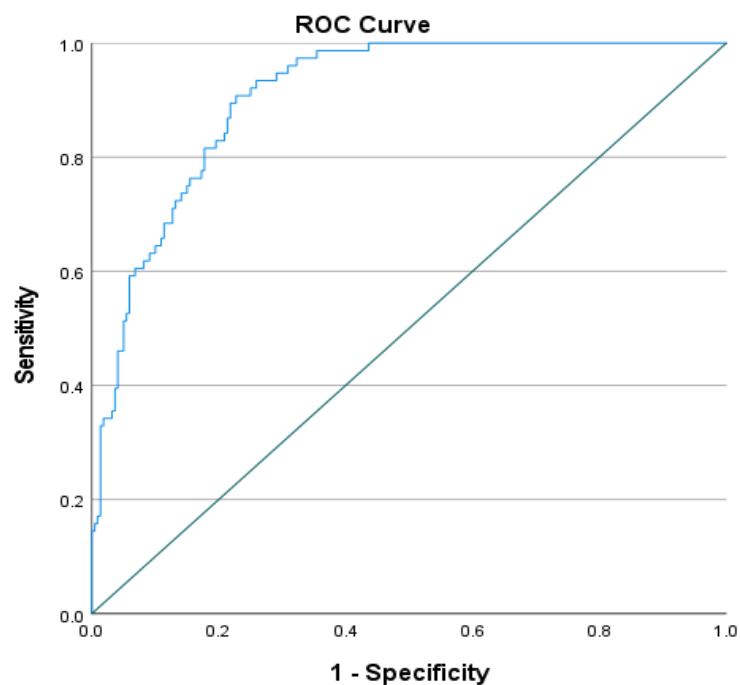


Figure 2: ROC curve for the final logistic regression model predicting pelvic organ prolapse.

The area under the curve is 0.908 (95% CI: 0.88-0.94).

The model demonstrated strong predictive performance. The Classification Table demonstrates an 83.8% accuracy rate for correct predictions. The model correctly identified 91.4% of women who did not have POP and correctly classified 61.8% of women who were diagnosed with POP.

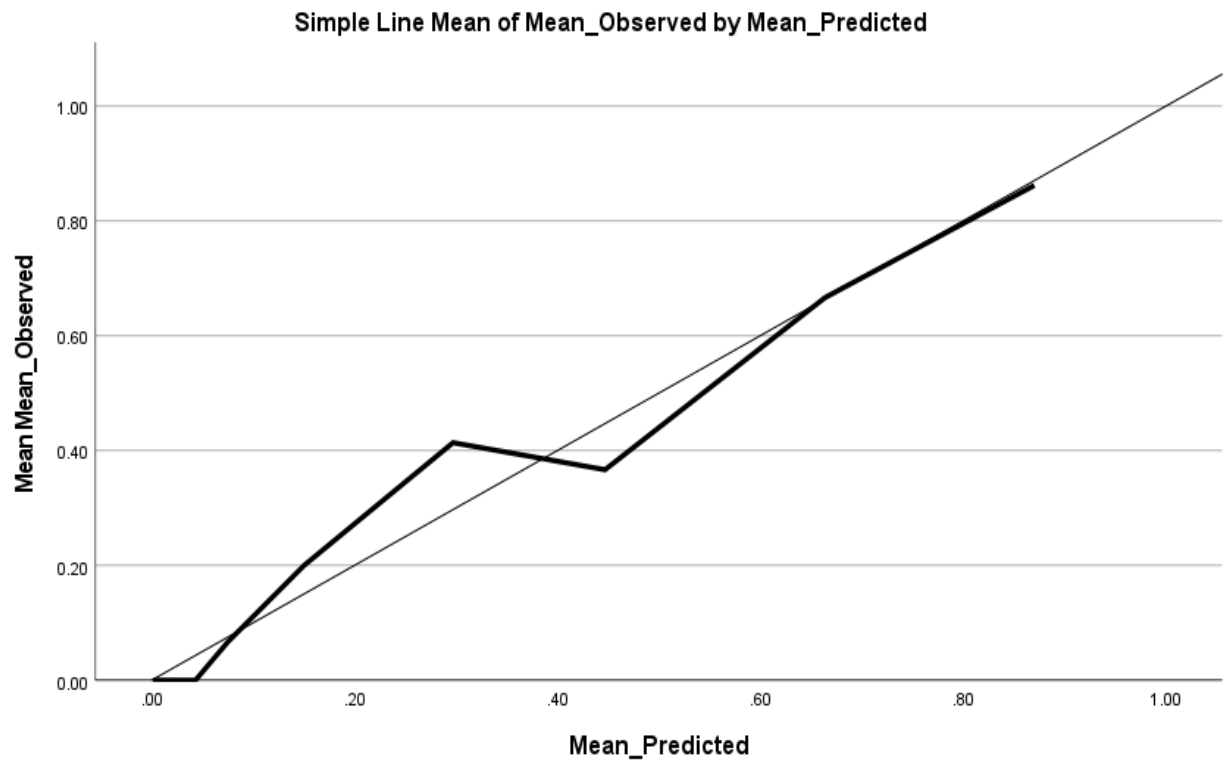


Figure 3: Calibration plot showing relationship of mean predicted probability (X-axis) and mean observed outcome probability (Y-axis).

The diagonal line represents perfect calibration. Most points lie close to the diagonal line, indicating good calibration of a logistic regression model.

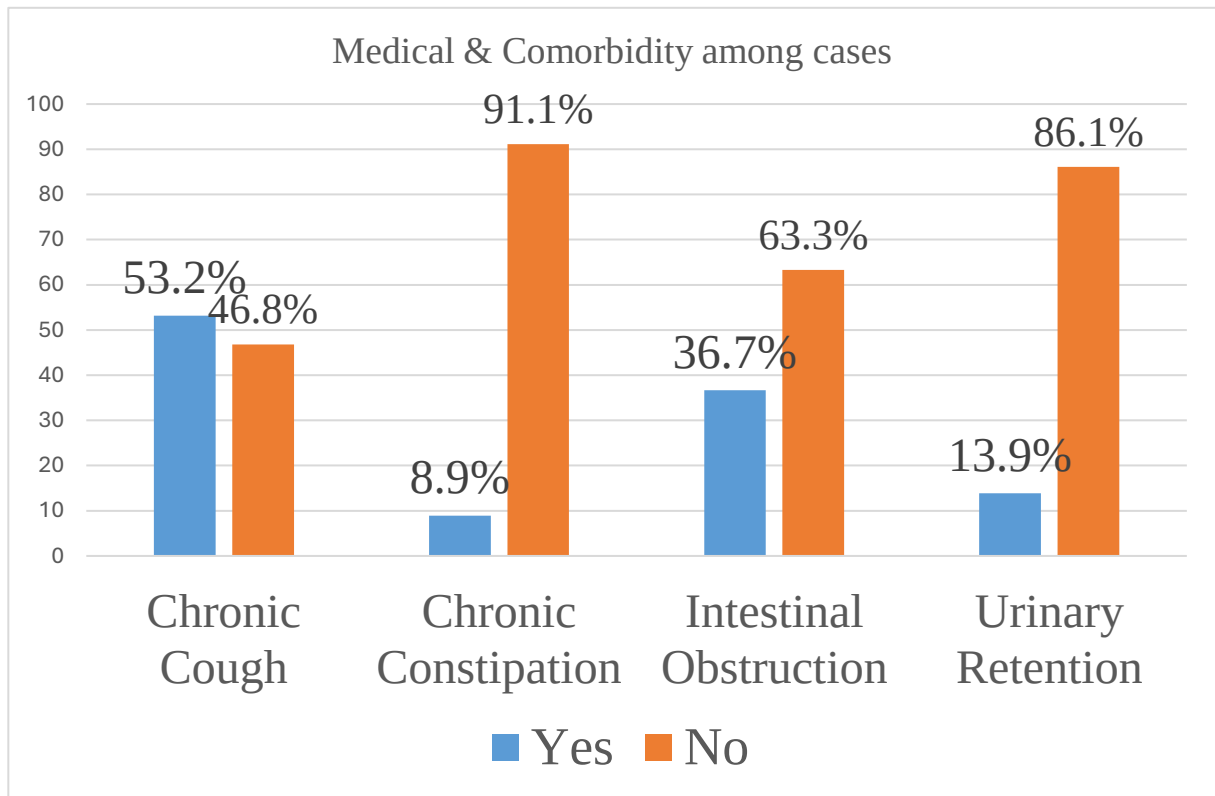


Figure 4: Bar graph showing Medical and Comorbidity among cases.

6. DISCUSSION

Age was identified as a significant determinant of POP. Women aged 40 years or older were found to have approximately 12.76 times higher odds of developing POP compared to women aged below 40 years. This result is consistent with the findings of a study conducted in East Wallaga, Northwest Ethiopia, Amhara Region (58,60,61). The connective tissue and muscle structures supporting pelvic organs weaken as people age due to anatomical and physiological changes, thus increasing the risk of prolapse (31). A study conducted in Bahir Dar revealed a positive relationship between age and prolapse risk despite showing a lower magnitude (3). Study populations with varying sample sizes and different POP diagnosis methods could explain the observed discrepancies (31). The multiple studies jointly demonstrate that advancing age stands as an essential determinant for prolapse.

The research found BMI to be a major determinant factor for POP development. The study demonstrates that women with overweight status demonstrated 4.84 times higher odds for pelvic organ prolapse compared to women with normal BMI. Evidence regarding obesity-related intra-abdominal pressure stress and pelvic floor structure damage comes from studies in Northeastern Ethiopia (1). Overweight leads to chronically loaded pelvic tissues that undergo permanent stretching, thus increasing prolapse risk. This result contradicts a study done in the United States of America. The research results differ because the populations possess different profiles and setting aspects, including movement patterns and job requirements, alongside dietary patterns. The research examined a diverse United States population that accessed healthcare well and implemented preventive measures against prolapse (62).

Women who participated in heavy lifting activities demonstrated a statistically significant link to pelvic organ prolapse (POP). Women who lift heavy weights presented 3.69 times greater odds of developing POP in comparison to women who avoided such activities. This is in line with the study done in Jimma University Specialized Hospital, Bahir Dar, Tigray, and Harar (2,47,56,63). The development of intra-abdominal pressure from heavy lifting creates a biological mechanism that weakens both pelvic floor muscles and fascia through repeated pressure rises. According to studies at Jimma University Specialized Hospital, mechanical stress stands as a primary factor triggering pelvic floor disorders among women who perform hard physical activities (7). Research demonstrates that heavy lifting may result in weakened

pelvic floor muscles, yet other studies failed to reveal statistical significance, possibly because of fluctuations in participants' occupational history (58).

This study demonstrated an association between intestinal obstruction and POP development. Women who were diagnosed with intestinal obstruction showed 8.73 times greater odds of developing POP compared to individuals without such a medical history. This study demonstrated similar findings to research from northeastern Ethiopia. Despite limited previous investigation, biological evidence suggests defecation-related straining and chronic pressure elevation within the abdomen (1).

This study revealed the relationship between delivery method and POP development. The odds of POP development are 4.90 times higher among women delivering by instrumental vaginal methods compared to spontaneous vaginal delivery. Research reveals instrumental deliveries specifically inflict trauma upon pelvic muscles and connective tissues, although cesarean section outcomes depend on delivery time and indications, similar to the findings in East Wallaga and Southern Ethiopia (9,58). Several studies conducted in Ethiopia detected no relationship between instrumental delivery and pelvic floor disorders, even though instrument use remained rare. Inadequate obstetric documentation may have affected the results. The results underline the necessity for appropriate instrumentation control in delivery procedures while also necessitating improved pelvic health assessment after childbirth (64).

The residency status had a significant influence on the development of POP. Women from rural areas had 2.53 times greater odds than those living in urban areas to develop POP. Rural women who perform heavy agricultural labor delay accessing expert birth care, and these findings match findings from Bale Zone and Southwest Ethiopia (7,59). Studies with inconsistent results have shown that this association may be due to migration movements and inaccurate residence categorizations among participants. Rural residents in Ethiopia face an increased risk of developing POP, according to most available study data (8).

6.1 Limitations of the Study

However, there are limits to this study. This is a hospital-based study, and so there is the possibility of selection bias; women attending healthcare facilities might not be a representation of the general population, especially healthy women, who have undiagnosed or asymptomatic POP. Second, some exposures, such as the history of heavy weight lifting, were reported by the self, and this implies the possible influence of recall bias. Third, unmeasured confounding, for example, nutritional status and detailed obstetric trauma history (e.g., duration of second stage of labor) and occupation, were not included, making the model somewhat less comprehensive. Fourth, causality cannot be established as the data are cross-sectional and relationships are strong, but the associations cannot be definitively temporally inferred. Finally, when lacking the grade of the outcome variable, the binary classification of the outcome variable (POP vs. no POP) might have concealed differences between mild and severe cases that may have had different risk factor profiles.

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

Multiple important risk factors associated with pelvic organ prolapse (POP) among women were identified through the final multivariable logistic regression model. Multiple independent risk factors for pelvic organ prolapse development include overweight, previous occurrence of intestinal obstruction, advancing beyond age 40, heavy weight lifting, and instrumental delivery alongside rural residence.

7.2 Recommendations

Medical staff must focus on enhancing obstetric procedures by eliminating nonessential instrumental delivery methods while providing secure vaginal birth assistance to decrease pelvic floor damage. Public health initiatives need to establish weight management programs that specifically target women during reproductive ages and perimenopause to decrease POP prevalence caused by overweight. The combination of pelvic floor muscle training and safe lifting education needs to become standard practice in maternal reproductive health, which comprises rural women most vulnerable to POP. The successful prevention and treatment of pelvic organ prolapse in this environment demands comprehensive consideration of all these factors.

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9. APPENDIX

English version of the questionnaire

Wallaga University School of Health Science, Department of Epidemiology

Consent form

Good morning/Good afternoon. Thank you for your interest in talking with me today.

My name is_____. I am a member of a team conducting a study on the determinants of pelvic organ prolapse among women visiting the gynecology OPD of Public Hospitals in West Hararge Zone. You are chosen to participate in this study. Your name will not be written on this form and will never be used in connection with any of the information you will tell me. You do not have to answer any question that you do not feel comfortable with, and you may end this task at any time you want to. However, your honest answers to these questions will help us better understand the situation of pelvic organ prolapse and will eventually help in designing and implementing appropriate intervention programs to alleviate the related problem of the disease. The interview will take 15-20 minutes.

Do you agree to participate in the study? 1. Yes 2. No

Participant ID No_____

Name of interviewer_____ Signature _____Date_____

Thank you very much

Name of kebele_____

Supervisor name and signature _____Date_____

ENGLISH VERSION QUESTIONNAIRE

Instruction: Circle the code number given parallel to the response the mother chooses, and for questions that the mother gives a direct answer, write the answer in the space provided.

Part I: Socio-demographic characteristics of the respondents among women attending gynecology OPD

S. N	Characteristics	Response	Skip pattern
101	How old are you?	Age in completed years_____	
102	1. What is your ethnicity?	1. Oromo 2. Amhara 3. Others specify_____	
103	2. What religions do you belong to?	1. Muslim 2. Protestant 3. Orthodox 4. Catholic 5. Others specify_____	
104	What is/ was your occupation, that is, what kind of work did you do mainly?	1. Housewife 2. Merchant 3. Government employer 4. Daily laborer 5. Farmer	
105	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widowed	
106	What is the highest level of school you have completed?	1. can't read and write 2. Can read and write 3. Grade (5-8) 4. Grade (9-12) 5. College and above	

107	What is your usual place of residence	1. Urban 2. Rural	
108	Are you menopause?	1. Yes 2. No	

Part II: Obstetric characteristics among women attending gynecology OPD

S. N	Characteristics	Responses	Skip to
201	At what age was your first marriage?	Age in completed years_____	
202	At what age was your first Pregnancy?	Age in completed years_____	
203	Have you ever given birth?	1. Yes 2. No	If no, skip to S.N. 301
204	How many children do you have?	Number of children_____	
205	Who assisted with the delivery?	1. Unskilled Attendant 2. Skilled Attendant	
206	What was the mode of delivery for the last child?	1. Spontaneous vaginal delivery 2. Instrumental delivery 3. Cesarean section	
207	Where did you give birth to your last child?	1. Home 2. Health facility	
208	What is the interval between the most recent previous childbirth and the starting time of pregnancy for the current child?	In years_____	
209	Was there a perineal tear during delivery?	1. Yes 2. No	

Part III: Factors related to increased comorbidity and medical conditions among women attending gynecology OPD.

S. N	Characteristics	Response	Skip pattern
301	Have you experienced chronic coughing? (> 3 weeks)	1. Yes 2. No	
302	Have you experienced chronic constipation?	1. Yes 2. No	
303	Do you lift heavy weights at home or work?	1. Yes 2. No	
304	Have you ever been diagnosed with Intestinal Obstruction	1. Yes 2. No	
305	Have you ever been diagnosed with Urinary Retention?	1. Yes 2. No	

Part IV: History of pelvic surgery

S. N	Characteristics	Response	Skip pattern
401	Have you had a hysterectomy?	1. Yes 2. No	

Part V: Body Mass Index

S. N	Characteristics	Response	Skip pattern
501	Patient height	_____meter	
502	Patient weight	_____kg	
503	BMI?	_____kg/m ²	

GAAFANNOO AFAAN OROMOO

YUNIVARSIITII WALLAGGAA INISTITIYUTII SAAYINSI FAYYAA, MUUMEE FAYYAA HAWAASA

Yaada Odeeffannoo

Akkam bultan/akkam ooltan? Ani_____ jedhama. Odeeffannoo tokko tokko akkan funaananuuf Inistiitiyutii Saayinsii Fayyaa, Hawaasaa Yuunivarsiitii Wallaggaa irraan dhufe. Kanaafuu har'a kanan assitti argame dhukkuba gadi ba'uu qama keessoo dubartootaa karaa qama saalaa irratti qorannoo geggeessuu barbaadeeni. Qarshii isin gaaffiif deebii kana irraa argattan homtuu hin jiru, garuu yaadaaf odeeffannoon isin amma naaf kennitan karooraaf namoota tarii rakkoo dhibee kanaa qabaniif immoo odeeffannoon ani isin biraa argadhu akka galtee guddatti na fayyada. Gaaffiif deebiin kun daqiiqaa 15- 20 caalaa hin fixu. Maqaan keessan asirratti hin galmaahu, hirmaattanis dhistanis namni isin dirqisiisu hin jiru. Hirmaachuuf dhiisuun mirga keessan jechuu kooti. Akka isin hirmattanii deebii dhugaaf gahaa ta'e naaf kennitaniif isin afeereera. Gaaffiif yaada ifaa isiniif hin taane yoo jiraate karaa teessoo kanaa nama barbaaddan sana quunnamuu dandeessu.

Maqaa; Dhaabaa Kumarraa Gootayee

Tessoo; Magaalaa Ciroo

Bil; 0913130776/0917641214

Email; dabakumera@gmail.com

Unka yaada waligaltee

Yaadaa amma ani isiniif kenneef hubannoof odeeffannoo argattaniin gaaffiif deebii kana irratti hirmaachuuf fedha qabduuree?

1. Eyyee ☐ → Gaaffiif deebicha itti fufi

2. Lakki ☐ → Haadha kana galateefadhuutii gaaffiif deebicha goolabi.

Maqaa nama odeeffannoo funaanuu_____

Mallattoo nama odeeffannoo funaanuu_____

Guyyaa _____

Lakkoofsa gaaffii(koodii)_____

Lakkoofsa adda deebii kennaa _____

Supervaayizeraan kan mirkanaa’e

Maqaa _____ Mallattoo _____ Guyyaa _____

Lakkoofsa koodii deebii haati filattee wajjin wal fakkaatuun geengoo godhi akkasumas gaaffilee haati kallattiin kennituun deebii bakka kenname keessatti barreessi.

Gaaffileewwan (Questionnaires)

Kutaa 1; Gaaffilee hawaasummaa waliin wal qabate

T. L	Gaaffilee	Deebiiwwan	Irra Utaali
101	Umuriinkee meeqa?	Umurii _____ wagga xumurameen_____	
102	Sabummaankee maali?	1. Oromoo 2. Amaaraa 3. Kan biraa, ibsi_____	
103	Gosi Amantiinkee maali?	1. Musliima 2. Pirootestaantii 3. Ortodoksii 4. Kaatoolikii 5. Kan biraa, ibsi_____	
104	Hojiin kee maal ture/ yeroo baay’ee hojii akkamii hojjetta?	1. Haadha Manaa 2. Haldaaltuu 3. Hojjettuu Mootummaa 4. Hojjettuu guyyaa guyyaa 5. Qonnaan Bultuu	
105	Haala gaa’elakee?	1. Kan heerumte 2. Kan hin heerumne 3. Kan wal hiikan	

		4. Kan Abbaan Manaa irraa du'e	
106	Sadarkaan barnootaa kee maali?	1. Barreessuuf dubbisuu hin danda'u 2. Barreessuuf dubbisuu nan danda'a 3. kutaa (5-8) 4. kutaa (9-12) 5. koolleejjiiif isaa ol	
107	Bakki jireenya kee eessa?	1. Magaalaa 2. Baadiyyaa	
108	Laguun sirraa dhaabbatee?	1. Eyyee 2. Lakki	

Kutaa 2; Gaaffilee da'umsaaf haala da'umsaan wal qabatan

T. L	Gaaffilee	Deebiiwwan	Irra Utaali
201	Gaa'elli keessan inni jalqabaa umurii meeqatti ture?	Umurii waggoota xumurame keessatti_____	
202	Ulfii keessan inni jalqabaa umurii meeqatti ture?	Umurii waggoota xumurame keessatti_____	
203	Lakkoofsa walii galaa ulfa Kanaan duraa?	_____	
204	Kanaan dura daa'ima deessanii??	1. Eyyee 2. Lakki	lakki, G301tti utaali.
205	Daa'ima meeqa qabdu?	Baay'ina ijoollee_____	
206	Daa'ima keessan xumuraa eessatti deessan??	1. Mana 2. Dhaabbata fayyaa	
207	Yeroo daa'ima deessan eenyutu isin gargaare?	1. Ogeessa fayyaa kan hin taane 2. Ogeessa fayyaa	

208	Haalli da'umsaa daa'ima isa dhumaa maal ture?	1. Ofumaan karaa qaama saalaa 2. Meeshaadhaan gargaaramee 3. Baqaqsanii hodhuu garaatiin	
209	Ulfakee ammaaf mucaakee isa dhiheenya dhalate gidduu garagarummaa wagga meeqaatu jira?	Waggaa_____	
210	Yeroo dahumsaatti tarsa'uun qama saalaaf naannoo isaa tureeraa?	1. Eyyee 2. Lakki	

Kutaa 3; Gaaffilee dhiibbaa garaa keessaa dabaluun wal qabatan

T. L	Gaaffilee	Deebiiwwan	Irra Utaali
301	Qufaan yeroo dheeraa isin mudatee beekaa?	1. Eyyee 2. Lakki	
302	Gogiinsi garaa yeroo dheeraa isin mudatee beekaa?	1. Eyyee 2. Lakki	
303	Tamboo/sigaaaraa aarsitee beektaa?	1. Eyyee 2. Lakki	
304	ba'aa ulfaataa manatti ykn bakka hojiitti ol in fuutaa?	1. Eyyee 2. Lakki	
305	Dhibeen danqamuu garaachaa isin mudatee beekaa?	1. Eyyee 2. Lakki	
306	Dhibeen danqamuu/ qabachuu fincaanii isin mudatee beekaa?	1. Eyyee 2. Lakki	

Kutaa 4; Seenaa baqaqsanii yaaluu qaama Saalaa

T. L	Gaaffilee	Deebiiwwan	Irra Utaali
401	Baqaqsanii yaaluun gadameessaa isiniif godhamee beekaa?	1. Eyyee 2. Lakki	

Kutaa 5; Indeksii Ulfaatina Qaamaa

T. L	Gaaffilee	Deebiiwwan	Irra Utaali
501	Dheerina Dhukkubsataa	-----meetira	
502	Ulfaatina Dhukkubsataa	-----kg	
503	Indeksii Ulfaatina Qaamaa(BMI?)	-----kg/m ²	