Determinants of Uterovaginal prolapse in Western Ethiopia

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Abstract

Background

Uterovaginal prolapse is a significant public health concern in developing countries like Ethiopia where access to health care is limited. It significantly affects women's health and productivity. Thus, it is very important to identify determinant factors and take preventive actions.

Methods

A hospital based unmatched case-control study was conducted on 86 cases and 258 controls who attended gynecologic outpatient departments in Nekemte town, from May 1 to July 30/2019. Cases were women with utero-vaginal prolapse while controls were women free from utero-vaginal prolapse but with other gynecologic diseases. Data were collected using pretested structured questionnaires and measurement on height and weight were taken to calculate body mass index of women. Data were entered using Epi Data version 3.1 and analysis was carried out by SPSS version 24.0. Descriptive, bivariate and multivariable logistic regressions were performed. Adjusted odds ratio with 95% confidence interval was used and statistical significance was declared at $p < 0.05$.

Results

This study revealed, age ≥ 40 years (AOR = 10.49; 95%CI: 4.03, 27.35), duration of labor ≥ 24 hours (AOR = 8.32; 95%CI: 3.58, 19.33), instrumental delivery (AOR = 7.40; 95%CI: 1.21, 45.28), non- utilization of family planning (AOR = 3.14; 95%CI: 1.32, 7.47) and underweight (BMI < 18.5 kg/m²) 5.30 (AOR = 5.30; 95%CI: 1.83, 15.33) were determinants of utero-vaginal prolapse.

Conclusion

Age ≥ 40 years, prolonged labor, instrumental delivery, non-utilization of family planning and underweight were identified as determinant factors of utero-vaginal prolapse. Thus, family planning service utilization and appropriate and timely obstetric care are advisable.

Background

Utero-vaginal prolapse (UVP) is the descent of the uterus through the vaginal canal due to defects in the support structures of the uterus and vagina because of different factors. It is manifested by protruding mass per vagina, urinary and rectal complaints [1,2].

Utero-vaginal prolapse is common pelvic floor disorder among women of reproductive age and postmenopausal women. It occurs both in developed and developing countries with overall global

prevalence of uterine prolapse of 2-20%. For instance, it is 3.4% in Nigeria, 20.4% in united kingdom, 14% in united states of America, and 27.1% in Turkey [3, 4, 5,6].

In Ethiopia, gynecological problems are important health problems affecting maternal health outcomes and women's productivity. In Ethiopia study done in Jimma and St. Paul's millennium medical college hospitals have revealed that POP accounted 40.7% and 15% of all gynecologic surgeries respectively [7, 8,9].

Though pelvic organ prolapse is not life threatening condition, it has significant effects on socioeconomic status, woman psychology, health, sexual function and overall quality of life [10,11,12].

Review of literature around the world revealed different factors for development of utero-vaginal prolapse. The most important once are factors that increase intra-abdominal pressure, difficult labor and delivery, malnutrition, old age, connective tissue disorders, heavy exercise, and pelvic trauma are associated with UVP [7, 13-29].

But what factors lead to occurrence of UVP are not well studied in Ethiopia. There are only few studies in the country that relied on patient record which might be subjected to information bias [7, 8]. Thus, the current study assess determinant factors of UVP in Western Ethiopia using primary data.

Methods

Study Area and Period

Hospital based unmatched case control study was conducted among 341 women attending gynecologic OPD in Nekemte town, from May 1 to July 30/2019. Nekemte town, the capital city of East Wollega zone, which is found at 331 km west of Addis Ababa. There are two public hospitals in the town namely Nekemte specialized hospital and Wollega University referral hospital. These hospitals give service to nearly 5 million people in western Ethiopia and adjacent areas. They have well organized gynecology and obstetrics departments which are led by 7 gynecologists.

Source Population

All women attending gynecologic OPD at public hospitals in Nekemte town were the source population

Study population

All women attending gynecologic OPD at public hospitals in Nekemte town during the study period. Cases were women with utero-vaginal prolapse and controls were those women free from utero-vaginal prolapse but with some other gynecologic disease during the same study period. All women aged more than 18 years attending OPD during the study period were included into the study. However, critically ill women and women with mental problems were excluded from the study.

Sample Size Determination and sampling procedure

Sample size was calculated using Epi-info software version 7 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 of 3: 1, the proportion of controls with exposure 6.2%, proportion of cases with exposure 18.5%, and Odd Ratio of 3.1. It was calculated from the study conducted in Bahir Dar town, North West Ethiopia by taking BMI ($< 18.5 \text{ kg/m}^2$) as one of the main exposure variables for pelvic organ prolapse that provide the maximum sample size [13]. Therefore, it yields 78 cases and 232 controls. Adding a 10% non-response rate, the final sample size becomes 341 (86 cases and 258 controls).

Two hospitals in Nekemte town were selected purposively. Then based on the number of clients who visited gynecologic OPD of these two hospitals during previous three months, sample size was proportionally allocated to each hospital. For each case, three controls were selected consecutively.

Study variables

Age, level of education, occupation, religion, ethnicity, marital status, educational status, income, obstetric factors, gynecologic history, medical factors

Data Collection Procedures

Data on socio demographic, obstetric, gynecologic and medical history were collected by using a pre-tested structured questionnaire which was developed by reviewing different literatures [13, 27, 30, 32]. Cases were identified by trained physicians working at gynecology OPD of the hospitals. Four nurse professionals were recruited and trained to collect data. All questionnaires were checked for completeness by the principal investigator.

Physical measurement was used to obtain data on weight and height of women. In this regard, the weight of each woman was measured using balanced beam in kg nearest to 0.1kg and height was measured using measuring tape to the nearest 0.1cm.

Shaw's classification system of utero vaginal prolapse was used for grading of the disease. In this classification system, descent is classified into four grades; the first grade is descent of cervix into the vagina, second grade is descent of cervix into introitus, third grade is descent of the cervix outside introitus, and the fourth grade is when the whole of the uterus is outside introitus [1].

Data Quality Assurance

The questionnaire was first prepared in English and then translated to local language (Afan Oromo). The data collectors and supervisors were trained for two days on data collection and details of the study. Pretest was conducted on 4 cases and 12 controls at Mettu Karl Hospital which is located in south west Ethiopia.

Data Processing and Analysis

Data entry was done using Epi-Info version 3.5.3 after checking for completeness. It was then cleaned and exported to SPSS Version 20 for analysis. Frequencies and other descriptive statistics were done. Bivariate analysis was used to examine the association between dependent and independent variables; Odds Ratios (ORs) and their 95% Confidence Intervals (CIs) were calculated. All variables that had a P-value of < 0.2 in the bivariate analysis were included in the multivariate logistic regression analysis model to determine the factors associated with dependent variables. Statistical significance was set at p-value of < 0.05 .

Results

Socio-Demographic Characteristics of study participants

Out of the total sample size, 325 respondents (82 cases and 243 controls) were participated in the interview with the response rate of 95.3%. The mean age of study participants was 34.9 years with SD of ± 10.5 (45.9(± 10.4 SD) years for cases and 31.2(± 7.6 SD) years for controls). The proportion of older age women (age ≥ 40) was found to be higher among cases (65.9%) compared to controls (8.6%). Majority of study participants, both in cases and controls, were Oromo by ethnicity, protestant in religion and married. 47(57.3%) of cases and 122(50.2%) of controls had no formal education. More than half of participants among cases 47(57.3%) and controls 140(57.6%) were house wife. From a total women involved, 54(65.9%) of cases and, 135(55.6%) of controls were rural residents (**Table 1**).

Obstetrics Characteristics of study participants

From the total study participants, 57(70.4%) of cases and, 180(75.6%) of controls were married at the age of eighteen and above. Greater than three fourths of cases 66(81.5%) and nearly half 108(47.6%) of controls had pregnancy experience great or equal to four. 49 (62.8%) of cases and 111(56.6%) controls had average inter-pregnancy interval of ≤ 2 years. Nearly half 146 (47.4%) of study participants had history of abortion. 51(63%) of cases and 62(27.3%) of controls had no ANC follow up for the last pregnancy. Larger proportion of cases 58(71.6%) and controls 151(66.5%) did labor intensive work during the last pregnancy. 60(74.1%) were cases and 78(35.6%) controls had ≥ 4 total number of delivery. Forty two (51.9%) of cases and 34(15.5%) controls gave birth at home. Majority of cases (80.2%) and controls (86.8%) gave birth vaginally to the last baby. Proportion of women who experienced vaginal tear during last delivery were 7(8.6%) among cases and 14(6.4%) among controls (**Table2**).

Fifty four (66.7%) of cases and fifty five (25.1%) of controls stayed in labor for great or equal to 24 hours during the last childbirth (**Figure 1**).

Medical Problems among study participants

From study participants, 17(20.7%) of cases and 16(6.6%) of controls had history of chronic cough. Thirty-six (43.9%) of cases and 40(16.5%) of controls had history of carrying heavy objects. Among women involved in the study, 47(14.5%), 3(0.9%), 63(19.4%), 5(1.5%), 6(1.8%) had hypertension, diabetes

mellitus and chronic constipation were detected in 14.5%, 0.9% and 19.4% of study participants respectively. Regarding participants' BMI, 50(61.0%) of cases and 183(75.3%) controls had BMI between 18.5-24.9 kg/m²(Table 3).

Determinants of uterovaginal prolapse among study participants

The odds of developing UVP in relation to different characteristics of women were estimated by odds ratio using binary logistic regression analysis. Predictor variables which were found to be associated with outcome variable in bivariate analysis at p-value less than 0.2 were taken to multivariable analysis. In final model the odds of having UVP across each independent variable were adjusted for confounding effects. Accordingly age, duration of labor, mode of delivery, family planning use, family history and low BMI were predictor variables remained significantly associated with UVP at p-value less than 0.05.

Multivariable logistic regression analysis indicated that the odds of being age ≥ 40 was 10.49 times higher among cases than controls (AOR=10.49; 95%CI: 4.03, 27.35). The odds of developing UVP were 8.32 times higher among women who had duration of labor great or equal to 24 hours during the last childbirth among cases than controls with (AOR=8.32; 95%CI: 3.58, 19.33). Women who gave birth by instrumental delivery were 7.40 times (AOR=7.40; 95%CI: 1.21, 45.28) more likely to develop UVP in cases as compared to controls. The odds of having a UVP among women who did not ever used family planning was 3.14 (AOR=3.14; 95%CI: 1.32, 7.47) times higher among cases as compared to controls. Similarly, the odds of positive family history of UVP was 3.77 higher among cases than controls (AOR=3.77; 95%CI: 1.10, 12.88). In addition, the odds of being underweight (BMI <18.5 kg/m²) was 5.30 (AOR=5.30; 95%CI: 1.83, 15.33) times higher among cases as compared with controls.

However, the effect of residence, gravidity, parity, place of delivery, menopausal status, history of chronic cough, chronic constipation, and carrying heavy objects were disappeared after adjusting for confounders (Table 4).

Discussion

The main objective of the study was to identify determinant factors of UVP among women attending gynecologic OPD at public hospitals in Western Ethiopia. Accordingly many modifiable factors were identified to affect occurrence of UVP.

This study revealed that women aged ≥ 40 years of age were 10.49 times more likely to have had UVP as compared to women aged <40 years. This might be due to age related weakening of pelvic supportive structures, decreased level of estrogen, and high parity in this age group. Study conducted in Lebanon and Ethiopia documented similar finding [7, 15]. Results of systematic review also revealed consistent finding [28].

Duration of labor great or equal to 24 hours was significantly associated with development of utero-vaginal prolapse. This finding is consistent with previous reports from India [25], Nepal [30], Nigeria [19]

and Ethiopia [7]. This could be due to the fact that prolonged labor causes more damage to supportive structures of the uterus and other pelvic organs. Prolonged labor can also be complicated by obstructed labor which might need aggressive interventions that worsen damage to already weakened structures.

This study also identified significant association between instrumental delivery and development of UVP like study conducted in USA [31]. Possible explanation could be excessive traction applied during difficult instrumental deliveries particularly in the presence of prolonged labor.

Women who did not use family planning were 3.14 times more likely to develop UVP as compared to women who used family planning at least once. This finding is similar with the study conducted at Wolaita Sodo University Referral Hospital [32]. This is because mothers who do not use family planning have repeated deliveries during which cumulative effects of pushing down pain damage the pelvic supportive structures.

Other interesting finding in this study is the occurrence of UVP in families. There are also other studies supporting this [8,33]. Study conducted in Italy reported that the risk of urogenital prolapse was higher in women with family history of prolapse as compared to women without family history of prolapse [17]. This could be due to the presence of congenital connective tissue disorders in these families.

Like report from Bahir Dar, Ethiopia [13], underweight ($\text{BMI} < 18.5 \text{ kg/m}^2$) was also found to be determinant of UVP in this study. This is due to possibility of micronutrient deficiencies which are necessary for connective tissue strength in underweight mothers. On the other hand, other studies showed that obesity ($\text{BMI} \geq 25 \text{ kg/m}^2$) was risk factor for UVP [15, 23].

Conclusion

Age ≥ 40 years, prolonged labor, instrumental delivery, non-utilization of family planning and underweight were identified as determinant factors of utero-vaginal prolapse. Thus, family planning service utilization and appropriate obstetric care are advisable.

Declarations

Ethical Considerations

Ethical clearance was obtained from Wollega University Institute of Health Sciences ethical review board. Additionally, letter of cooperation was written to respective hospitals by Wollega University Institute of Health Sciences. To obtain permission, hospitals administrations were informed before starting data collection. All participants were given adequate information regarding the purpose, risk and benefit, and confidentiality of the study as described in the information sheet. Participation was fully voluntary and written informed consent was taken from each participant. Confidentiality of patient was kept and the information merely used for this study.

Consent for publication

Not applicable.

Availability of data and materials

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interest

The authors declare that they have no competing interests.

Funding

There was no funding source.

Authors' contributions

GF, TT and GK were involved in all components of this research, including conception, design, and supervision of data collection, data analysis and write up of the manuscript. All authors read and approved the final manuscript.

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Tables

Table 1: Socio demographic characteristics of women attending gynecologic OPD among cases and controls at public hospitals in Nekemte town, Western Ethiopia, 2019

Characteristics of Respondents	Cases Number (%)	Controls Number (%)	Subtotal Number (%)
Age			
≥40	54(65.9)	21(8.6)	75(23.1)
<40	28(34.1)	222(91.4)	250(76.9)
Ethnicity			
Oromo	74(90.2)	225(92.6)	299(92.0)
Amhara	7(8.5)	13(5.3)	20(6.2)
Other(Tigre, Guraghe)	1(1.2)	5(2.1)	6(1.8)
Religion			
Protestant	50(61.0)	150(61.7)	200(61.5)
Orthodox	25(30.5)	55(22.6)	80(24.6)
Muslim	6(7.3)	35(14.4)	41(12.6)
Other(Catholic, Adventist)	1(1.2)	3(1.2)	4(1.2)
Education of Women			
No education	47(57.3)	122(50.2)	169(52.0)
Primary(1-8 grade)	25(30.5)	76(31.3)	101(31.1)
Secondary(9-12 grade)	7(8.5)	35(14.4)	42(12.9)
College and above	3(3.7)	10(4.1)	13(4.0)
Occupation			
House wife	47(57.3)	140(57.6)	187(57.3)
Merchant	10(12.2)	35(14.4)	45(13.8)
Government employee	2(2.4)	11((4.5)	13(4.0)
Daily laborer	3(3.7)	4((1.6)	7(2.2)
Farmer	20(24.4)	53(21.8)	73(22.5)
Marital Status			
Single(single, divorced, widowed)	3(3.7)	8(3.3)	11(3.4)
Married	79(96.3)	235(96.7)	314(96.6)
Residence			
Urban	28(34.1)	108(44.4)	136(41.8)

Rural	54(65.9)	135(55.6)	189(58.2)
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Table 2: Obstetrics and gynecologic history of women attending gynecologic OPD among cases and controls at public hospitals in Nekemte town, Western Ethiopia, 2019

Characteristics	Cases Number (%)	Controls Number (%)	Subtotal Number (%)
Age at first marriage			
≥18 years	57(70.4)	180(75.6)	237(74.3)
<18 years	24(29.6)	58(24.4)	82(25.7)
Age at first pregnancy			
<20 years	36(44.4)	112(49.3)	148(48.1)
≥20 years	45(55.6)	115(50.7)	160(51.9)
Gravidity			
≥4	66(81.5)	108(47.6)	174(56.5)
<4	15(18.5)	119(52.4)	134(43.5)
Inter-pregnancy interval			
≤2 years	49(62.8)	111(56.6)	160(58.4)
>2 years	29(37.2)	85(43.4)	114(41.6)
History of abortion			
Yes	41(50.6)	105(46.3)	146(47.4)
No	40(49.4)	122(53.7)	162(52.6)
ANC follow up			
Yes	30(37.0)	165(72.7)	195(63.3)
No	51(63.0)	62(27.3)	113(36.7)
Labor intensive work			
Yes	58(71.6)	151(66.5)	209(67.9)
No	23(28.4)	76(33.5)	99(32.1)
Ever gave child birth			
Yes	81(100.0)	219(96.5)	300(97.4)
No	0(0.0)	8(3.5)	8(2.6)
Parity			
≥4	60(74.1)	78(35.6)	138(46.0)
<4	21(25.9)	141(64.4)	162(54.0)
Number of vaginal deliveries			

≥4	59(72.8)	69(32.2)	128(43.4)
<4	22(27.2)	145(67.8)	167(56.6)
Place of delivery (for the last child)			
Home	42(51.9)	34(15.5)	76(25.3)
Health facility	39(48.1)	185(84.5)	224(74.7)
Mode of delivery (for the last child)			
Spontaneous vaginal delivery	65(80.2)	190(86.8)	255(85.0)
Instrumental delivery	11(13.6)	10(4.6)	21(7.0)
Cesarean section	5(6.2)	19(8.7)	24(8.0)
Vaginal tear (during last child birth)			
Yes	7(8.6)	14(6.4)	21(7.0)
No	74(91.4)	205(93.6)	279(93.0)
Sphincter damage (during the last child birth)			
Yes	2(2.5)	2(0.9)	4(1.3)
No	79(97.5)	217(99.1)	296(98.7)
Episiotomy (during the last child birth)			
Yes	5(6.2)	18(8.2)	23(7.7)
No	76(93.8)	201(91.8)	277(92.3)
Duration of rest after delivery (for the last child)			
≤42 days	59(72.8)	168(76.7)	227(75.7)
>42 days	22(27.2)	51(23.3)	73(24.3)
Ever used family planning			
Yes	16(19.5)	129(53.1)	145(44.6)
No	66(80.5)	114(46.9)	180(55.4)
Menopausal status			
Premenopausal	33(40.5)	222(91.4)	255(78.5)
Postmenopausal	49(59.5)	21(8.6)	73(21.5)
Family history of UVP			
Yes	17(20.7)	13(5.3)	30(9.2)
No	65(79.3)	230(94.7)	295(90.8)

Table 3: Medical problems and history of pelvic surgery among cases and controls at public hospitals in Nekemte town, Western Ethiopia, 2019

Variables	Cases Number (%)	Controls Number (%)	Subtotal Number (%)
History of chronic cough			
Yes	17(20.7)	16(6.6)	33(10.2)
No	65(79.3)	227(93.4)	292(89.8)
Hypertension			
Yes	13(15.9)	34(14.0)	47(14.5)
No	69(84.1)	209(86.0)	278(85.5)
Diabetic mellitus			
Yes	1(1.2)	2(0.8)	3(0.9)
No	81(98.8)	241(99.2)	322(99.1)
Chronic constipation			
Yes	30(36.6)	33(13.6)	63(19.4)
No	52(63.4)	210(86.4)	262(80.6)
Ever smoke cigarette			
Yes	3(3.7)	4(1.6)	7(2.2)
No	79(96.3)	239(98.4)	318(97.8)
Carry heavy objects			
Yes	36(43.9)	40(16.5)	76(23.4)
No	46(56.1)	203(83.5)	249(76.6)
History of hysterectomy			
Yes	2(2.4)	3(1.2)	5(1.5)
No	80(97.6)	240(98.8)	320(98.5)
Previous prolapse surgery			
Yes	4(4.9)	2(0.8)	6(1.8)
No	78(95.1)	241(99.2)	319(98.2)
BMI			
18.5-24.9 kg/m ²	50(61.0)	183(75.3)	233(71.7)

<18.5 kg/m ²	27(32.9)	18(7.4)	45(13.8)
≥25 kg/m ²	5(6.1)	42(17.3)	47(14.5)

Table 4: Bivariate and multivariable logistic analysis of determinants of utero-vaginal prolapse among women attending gynecologic OPD at public hospitals in Nekemte town, Ethiopia, 2019

Variables	Cases N (%)	Controls N (%)	Crude OR(95%CI)	Adjusted OR(95%CI)
Age				
≥40	54(65.9)	21(8.6)	20.39(10.76, 38.63)	10.49(4.03,27.35)*
<40	28(34.1)	222(91.4)	1	1
Residence				
Urban	28(34.1)	108(44.4)	1	
Rural	54(65.9)	135(55.6)	1.54(0.92,2.60)	0.59(0.25,1.39)
Gravidity				
≥4	66(81.5)	108(47.6)	4.85(2.61,8.99)	1.29(0.32,5.26)
<4	15(18.5)	119(52.4)	1	1
Parity				
≥4	60(74.1)	78(35.6)	5.17(2.93,9.12)	2.12(0.88,5.04)
<4	21(25.9)	141(64.4)	1	1
Place of delivery (for the last child)				
Home	42(51.9)	34(15.5)	5.86(3.31,10.35)	1.43(0.49,4.11)
Health facility	39(48.1)	185(84.5)	1	1
Duration of labor (for the last child)				
≥24 hours	54(66.7)	55(25.1)	5.96(3.43,10.38)	8.32(3.58,19.33)*
<24 hours	27(33.3)	164(74.9)	1	1
Mode of delivery (for the last child)				
SVD	65(80.2)	190(86.8)	1.30(0.47,3.62)	1.11(0.25,4.90)
Instrumental delivery	11(13.6)	10(4.6)	4.18(1.13,15.42)	7.40(1.21,45.28)*
Cesarean section	5(6.2)	19(8.7)	1	1
Ever used family planning				
Yes	16(19.5)	129(53.1)	1	1
No	66(80.5)	114(46.9)	4.67(2.56,8.52)	3.14(1.32,7.47)*
Menopausal status				

Premenopausal	33(40.5)	222(91.4)	1	1
Postmenopausal	49(59.5)	21(8.6)	15.69(8.29,43)	1.77(0.44,7.17)
Family history of UVP				
Yes	17(20.7)	13(5.3)	4.63(2.14,10.02)	3.77(1.10,12.88)*
No	65(79.3)	230(94.7)	1	1
History of chronic cough				
Yes	17(20.7)	16(6.6)	3.71(1.78,7.75)	1.97(0.56,6.72)
No	65(79.3)	227(93.4)	1	1
Chronic constipation				
Yes	30(36.6)	33(13.6)	3.67(2.06,6.56)	1.92(0.78,4.74)
No	52(63.4)	210(86.4)	1	1
Carry heavy objects				
Yes	36(43.9)	40(16.5)	3.97(2.29,6.90)	1.94(0.82,4.60)
No	46(56.1)	203(83.5)	1	1
BMI				
18.5-24.9 kg/m ²	50(61.0)	183(75.3)	1	1
<18.5 kg/m ²	27(32.9)	18(7.4)	5.49(2.80,10.77)	5.30(1.83,15.33)*
≥25 kg/m ²	5(6.1)	42(17.3)	0.44(0.16,1.16)	0.40(0.10,1.51)

Note:* represents statistical significance at p<0.05

Figures

Figure 1

Duration of labor during last childbirth among cases and controls at public hospitals in Nekemte town, Western Ethiopia, 2019

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