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Determinants of Pelvic Organ Prolapse among Gynecological Cases in Wolaita Sodo University Referral Teaching Hospital, Southern Ethiopia: A Case Control Study

Zinash Lema[1] Yemane Berhane[2] Mengistu Meskele[3]
1.Christian General Hospital, Wolaita Sodo, Southern Ethiopia
2.Adis continental school of public health, Addis Ababa , Ethiopia
3.School of Public Health, College of Health Sciences and medicine , Wolaita Sodo University, Wolaita sodo, Ethiopia , PO Box: 138

Abstract
Background: Pelvic organ prolapse is the down ward descent of female pelvic organs including the bladder, small and large bowel resulting in protrusion of the vagina, uterus or both. Most women are unwilling to discuss this problem with each other and even with health professionals. This study aimed to assess factors affecting pelvic organ prolapse among gynecologic cases in Wolaita Sodo University Referral Teaching Hospital. Methods: An institutional based case-control study was conducted from June, 2013 to August 30/2013 in Wolaita Sodo University Referral Teaching Hospital. A total sample size of 318, women with vaginal prolapse as a case (n=159) and women's without vaginal prolapse as control (n=159) were used. Data were entered into EPI Info version 3.22 and exported, cleaned, edited and analyzed in SPSS version 16.0. Odds ratios in binary and multivariate logistic regression model along with 95% confidence interval were used. Results: In this study there was significant difference among cases of Pelvic organ prolapse and their control in past obstetric history. Age at first marriage, parity and, place of delivery were statistically associated with pelvic organ prolapse (AOR=11.6; 95% CI: 4.29- 31.33), (AOR=3.05; 95% CI: 1.67- 5.6) and (AOR=8.5; 95% CI: 3.8-19.3) respectively. Likewise, marriage before age of 15, gravid above three, home delivery and prolonged labor were statistically associated with pelvic organ prolapse. Conclusion**:** Early marriage, early child birth, multi-parity, home delivery and prolonged labor were the risk factor for pelvic organ prolapse. Moreover, chronic constipation, chronic cough and heavy weight lifting were also significant predictors of pelvic organ prolapse. Hence, different stake holders, programmers and implementers should aggressively take responsibility to prevent early marriage, train health professionals to encourage women to use family planning and institutional delivery was recommended.
Keywords: Pelvic organ prolapse, early child birth, parity, Wolaita, Ethiopia

1.Background

About 34 million women worldwide are affected by pelvic organ prolapse. Moreover; women are reluctant to discuss this problem with each other and even with a doctor [1]. It is also very common and 1 out of 2 women over age 45 suffer from pelvic organ prolapse. Though, most women are unaware that they do not have to live with this health issue [2]

A study conducted in Dabat district, northwest Ethiopia, showed that an anatomical pelvic organ prolapse stage II-IV was detected in 55.1 % of women who undergone pelvic examination. [3].Moreover, other study which conducted in Jimma University specialized hospital, showed that 40.7% of pelvic organ prolapse were identified out of the major gynecologic operations [4].

Multiple factors can cause pelvic organ prolapses. Among these, pelvic muscles and connective tissues which have been weakened with age is the first cause. Vaginal childbirth, obesity, previous history of vaginal surgeries, menopause, smoking, diabetes, repeated heavy lifting, chronic coughing, and chronic constipation are other risk factors for POP. Occasionally it can be caused by genetic factors. Moreover, pregnant women, women with insufficient perineum, and moderately and severely anemic women were the risk for POP development [2, 4, 5, 6].

POP can severely affect a woman's quality of life by limiting physical, social and sexual function and so many researches was done on maternal mortality, but no more attention given for maternal morbidity. So, most women's health affected by this problem and still it is a hidden problem. The community are also not aware on this issue and the women also not seeking help rather than keeping their prolapse a secret because they facing social stigma, discrimination and other problems [7, 8, 9].

Considering how bad POP is, up to 40% of women have a minor degree of prolapse with minimal or no symptoms. A prolapse may occur during or soon after a pregnancy or may take many years to develop. However, only one out of nine women (about 11%) will ever need surgery for prolapse in their lifetime. Pregnancy and childbirth are considered to be major factors leading to weakening of the vagina and its supports. Moreover, obesity, straining, ageing and menopause are also risk for such disease [10].

This study is aimed to understand the factors that affect maternal health related to POP. Gaining

insights of such factors is the critical step to designing of different programs that are effective to increase awareness for community on risk factors and prevention of POP and health seeking behavior to improve quality of maternal health. Therefore, the result will help to look for appropriate intervention to decrease maternal morbidity related with POP.

2.Research Questions

The following research questions were guided the study as follows:

1. What obstetric and Gynecologic history will be the risk factors for pelvic organ prolapse?
2. What medical history of women can be the risk for the development of pelvic organ prolapse?

3.Hypothesis

Alternate Hypothesis

1. The odds of having POP was higher among study participants who had married before the age of 15 among cases than controls.
2. The odd of women who was not utilizing family planning method was more risk to develop pop in cases as compared to controls.
3. Home delivery is high risk to develop pelvic organ prolapse and high fertility (gravida 3 and above were higher in cases compared with controls and the difference was statistically significant.

4.Methods

4.1 Study area and setting

This study was conducted in Wolaita Sodo University Referral Teaching Hospital and the institution is located in wolaita zone, sodo town. It is the only governmental hospital in wolaita zone and by the year 2012 the hospital was handed over to Wolaita Sodo University and the name of hospital changed (Wolaita Sodo University Referral Teaching Hospital). The hospital provides different clinical services for about 50,670 peoples including referral cases from different Districts and nearby Zones as well as gives public health programs such as family planning, antenatal care, delivery service, diagnostic service, treatment of complicated cases, and major and minor surgery etc.(based on 2012 report).

4.2 Study Design

Institutional based case-control study design was conducted from June, 2013 to August 30/2013. All women with gynecological cases, who came to the gynecologic clinic in Wolaita Sodo University Referral and teaching hospital, were the study population. Cases were women with confirmed cases of pelvic organ prolapse in gynecologic clinic at Wolaita Sodo University Referral Hospital and Controls were women who came for other gynecologic problem without pelvic organ prolapse who came to gynecologic clinic during the same period as of the cases.

4.3 Sample size and sampling procedure

Sample size was calculated by using Open Epi statistical software version 2.3 for unmatched case control study. Deficient perineum, current pregnancy, advanced age and parity are the determinant factors [6] and considered to calculate the required sample size. In order to have the required number of cases with in the study period, a control to case ratio of 1:1, the prevalence of deficient perineum is 57%, 95% CI, power 80, and OR=2 was taken. Therefore, the calculated sample size was 288 and adding 10% non-response rate, it became 317. Therefore, the required sample size becomes 159 gynecologic Cases with POP were cases and 159 gynecological Cases without POP were controls. Hence, the final total sample size was 318.Convinience sampling technique was used to collect the necessary information from the study participants.

4.4 Data collection procedure

Data was collected using pre –tested questionnaires. The questionnaires initially prepared in English and translated to Amharic language, three data collectors (Midwife nurses working in MCH) and one supervisor (senior midwife) were trained on each item included in the questionnaire and getting consent from the woman and collect data before the doctor taking history or patients on waiting room and to know the type and degree of prolapse data collectors were assist doctor during physical examination. Then collecting data until the required sample size was achieved, then the investigator review the questioner on daily basis for completeness. Any questionnaires' which is found incomplete was discarded and other eligible patients were asked.

4.5 Operational definitions

Pelvic organ prolapse is down ward decent of the female pelvic organs at least one of the following: bladder, small or large bowel resulting in protrusion of vagina, uterus or both.

4.6 Data entry and analysis

Data entry and clearing was done using EPI info version 3.22 statistical packages, and analysis was made using SPSS statistical program. Odds ratio, 95% CI and P-value were used to assess the strength of association and statistical significance. Binary Logistic regression and multivariate analysis was used to see the effect of each independent variable on the dependent variable, Hosmer and lemeshow final test used to see the fitness of the model.

4.7 Ethical considerations

Ethical clearance was obtained from Research and ethic committee of Wolaita Sodo University, School of public health. Informed verbal consent was also being obtained from each study subject prior to data collection and the purpose of the study was explained to the respondents. Confidentiality of the information was maintained. Privacy of the respondents was maintained while doing pelvic examination by letting them in the private room. During the data collection each study subject was communicated that their participation would be voluntary and they also informed on the risk factors and prevention of POP.

5. Result

A total of 318 gynecologic cases were enrolled in the study, out of which 159 gynecologic cases with pelvic organ prolapse as a case and 159 gynecologic cases without pelvic organ prolapse as a control.

Majority of participants, 159 (50%) were in the age group between 35 and 55 years, with a mean and standard deviation of age of 41.9 + 13.8 years. Two hundred six (64.8%) women's were house wives'; among that nearly three-fourth 123 (77.4%) were cases and 83 (52.2%) were controls. Government employee and students were only 54 (18.9%). Among these 44 (27.6%) were controls and 10 (6.3%) were cases. From the total farmers wife 165 were cases and 45 were controls.162 (50.9%) of study participants were uneducated or illiterate among that 41 (25.8%) were controls and 121 (76.1%) were cases. women in secondary and more than secondary school were 80 (25.2%) among that 76 (47.8%) were controls and 4 (2.5%) were cases. Two hundred four (64.2%) of study subjects were Protestant, followed by Orthodox 89 (28%) and the rest 25 (8.3%) belonged to Muslim and catholic religions.

The majority of the study subjects was wolaita ethnicity, 282 (88.7%), followed by Gurage 36 (11.4%).Moreover, the majority of the participants 236 (74.2%) were married and live together (Table 1.)

5.1 Obstetric and Gynecologic history

Of the total study subjects 68 (21.4%) of participants married before the age of 15, among that 58(36.5%) were cases and 10 (6.3%) were controls. More than a quarter 91(28.6%) of participants reported married on the age between 15 & 18, and 159(50%) of participants married above the age of 18. From the total participants 92(29.1%) were gave birth before the age 18, among these 66(41.5%) participants were cases and 26(16.5%) participants were controls, while the rest 226 (70.9%) were gave birth after the age of 18. From the total study participants 175 (60.7%) had got less than 3 pregnancy including abortion, while the rest 143 (41.0%) participants had more than 3 pregnancy including abortion.

Only 93(29.2%) of study participants gave birth at health institution while the majority 225 (70.9%) birth was home delivery. Majority, 278 (95.9%) participants gave birth vaginally and 12 (4.1%) were gave birth by caesarian section. Only 44 (13.8%) of women stayed on labor less than 4hours (they faced precipitated labor), 244 (76.8%) of women stayed 4-24 hours and 30 (9.4%) of women stayed >24 hours (they faced prolonged labor). About 136(42.8%) of women stayed <30 minute on second stage of labor, 164 (51.6%) of women stayed from 30-120 minute on second stage of labor and 18 (5.7) of women faced prolonged second stage of labor.

From the total study participants, 178 (56%) were no ANC follow up during pregnancy and the rest 140 (44%) of participants have ANC follow up during their pregnancy. Majority 207 (65.1%) participants were not used FP. More than half 52.2% of participants used FP and spacing <2 years between each pregnancy and 47.8% of participants spacing > 2 years in between each pregnancy. More than half 186 (58.5%) of study groups reported to have no information about POP and 132 (41.5%) of participants were reported have information on POP. And finally 251 (78.9%) of study participants have no family history of POP and about 67 (21.1%) of women's have reported to have family history of POP (Table 2.)

5.2 Medical history of women

From the total of participants, more than a quarter 89(28%) had any medical problem. Among these 15(4.7%), 22(6.9%), 23(6.9%), 8(2.5%), 6(1.9%), 5(1.9%) had bronchial asthma, tuberculosis, chronic constipation, hypertension, HIV/AIDS and previous hysterectomy.

With the regard of the kind of work the clients were performing , different kinds of activities like carrying water twice a day, working on the farm, other house work , office work and preparing false banana or 'kocho' accounts 115(36.2%), 39(12.3), 311(97.8), and 44(13.8%), 119(37.4) respectively.

5.3 Socio-Demographic determinants of pelvic organ prolapse

The women's age 45-55 and above among cases were 15.7 times more likely to have pelvic organ prolapse than their counterpart (AOR=15.7; 95%CI= 5.62-43.84).Women live in rural area were 5.7 times more likely to have POP than their counter part (AOR=5.7; 95 % CI =1.92-16.89).After adjusting for other variables the likelihood of having POP was higher among illiterates (not educated) than those who educated at least primary school and above (AOR=15.11; 95 % CI= 2.61-87.4), so illiteracy is high risk to POP among cases than controls. Moreover, the women who had no radio or television were more prone to develop POP than those who had television or radio (Table 3).

5.4 Determinants related to obstetric and Gynecologic history

The odds of having POP was also 11.6 times higher among study participants who had married before the age of 15 among cases than controls (AOR=11.6; 95 % CI =4.29-31.33) and also non utilization of family planning method was 2.14 times more risk to develop pop in cases as compared to controls with (AOR=2.14; 95% CI =1.06-4.29) so most cases were not using any family planning method and not spacing between births. Giving birth take place at home were 8.5 times higher in cases as compared with controls of POP and this difference was statistically significant (AOR=8.5, 95% CI=3.8- 19.3). So home delivery is high risk to develop pelvic organ prolapse and high fertility (gravida 3 and above were higher in cases compared with controls and the difference was statistically significant (AOR=3.05, 95% CI: 1.67- 5.60).So high fertility with early marriage, early child bearing and many vaginal deliveries were high in cases of POP compared with controls. Hereditary history of POP also higher in cases compared with controls and the difference was statistically significant (AOR=3.02; 95%CI: 1.42-6.4) (Table.4).

5.5 Determinants of medical history regarded as risk for development of POP

The presence of medical problems like chronic constipation and chronic cough was significantly associated with POP after adjusting for other variables (AOR=4.98, 95% C.I:1.48-16.75), and (AOR=28.16; 95% C.I:3.57-222.2) respectively. After adjusted for occupational history of study participants carrying water, working on the farm and preparing 'kocho' were significantly associated with pelvic organ prolapse(AOR=3.21; 95% CI(1.76-5.85), (AOR=3.26 ;95%CI:1.25-8.47) and (AOR=2.93; 95% CI:1.58-5.43) respectively. So lifting heavy load was high among cases as compared to controls and that is high risk to develop pelvic organ prolapse. Those women who had no information on POP were 1.76 times more likely to develop pop than who had information on POP(AOR=1.76; 95%CI:0.93-3.33)(Table5).

5.6 Discussion

This study identified different risk factor for pelvic organ prolapse. Among these determinants, age is one of the highest risk factor for POP development. So the risk of POP among old aged women (>45 years.) was 15.7 times higher compared to younger women (AOR=15.70; 95%CI: 5.62-43.84). This finding is consistent with the study finding which conducted in Jima University Specialized Hospital [4, 6]. The mean age of women with POP was found to be 41.9 ± 13.8 years and controls were younger than cases in this study. The result also is similar with the study finding in Jima and mentioned above [4]. It might be due to because of the aging can weaken pelvic muscles and ligaments and the risk of vaginal prolapse increases [2,5]. Advancement in age is associated with a higher rate of pelvic dysfunction. This could be due to secondary to different factors including the fall in estrogen during the postmenopausal period and normal physiologic advancement of the pelvic floor components [11, 12].

Illiteracy was also found significantly associated with POP (AOR=15.11; 95% CI: 2.61- 87.4). So 76.1% of women among cases were illiterate as compared to controls and 47.8% of controls were secondary school and above, so illiterate women were 15.11 times highly exposed to POP compared with educated women .Hence, illiteracy is not directly causes POP but possible explanation of this could be educated women could control their fertility. Most of time the educated women live in urban area and they can easily get health service and have office worker and have low work load compared to house wives and merchants.

In this study, women live in rural area were 5.7 times more likely to have POP than their counter part(AOR=5.7; 95 % CI =1.92-16.89), so the possible explanation could be rural women were house wives and also farmer's wife, so they assisting their husbands in farm land, marketing and water fetching which are assigned to rural women. This finding is consistent with other studies [3, 4].

In this study early marriage and early child birth were a risk factor for development of pelvic organ prolapse. It could be directly or indirectly related to high fertility and that related with the ligaments and other supportive structures of pelvic floor was not matured and strong enough to prevent prolapse [2]. This finding is comparable with the study of Nepal [13].

Women who have not controlling their fertility by different family planning methods were highly exposed for POP as compared with women using family planning methods (AOR =2.14; 95% CI:1.06-4.29). The

find is consistent with other studies [4]. It might be due to those women who did not use family planning can give more births and as the result of it more pelvic ligaments will lose and can cause pop [2].

This study revealed that the women whose pregnancy was more than three times and home delivery was the risk factor for POP. The find is similar with others studies [4, 6]. Possible explanation could be no skilled person to instruct when to start pushing and they have no idea about prolonged labor. So most women don't know when to start pushing and they push with each contraction and that make the supportive ligaments weak and the labor would be obstruct.

Family history of prolapse was statistically significant in this study and it is also became consistence with the result of previous studies [2, 5, 14, 15, 16].

The higher frequency of medical problems, like chronic constipation and chronic cough were detected higher among cases as compared to controls. This finding was consistent with other studies [2, 5, 4, 17]. Hence, women with constipation and chronic cough were high risk to develop prolapse compared with women without constipation and chronic cough. Obesity (BMI>25) were assessed in this study but the result showed no association with POP.

Heavy lifting to be potential cause of prolapse in this study as it was conducted in previous Danish study [2, 3, 5]. Working on the farm, carrying water and preparing 'kocho' were strongly associated with pelvic organ prolapse. 'Kocho' is the local common staple food in Southern part of Ethiopia and its preparation is very tiresome as well as it is characterized as hard work. It required to you to stand long time and to lift heavy load of materials. It may exhausts the pelvic floor muscles and pulls further to downward; as result the women can easily develop prolapse.

6. Conclusion

Early marriage and early child birth is one of the risk factor for POP. Moreover, multi-parity, home delivery and prolonged labor are also other risk factor for POP. Some medical problems like chronic constipation and chronic cough can expose the women to develop POP. With the regard to occupational history, heavy weight lifting is the potential cause of prolapse. Therefore, Wolaita zone women and children affair should take responsibility to prevent early marriage. Moreover, Wolaita zone health office could train HEWs to encourage women to use family planning and institutional delivery.

7. Competing Interest

The authors declare that they have no competing interests. Furthermore, the authors declare that they have no financial and non –financial competing interest.

8. Author's contribution

ZL: Conceived the study, ZL YB MM: Participated in the design of the study and performed the statistical analysis, ZL YB MM: Interpreted the data: ZL : Obtained ethical clearance and permission for the study: ZL: Supervised data collectors: MM: Drafting the article or revisiting it critically for important intellectual content: MM: Helped to draft the manuscript . All authors read and approved the final manuscript.

9. Authors' information

ZL is Masters of Public Health (MPH) and working in the Sodo Christian General Hospital, Wolaita Sodo, Southern Ethiopia. **YB** is a professor **(MD, MPH, PhD)** at Addis continental school of public health, Addis Ababa, Ethiopia. **MM** is Masters of Public Health (MPH) in Reproductive and family health, lecturer in the school of public health, college of health science and medicine ,Wolaita Sodo university, Ethiopia.

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Table1: Socio-demographic characteristics of study participants (gynecology cases) of Wolaita Sodo university referral teaching hospital, June 2013- August 2013

Characteristics of participants	**Controls (Number & %)**	**Cases (Number & %)**	**Total (number & %)**
Age			
<35	98 (61.6%)	15 (9.4%)	113 (35.5%)
35-45	45 (28.3%)	51 (32.1%)	96 (30.2%)
46-55	12 (7.5%)	51 (32.1%)	63 (19.8%)
>55	4 (2.5%)	42 (26.4%)	46 (14.5%)
Occupation			
Housewife	83 (52.2%)	123 (77.4%)	206 (64.8%)
Merchant	15 (9.4%)	26 (16.4%)	41 (12.9%)
Student	39 (24.5%)	3 (1.9%)	42 (13.2%)
Daily laborer	16 (10.1%)	0 (.0%)	16 (5.0%)
Government employee & others	5 (3.1%)	7 (4.4%)	12 (3.8%)
Education of Women			
No education	41 (25.8%)	121 (76.1%)	162 (50.9%)
Can read and write	17 (10.7%)	24 (15.1%)	41 (12.9%)
Primary education	25 (15.7%)	10 (6.3%)	35 (11.0%)
Secondary& more than secondary	76 (47.8%)	4 (2.5%)	80 (25.2%)
Religion			
Orthodox	41 (25.8%)	48 (30.2%)	89 (28.0%)
Protestant	108 (67.9%)	96 (60.4%)	204 (64.2%)
Muslim & catholic	10 (6.2%)	15 (9.4%)	25 (7.9%)
Ethnicity			
Wolaita	132 (83.0%)	150 (94.3%)	282 (88.7%)
Amahara	15 (9.4%)	5 (3.1%)	20 (6.3%)
Others(Sidama, Kambata, Dawro, Gofa, Gurage)	12 (7.5%)	4 (2.6%)	16 (5.1%)
Marital status			
Married & live together	144 (90.6%)	92 (57.9%)	236 (74.2%)
Single(divorced, widowed, separated, unmarried)	15 (9.4%)	67 (42.1%)	82 (25.8%)

Table 2 obstetric and gynecologic history of cases and controls in Wolaita , June 2013

Characteristics of study participants	Controls (number & %)	Cases (number & %)	Total (number & %)
Age at first marriage			
<15 years	10 (6.3%)	58 (36.5%)	68 (21.4%)
15-18 years	42 (26.4%)	49 (30.8%)	91 (28.6%)
>18 years	107 (67.3%)	52 (32.7%)	159 (50.0%)
Age at first child birth			
<15 years	3 (1.9%)	9 (5.7%)	12 (3.8%)
15-18 years	23 (14.6%)	57 (35.8%)	80 (25.3%)
>18 years	131 (83.4%)	93 (58.5%)	224 (70.9%)
Gravid			
<3 pregnancy	116 (73.0%)	59 (37.1%)	175 (55.0%)
>3 pregnancy	43 (27.0%)	100 (62.9%)	143 (45.0%)
Place of delivery(the last child)			
Institutional delivery	81 (50.9%)	9 (5.7%)	90(28.3%)
Home Delivery	78 (49.1%)	150 (94.3)	228 (71.7%)
Mode of delivery			
Vaginal birth	140 (88.1%)	159 (100.0%)	299 (94.0%)
C/S	12 (7.5%)	0 (.0%)	12 (3.8%)
Duration of labor (last birth)			
<4 hr. (precipitated labor)	21 (13.2%)	23 (14.5%)	44 (13.8%)
4-12hrs	96 (60.4%)	82 (51.6%)	178 (56.0%)
13-24hrs	33 (20.8%)	33 (20.8%)	66 (20.8%)
>24hr(prolonged labor)	9 (5.7%)	21 (13.2%)	30 (9.4%)
Duration of second stage(last birth			
<30min	75 (47.2%)	61 (38.4%)	136 (42.8%)
30-120min	74 (46.5%)	90 (56.6%)	164 (51.6%)
>120min(prolonged second stage)	10 (6.3%)	8 (5.0%)	18 (5.7%)
ANC utilization			
No	55 (34.6%)	123 (77.4%)	178 (56.0%)
Yes	104 (65.4%)	36 (22.6%)	140 (44.0%)
FP utilization			
No	76 (47.8%)	131 (82.4%)	207 (65.1%)
Yes	83 (52.2%)	28 (17.6%)	111 (34.9%)
Birth spacing			
<2Years	99(62.2%)	67 (42.1%)	166 (52.2%)
>2 Years	60 (37.7%)	92 (57.9%)	152 (47.8%)
Information about POP			
Yes	56 (35.2%)	76 (47.8%)	132 (41.5%)
No	103 (64.8%)	83 (52.2%)	186 (58.5%)
Family history of POP			
No	139 (87.4%)	112 (70.4%)	251 (78.9%)
Yes	20 (12.6%)	47 (29.6%)	67 (21.1%)

Table3, Predictors of socio-demographic characteristics for cases and Controls of study participants in Wolaita Sodo, university referral teaching hospital

Characteristics of study participants	Controls	Cases	Crude OR(95% CI)	Adjusted OR&95%CI
Women age				
<35yrs	98	15	1	
35-45yrs	45	51	7.40 (3.76, 14.54)	6.22 (2.71, 14.28) ***
46-55yrs	12	51	27.76 (12.09, 63.74)	15.70 (5.62, 43.84) ***
>55yrs	4	42	68.60 (21.49, 218.97)	43.13 (10.99,169.2) ***
Women's education				
No education	41	121	56.07 (19.31, 162.822)	15.11 (2.61, 87.40) **
Can read and write	17	24	26.82 (8.22, 87.46)	10.59 (1.69, 66.13) *
Primary school	25	10	7.60 (2.19, 26.38)	4.94 (0.79, 30.84)
Secondary and more than Secondary	76	4	1	
Husband's education				
No education	23	95	25.33 (12.44,51.57)	1.68 (0.48, 5.92)
Can read and write	27	26	5.90 (2.74, 12.71)	0.77 (0.22, 2.74)
Primary school	17	23	8.29 (3.61, 19.05)	2.10 (0.19, 7.29)
Secondary and more than secondary school	92	15	1	1
Women's occupation				
House wives	84	123	4.39 (1.78, 10.79)	0.6 (0.14, 2.8)
Merchants	15	26	5.20 (1.79, 15.09)	2.2 (0.4, 11.9)
Students	39	3	.23 (.054,.987)	2.14 (0.19, 21.5)
Gov't employee	21	7	1	
Husband's occupation				
Farmer	50	121	3.53(1.62, 7.70)	1.90 (0.52, 6.93)
Merchant	39	16	.60(.24, 1.49)	1.04 (0.23, 4.55)
Gov't employee	51	9	.25(.09, .07)	2.10 (0.32, 13.64)
Others	19	13	1	1
Residence				
Urban	95	23	1	
Rural	64	136	8.77 (5.09, 15.11)	5.7 (1.92, 16.89) **
Availability of radio/TV				
No	42	114	7.05(4.3, 11.55)	2.87 (1.38, 5.96) **
Yes	117	45	1	
Distance from the nearest health facility				
<5km	104	73	1	1
>5km	55	86	2.22(1.4, 3.5)	0.3 (0.11, 0.80)
House hold income(monthly)				
<1000ETB	55	119	11.2(5.45, 23.03)	0.55 (0.15, 2.07)
1000-2000ETB	47	29	3.19(1.4, 7.07)	0.47 (0.13, 1.74)
>2000ETB	57	11	1	

Table 4: Crude and Adjusted odds ratio of obstetric & gynecologic history for cases &control of study participants in wolaita sodo university referral teaching hospital

Characteristics of participants	Controls	Cases	Crude OR(95% CI)	Adjusted OR&95%CI
Age at first marriage				
<15yrs	10	58	11.93(5.64, 25.22)	11.6 (4.29, 31.33)***
15-18yrs	42	49	2.40(1.41, 4.07)	1.37 (0.7, 2.64)
>18yrs	107	52	1	
Gravid				
<3 pregnancy	116	59	1	
>3 pregnancy	43	100	4.57(2.84, 7.35)	3.05 (1.67, 5.6)***
Para				
<3 children	128	107	1	1
>3children	31	52	2(1.2, 3.35)	0.52 (0.20, 1.30)
Place of delivery				
Institution	83	10	*1*	1
Home	76	149	17.9 (8.76, 36.9)	8.5 (3.8, 19.3)***
Large baby during delivery (last child)				
No	86	54	1	
Yes	73	105	2.29 (1.45, 3.6)	1.55(0.85, 2.83)
Duration of labor				
<4hrs	21	23	1	1
4-12hrs	96	82	0.78 (0.4, 1.5)	0.72 (0.29, 1.79)
13- 24hrs	33	33	0.91 (0.42, 1.9)	1.59 (0.62, 6.15)
>24hrs	9	21	2.13 (0.8, 5.67)	1.34 (0.34, 4.94)
Duration of 2nd stage				
<30 min	75	61	1	1
30-120 min	7410	90	1.49 (0.94, 2.36)	1.42 (0.70, 2.88)
>120 min		8	0.98 (0.36, 2.64)	0.81 (0.14, 4.65)
F/P use				
No	76	131	5.1(3.05, 8.53)	2.14 (1.06, 4.29)*
Yes	83	28	*1*	*1*
Family history of POP				
No	139	112	*1*	*1*
Yes	20	47	2.91(1.63, 5.2)	3.02 (1.42, 6.4)**

Table 5: Crude and Adjusted odds ratio of medical history of cases and controls in wolaita sodo university referral hospital;-

Characteristics study participants	controls	Cases	Crude OR &CI	Adjusted OR &95% CI
Medical problem				
No	123	106	1	1
Yes	36	53	1.7(1.04, 2.80)	0.67 (0.62, 1.42)
Chronic cough				
No	158	138	1	
Yes	1	21	24.04(3.19, 181.0)	28.16 (3.57, 222.2) **
Chronic constipation				
No	155	140	1	1
Yes	4	18	4.98(1.64, 15.07)	4.98 (1.48, 16.75) **
Carrying of water twice a day				
No	129	74	1	1
Yes	30	85	4.93(2.98, 8.13)	3.21 (1.76, 5.85) ***
Working on the farm (daily)				
No	152	127	1	1
Yes	7	32	5.47(2.33, 12.81)	3.26 (1.25, 8.47) *
Preparing kocho (twice a week)				
No	130	69	1	1
Yes	29	90	5.84(3.51, 9.74)	2.93 (1.58, 5.43) **
Information on POP				
No	56	76	1.68(1.07, 2.64)	1,76 (0.93, 3.33)
Yes	103	83	1	1

{P<0.05 =*} {P<0.01 =**} {P<0.001 =***}