Determinants of Pelvic Organ Prolapse among Patients Attending At Hospitals in Southern Ethiopia: A Case Control Study

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ABSTRACT

Background: Pelvic organ prolapse is an anatomic support defect of the pelvic viscera, and may result from a series of long term failure of the supporting and suspension mechanisms of the uterus and the vaginal wall.

Objective: The aim of this study intended to assess determinant factors of pelvic organ prolapse among patients attending at hospitals in Southern Ethiopia.

Methods: This facility-based unmatched case-control study included 416 (104 cases and 312 controls with a case to control ratio of 1:3) participants selected by using simple random sampling technique. Data was collected using interviewer administered questionnaire and the collected data was entered in to Epi data version 3.1 which was then exported to SPSS version 20.0 for analysis. The association between variables was analyzed with bivariate and multi variable logistic regression. A statistical significance was declared at p value < 0.05, with 95% confidence interval.

Results: A total number of 401 (104 cases and 297 controls) study participants participated in the present study yielding a response rate of 96.4% (95.2% for controls and 100 % for cases).

After adjusting for the possible confounders, Age > 55 years [AOR=13.85, 95% CI (1.27- 26.26)], educational status, no formal education [AOR=1.75, 95% CI (1.58-4.90)], number of delivery > 4 [AOR=5.76, 95% CI (3.88 -9.47)], place of delivery [AOR=1.94, 95% CI (1.03-4.86)], vaginal tear [AOR=2.07, 95% CI (1.33-7.74)], family planning ever use [AOR=0.41, 95% CI (0.27- 0.93)], type of usual work [AOR=2.66, 95% CI (1.42- 8.43)] and history of chronic cough [AOR=11.99, 95% CI (1.21- 21.81)] were found to be significant predictors for pelvic organ prolapse among patients attending at hospitals of Southern Ethiopia.

Conclusion: Age, educational status of the respondent, number of delivery, place of delivery, vaginal tear, and type of usual work, family planning ever use and history of chronic cough were found to be significant predicators for pelvic organ prolapse.

The regional and zonal health bureau could train health extension workers to encourage women to use family planning and institutional deliveries.

Keywords: Pelvic organ prolapse, Determinants, Southern Ethiopia

INTRODUCTION

Gynecological problems are among the emerging health problems affecting maternal health outcomes and women's productivity [1]. Pelvic organ prolapse (POP), a condition referring to the bulging or herniation of one or more pelvic organs (uterine, vagina, bowel or bladder) from their normal position into or out of the vagina presenting a variety of urinary, bowel and sexual symptoms, is among the pelvic floor disorders commonly affecting multiparous and malnourished women [1,2].

Pelvic organ prolapse have a negative impact on women's physical, social and also sexual function [3]. Communities are not aware on this issue and women's also keep their prolapse as a secret rather than seeking help, because they are facing social stigma, discrimination and other problems [4-5].

Increasing parity, increasing age, prolonged labor, lifting of heavy objects, obesity, home delivery and chronic cough are some of the risk factors for pelvic organ prolapse [6, 7]. Since women in low income countries are repeatedly prone to many vaginal deliveries, early child birth and involvement in occupation with heavy lifting the problem is worsen [7].

Very few studies concerned with determining the risk factors for have been documented, but even some of those studies lack appropriate design and are small scale study. As a result of this it is not an easy task for policy makers to develop prevention strategies for the problem.

And also studies conducted in Ethiopia for assessing the determinants of pelvic organ prolapse only focused on multiparous women which did not give any emphasis for nulliparous women [8]. But the problem is also seen among nulliparous women [9]. In the current study, an attempt has been made to identify the determinant factors of pelvic organ prolapse at regional level with a larger sample size and including both multiparous and nulliparous women. Therefore, the main aim of this study was to identify the determinants factors of POP among patients attending at hospitals in Southern Ethiopia.

The objective of this study was to assess the determinant factors of pelvic organ prolapse among patients attending at hospitals in Southern Ethiopia.

METHODS

Study Area and Period

The study was conducted in hospitals of SNNPR from June to September 2020.

Study Design

Institutional based unmatched case-control study design was carried out on determinants of pelvic organ prolapse among patient at hospitals in Southern Ethiopia.

Source Population

The Source populations for cases were all women's with confirmed cases of POP attending at hospitals in Southern Ethiopia.

The source populations for controls were all women's with medical cases who are confirmed to be free of POP attending at hospitals in Southern Ethiopia.

Study Population

The study population for cases all women's with confirmed cases of POP attending at hospitals in Southern Ethiopia.

The study populations for controls were all women's with medical cases who are confirmed to be free of POP attending at hospitals in Southern Ethiopia.

Inclusion Criteria

Women's with confirmed cases of pelvic organ prolapse who visited hospitals were included as a case and women with medical problem who are confirmed to be free from POP and visited hospitals for medical case were included as control.

Exclusion Criteria

Patients who were severely ill during the study period were excluded.

Sample size and sampling technique

Sample size was calculated using Open-Epi statistical software version 3.2 for unmatched case control study. Vaginal tear, delivery assistance, heavy object lifting, gravidity, family history of POP, family planning utilization and BMI [10,11] were considered to calculate the required sample size. In order to have the required number of cases with in the study period, a case to control ratio of 1:3 was used. The percent of controls exposed for BMI was 6.2 %, 95% CI, power 80, and OR=3.1 was taken which provide the maximum sample size [11]. The calculated sample size was 379. After adding 10% non- response rate it became 416.

Dependent Variables:

✓ Pelvic organ prolapse

Independent Variables

Socio demographic factors

✓ Age, place of residence , marital status, occupational status, educational status, household Income

Obstetric factors

✓ Age at marriage, number of delivery, place of delivery, return to work after delivery, duration of labor, age at first delivery, vaginal tear, abortion, ANC follow up, FP utilization

Medical and substance related factors

✓ History of carrying heavy object, chronic cough, chronic constipation, chronic diarrhea, smoking habit, family history of POP, previous history of trauma in or around the pelvis

Data Collection Tool and Procedure

Data were collected using interviewer administered questionnaires. Two data collectors (Midwife nurses working in MCH) with the criteria of being interested, known to be honest and willing to face the difficulty that may arise during the process of interview, have experience in data collection were hired to collect data, and one supervisor (senior midwife working in MCH) who was familiar with the population and social administration setting of the clinics was hired with the responsibility of Coordinating the activities of the interviewers, timely supply of the necessary materials for interviewers and Check the questionnaire each day was assigned for each selected hospitals. However, the responsibility of facilitating the whole processes was carried out by the principal investigator. For all selected seven hospitals a total of 14 data collectors and 7 supervisors were trained on how to collect data on each item included in the questionnaire.

The questionnaire was modified and contextualized to fit the local situation and the research objective. The questionnaire was first prepared in English after reviewing different kind of literature and manuals related to pelvic organ prolapse and then translated to amharic. The translated Amharic versions were then back-translated into English in order to check a possible gap in the contents of the original and the second translated versions that helped necessarily adjustments to be made. The questionnaire was administered to participants by interviewers.

Data was collected consecutively until the required sample size was achieved, then the collected data was reviewed on daily basis for completeness. Any questionnaires' which was found to be incomplete was discarded and other eligible patients were asked.

Data Analysis

The completeness of the questionnaire was checked before data entry and the data were coded, entered and stored in to computer using Epi Data version 3.1 and analyzed using SPSS software version 20. Descriptive statistics were carried out using text, table and figure. The association of independent variables with pelvic organ prolapse was investigated using logistic regression analysis. The variables that showed an association with the outcome variable at the bivariate analysis with p value <0.25 was entered into the final multivariable logistic regression to control for potential confounders. Adjusted odds ratio (AOR) along with 95 % confidence interval was estimated to assess the strength of association and a P value <0.05 was considered to declare the statistical significance in the multivariable analysis. Assumptions like model fitness, normality and multi-collinearity were checked to be satisfied.

Ethical Consideration

Ethical approval was obtained from the Institutional Review Board of Dilla University. Formal letter of permission was obtained from SNNPR administrative office. After all permission requests were granted, a permission letter, that explains the purpose of the study and rights of participants, was explained for each participant. Participants were also assured that they could withdraw from the study at any time during the study period.

Informed consent was secured from each participant during the study period. Participants gave their written informed consent after having adequate information about the study. The issues of confidentiality and privacy were also maintained. Study Participants was also informed about on the risk factors and prevention of pelvic organ prolapse.

Table 1: Socio-demographic characteristics for determinants of pelvic organ prolapse among patients attending at hospitals in southern Ethiopia, 2019 (n=401).

VARIABLES	CASES (N=104) FREQUENCY (%)	CONTROLS (N=297) FREQUENCY (%)
Age of respondents	10 (9.7)	179 (60.3)
< 35 years	26 (25.0)	62 (20.9)
35-45 years	38 (36.5)	44 (14.8)
46-55 years	30 (28.8)	12 (4.0)
> 55 years		
Religion	28 (26.9)	105 (35.4)
Orthodox	49 (47.1)	119 (40.1)
Protestant	21 (20.2)	52 (17.5)
Muslim	6 (5.8)	21 (7.1)
Catholic		
Ethnicity	9 (8.6)	30 (10.1)
Gedeo	29 (27.9)	60 (20.2)
Sidama	12 (11.5)	47 (15.8)
Gamo	17 (16.3)	46 (15.5)
Wolaita	19 (18.2)	49 (16.5)
Gurage	9 (8.6)	22 (7.4)
Hadiya	8 (7.7)	22 (7.4)
Silte	1 (1.0)	21 (7.1)
Other [a]		
Residence	48 (46.2)	229 (77.1)
Urban	56 (53.8)	68 (22.9)
Rural		
Educational status of the respondent		
No formal education	50 (48.1)	55 (18.5)
Primary education	24 (23.1)	57 (19.2)
Secondary educ and above	30 (28.8)	185 (62.3)
Occupational status of the respondent		
Housewife		
Merchant	56 (53.8)	111 (37.4)
Daily laborer	11 (10.6)	22 (7.4)
Student	12 (11.5)	1 (0.3)
Gov. employee and others	1 (0.4)	61 (20.5)
Marital status	24 (23.6)	102 (34.3)
Single		
Married	14 (13.5)	99 (33.3)
Divorced and widowed	79 (76.0)	180 (60.6)
Husbands educational status	11 (10.5)	18 (6.1)
No formal education		
Primary education		
Secondary educ and above	30 (38.0)	46 (25.6)
	9 (11.4)	19 (10.6)
	40 (50.6)	115 (63.9)

RESULTS

Socio-demographic Characteristics

A total number of 401 (104 cases and 297 controls) study participants participated in the present study yielding a response rate of 96.4% (100 % for cases and 95.2% for controls). The mean age of the participants was 38 years (SD = 13) with (44 ± 14 years for cases and 35 ± 12 years for controls). Nearly half, of the cases 49 (47.1%) and controls 119 (40.1%) were followers of the Protestant faith, followed by Orthodox Christian 28 (26.9%) and 105 (35.4%) for cases and controls respectively (Table 1).

Obstetric and gynecologic characteristics

The mean age for experience of pregnancy was 24 years (SD = 5.23) with 22 years (SD= 3.11) for cases and 27 years (SD= 4.87)

for controls. Thirty nine (39.4%) of the cases had more than four deliveries, whereas only eleven (6.0%) of controls had greater than four deliveries. Majority of the cases 95 (96.0%) and controls 161 (86.5%) delivered their last child vaginally. Sixty seven (67.7%) of women who had pelvic organ prolapse return to work after delivery for the last birth within 60 days; while only 29 (15.6%) women in the control group return to work after delivery for the last birth within 60 days. Seventy two (72.7%) of cases had vaginal tear during the last delivery; while only 13 (7.0%) from the control group had vaginal tear during the last delivery (Table 2).

Medical and other related characteristics

Forty one (39.4%) of women who had pelvic organ prolapse had history of working on the farm daily; while only 20 (6.7%) of the controls had history of working on the farm daily. Majority of the

Table 2: Obstetrics and gynecologic characteristics for determinants of pelvic organ prolapse among patients attending at hospitals in Southern Ethiopia, 2019 (n=401).

VARIABLES	CASES (N=104) FREQUENCY (%)	CONTROLS (N=297) FREQUENCY (%)
	99 (95.2)	186 (62.6)
	5 (4.8)	111 (37.4)
Experience of pregnancy		
Yes	5 (5.0)	4 (2.2)
No	94 (95.0)	182 (97.8)
Age at first pregnancy		
< 18 years	24 (24.2)	96 (51.6)
>= 18 years	36 (36.4)	79 (42.4)
Number of delivery	39 (39.4)	11 (6.0)
<= 2		
3 – 4		
> 4	95 (96.0)	161 (86.5)
Mode of delivery for the last birth	4 (4.0)	25 (13.5)
Vaginal		
C/S		
Experience of abortion	45 (45.5)	48 (25.8)
Yes	54 (54.5)	138 (74.2)
No		
Delivery characteristics of the last birth	98 (99.0)	178 (95.7)
Single	1 (1.0)	8 (4.3)
Twin or more		
Return to work after delivery for the last birth		
< 60 days	67 (67.7)	29 (15.6)
>= 60 days	32 (32.3)	157 (84.4)
Duration of labor for the last birth		
< 4 hours		
4 – 12 hours	21 (21.2)	142 (76.3)
>12 hours	58 (58.6)	35 (18.8)
labor of the last birth	20 (20.2)	9 (4.8)
spontaneous		
Induced	97 (98.0)	161 (86.5)
Vaginal tear during for last delivery	2 (2.0)	25 (13.5)
Yes		
No		
ANC follow up for the last birth	72 (72.7)	13 (7.0)
Yes	27 (27.3)	173 (93.0)
No		
Family planning ever use		
Yes	53 (53.5)	151 (81.2)
No	46 (46.5)	35 (18.8)
	45 (43.3)	226 (76.1)
	59 (56.7)	71 (23.9)

Table 3: Medical and substance use related characteristics for determinants of pelvic organ prolapse among patients attending at hospitals in Southern Ethiopia, 2019 GC (n=401).

VARIABLES	CASES (N=104) FREQUENCY (%)	CONTROLS (N=297) FREQUENCY (%)
	18 (17.3)	71 (23.9)
History of carrying water twice a week	86 (82.7)	226 (76.1)
Yes		
No		
History of preparing *kocho* twice a week	35 (33.7)	20 (6.7)
Yes	69 (66.3)	277 (93.3)
No		
History of working on the farm daily		
Yes	41 (39.4)	20 (6.7)
No	63 (60.6)	277 (93.3)
History of smoking cigarette		
Yes		
No	5 (4.8)	84 (28.3)
History of any medical problem	99 (95.2)	213 (71.7)
Yes		
No		
History of chronic cough	33 (31.7)	173 (58.2)
Yes	71 (68.3)	124 (41.8)
No		
History of chronic constipation	68 (65.4)	19 (6.4)
Yes	36 (34.6)	278 (93.6)
No		
History of chronic diarrhea		
Yes	84 (80.8)	12 (4.0)
No	20 (19.2)	285 (96.0)
Family history of POP		
Yes	9 (8.7)	19 (6.4)
No	95 (91.3)	278 (93.6)
History of trauma in or around the pelvis		
Yes	34 (32.7)	26 (8.8)
No	70 (67.3)	271 (91.2)
	62 (59.6)	5 (1.7)
	42 (40.4)	292 (98.3)

cases 69 (66.3%) and controls 277 (93.3%) did not have history of preparing *Kocho* twice a week (Table 3).

Associated factors

After adjustment for possible confounders on multivariate analysis age, educational status of the respondent, number of delivery, place of delivery, return to work after delivery, vaginal tear, type of usual work, FP utilization and history of chronic cough have significant association with the outcome variable in multivariate analysis at 95% CI (p < 0.05).

Women's whose ages are greater than 55 years were 13.85 times more likely to have pelvic organ prolapse than those women whose age is less than 35 years. Uneducated women's were 1.75 times more likely to have pelvic organ prolapse than educated women.

Women's who had greater than four delivery were 5.76 times more likely to have pelvic organ prolapse than those women who had less than or equal to 2 children. Women's who delivered at home had 1.94 times increased risk of acquiring pelvic organ prolapse than those women's who delivered their child at health institution. Women's who have used family planning service had 59% reduced odds of acquiring pelvic organ prolapse than their counterparts. Women's who had vaginal tear during delivery had 2.07 times increased risk of having pelvic organ prolapse than those women who did not have vaginal tear. Women's who had heavy type of usual work were 2.66 times more likely to have pelvic organ prolapse than their counterparts. Women's who had history of chronic cough had 11.99 times increased risk of developing pelvic organ prolapse than those who did not had chronic cough (Table 4).

Table 4 - Bivariate and multivariate analysis on determinants of pelvic organ prolapse among patients attending at hospitals in Southern Ethiopia, 2019 GC (n=401).

VARIABLES	CASE (N=104) FREQUENCY (%)	CONTROL (N=297) FREQUENCY (%)	COR (95% CI)	AOR (95% CI)
Age				
> 55 years	30 (28.8)	12 (4.0)	44.75 (23.49–71.01)	13.85 (1.27-26.26)*
46-55 years	38 (36.5)	44 (14.8)	15.45 (0.13-31.33)	17.81 (0.53-41.79)
35-45 years	26 (25)	62 (20.9)	7.50 (0.39-10.88)	3.29 (0.17-5.44)
< 35 year	10 (9.7)	179 (60.3)	1	1
Residence				
Rural	56 (53.8)	68 (22.9)	3.92 (1.73–9.27)	1.44 (0.11-10.71)
Urban	48 (46.2)	229 (77.1)	1	1
Educ status of respondent				
No formal edu	50 (48.1)	55 (18.5)	5.60 (1.02–6.81)	1.75 (1.58-4.90)*
Primary edu	24 (23.1)	57 (19.2)	2.59 (0.83–7.48)	0.65 (0.29-2.36)
Secondary edu and above	30 (28.8)	185 (62.3)	1	1
Occup status of respondents				
House wife				
Merchants	56 (53.8)	111 (37.4)	2.14 (1.65–4.01)	1.61 (0.17-25.81)
Daily laborers	11 (10.6)	22 (7.4)	2.12 (0.91–8.15)	0.88 (0.01-8.13)
Students	12 (11.5)	1 (0.3)	51.0 (0.60–119.08)	2.99 (0.44-5.55)
Gov. employee	1 (0.4)	61 (20.5)	0.07 (0.17–0.64)	14.43 (0.17-33.07)
	24(23.6)	102 (34.3)	1	1
No of delivery				
> 4	39 (39.4)	11 (6.0)	14.18 (5.66-44.75)	5.76 (3.88-9.47)***
3 – 4	36 (36.4)	79 (42.4)	1.82 (1.57-5.92)	9.11 (0.32-44.85)
< = 2	24 (24.2)	96 (51.6)	1	1
Delivery place				
Home	76 (76.8)	47 (25.2)	9.77 (3.87-20.29)	1.94 (1.03-4.86)*
Health institute	23 (23.2)	139 (74.8)	1	1
Return to work after delivery				
< 60 days				
>= 60 days	67 (67.7)	29 (15.6)	11.33 (4.06-35.88)	3.33 (0.71-6.09)
	32(32.3)	157 (84.4)	1	1
Vaginal tear				
Yes	72 (72.7)	13 (7.0)	35.48 (18.67-63.80)	2.07 (1.33-7.74)**
No	27 (27.3)	173 (93.0)	1	1
FP use				
Yes	45 (43.3)	226 (76.1)	0.24 (0.19-0.87)	0.41 (0.27-0.93)*
No	59 (56.7)	71 (23.9)	1	1
ANC follow up				
Yes	53 (53.5)	151 (81.2)	0.26 (0.11-0.75)	1.31 (0.84-2.33)
No	46 (46.5)	35 (18.8)	1	1
Type of usual work				
Heavy work	59 (56.7)	33 (11.1)	10.48 (7.82-29.58)	2.66 (1.42-8.43)**
Light work	45 (43.3)	264 (88.9)	1	1
History of chronic cough				
Yes	68 (65.4)	19 (6.4)	27.63 (16.66-43.99)	11.99 (1.21-21.81)*
No	36 (34.6)	278 (93.6)	1	1
Hx of chronic constipation				
Yes				
No	84 (80.8)	12 (4.0)	99.75(77.92-132.71)	52.06 (0.44-73.04)
	20 (19.2)	285 (96.0)	1	1
trauma in or around pelvis				
Yes				
No	62 (59.6)	5 (1.7)	86.20 (62.81-97.17)	61.73 (0.25-91.37)
	42 (40.4)	292 (98.3)	1	1

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

DISCUSSION

In this study women aged greater than 55 years were 13.85 times more likely to have POP than women aged < 35 years. A study conducted on determinants of pelvic organ prolapse among gynecologic patients in Wolaita Sodo university referral hospital, Southern Ethiopia revealed that women aged greater than 55 years were 43.13 times more likely to have POP than women aged less than 35 years [12]. The possible explanation for this might be due to; increasing in age may lead to loss in strength to pelvic muscles

and ligaments, as a result the risk of vaginal prolapse increases with age [3].

Educational status also showed statistically significant association with pelvic organ prolapse, women's with no formal education were 1.75 times more likely to have POP than their counterparts. This finding is comparable with a study conducted at Gondar Dabat district, Ethiopia, which revealed that women with lower educational status were more likely to have pelvic organ prolapse than those women who had higher educational status [13]. This could be due to educated women could control their fertility, most of the time educated women live in urban area and they can easily get health service. And also educated women tend to be more open in discussing in their health issue than uneducated women.

This study revealed that women's who had more than 4 numbers of delivery were at risk of developing POP than those women who had less than or equal to two deliveries. Similarly a study conducted at Felegehiwot Referral Hospital and Gamby Teaching Hospital, Bahirdar Ethiopia revealed that women who had greater than or equal to four delivery were 4.5 times more likely to have pelvic organ prolapse than those women who experienced less than four deliveries [11]. This may be explained as repeated delivery triggers weakness to pelvic muscle and ligaments supporting the pelvic floor this in turn predispose to pelvic organ prolapse.

This study also revealed that home delivery was another risk factor for POP. The is also consistent with a study conducted in Wolaita, Ethiopia, which revealed that women who delivered at home were 8.5 times more likely to develop POP than their counterpart [12]. Explanation could be no skilled birth attendants are available at home, which leads to prolonged labor, which in turn lead to pelvic organ prolapse.

Family planning ever use was also found to be an important determinant factor for pelvic organ prolapse. Women who utilized family planning method had 59% reduced odds of acquiring pelvic organ prolapse than their counterpart. This finding is consistent with a study done at rural Gambia, which revealed that women's with family planning utilization had 32 % reduced odds of having POP than those women who did not ever utilize family planning [14], a study done on pedestrian back loading women in Bench Maji zone, Ethiopia, which showed women who did not had history of family planning utilization were 1.78 times more likely to have POP than women who have family planning utilization [15].

CONCLUSION

From this study the significant risk factors associated with developing pelvic organ prolapse among women attending at pelvic organ prolapse surgical intervention providing hospitals in Southern Ethiopia were age of women, educational status of the respondent, number of delivery, place of delivery, vaginal tear during delivery, type of usual work, Family planning ever use and history of chronic cough.

DATA AVAILABILITY

All data underlying the findings are fully available without restriction. All relevant data are within the manuscript.

Conflict of Interest

Submitting authors are responsible for coauthors declaring their interests.

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