DETERMINANTS OF PELVIC ORGAN PROLAPSE AMONG WOMEN VISITING ARBA MINCH, SAWLA, AND JINKA GENERAL HOSPITALS, SOUTHERN ETHIOPIA

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ABSTRACT

BACKGROUND: Pelvic organ prolapse is one of the most common gynecological health problems; it can severely limit a woman's psychological, social, physical, and sexual function. The factors causing pelvic organ prolapse have been poorly understood. Therefore this study aimed to investigate the determinants of pelvic organ prolapse among women visiting Arba Minch, Sawla, and Jinka General Hospitals, Southern Ethiopia.

METHOD: Institution-based case-control study was conducted from July 10 to August 31, 2020, in Arba Minch, Sawla, and Jinka General Hospitals. A total of 348 participants were included in the study. Cases and controls were identified by a health professional using the pelvic organ prolapse symptom score (POP-SS). Data was collected by using a pre-tested interviewer-administered questionnaire. Bivariate logistic regression was done to identify variables candidates for Multivariable logistic regression at p-value <0.25. Multivariable logistic regression analysis was done and p-value <0.05 and 95%CI of AOR were used to declare the level of significance.

RESULT: Age of the mother at first delivery (AOR=4, 95% CI: 1.48-11.53), carrying heavy object (AOR=2.8, 95% CI: 1.9-7.62), place of previous delivery (AOR=3.6, 95% CI: 1.37-9.47), mode of previous delivery (AOR=3, 95% CI: 1.73-8.44), family history of pelvic organ prolapse. (AOR=4, 95% CI: 1.63-11.2), body mass index (AOR=4, 95% CI: 1.82-12.9) and household food insecurity (AOR=3, 95% CI: 1.51-7.75) were identified as the determinants of pelvic organ prolapse.

CONCLUSION: In this study age of the mother at first delivery, carrying a heavy object, place of previous delivery, mode of previous delivery, body mass index, family history of pelvic organ prolapse, and household food insecurity were factors found to be significantly associated with pelvic organ prolapse. Therefore, to prevent pelvic organ prolapse health care providers should counsel mothers for maintaining a normal weight, having skilled delivery, and avoiding early pregnancy.

KEYWORDS: Pelvic organ prolapse, determinants, case-control, southern Ethiopia.

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INTRODUCTION

Pelvic organ prolapse is the descent of one or more of the pelvic organs towards and down through the vaginal opening [1]. It is one of the pelvic floor disorders caused by the loss of pelvic floor muscle strength. When the pelvic muscle and tissue loss their ability to support the pelvic organ, the organ will press against or drop into and outside the vagina [2]. Generally, about 34 million women are affected by pelvic organ prolapse worldwide, it is also a very common gynecological health problem with multifactorial etiology, and about 50% of women over the age of 45 years suffer from pelvic organ prolapse [3]. High occurrence of pelvic organ prolapse has also been reported among women of reproductive age in Sub-Saharan Africa [4]. Previous studies done in Ethiopia showed that the prevalence of pelvic organ prolapse ranges from 13.3%-20.5% [5,6].

Pelvic organ prolapse has a giant influence on the basic day-to-day activities of women, disturbing and reducing their quality of life. It can also severely limit a women psychological, social, physical, and sexual function [7]. Studies showed that the social consequences of pelvic organ prolapse include discrimination, functional impair¬ment, depression, poor quality of life, and a significant economic burden on the affected women [8–10]. Research findings showed that high parity, birth-induced injury to connective tissue, age >40 years, delivered at home or delivery assisted by non-health professional, early marriage, early childbirth, occupation like being a farmer, carrying heavy objects, obesity, family history of POP, level of education, and other co-morbidity like constipation chronic and chest disease are a significant risk factor for pelvis organ prolapse [5,11–16].

Even if the problem is prominent, the risk factor associated with POP has been poorly understood [17]. Also, there is a scarcity of research in Ethiopia on this topic, especially in the study area. This study also considers variables like household food insecurity that have not been addressed by other studies. Thus, this study would give important input to health professionals, decision-makers, and program implementers at zonal as well as regional levels to design evidence-based interventions for different programs that are effective for preventing and creating awareness in the community on risk factors of POP. Therefore, this study aimed to investigate the determinant of pelvic organ prolapse among women visiting Arba Minch, Sawla, and Jinka General Hospital, Southern Ethiopia.

METHOD

Study design

An institution-based case-control study design was conducted to identify determinants of pelvic organ prolapse.

Study setting and Population

A study was conducted at Arba Minch, Sawla, and Jinka General Hospitals, Southern Ethiopia from July 10 to August 31, 2020. Arba Minch General Hospital is located in Gamo zone Arba Minch town. Arba Minch town is the administrative center of the Gamo zone and it is located 505 km from Addis Ababa the capital city of Ethiopia. Sawla Hospital is located in the Gofa zone Sawla town, Sawla town is the administrative center of the Gofa zone and it is located 535 km from Addis Ababa. And Jinka General Hospital is located in the South Omo zone Jinka town, the administrative center of the south Omo zone is Jinka town, which is located 745km from Addis Ababa. All three hospitals provide different clinical services including referral cases from different districts and give public health programs such as family planning, antenatal care, delivery service, diagnostic service, treatment of complicated cases, and major and minor surgeries. The source population for cases and controls were all women who visited the gynecologic clinic of Arba Minch, Sawla, and Jinka General Hospitals. Cases were women identified as having a POP, whereas controls were women identified as not having POP by health care professionals using the Pelvic Organ Prolapse symptom score (POP-SS).

Inclusion criteria

All women who visited gynecologic clinics of Arba Minch, Sawla, and, Jinka General Hospitals during the data collection period were included.

Exclusion criteria

Women who were severely ill were excluded.

Sample size determination

The sample size was calculated by using epi-info 7 software with consideration of the proportion of BMI among control exposed = 6.2% and AOR of 3.1 [12], and with the assumptions of the confidence level of 95%, power of 80%, and with the case to control ratio of 1:2. After additional consideration of 5% non-response rate, the total sample size was 348 (cases 116 and controls 232).

Sampling procedure and technique

The three hospitals (Arba Minch, Sawla, and Jinka General Hospitals) were selected because they were the only hospital in Gamo, Gofa, and South Omo zones that provide pelvic organ prolapse reconstructive surgery. Last year, 2011 EFY, 4th quarter 2-month report data was used to estimate the number of cases from each hospital. Then, based on that report, i.e. a total of 162 women with POP received care from the three hospitals; Proportional allocations of respondents to the three hospitals were done. All consecutive case in each hospital during the data collection period was included in the study, and two controls were also included consecutively for each case.

Operational definition

Pelvic organ prolapse: Was identified by the Pelvic Organ Prolapse Symptom Score (POP-SS) which consists of seven items that focus on symptoms caused by pelvic organ prolapse. Each item has a "Yes" and "No" answer with a total score ranging from 0 to 28. Women with a score of 10 and above were taken as cases whereas women with a below score of 10 were taken as controls [18].

Household food insecurity: Was determined using a standardized set of questions derived from the Food Insecurity Experience Scale (FIES) measurement guide. This guide consists of eight questions that were used to measure the degree of food insecurity in the household in the last 12 months. It classifies respondents as "food secure" (those women who replied No for each question) and "food insecure" (those women who replied Yes at least for one question) [19].

Prolonged labor: Labor lasts for approximately 20 hours or more if the mother is the first mother, and 14 hours or more if the mother has previously given birth [20].

Body Mass Index: - Is a women's weight in kilogram divided by the square of height in meters. If BMI is less than 18.5kg/m^2 it falls within the underweight range, If BMI is 18.5kg/m^2 to <25kg/m^2 it falls within the normal range, If BMI ≥25 kg/m^2 to <30kg/m^2 it falls within the overweight range and BMI ≥30 kg/m^2 it falls within the obese range [21].

Heavy work: Women engaged in farming, wood collection, fetching water, and carry¬ing more than 22 kg [22].

Data collection tool and technique

The data was collected through a face-to-face interview using an interviewer-administered semi-structured questionnaire that was developed through reviewing different works of literature [12,13,16,18,19,23]. The questionnaire has five parts. These were socio-demographic, Obstetric and Gynecologic Characteristics, Medical Related Factors, Household Food Insecurity, and pelvic organ prolapse symptom score (POP-SS). POP-SS was validated in Ethiopia in Amharic language with high internal consistency (Cronbach's alpha = 0.86) and test-retest reliability (ICC = 0.81; p < 0.001) [18]. The Food Insecurity Experience Scale (FIES) measurement guide was developed by the FAO [19]. And also the height of the women was measured using a height board while in a standing position and each height was taken to the nearest 0.01m. The weight of the women was measured by using a weight scale to the nearest 1 gram. Then data were collected by six Female Midwife nurses working in maternal and child care and supervised by 3 senior Midwives. Proper orientation was given to each participant on the purpose and usefulness of the study.

Data quality assurance

To assure the data quality, a data collection tool was prepared after an intensive review of relevant works of literature and similar studies. Properly designed data collection instruments were provided after translation into Amharic language and appropriate training for data collectors and supervisors was given. The training included a briefing on the general objectives of the study and clarity on each item in the instrument. Pre-testing was performed at Ottona General Hospital on 5% of the sample size. Every day the collected data was reviewed and checked for completeness by the supervisor and weekly by the Principal Investigator.

Data processing and Analysis

The collected data were coded, cleaned, and entered by epi-data version 4.4.3.1 and exported to STATA version 14 for analysis. Descriptive analysis was carried out and summarized by frequency tables, graphs, and text. Bivariate logistic regression was conducted to identify the variables which were the potential candidate for multivariable logistic regression at a p-value <0.25. Then, those fulfilled entry criteria for multivariable logistic regression were entered into the final model. Multivariable logistic regression analysis was conducted to assess determinants of pelvic organ prolapse among women at a P-value <0.05 and 95% confidence interval of the adjusted odds ratio. The Hosmer Lemeshow statistics were used to check the goodness of fit of the model and variance inflation factor (VIF) was used to assess multicollinearity.

Ethical approval

Ethical clearance was obtained from Arba Minch University, College of Medicine and Health Science Institutional Review Board with IRB reference number of IRB/184/12. A formal letter was written to Arba Minch, Sawla, and Jinka General Hospitals for permission and support by Arba Minch University school of Public Health. Respondents were informed about the objective and purpose of the study and written consent was obtained from each respondent. Similarly, no personal identifiers were used to collect the data, to maintain the confidentiality of the information and privacy. During the data collection period to prevent COVID-19 the data collectors used personal protective equipment like a face mask, hand sanitizer, disposable glove, and physical distancing, and also information was given to inform the respondents about the COVID-19 prevention mechanism. Besides, this study was conducted following the Declaration of Helsinki, and all ethical and professional considerations were followed throughout the study to keep participants' data strictly confidential.

RESULT

Socio-Demographic Characteristics

A total of 339 women (113 cases and 226 controls) participated in the study which yielded a response rate of 97.4%. The mean age was 52 (± 7.4SD) years and 40.3 (± 7.5SD) years for the cases and controls, respectively. The majority of the cases 105 (92.9%) and controls 143 (63.27%) were rural inhabitants. Concerning the level of education 53 (46.9%) of cases and 27 (12%) among controls were unable to read and write. Forty-six (40.71%) of cases and 30 (13.27%) of controls were farmers. (Table 1)

Table 1 Distribution of Socio-demographic characteristics among women at Arba Minch, Sawla, and Jinka general hospitals, Southern Ethiopia

Variables	Categories	Cases Number (%)	Controls Number (%)	COR (95% CI)	P-value
Age of the mother (Years)	<45	24 (21.24)	153 (67.7)	1	
	45-55	40 (35.40)	42 (18.58)	6 (3.29, 11.17)	<0.01
	>55	49 (43.36)	31 (13.72)	10 (5.4, 18.77)	<0.01
Age of the mother at first delivery (Years)	<20	69 (61.06)	31 (13.72)	9.8 (5.77, 16.84)	<0.01
	≥20	44 (38.94)	195 (86.28)	1	
Educational status	Unable to read and write	53 (46.90)	27 (11.95)	21.9 (7.88, 61.3)	<0.01
	Able to read and write	28 (24.78)	45 (19.91)	6.9 (2.48, 19.5)	<0.01
	Primary education	17 (15.04)	30 (13.27)	6.3 (2.13, 18.9)	0.01
	Secondary education	10 (8.85)	68 (30.09)	1.6 (.53, 5.1)	0.387
	College and above	5 (4.42)	56 (24.78)	1	
Marital status	Married	89 (78.76)	207 (91.59)	1	
,	Unmarried (Single Divorced, widowed)	24 (21.24)	19 (8.41)	2.9 (1.53, 5.63)	0.01
Residence	Urban	8 (7.08)	83 (36.7)	1	
	Rural	105 (92.9)	143 (63.3)	7.6 (3.53, 16.42)	<0.01
Occupation of the mother	**Government and Private**	12 (10.62)	91 (40.27)	1	
	Merchant	25 (22.12)	49 (21.68)	3.8 (1.78, 8.36)	0.01
	House wife	30 (26.55)	56 (24.78)	4 (1.92, 8.58)	<0.01
	Farmer	46 (40.71)	30 (13.27)	11.6 (5.45, 24.8)	<0.01
Income	<1000	54 (47.79)	25 (11.06)	14.5 (6.58,32.05)	<0.01
	1000-2999	48 (42.48)	127 (56.19)	2.5 (1.24, 5.19)	0.011
	≥3000	11 (9.73)	74 (32.74)	1	

Obstetric and Gynecologic Characteristics

Eighty-two (72.57%) cases and 64 (28.32%) controls had more than 4 vaginal deliveries. Concerning the place of delivery 67 (59.3) of cases and 55 (24.34%) of controls reported that they gave their last birth at home. Forty-six (40.7%) of cases and 171 (75.66) of controls gave their last birth at health facilities. Regarding mode of delivery 37 (32.7%) of cases and 36 (15.93%) of controls delivered their last child by instrumental delivery and 71 (62.83%) of cases and 145 (64.16%) of controls delivered their last child by Spontaneous vaginal delivery. (Table 2)

Table 2 Distribution of obstetric and gynecologic characteristics among women, at Arba Minch, Sawla and Jinka general hospitals, Southern Ethiopia

Variables	Categories	Cases Number (%)	Controls Number (%)	COR (95% CI)	P-value
Parity	Primiparous and multiparous	**39 (34.51)**	**161 (71.24)**	**1**	
	grand multiparous	**74 (65.49)**	**65 (28.76)**	**4.6 (2.89, 7.61)**	**<0.01**
Number of vaginal delivery	<4	31 (27.43)	162 (71.68)	1	
	≥4	82 (72.57)	64 (28.32)	6.6 (4.04, 11.08)	<0.01
Place of delivery for the last delivery	Home	67 (59.3)	55 (24.34)	4.5 (2.79, 7.33)	<0.01
	Health facility	46 (40.7)	171 (75.66)	1	
Mode of delivery for the last birth	Instrumental	37 (32.7)	36 (15.93)	2 (1.22, 3.60)	<0.01
	Caesarean section	5 (4.4)	45 (19.91)	0.22 (0.08, 0.59)	<0.01
	SVD	71 (62.8)	145 (64.16)	1	
How long did you stay in the labor for the last birth	Prolonged	67 (59.29)	55 (23.34)	4.5 (2.79, 7.33)	<0.01
	Normal	46 (40.71)	171(75.66)	1	
Duration of rest at home after delivery in the last childbirth	<42 day	42 (37.17)	20 (8.85)	6 (3.35, 11.06)	<0.01
	≥42 day	71 (62.83)	206 (91.15)	1	

Medical Related Factors and Household Food Insecurity

The majority 71 (62.83%) of cases and about a quarter 60 (26.50%) of controls had a chronic cough, 48 (42.48%) of cases and 18 (8%) of controls had chronic constipation. Regarding hypertension 35 (30.97%) of cases and 22 (9.73%) of controls had hypertension. Concerning the family history of Pelvic organ prolapse, the majority 63 (55.70%) of cases and 43 (19.03%) of controls had a family history of POP. (Figure 1)

Determinants of pelvic organ prolapse among women

A total of 21 variables with p-value < 0.25 in the bivariate analysis were included in multivariable logistic regression. Age of the mother at first delivery [(AOR=4, 95% CI: 1.48-11.53)], carrying heavy object [(AOR=2.8, 95% CI: 1.9-7.62)], place of previous delivery [(AOR=3.6, 95% CI: 1.37-9.47)], mode of previous delivery [(AOR=3, 95% CI: 1.73-8.44)], family history of POP [(AOR=4, 95% CI: 1.63-11.2)], BMI [(AOR=4, 95% CI: 1.82-12.9)] and household food insecurity [(AOR=3, 95% CI: 1.51-7.75)] were identified as the determinants of pelvic organ prolapse. (Table 3)

Table 3 Multivariable Logistic regression result on determinants of Pelvic Organ Prolapse among women at Arba Minch, Sawla, and Jinka general hospitals, Southern Ethiopia.

Variables	Categories	Cases Number(%)	Controls Number(%)	COR (95% CI)	AOR(95% CI)
Age of the mother at first delivery (Years)	<20	69(61.06)	31 (13.72)	9.8(5.77,16.84)	4(1.48,11.53)**
	≥20	44(38.94)	195 (86.28)	1	1
Place of delivery for the last delivery	Home	67 (59.3)	55 (24.34)	4.5(2.79, 7.33)	3.6(1.37,9.47)**
	Health facility	46 (40.7)	171 (75.66)	1	1
Mode of delivery for the last birth	Instrumental	37 (32.7)	36 (15.93)	2(1.22, 3.60)	3(1.73, 8.44)*
	Caesarean section	5 (4.4)	45 (19.91)	0.22(0.08,0.59)	0.26(.04, 1.50)
	SVD	71 (62.8)	145 (64.16)	1	1
Family history of POP	Yes	63(55.75)	43 (19.03)	5.3(3.2, 8.82)	4(1.63, 11.2) **
	No	50(44.25)	183 (80.97)	1	1
Carrying heavy object	yes	64(56.64)	43 (19.03)	5.5(3.37, 9.15)	2.8(1.9, 7.62)*
	No	49(43.36)	183(80.97)	1	1
Household food insecurity	Yes	65(57.52)	41(18.14)	6(3.7, 10.11)	3(1.51, 7.75)*
	No	48(42.48)	185(81.86)	1	1
BMI	≥25kg/m^2	24(21.24)	27(11.95)	3.6(1.9, 6.8)	4(1.82, 12.91)*
	<18.5kg/m^2	43(38.05)	12(5.31)	14(7.1, 29.8)	2.4(.62, 9.27)
	≥18.5-<25kg/m^2	46(40.71)	187(82.74)	1	1

*=Statistically significant variable at p<0.05, **= statistically significant at p <0.01

DISCUSSION

The study finding showed that the odds of developing POP were 4 times higher among women who had their first delivery below the age of 20 years than those who had their first delivery 20 and above years. This finding is supported by the studies done in Wolita Sodo, Southern Ethiopia [13]. This could be because sphincter muscles together with their surrounding tissues are responsible for protecting or stabilizing all of the pelvic organs in the correct position but if a mother had birth below the age of 20 years these muscles and ligaments can be damaged during delivery predisposes the woman for POP [24]. The odds of developing POP were 3 times higher among those women who carry heavy objects compared to those who didn't carry heavy objects. This finding goes in line with the study done in Bahir Dar, Northwest Ethiopia [12]. This might be due to the reason that most Ethiopian rural women engage in carrying heavy objects during farming, fetching water, and collecting wood which may increase intra-abdominal pressure that results in POP. The odds of developing POP were 3 times higher among women who deliver their last child at home compared to those who deliver at the health facility. This finding is consistent with the studies done in India [15] and Wolita Sodo, Southern Ethiopia [13]. This could be because giving birth at home and delivery supervised by non-health professionals in the home lead to obstetric complications such as prolonged labor, and perineal tear which causes injury to the supporting structures of pelvic organs and predisposes to POP. The odds of developing POP were 3 times more higer among women who gave birth with instrumental assistance compared with those who gave birth with spontaneous vaginal delivery. This finding is similar to the study done in South Australia [14]. This might be because instrumental delivery causes injury to pelvic floor muscle and loss of muscle tone that supports the pelvic organs, this may be a risk factor for the descent to one or more vaginal compartments [25]. The odds of developing POP were 3 times higher among women with food insecure households than in those with food secure households. This might be explained by poor nutritional status is a cause of weakness in the muscles and other supportive structures of the pelvic floor, this may be a risk factor for the development of pelvic organ prolapse [26]. The odds of developing POP were 4 times higher among obese women compared with women with normal BMI. This finding is in line with the studies conducted in India [15] and China [27]. This might be because obesity increases intra-abdominal pressure which causes weakening of pelvic floor muscles and fascia [28]. The odds of developing POP were 4 times higher among women who had a family history of POP compared with those who didn't have a family history of pregnancy. This finding is supported by the studies done in the USA [29], Wolita Sodo, Southen Ethiopia [13], and Bahir Dar, Northwest Ethiopia [12]. The relationship between the family history of POP and the occurrence of POP needs further investigation.

CONCLUSION

In this study age of the mother at first delivery, carrying a heavy object, place of previous delivery, mode of previous delivery, body mass index, family history of pelvic organ prolapse, and household food insecurity were factors found to be significantly associated with pelvic organ prolapse. Therefore, health care professionals should advise mothers to maintain a normal weight, have skillful delivery, and avoid early pregnancy to prevent pelvic organ prolapse. Women in the community should also be screened for food insecurity and connected to the agricultural industry and facilitate small-scale business.

DECELARATIONS

Strength of the study

Pelvic organ prolapse symptom score was used to identify cases of POP which is validated in Ethiopia in Amharic.

Limitation

Identification of cases and control was made entirely based on the response of the participant women.

So, asymptomatic stages of Pelvic organ prolapse may be missed.

Abbreviations

AOR: Adjusted Odds Ratio; BMI: Body Mass index; EFY: Ethiopian Fisical Year; CI: Confidence Interval; COR: Crude Odds Ratio; POP: Pelvic Organ prolapse; POPSS: Pelvic organ prolapse symptom score

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Conflict of interest

We want to reassure you that the material was provided with full accountability and communication. We stated that there are no conflicts of interest with any people or organizations that could unfairly influence or skew the content of the work.

Authors' Contributions

All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the worker.

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