

Magnitude of Obstructed Labor and Associated Factors Among Women Who Delivered at Public Hospitals of Western Harerghe Zone, Oromia, Ethiopia

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Abstract: Obstructed labor is one of the common preventable causes of maternal, perinatal morbidity and mortality in low income countries including Ethiopia. The prevalence is more common in communities in which under nutrition in childhood is dominant and where there is no access to health facilities. The common causes are cephalo pelvic disproportion, malpresentation and malposition. The objective of this study was to assess the magnitude of obstructed labor and associated factors among women who delivered at public hospitals in West Harerghe Zone, Oromia Region, Ethiopia. Institution based retrospective cross sectional study design was conducted from March 10, 2016 to April 10, 2016 in West Harerghe public hospitals. The data was collected by using structured pretested questionnaire check list. Systematic random sampling technique was used to select 385 delivered women. The data was checked, coded and entered to Epi-info version 3.1 and was exported to SPSS version 21 software. Binary and multiple Logistic regressions were used to analyze the association between the dependent and independent variables. Magnitude of obstructed labor was found to be 34.3% of the total delivered women. The identified independent risk factors for obstructed labor were distance (P-value=0.001, AOR=0.029, 95% CI 0.005-0.169), parthograph utilization (P-value=0.000, AOR=0.064, 95% CI 0.025-0.162) and source of referral (P-value=0.002, AOR=0.346, 95%CI 0.180-0.667). The magnitude of obstructed labor was high in the study area. Improved proper utilization of parthograph, antenatal care coverage, good referral system, and comprehensive obstetric care in nearby health institutions are recommended to prevent obstructed labor and its complications.

Keywords: Magnitude, Obstructed Labor, Risk Factors

1. Introduction

Globally, more than half a million women die each year because of complications related to pregnancy and childbirth. Of the estimated maternal deaths worldwide in developing countries, where 85 percent of the population lives, accounted for about 99 percent. About half of the maternal

deaths occurred in sub-Saharan Africa alone and one third took place in South Asia [1]. Global maternal mortality due to obstructed labor is responsible for 9% of all maternal deaths. The common causes for obstructed labor include; cephalo pelvic disproportion which is more common when malnutrition is prevalent, malpresentation and malposition [2].

Ethiopia is one of the countries in sub-Saharan Africa with markedly high maternal mortality ratio. It is one of the ten countries that contribute for about 60% of global maternal deaths worldwide [2]. The chance that women die estimated at 1 in 14. The maternal mortality rate in the country is high which is, 412 deaths per 100,000 live birth [3].

The major causes of maternal deaths in Ethiopia are similar to most developing countries: infection, hemorrhage, obstructed labor, abortion and hypertension in pregnancy. The proportion of maternal death ascribed to the different causes varies from year to year. Overall the case fatality rates of ruptured uterus/obstructed labor and preeclampsia/eclampsia indicate an increasing trend while that of abortion remain stable [4].

Among these mortality rates obstructed labor contributes 13% of maternal death in Ethiopia. The case fatality rate has not shown gross notable change in the proportion of death due to obstructed labor/rupture uterus. A death due to obstructed labor may be misclassified under other headings, including sepsis, ruptured uterus or hemorrhage, all of which could be secondary to obstructed labor [5].

Global maternal mortality due to obstructed labor is responsible for 9% of all maternal death. 4.1% (range 0–10.3%) to all maternal deaths in Africa; for Asia this amounted to 9.4% (0–12%) and 13.4% (range 0–38.9%) for Latin America and the Caribbean. In contrast most maternal deaths in developed countries are due to other direct causes, mainly complications of anesthesia and Caesarean sections [1].

Obstructed labor is when the presenting part of the fetus cannot progress into the birth canal, despite strong uterine contractions. It is one of the common preventable causes of maternal and perinatal morbidity and mortality in developing and low income countries including Ethiopia [2].

Maternal mortality from obstructed labor is caused by complication of ruptured uterus, postpartum hemorrhage, and puerperal sepsis, while substantial long term maternal morbidity include, intrauterine infections following prolonged rupture of membranes, trauma to the bladder and/or rectum due to pressure from the fetal head or damage during delivery, and ruptured uterus with consequent hemorrhage, shock or even death. Trauma to the bladder during vaginal or instrumental delivery may lead to stress incontinence [3, 6].

In the long-term it can cause secondary infertility due to Sheehan's syndrome, hysterectomy due to rupture or vaginal scarring and stenosis, severe anemia, musculoskeletal injury, urinary incontinent and obstetric fistula. If the duration of obstructed labor is prolonged without intervention, the fetus dies because of anoxia by excessive pressure on the placenta and umbilical cord. The dead fetus becomes softened by decay and may trigger the onset of coagulation failure and prolonged uterine contraction, end with rupture of uterus these leads to maternal hemorrhage and then to hemorrhagic shock, peritonitis, and septic shock, and death [7].

In Ethiopia as observed in different studies from across the country the incidence or prevalence of obstructed labor is

estimated between as low as 3.3% and as high as 12.2%. Maternal mortality from obstructed labor is largely the result of ruptured uterus or puerperal infection, whereas perinatal mortality is mainly due to asphyxia. Considerable maternal morbidity is associated with prolonged labor, since both postpartum hemorrhage and infection are more common in women with long lasting labor. Obstetric fistulas are long-term complications of obstructed labor, and a traumatic delivery affects both mother and child but the contribution to maternal (as well as in perinatal) mortality is labeled as major tell and can provide indications on practical ways of addressing its causes and determinants [8].

Among the factors low social status of women in developing country limits their access to economic resources, basic education and thus their ability to make decision related to their health and nutrition. culture also promote maternal deaths in many areas, such as low status and neglect to girls and women, polygamy, early marriages and childbearing, underfeeding and dietary practices during pregnancy, and double standards of sexual ethics resulting in clandestine abortion or pre pubertal marriage [9].

Despite the fact that obstructed labor in Ethiopia seems to be a common cause of maternal and perinatal morbidity and mortality, there is lack of research evidence to substantiate this. In order to increase knowledge base for more successful intervention against obstructed labor, understanding the underlying factors leading to the deaths is critical for prevention of future mortality.

2. Method and Materials

2.1. Study Area and Period

The study was conducted in West Harerghe public hospitals from March 10, 2016 to April 10, 2016, which is located 326 Kilometers east of the capital city Addis Ababa. It occupies 17,635 square kilo meters and estimated house hold 500,106. According to Oromia demographic characteristic 2013, it has 2,400,509 total populations with Population density 126 person/km². Out of this, the majority 91% living in rural area and only 9 % are urban resident. Within the Zone there are two public hospitals (one zonal and one general Hospital), there isn't any private hospital found. Under those two hospitals, there are 75 catchment health centers. Those hospitals have a total capacity of about 283 beds. The maternity, labor and delivery ward have 36 beds, 8 first stage beds, and 6 second stage couches, 5 maternal ICU, 6 waiting area beds and 11 post natal beds. In addition, the gynecology ward has 82 beds including the post abortion room. During the study period those hospitals have two Gynecologists/obstetrical one for each, two surgeons, two emergency surgeons, 27 General practitioners, 26 midwiferies and 110 nurses were working in those hospitals.

2.2. Study Design

An Institution based Retrospective chart review cross-sectional study design was employed.

2.3. Population

2.3.1. Source Population

All cards of women who were delivered public hospital in this study area during the study period.

2.3.2. Study Population

All cards of women who delivered at public hospitals in the study period and fulfill the inclusion criteria during the study period.

2.4. Exclusion Criteria

Women whose gestational age were less than 28 weeks, women who were admitted to post-partum, antepartum hemorrhage and those who were discharged before delivery and eclampsia were excluded from the study.

2.5. Sample Size Determination

The sample size was determined by using single population proportion sample size calculation formula. By considering 95% confidence interval (CI) and 5% marginal error, sample size is calculated as follows

Assumptions:

Considering 5% marginal error, 95% level of confidence

Where, $p = 50\%$,

$$n = \frac{\left(\frac{Z_{\alpha}}{2}\right)^2 p(1-p)}{d^2}$$

n = sample size, $Z_{\alpha/2}$ at 95% confidence level = 1.96, d (margin of error) = 0.05, p (prevalence) = 0.5

Accordingly:

$$n = \frac{(1.96)^2 * 0.5 * (1 - 0.5)}{0.05^2} = 385$$

$n = 385$

Total sample size, $n = 385$.

2.6. Sampling Technique and Data Collection Method

All public hospitals within the zone were included in order to make the data representative. Since, within the zone there were only two hospitals, both of them were taken for the study. After identifying the average number of two months' delivery report from each hospital. The number of study subjects for each hospital was allocated proportionally with total average admission in the two hospitals. There was a total of an average 512 delivery in two months period from the two hospitals (274 from Chiro hospital and 238 from Gelemso hospital). Subjects were selected using systematic random sampling method, every 2 interval ($K = 2$) and the first number were randomly selected. Sampling frame was developed from registration book. A total of 385 were sampled. The number of mothers allocated for each hospital was 206 from Chiro hospital, and 179 from Gelemso hospital.

The data was collected using structured data collection

tools. A uniform checklist questioner was used to collect information from registers and patients' files. Patient records, delivery room records and operating theater books were reviewed retrospectively to gather information about patient admitted for obstructed labor from March 1, 2011 and February 30, 2016. Two staff diploma midwife/Nurses and two BSc. nurses was recruited as data collectors, and the supervision was done by one MSc. holder with maternity and Reproductive health.

2.7. Variables

2.7.1. Dependent Variable

Obstructed Labor.

2.7.2. Independent Variable

- i Socio demographic characteristics; age, ethnicity, religion, educational level and marital status.)
- ii Obstetric factors; parity, number of ANC follow-up, duration of labor before visiting hospital,
- iii Health care factors; use of parthograph, referral system, Distance from health institution).

2.8. Operational Definition

Obstructed Labor: despite adequate uterine contractions the delivery of the baby could not be accomplished timely in a normal, natural fashion but active intervention by health professionals will needed [9].

Antenatal follow up: when the mother reported that she had visited any health institution during her recent pregnancy.

Partogram: A graphical representation of the dilatation of the cervix against time with an alert and an action line based on cervical dilatation of 1 cm/hr. between 4 and 10 cm

Multigravida: mother at least one previous delivery past 28 completed weeks of pregnancy

Grand multipara: when the number of previous similar deliveries was at least five.

Destructive operation: is procedure done for Dead fetus after prolonged labor to affect vaginal delivery.

2.9. Data Processing and Analysis

Data was checked, coded and entered to Epi-info version 3.1 and was exported to SPSS (Statistical Package for Social science) version 21 packages for analysis. Data entry was made by the principal investigator. Descriptive statistics: frequency, proportion mean and SD was used independent variables and binary logistic regression was used to identify association between independent and the outcome variable finally, multiple logistic regressions was used to identify more commonly associated risk factors. The degree of association between dependent and independent variables examined using odds ratio with 95% CI and $p < 0.05$.

2.10. Data Quality Assurance

The data collection tool was pre-tested on 5% of sample size on the previous records at the same hospital, with

obstructed labor to check for clarity of the items and also to identify any confusing or any vague items in the checklist in this health facility. The collected data was close supervision was done by principal investigators and supervisors during data collection. Completeness of data was checked daily and coded before data entry. Training was given for one day on how to collect and purpose of the study, details of the checklist, and insuring confidentiality of collected data.

3. Result

3.1. Socio-demographic Characteristics

A total of 18,679 hospital-deliveries were conducted from March 01, 2011 to February 30, 2016. Among them, 132 cases of obstructed labor were recorded giving a magnitude of 34.30%.

In this study, 385 samples were included providing response rate of 100%. Out of this, the mean age of the women during the time of delivery was 24.55 (SD=5.581). Nearly two thirds or 276(71.7%) of the study population were living in Rural area. Majority of the cases accounting for 371 (96.4%) were married and cohabiting. More than two thirds or 301(78.2%) of the women were Muslim by religion and above two thirds or 305 (79.2%) were ethnically Oromo (Table 1).

Table 1. Sociodemographic characteristics of women who gave birth Public Hospitals, West Harerghe Ethiopia 2016 [N=385].

Variables	Categories	Frequency (n)	Percentage (%)
Age	≤ 19	196	50.9
	20–24	59	15.3
	25–29	61	15.8
	30–34	40	10.4
	≥ 35	29	7.5
Residency	Rural	276	71.7
	Urban	109	28.3
	Muslim	301	78.2
Religion	Orthodox Christian	76	19.7
	Protestant	8	2.1
Marital status	Single	14	3.6
	Married and cohabiting	371	96.4
	Oromo	305	79.2
	Amhara	54	14.0
Ethnicity	Gurage	17	4.4
	Others (Somali, Afar and Harare)	9	2.3

3.2. Magnitude of Obstructed Labor

The magnitude of obstructed labor in the study area was found to be 118(34.3%) (Figure1).

Table 3. Distribution of health care character of obstructed labor in West Harerghe public hospitals, Ethiopia, 2016 [N=385].

Variables	Categories	Frequency (n)	Percentage (%)
Parthograph	Not at all	196	50.9
	Partial	80	20.8
	Complete/correctly	89	23.1
	Unknown/no data	20	5.2
Distance from hospitals	<10km	172	44.7
	10-50km	144	37.4

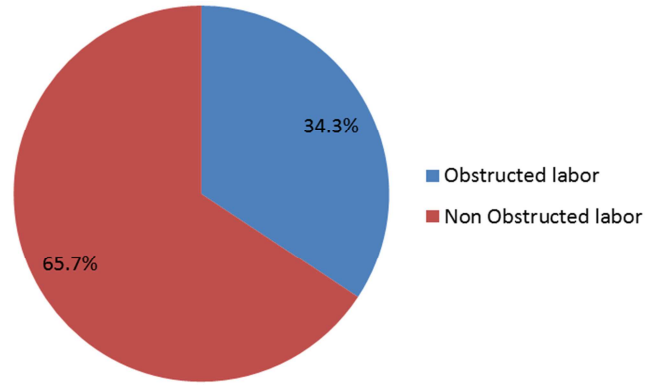


Figure 1. Pie chart showing magnitude of obstructed labour in, west Harerghe zone public hospitals Ethiopia 2016 [N=385].

3.3. Obstetric Characteristics

Majority of the cases involving 198 (51.4%) were prime Para. Near to half or 181 (47.0%) cases were in labor range for 12-24hr while 79(20.5%) were for more than24hr. Half of the cases or 195 (50.6%) had no ANC visits during their pregnancy while 75(19.5%) had at list two visits (Table 2).

Table 2. Distribution of Obstetric characteristics in West Harerghe public hospitals, Ethiopia, 2016 [N=385].

Variables	Categories	Frequency (n)	Percentage (%)
Parity	Primi Para	198	51.4
	Para II-V	119	30.9
	Para > V	65	16.9
	Unknown/no data	3	0.8
Duration of labor	<12 hours	92	23.9
	12-24 hours	181	47.0
	Unknown/no data	33	8.6
	>24 hours	79	20.5
ANC	Had > two visit	80	20.8
	Had at least two visit	75	19.5
	Had < two visit	15	3.9
	Had no visit	195	50.6
	Unknown/no data	20	5.2

3.4. Healthcare Characteristics

The study showed that usage of parthograph by the midwives was below average. It was not used or left blank for half of the cases or 196(50.9%). Only 89 cases or 23.1% filled parthograph fully. Near to half or 172 (44.7%) cases lived within a radius of less than 10 km from the selected hospitals while 24 (6.2%) lived beyond 100km from the selected hospital. More than two thirds or 286(74.3%) were self-referred (Table 3).

Variables	Categories	Frequency (n)	Percentage (%)
Source of referral	51-100km	40	10.4
	>100km	24	6.2
	Unknown/no data	5	1.3
	Self	286	74.3
	Hospital	8	2.1
	Health center	73	19.0
	TBA (traditional birth attendant)	9	2.3
	Unknown/no data	9	2.3

3.5. Causes of Obstructed Labor and Intervention Done

Cephalo-Pelvic Disproportion (CPD) was the leading cause of obstructed labor cases which accounts 73(61.9%). Cesarean section was done for 117(99.2%) of obstructed labor cases (Table 4).

Table 4. Causes of obstructed labor and Interventions in West Harerghe Public Hospitals, Ethiopia, 2016 [N=385].

Variables	Frequency	(%)	variables	Frequency	(%)
Causes			Interventions		
CPD	73	61.9	C/S (cesarean section)	117	99.2
Mal-presentation/malposition	38	32.2	Distractive operation	1	0.8
Fetal congenital abnormality	1	0.8			
Others (conjoined twin)	6	5.1			

3.6. Associated Factors of Obstructed Labor

The level of association was computed using bivariate logistic regression analysis. For those variables that had significant association to the dependent variable, P-value of less than 0.2 was entered to multiple logistic regressions.

Accordingly, the analysis indicated mothers who lived within the radius of less than 10 km from the selected hospitals was 97% less likely to encounter obstructed labor compared to those who lived within the radius greater than

100km (P-value=0.001, AOR=0.029, 95% CI 0.005-0.169). Similarly, those mothers whose parthograph had been fully and partially filled were 93.6% less likely to encounter obstructed labor than mothers whose parthograph was not filled at all (P-value=0.000, AOR=0.064 ,95% CI 0.025-0.162). Those mothers who were referred from health center were 93.6% less likely to encounter obstructed labor compared to those who were referred by themselves (P-value=0.002, AOR=0.346, 95%CI 0.180-0.667) (Table 5).

Table 5. Factors associated with obstructed labor in women who gave birth at West Harerghe public hospitals, Ethiopia, 2016 [N=385].

Variables	Obstructed labor		COR (95%)	AOR (95%)
	Yes	No		
	n (%)	n (%)		
Age			P=0.047	
≤19	52(26.5)	144(73.5)	1	
20-24	20(33.9)	39(66.1)	0.521(0.293-0.927)*	
25-29	20(32.8)	41(67.2)	1.049(0.568-1.938)	
30-34	16(40.0)	24(60.0)	0.912(0.448-1.853)	
≥35	10(34.5)	19(65.5)	0.503(0.237-1.065)	
ANC visits			P=0.100	
Had>2 visits	12(15.0)	68(85.0)	4.321(2.417-7.724)*	
Had at list 2 visit	18(24.0)	57(76.0)	2.125(1.219-3.702)*	
Had<2 visit	1(6.7)	14(93.3)	11.871(1.546-91.131)*	
Had no visit	13(65.0)	7(35.0)	1	
Distance			P=0.057	P= 0.001
<10km	1(4.2)	23(95.8)	0.028(0.008-0.100)*	0.029(0.005-0.169)**
10-50km	48(33.3)	96(66.7)	0.482(0.295-0.787)*	0.894(0.469-1.703)
51-100km	18(45.0)	22(55.0)	0.375(0.186-0.758)*	0.388(0.148-1.017)
Unknown/ no data	3(60.0)	2(40.0)	0.228(0.044-1.175)	0.174(0.021-1.421)
>100km	48(27.9)	124(72.1)	1	1
Duration of labor			P=0.079	
<12hours	21(22.8)	71(77.2)	3.532(1.873-6.661)*	
12-24hours	54(29.8)	127(70.2)	2.421(1.441-4.066)*	
Un known	14(42.4)	19(57.6)	1.468(0.670-3.215)	
>24hours	29(36.7)	50(63.3)	1	
Parthograph			P=0.000	P=0.000
Complete	8(9.0)	81(91.0)	0.083(0.039-0.179)*	0.064(0.025-0.162)**
Partially	8(10.0)	72(90.0)	0.106(0.051-0.222)*	0.073(0.029-0.1891)**
Unknown/no data	5(25.0)	15(75.0)	0.091(0.021-0.392)*	0.065(0.010-0.408)**
Not at all	97(49.5)	99(50.5)	1	1

Variables	Obstructed labor		COR (95%)	AOR (95%)
	Yes	No		
Source of referral			P=0.004	P= 0.002
TBAAs	6(22.0)	3(78.0)	0.784(0.198-3.103)	1.842(0.157-21.598)
Hospitals	6(75.0)	2(25.0)	0.084(0.009-0.762)*	0.066(0.004-1.073)
Health center	35(47.9)	38(52.1)	0.353(0.214-0.582)*	0.346(0.180-0.667)**
Unknown /no data	8(88.90)	1(11.1)	0.896(0.232-3.458)	4.968(0.635-38.820)
Self	63(66.7)	223(33.3)	1	1

*Statically associated at $p < 0.05$, **adjusted for socio-demographic, obstetric and health care factors variables those showed significant association during bivariate analysis.

4. Discussion

The study revealed that the magnitude of obstructed labor (34.30%), was a bit higher when compared to the previous studies conducted in Jimma University Specialized Hospital and Mizan Aman General Hospital which was 12.2% and 7.95% respectively [10,11]. It is also higher than what other studies found in other African and Asian countries like Nigeria (2%), India (1.11%), Pakistan (3.61%), Bangladesh (4.2%), [12-15].

Such variation in magnitude of obstructed labor in this study might be due to difference in study design, socio economic status, cultural difference, utilization of health care services, and availability of few numbers of hospitals which cover a wide catchment area.

Mothers whose parthograph was fully or partially filled were found to have significantly, 93.6%, less likely to encounter obstructed labor compared to those whose parthograph was not filled at all (AOR 0.064 (0.025 - 0.162)). However, in this study, it was found that only 9.1% of mothers had their parthograph been fully and partially filled which is higher than the study conducted in West Wollega (4.2%) and Malawi (3.9%). This difference might be explained by shortage of staff with high work load, negligence, inadequate supervision and lack of motivation [16, 17].

The study found that source of referral has significant association with obstructed labor. Those mothers who were referred from health center were 93.6% less likely to encounter obstructed labor compared to those who were referred by themselves, AOR 0.346 (0.180-0.667). In this study, 66.7% were self-referred which is higher than the study conducted in Mizan Aman which accounted 60.9%, in contrast lower than the study done in Jimma which was 93.9% [10, 11]. This might be due to lack of health seeking behavior, had no ANC follow up, attitude of mothers towards health professionals and health center delivery, and cultural difference.

In this study, age and parity were not associated with obstructed labor. However, it is difficult to entirely dismiss the influence age and parity on obstructed labor judging by results of the logistic regression, as it is contrary to many other studies which correlated obstructed labor and concluded age and parity were a strong predictor of obstructed labor [12-14, 18, 19]. This may be due to differences in methods used for the studies, distance of health facility, accessibility of family planning, awareness of early

marriage complications especially in rural residences and extent women education.

The study showed that distance from home to selected hospitals has significant association with obstructed labor. Mothers who lived within the radius of less than 10 km from the selected hospitals were 97% less likely to encounter obstructed labor compared to those who lived within the radius greater than 100km, AOR 0.029(0.005-0.169). In this study, 27.9% of the cases came from a distance of more than 100 kilometers which is a closer figure to the study done in Jimma which was 22.3% [10]. However, it is higher figure than the study done in Wollega which was 8.4 % [16]. This difference might be due to poor access to transportation, information, and road, lack of health seeking behavior, no ANC follow up and availability of health facility in nearby.

All of obstructed labor cases were delivered by Cesarean Section which was similar with the study done in India (100%) [12]. It was higher than the study conducted in, Jimma (54.7%), Nigeria (65.3%, 85.94%), and Pakistan (72.5%, 90%), India (82%), and Bangladesh (78%) [10, 13-15, 18, 19, 20]. This variation in different countries might be because of accessibility to the service, economical condition, utilization of parthograph, availability of comprehensive emergency maternal and obstetric new born care service, and health care referral.

The most common maternal complication observed in this study was uterine rupture which accounted 9.1%. However, it is lower than the study conducted in Pakistan (20%), Jimma (45.1%), Mizan Aman (25%), and Nigeria (21.5%) [10, 11,14, 21]. Whereas, it is higher than the study in Nigeria (11.6%, 7%), India (2.56%) and Pakistan (6.8%) [21-23]. This variation might be due to full and correct utilization of parthograph, the difference in management of obstructed labor, source of referral, availability of health facility, distance of health institution, access of transportation and economy of the country.

Only one maternal death was reported which was similar to the study in Pakistan and Bangladesh [13, 22]. However, it was lower than the report in India (2.04%), West Wollega (1.4%), Pakistan (1.94%) and Nigeria (8.3%) [14,16,24,25]. This might be due to lower proportion of uterine rupture, a well-known contributor of maternal hemorrhage and sepsis, which are major causes of maternal mortality and morbidity.

5. Conclusions and Recommendation

There was high magnitude of obstructed labor among west

Harerghe public hospitals. Long distances from the selected hospitals, lack of partograph record utilization and self-referred was found to be a risk for obstructed labor. Managing of obstructed and prolonged labor is one of the most important ways of reduction of maternal and perinatal mortality, and morbidity.

In addition, early referral, proper follow-up of labor with full Partograph record, nearby access to hospitals, easy transport, awareness on birth preparedness and complication readiness including early sign of obstructed labor and complications, delivery by skilled birth attendant minimizes the magnitude of obstructed labor and risk of complication.

List of Abbreviations

ANC; Antenatal Care, AOR; Adjusted Odds Ratio, CI; Confidence Interval, COR; Crude Odds Ratio, CPD; Cephalo Pelvic Disproportion, SD; Standard Deviation, SPSS; Statistical Package for Social Science, TBA; Traditional Birth Attendant

Declarations

Ethics Approval and Consent to Participant

Permission was obtained from the Institutional Review Board of Addis Ababa University, College of Health Sciences, and School of Allied health sciences, Department of Nursing and Midwifery. In addition, letter of permission was secured from Oromia Regional Health Bureau, West Harerghe Zonal Health Bureau and Hospitals Management committee. Confidentiality of information was maintained.

Consent for Publication

Not applicable.

Availability of Data and Materials

The data that support the findings of this study are available but some restrictions may apply to the availability of these data as there are some sensitive issues. However, data are available from the corresponding authors upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

TT was involved in the conception, design, analysis, interpretation, report and manuscript writing. ZM was involved in the design, analysis, interpretation and report writing. BW ,

KA and RO were involved in design, analysis and interpretation of the data. All authors read and approved the final manuscript.

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