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Determinants of Home Delivery among Mothers Who Gave Birth in the Last One Year in Farta Woreda, South Gondar Zone, Northwest, Ethiopia: Unmatched Case Control Study

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Abstract

Background: A home birth is a birth that takes place in a residence rather than health institutions in the absence of skilled birth attendant, is still problem that strongly associated with serious maternal complications and worse neonatal outcomes. In Ethiopia, despite existent intensive efforts to improve maternal health, the proportion of births delivered at home remains high and is still the top priority among the national health threats.

Objective: The aim of this study was to assess determinants of home delivery among women who gave birth in the last one year in Farta woreda, South Gondar Zone, Northwest, Ethiopia, 2019.

Methods: A case-control study was done from March 02 - 18, 2019 among 276 delivered women were interviewed using structured questionnaire. Multistage sampling through simple random sampling technique was employed and SPSS version 23 was used for analysis. Crude and adjusted Odds ratios were computed for selected variables. P-value of less than 0.05 at 95% CI was considered as statistically significant.

Result: A total of 276 study participants (92 cases and 184 controls) were included giving for a response rate of 100%. The median age among cases was 34 (IQR ± 8) years, and the mean age among control 30.21 (SD ± 6.04) years and ranging from 17 - 44 years. No formal education [AOR = 11.1, 95% CI = 3.44 - 35.97], mother who were not attend ANC [AOR = 2.4, 95% CI = 1.27- 4.89], mother who delivered previously at home [AOR = 2.8, 95% CI = 1.44 - 6.57] and transportation on foot [AOR = 2.4, 95% CI = 1.18 - 4.93] increases home delivery. But age between 25 - 34 years [AOR = 0.3, 95% CI = 0.15 - 0.62] decreases of home delivery.

Conclusion and Recommendation: The predictor of home delivery were age of the mother, no formal education, had no ANC visits, previous delivery at home and transportation on foot. Concerned bodies at different level should create awareness the place of delivery, importance ANC services, complication readiness as well as on women education.

Keywords: *Home Delivery; Maternal Mortality; Farta*

Introduction

Maternal mortality is unacceptably high; every day in the world, approximately 830 women die from preventable causes related to pregnancy and childbirth. Almost 99% of all maternal deaths occur in developing countries. The high number of maternal morbidity and mortality in developing countries reflects not using the existed knowledge and services timely [1].

Childbirth is a vital event in women's life and represents a time of intense vulnerability of morbidity and mortality; especially in developing countries like Ethiopia where institutional delivery is low. As per the Ethiopia Demographic and Health Survey [EDHS] 2016 report, majority of birth occurs without the assistance of skilled birth attendants mainly at home which is 73.1% and only 26% of births were delivered in health facilities which have shown only 16% increment in the last five years and also has high maternal mortality ratio of 412 per 100,000 live births; one of the leading causes of death is home delivery [2].

Home birth is a birth that takes place in a residence rather than health institutions in the absence of skilled birth attendant, is a significant contributor of maternal and neonatal morbidity and mortality [3].

Home births can be attended or unattended. It is usually unattended and assisted by lay person, possibly their spouse, family and friend [4]. Unattended home birth often associated with a greater risk of mortality and morbidity for the mother and her neonate [5].

Women commonly gave birth at home in the reason of previous harmful hospital birth experiences, belief that home birth is safer than the hospital, desire to avoid unnecessary interventions, previous negative or traumatic hospital birth experience, control over birth decisions and choices, dislike of hospitals health professionals, desire for privacy, trust in birth as a normal, lack of separation from baby, easier breastfeeding initiation, comfortable atmosphere, family involvement during the birth, decreased risk of infection, history of fast labor where it is difficult to get to the hospital in time [6].

Evidence shows that maternal health problems are critical public health concerns across the world and are more pronounced in Sub-Saharan Africa especially in Ethiopia. Pregnancy and childbirth are leading causes of morbidity and mortality for women of child bearing [3].

Home births are strongly associated with worse neonatal outcomes; which are a higher risk of failing APGAR score, as well as a delay in diagnosing hypoxia, acidosis and asphyxia, neonatal seizures or serious neurological dysfunction, birth trauma, cord bleeding and infection [4].

Place delivery service utilization affected by different factors includes sociodemographic, socioeconomic, obstetric and health programme related factors [7,8].

Generally, the home delivery most life-threatening causes of maternal and neonatal morbidity and mortality and still there is the prevalence is high, but the government allocates large amount of resources to overcome the problem, but still, there is one of the cores the challenge [9].

Methods

Study area

The study was carried out in Farta woreda, South Gondar zone, Amhara Region, Northwest Ethiopia. Farta Woreda is one of the 15 woreda in South Gondar Zone, situated in Amhara National Regional State, Ethiopia. South Gondar Zone is one of the 11 Zones of the Amhara National Regional State and has a total of ten rural woreda and five town administrations. Farta woreda is located 660 kilometers northwest from the capital city of Ethiopia, Addis Ababa and 103 kilometers from Bahir Dar a city of Amhara National Regional State. The woreda is divided into 31 rural and 2 urban kebeles. Based on the 2015 demographic survey projection a total of 276,144 populations in the woreda, among these 136,221 are females. The current estimate of women who gave birth within January 1, 2018, to December 30, 2018, was 6321 (832 home and 5489 institutional deliveries). In Farta woreda there are 10 health centers, 56 health posts, and 4 privet health clinics [10].

Study design and period

A community-based unmatched case-control study was conducted from March 02-18, 2019 in Farta woreda, South Gondar Zone among mothers who gave birth in the last one year.

Population

The source population for the study was all women who gave birth in last one years in Farta woreda, while the study population was all women who gave birth in the last one years between January 1, 2018, to December 30, 2018, in randomly selected kebeles. Cases were women who gave birth at home in the last one years. Controls were women who give birth at health institution in the last one years in Farta woreda. Inclusion criteria for both cases and controls All mothers who gave birth in the last one year regardless of their birth outcomes status and fulfills the definition of cases and controls. Women with mental illness and severe illness were excluded from the study because it was considered that they could not give necessary information.

Sample size determination and sampling techniques

The sample size was calculated by using EPINFO 7 STAT calc. The required sample size was calculated by using two population proportions formula. In this regard, a 5% level of significance (two-sided) or the hypothesis of no significant difference, a power of 80% and a one to two allocation ratio of home deliveries to institutional deliveries (1:2) was assumed. Among associated factors for home deliveries taken from a literature, ANC visit was taken as a major associated factor. The proportion not attended ANC visit at all among controls to be 7.1% and cases to be 35.9%, detect an odds ratio of 5.15 from the least significantly associated factor; which is time to reach the health center takes greater than 2 hours. Based on the above assumptions, the sample size was 125 [11]. Therefore, Total sample size with design effect 2 and 10% of non-response rate was 276 (92 cases and controls 184).

By using a multistage sampling technique, first kebeles were stratified in to urban and rural. Then nine out of 33 kebeles were selected by simple random sampling methods to get the representative sample size. The household which contains women who gave birth in the last one years were listed out from family folder of health extension workers (HEW) and house to house survey was conducted with their corresponding household identification number. Using respective household identification number; frames of households containing study subjects defined as cases and controls was prepared for each selected kebeles. Then study participants allocated proportionally to each kebeles based on the distribution of women who gave birth in the last one years in each selected kebeles. Then after the study participants were selected by using simple random sampling technique (lottery method). When there was more than one eligible mother in the selected household, lottery method was used to select either of the mothers. Participant in the selected household was also not present at the time of data collection, at least three revisits was made to interview the women.

Study variables

In this study home birth is the dependent variable while socio-demographic characteristics, reproductive and obstetric characteristics and healthcare related factors were considered as explanatory variables.

Data collection tools and procedures

A structured questionnaire was constructed after a thorough literature search and considering the local situation of the study area and purpose of the study. It was initially prepared in English and translated into local language (Amharic). It was then checked for consistency back translation to English by language experts. A pretest was done before the survey; based on the pretest result, a questionnaire was corrected to ensure clarity, wording, and logical sequence and skip patterns. Data was collected by using a pre-tested and structured

questionnaire administered by face to face interviews. Four diploma midwives were used for data collectors; two-degree midwives' supervisors were assigned.

Data quality assurance

To ensure the quality of data, data collection tool was preparing after intensive review of relevant literature, technical training was given for data collectors and supervisor for one day and pre-test was carried out on 5% (n = 14) of sample size on D/eyesus kebele that has similar characteristics with the study population. The collected data was checked for the completeness, accuracy and clarity by supervisors and principal investigators daily during data collection period. Then necessary correction was done accordingly to the aims of the study. The principal investigator and supervisor was done ongoing checking each day during the data collection period to ensure the quality of data.

Data processing, analysis and interpretation

Data was checked for its completeness and consistency by supervisors and principal investigators during data collection period. The collected data was cleaned, coded and entered using epidata version 3.1 then exported to SPSS version 23 for analysis. Descriptive analysis was conducted to summarize the data. Binary logistic regression analysis was executed to see the association between the independent and outcome variable. All explanatory variables with $p < 0.2$ were entered into multivariable logistic regression analysis and significant association was identified based on $p < 0.05$ and adjusted odd ratio (AOR) with 95% CI. The final model was fitted using the Hosmer-Lemeshow Goodness of Fit test. The final result of the study was presented in the form of texts and tables.

Result

Socio-demographic characteristics of the participants

A total of 276 study participants were included, making a response rate of 100%. The median age among cases was 34 (IQR ± 8) years and the mean age among control was 30.21 (SD ± 6.04) years and ranging from 17-44 years. Nearly half of the cases were married 45 (45.9%) and 151 (82.1%) of control was orthodox Cristian followers. Majority of cases 76 (82.6%) and one-third 61 (33.2%) of controls were no formal education. Forty-six (50%) of cases and 43 (23.4%) of controls were housewife and farmer by occupation respectively. Around 61 (66.3%) of cases and 93 (50.5%) of controls did not have a radio or television.

Regarding husband's education, 47 (56.6%) of cases and 63 (36%) of controls had no formal education, 14 (16.9%) and 47 (26.9%) of cases and controls had secondary and above education respectively. And on husband's occupation status, 66 (79.5%) of cases and 119 (68%) of the controls were farmers (Table 1).

Variable		Cases (%)	Controls (%)	X^2 Square, df, P-value
Age	15-24	9(9.8)	29(15.8)	X^2=22.269
	25-34	38(41.3)	116(63)	df=2
	≥ 35	45(48.9)	39(21.2)	p-value=0.000
Marital status	Married	48(52.2)	118(64.1)	X^2=3.658, df=1
	Others*	44(47.8)	66(35.9)	p-value=0.056
Religion	Orthodox	82(89.1)	151(82.1)	X^2=2.328, df=1
	Muslim	10(10.9)	33(17.9)	p-value=0.211
Ethnicity	Amhara	74(80.4)	144(78.3)	X^2= 0.193
	Oromo	8(8.7)	17(9.2)	df =2
	Tigrie	10(10.9)	23(12.5)	p-value=0.908

Maternal Education	No formal education Primary (1-8) Secondary and above	76(82.6) 10(10.9) 6(6.5)	61(33.2) 68(37) 55(29.9)	X^2= 60.148 df= 2 p-value=0.000
Maternal occupation	Housewife Farmer Employed™ Other**	58(63) 20(21.7) 1(1.1) 13(14.1)	43(23.4) 33(17.9) 16(8.7) 92(50)	X^2= 53.351 df= 3 p-value= 0.000
Husband Education (n = 258)	No formal education Primary (1-8) Secondary and above	47(56.6) 22(26.5) 14(16.9)	63(36) 65(37.1) 47(26.9)	X^2= 9.883 df= 2 p-value= 0.007
Husband occupation (n = 258)	Farmer Employed™ Others**	51(65.4) 17(21.8) 10(12.8)	104(68.4) 22(14.5) 26(17.1)	X^2= 2.305 df= 2 p-value= 0.316
Residence	Urban Rural	14(15.2) 78(84.8)	31(16.8) 153(83.2)	X^2= 0.119, df= 1 p-value= 0.730
Have radio or TV	No Yes	61(66.3) 31(33.7)	93(50.5) 91(49.5)	X^2= 6.177, df= 1 p-value= 0.013
Family size	< Four ≥ Four	25(27.2) 67(72.8)	86(46.7) 98(53.3)	X^2= 9.765, df= 1 p-value= 0.002

Table 1: *Socio-demographic characteristics of the participants (n = 276) in Farta woreda, South Gondar zone, Northwest, Ethiopia, 2019.*

**Marital status include: single, divorced, widowed and separated ™civil servant and merchant **student, daily laborer.*

Reproductive and obstetric related characteristics of participants

Near to half of cases 45 (48.9%) and 58 (31.8%) of controls had gravidity of 4+ and 26 (28.3%) of cases and 40 (21.7%) of controls had a stillbirth in their lifetime. Forty-six (50%) of cases and 111 (60.3%) of controls were planned last pregnancy. Around 36 (47.7%) of cases and 127 (69%) of controls had ANC visits during their last pregnancy. Out of these, ANC follow up started at the time of first trimester among the cases and controls were 7 (16.7%) and 26 (18.1%) respectively (Table 2).

Variable		Cases(%)	Controls(%)	X^2 square, df, P- value
Age at marriage (n = 224)	<18	60(85.7)	123(79.9)	X^2 square= 1.099, df= 1
	≥18	10(14.3)	31(20.1)	P- value= 0.294
Age at 1st pregnancy (n = 239)	<20	59(73.8)	110(69.2)	X^2 square=0.536, df= 1
	≥20	21(26.2)	49(30.8)	P- value = 0.464
Gravidity	Once	12(13)	42(22,8)	X^2 square= 9.149
	Twice	17(18.5)	46(25)	df = 3
	Three	18(19.6)	38(20.7)	P- value= 0.027
	Four and above	45(48.9)	58(31.5)	
Parity	Primipara	23(25)	56(30.4)	X^2 square= 0.887, df = 1
	Multipara	69(75)	128(69.6)	P- value= 0.346
No of surviving children	0-2	11(12.0)	47(25.5)	X^2 square= 6.821, df = 1
	>2	81(88.0)	137(74.5)	P- value= 0.009
Ever had stillbirth	No	66(71.7)	144(78.3)	X^2 square= 1.434, df = 1
	Yes	26(28.3)	40(21.7)	P- value= 0.231
No of stillbirth(n=127)	1	32(66.7)	60(75.9)	X^2 square= 1.289, df = 1
	≥ 2	16(33.3)	19(24.1)	P- value= 0.256
Planned last pregnancy	No	46(50)	73(39.7)	X^2 square= 2.666, df = 1
	Yes	46(50)	111(60.3)	P- value= 0.102
Had ANC visit	No	56(60.9)	57(31)	X^2 square=22.664, df=1
	Yes	36(39.1)	127(69)	P- value= 0.000
No of ANC visits(n=186)	1-3 visit	15(46.9)	65(49.6)	X^2 square= 0.013, df = 1
	Four and above	17(53)	66(50.4)	P- value= 0.910
Timing of ANC visit(n=186)	< 12 week	7(21.8)	26(19.8)	X^2 square= 1.851
	13-28week	13(40.6)	57(43.5)	df = 2
	>28weeks	12(37.5)	48(36.6)	P- value= 0.396
Place of ANC visit(n=186)	Health post	9(28.1)	24(18.2)	X^2 square= 2.329
	Health center	16(50)	62(47.3)	df = 2
	Hospital	7(21.8)	45(34.4)	P- value= 0.312
Previous place of delivery	Home	51(55.4)	62(33.7)	X^2 square=11.98, df= 1
	Health facility	41(44.6)	122(66.3)	P- value= 0.001

Do you know danger sign of pregnancy?	No Yes	44(47.8) 48(52.2)	46(25) 138(75)	X^2 square=14.542, df= 1 P- value= 0.000
Knowledge about danger signs of pregnancy	Poor knowledge Good knowledge	40(43.5) 52(56.5)	53(28.8) 131(71.2)	X^2 square= 5.911, df = 1 P- value= 0.015
Do you know danger sign of labor and delivery?	No Yes	44(47.8) 48(52.2)	59(32.1) 125(67.9)	X^2 square= 6.513, df = 1 P- value= 0.011
Knowledge about danger sign of labor and delivery	Poor knowledge Good knowledge	40(43.5) 52(56.5)	48(26.1) 136(73.9)	X^2 square= 8.542, df= 1 p-value= 0.003
Do you know bad obstetrical history?	No Yes	44(47.8) 48(52.2)	74(40.2) 110(59.8)	X^2 square= 1.451, df= 1 p-value= 0.228
General knowledge of obstetric complications	Bad knowledge Fair knowledge Good knowledge	51(55.4) 20(21.7) 21(22.8)	82(44.6) 52(28.3) 50(27.2)	X^2 square= 2.954 df = 2 p-value= 0.228

***Table 2**: Reproductive and obstetrical factors of the participants in Farta woreda, South Gondar zone, Northwest, Ethiopia, 2019.*

Regard to knowledge of pregnancy danger signs; 40 (43.5%) of cases had "poor knowledge" but 131 (71.2%) of controls had "good knowledge". Fifty-one (55.4%) of cases and 50 (27.2%) of controls had bad and good knowledge respectively with respected to general knowledge of obstetric complications. Both vaginal bleeding and decreasing or loss of fetal movement were the commonly mentioned danger signs during pregnancy among cases and control group by (77% and 71.7%) and (73.8% and 69.1%) respectively. Whereas severe headache (57.5%) among cases and fever (58.6%) among controls. From knowledge of obstetric complications, three most common complications revealed by cases were hemorrhage (76.5%), prolonged/obstructed labor (68.6%) and IUFD (58.8%) and controls were hemorrhage (86.1%), preeclampsia and eclampsia (60.7%) and prolonged/obstructed labor (59%) respectively (Table 3).

Variables		Cases (%)	Controls (%)
Types of pregnancy danger signs	Fever	32(52.5)	89(58.6)
	Convulsion	26(42.6)	79(52)
	Decreasing fetal mov't	45(73.8)	105(69.1)
	Vaginal bleeding	47(77)	109(71.7)
	Severe abdominal pain	18(29.5)	60(39.5)
	Blurring of vision	24(39.3)	67(44.1)
	Severe headache	35(57.4)	84(55.3)
	Likeage of liquor	28(45.9)	63(41.4)
Types general obstetric complication	Hemorrhage	39(76.5)	105(86.1)
	Prolonged/obstructed labor	35(68.6)	72(59)
	Infection	9(17.6)	33(27)
	Fistula	13(25.4)	31(25.5)
	IUFD/stillborn	30(58.8)	71(58.2)
	Preeclampsia/ eclampsia	25(49)	74(60.7)
	Uterine rupture	17(33.3)	47(38.5)

***Table 3:** Types of obstetric danger signs and complication spontaneously reported by respondents, in Farta woreda, South Gondar zone, Northwest, Ethiopia, 2019.*

Reasons for home delivery

Major reasons of home delivery claimed by the study participants were previous experience of delivery outside health facility were; 27 (29.3%) of cultural or traditional beliefs, 21 (22.8%) of privacy concern and 44 (47.8%) of due to others reason like; short and fast labor, lack of person accompanying them to the health facility, presence of TBA and getting closer attention from relatives in their house by 15 (16.3%), 12 (13%), 10 (10.9%) and 7 (7.6%) respectively.

Health care related problems of the study participants

Majority 85 (92.4%) of cases and 174 (94.6%) of controls said that have health facility in yours's kebeles. Median times to travel to the nearest health facility for cases and controls were 45 (IQR ± 95.75) minute and 52.5 (IQR ± 90) minutes respectively. Concerning mode of transport, 70 (76.1%) of cases and 89 (48.4%) of controls cited walking by foot. Majority 80 (87%) of cases and two-third 139 (75.5%) of controls did not getting ambulance services. Regarding to counseling and ANC provider 61 (67.8%) of cases and 138 (75.4%) of controls as well as 30 (33%) of cases and 70 (38%) controls were getting service by health workers and midwives respectively (Table 4).

Variable		Cases (%)	Controls (%)
Have health facility in your kebeles?	No	7(7.6)	10(5.4)
	Yes	85(92.4)	174(94.6)
Time taken to reach health facility	< 60 minute	25(27.2)	86(46.7)
	≥ 60 minute	67(72.8)	98(53.3)
Mode of transportation	Foot	70(76.1)	89(48.4)
	Others*	22(23.9)	95(51.6)
Getting ambulance service	No	80(87)	139(75.5)
	Yes	12(13)	45(24.5)
Counseling provider (N = 273)	Health worker	61(67.8)	138(75.4)
	Women dev't army	5(5.6)	11(6.0)
	Family	24(26.7)	34(18.6)
ANC care provider (N = 275)	Nurse	37(40.7)	57(31)
	Midwife	30(33)	70(38)
	Health officer	8(8.8)	27(14.7)
	Physician	10(11)	18(9.8)
	I don't know	6(6.6)	12(6.5)

Table 4: *Health care related problem of the study participants in Farta woreda, South Gondar zone, Northwest, Ethiopia, 2019.*

Determinants of Home delivery

On binary logistics regression analysis; age, marital status, maternal education and occupation, husband's education, family size, have radio and TV, gravidity, number of live births, planned last pregnancy, ANC visit, previous place of delivery, knowledge about obstetrics danger signs during pregnancy, labor and delivery, mode of transportation, availability of ambulance of service and time taken to reach health facility were associated with home delivery.

The multiple logistic regressions analysis; by using backward stepwise method revealed that age and education of the mother were identified as socio-demographic determinant factors for home delivery; while had ANC for the last pregnancy and previous place of delivery were the identified factor that were related to reproductive and obstetrical characteristics and also mode of transportation was identified factors related to health care system related problem.

Home delivery was 69.9% lowering than among mothers who ages 25 - 34 years [AOR = 0.3, 95% CI = 0.15 - 0.62] compared with a mother who ages 35 and above years. Respondents with no formal education were more likely to deliver at home than those mothers who attend secondary and above education [AOR = 11.1, 95% CI = 3.44 - 35.97]. Those women didn't have ANC for the last pregnancy were 2 times increases home delivery [AOR = 2.4, 95% CI = 1.27 - 4.89] than those had ANC. Previous place of delivery were determinants of home delivery. Mothers who had previously gave birth at home were 3 times increases home delivery [AOR = 2.8, 95% CI = 1.44 - 5.70] than women previously delivered in health facility. Transportation on foot were 2 times increases home delivery [AOR = 2.4, 95% CI = 1.19 - 4.93] as compared to those mothers who getting an access of ambulance and public transport services (Table 5).

Variable		Place of delivery		COR(95% CI)	AOR(95% CI)	P-value
		Cases(HD)	Controls(ID)			
Age	15-24	9(9.8)	29(15.8)	0.269(0.114-0.637)	0.33(0.09-1.25)	0.102
	25-34	38(41.3)	116(63)	0.284(0.162-0.499)	0.301(0.145-0.624)	0.001*
	≥ 35	45(48.9)	39(21.2)	1	1	
Maternal Education	No formal education	76(82.6)	61(33.2)	11.421(4.609-28.303)	11.12(3.44-35.97)	0.0001*
	Primary (1-8)	10(10.9)	68(37)	1.348(0.461-3.941)	1.16(0.428-6.08)	0.48
	2º and above	6(6.5)	55(29.9)	1	1	
Husband education	No formal education	47(56.6)	63(36)	2.505(1.236-5.075)	0.466(0.157-1.385)	0.17
	Primary (1-8)	22(26.5)	65(37.1)	1.136(0.527-2.449)	0.669(0.217-2.065)	0.485
	2º and above	14(16.9)	47(26.9)	1	1	
Have radio or TV	No	61(66.3)	93(50.5)	1.925(1.145-3.239)	0.68(0.33-1.41)	0.304
	Yes	31(33.7)	91(49.5)	1	1	
Family size	< Four	25(27.2)	86(46.7)	0.425(0.247-0.732)	0.839(0.340-2.071)	0.703
	≥ Four	67(72.8)	98(53.3)	1	1	

Gravidity	Once	12(13)	42(22,8)	0.368(0.174-0.780)	0.44(0.09-2.07)	0.299
	Twice	17(18.5)	46(25)	0.476(0.242-0.939)	0.953(0.351-2.586)	0.925
	Three	18(19.6)	38(20.7)	0.611(0.308-1.208)	1.176(0.429-3.219)	0.753
	Four and above	45(48.9)	58(31.5)	1	1	
No of children	0-2	11(12.0)	47(25.5)	0.396(0.194-0.806)	0.301(0.055-1.666)	0.169
	>2	81(88.0)	137(74.5)	1	1	
Planned last pregnancy	No	46(50)	73(39.7)	1.521(0.918-2.518)	1.161(0.549-2.453)	0.696
	Yes	46(50)	111(60.3)	1	1	
Had ANC visits	No	56(60.9)	57(31)	3.466(2.056-5.844)	2.493(1.270-4.891)	0.008*
	Yes	36(39.1)	127(69)	1	1	
Previous place of delivery	Home	51(55.4)	62(33.7)	2.448(1.466-3.086)	2.866(1.440-5.703)	0.003*
	Health facility	41(44.6)	122(66.3)	1	1	
Knowledge of pregnancy danger signs	No	44(47.8)	46(25)	2.750(1.622-4.662)	1.676(0.827-3.397)	0.152
	Yes	48(52.2)	138(75)	1	1	
Knowledge of labor and delivery danger signs	No	44(47.8)	59(32.1)	1.942(1.163-3.244)	1.892(0.623-5.739)	0.26
	Yes	48(52.2)	125(67.9)	1	1	
Time taken to reach health facility	< 60 minute	25(27.2)	86(46.7)	0.425(0.247-0.732)	0.527(0.257-1.081)	0.081
	≥ 60 minute	67(72.8)	98(53.3)	1	1	
Mode of transportation	Foot	70(76.1)	87(48.4)	3.548(2.027-6.209)	2.42(1.187-4.932)	0.015*
	Others	22(23.9)	97(51.6)	1	1	
Getting ambulance service	No	80(87)	139(75.5)	2.158(1.079-4.319)	1.51(0.61-3.73)	0.372
	Yes	12(13)	45(24.5)	1	1	

Table 5: *Binary and multivariable logistics regression of determinants of home delivery in Farta woreda, South Gondar zone, Northwest, Ethiopia, 2019.*

**Significant p-value < 0.05, HD = Home delivery; ID = Institutional delivery; Hosmer and Lemeshow Test = 0.771.*

Discussion

Women who were at age group of 25 - 34 years 69.9% lowering of home delivery as compared to age group of 35 and above years. The reason for this could be many older women as experts in matters concerning childbirth at home. Additional explanation could be due to the fear of ridiculous to them to go to the healthcare facilities. Also, older women may be having long to older traditional cohorts and thus be less likely to use modern facilities. This finding also supported with studies in Zambia [12], Ghana [13], Kenya [9], Ethiopia [14], Eastern Tigray [15] and Dejen [16].

However, the finding of this study is contrary with the study done in Bhutan [17] and Ayssaita Afar, Ethiopia [8]. The possible reason it could be teenagers are choosing home delivery because they were often scolded and preached to by care providers for becoming pregnant at early age.

Level of education is another predictor of home delivery. Mothers education is no formal related to home delivery. This finding agrees with studies findings of Zambia [12], Tanzania [18], Kenya [9,19,20], Ghana [13], Ethiopia [14], Sothern Ethiopia [21,22], South Wollo [23], Debre Marcos [24] and Bahirdar [7]. The likely explanation could be mothers with increased levels of education are more aware of the importance of delivering in a healthcare facility. They are also in a better position to appreciate health education messages and act on them. In addition, women with increased levels of education have high self-confidence and feel comfortable delivering in healthcare facilities. Education could influence women's overall empowerment enhancing their ability to have self-determination, access to information, and financial freedom to support themselves to take transport to a health facility and pay for (if applicable) for services, as well as to easily absorb health messages through the media and from health professionals. These could collectively influence mothers' awareness to seek better medical services, including delivering in health facilities.

In the other hand; non educated women might not have a decision making power on seeking health services or have ability to travel outside the home; they are more exposed to family pressure and cultural influences.

The World Health Organization [WHO] recommends that women without complications should have at least four antenatal visits, which is one visit in each trimester [25]. Women who attend ANC services in their last pregnancy were more likely delivered in health institution. The finding similar with studies done in Nepal [26], Ghana [13], Eastern Tigray [15], Dejen [16] and Debre Marcos [24]. The possible reason could be ANC services can provide opportunities for health worker to promote a specific place of delivery or give women information about the actual status of their pregnancy and risk of home delivery which in turn alerts them to decide where to deliver. Additionally, explained by Antenatal care is the most favorable contact point for mothers to get more information about risks and problems they may encounter during delivery.

This finding demonstrated the fact that previous place of delivery affects women attention and attitude for current place of delivery. Mothers who had previous experience of home delivery were less likely delivered at health facilities. This finding is in line with a studies findings in Kenya [20], Southern Ethiopia in Anlemo district [27] and Debre Marcos [24]. The reason could be mothers with no previous experience of delivery complication, fear of surgical procedure at health facility, cultural reason, urgent labor and no transport access during labor. And also highly associated with lack of access to transportation and lack of awareness of the complication related to home delivery.

In the other hand; mothers who had the history of institutional delivery have practical experience about the life treating conditions than those who did not. This experience could motivate the mother to give birth at health institution than home delivery.

Transportation is an important barrier to accessing obstetric care for many pregnant and postpartum women in low-resource settings, particularly in rural areas [28]. Walking by foot is the predominant form of transportation in rural Africa [23]. In this finding; transportation on foot was twofold increases home delivery compared to those mothers using ambulance and public transport. The reason could be due to as a result of the poor infrastructure, lack of access ambulance and motorized transport for obstetrics emergency at time of labor and delivery. Another reason could be many pregnant women do not even attempt to reach a facility for delivery since walking many kilometers is difficult in labor and impossible if labor start at night. And this finding also supported with the studies done in Bangladesh [29], Nepal [26], Eretria [30] and western Ethiopia [3] and Eastern Tigray [15].

Limitation of the Study

The sampling frame was constrained to the records of mothers who gave birth at a health institution or home as contained in the Farta woreda family folder, which may not be comprehensive.

Due to time and logistic constraints this study used only quantitative approach which could not address the "why" questions in detail.

Conclusion and Recommendations

Maternal age between 25 - 34 years, mothers with no formal education, mother who were not attend ANC, mother who delivered previously at home and transportation on foot were significant predictors of home delivery in the study area. Therefore, better to encourage women to pursue their education at least primary school level, increase both ambulance and public transport service, provide counseling, health education and improving awareness the importance of ANC services as well as complication readiness to decrease home delivery. Focus on strengthening of the provision of information, education and communication (IEC) about place of delivery and its related complication.

Ethical Approval

Ethical clearance was obtained from the institutional review board of the College of Medicine and Health Science of Bahir Dar University. A further letter of permission was also granted from Farta Woreda health office and their respective kebeles where necessary. Informed verbal consent was obtained from all participants before data collection and confidentiality was maintained by anonymous recording and coding. The aim of the study was informed for each participant and the study participants was had a right to refuse or discontinue participating in the research without any restriction.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests regarding the publication of this paper.

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Author Contributions

BGK: conceived and designed the study, conducted statistical analysis and result interpretation; BGK, AAN, THW, FYB, ADA and GNM: edition, prepared manuscript, assisted with data analysis and interpretation. All authors read and approved the manuscript.

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