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PREDICTORS OF HOME DELIVERY AMONG CHILD BEARING AGE (15-49) WOMEN IN WONAGO DISTRICT, SOUTHERN ETHIOPIA; UNMATCHED CASE CONTROL STUDY

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ABSTRACT

Background: Delivery care through access to health facilities and skilled health personnel is the main important intervention for safe motherhood. Institutional delivery service utilization reduces maternal morbidity and mortality. Despite, institutional delivery assisted by skilled attendants given for free, nearly one third of pregnant mothers give birth at home. This study was tried to identify predictors of home delivery among Child Bearing Age (15-49years) Women in Wonago District, Southern Ethiopia, 2018. **Methods:** unmatched case-control study was conducted from May-June 2018. The total Sample size for this study was 512 from which 170 cases and 342 controls. Simple random sampling technique was employed to select study participants. Interviewer administrated structured questioner was used to collect data for quantitative study. Quantitative data were analysed using SPSS version 20.0 software. Descriptive statistics was employed to describe each variables and Multi variable logistic regression analysis was used to identify independent predictors of home delivery. Crude odds ratio (OR) and 95% confidence interval (CI) for each variable of interest was calculated. P < 0.05 was considered as statistically significant. **Results:** The main reasons for home delivery among cases were 84 (33.2%) need family support, 68(26.9%) did not know the expected date of delivery followed by lack of transportation access 31(12.3%). In this study antenatal care visit is one of the important predictor in determining home delivery; women who had few ANC visits were less likely to delivery at health institutions (AOR=.065, 95%CI: (.027-.159) compare to those who had more ANC visits. **Conclusion:** Number of Antenatal care visits, perceived husband support, Knowledge about pregnancy related danger signs and perceived quality of care were significant factors associated with home delivery. Therefore, those Healthcare providers should take the opportunity to encourage mothers to attend institutional delivery services and to improve institutional delivery and creating awareness towards impact of home delivery.

KEY WORDS: Unmatched Case Control, Home Delivery, Wonago District, Predictors, Child Bearing Age (15-49) Women and Southern Ethiopia.

INTRODUCTION

Delivery care through access to health facilities and skilled health personnel is the main important intervention for safe motherhood. Historically, increasing women's access to health facilities with the capacity to provide emergency obstetric care has been the cause for large drops in maternal mortality.[1] Maternal mortality refers to deaths due to complications from pregnancy or childbirth. Childbirth in a Health facilities attended by trained medical staff reduces the rates of maternal and neonatal mortality and morbidity than home births. Reducing maternal morbidity and mortality is a global priority which is particularly relevant to developing countries like Ethiopia. One of the key strategies for reducing maternal morbidity and mortality is increasing institutional delivery.but in developing nations, where women may not be able to afford medical Care, then home birth may be the only option available.[2,3]

About 830 women die from pregnancy- or childbirth-related complications around the world every day. It was estimated that in 2015, roughly 303 000 women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented.[4]

The high number of maternal deaths in some areas of the world reflects inequities in access to health services, and

highlights the gap between rich and poor. Almost all maternal deaths (99%) occur in developing countries. More than half of these deaths occur in sub-Saharan Africa and almost one third occur in South Asia.[5]

Most obstetric complications could be prevented or managed if women had access to skilled birth attendants during childbirth. Globally, almost 80 per cent of live births occurred with the assistance of skilled health personnel in the latest period 2012-2017 up from 62 per cent in the 2000-2005 periods with largest progress occurring in the last 10 years. However, coverage and the rate of progress have varied across regions. Central and Southern Asia has shown the greatest rate of progress from 40 per cent coverage in the 2000-2005 periods to 77 percent in the 2012-2017 periods. Sub-Saharan Africa has also shown progress over the same period, and by 2012-2017 over 50% of births was attended by skilled health personnel.[6]

One of the factors associated with this maternal mortality is the occurrence of home deliveries in developing countries as they are largely unplanned, accidental and unhygienic. Poor women in remote areas are the least likely to receive adequate health care. This is especially true for regions with low numbers of skilled health workers, such as sub-Saharan Africa and South Asia.[7]

Other factors that prevent women from receiving or seeking care during pregnancy and childbirth are: poverty, distance, lack of information inadequate services cultural practices. To improve maternal health, barriers that limit access to quality maternal health services must be identified and addressed at all levels of the health system.[8,9]

In the era of the Sustainable Development Goals, targeted to reduce the global maternal mortality ratio to less than 70 per 100 000 by 2030; large proportion of pregnant women are still delivering at home with no skilled attendant. Limited empirical studies have been carried out to understand the factors associated with delivery at home. Despite the remarkable progress made in reducing maternal mortality in Ethiopia. However, access to health facilities in rural areas is more difficult than in urban areas because of distance, inaccessibility, and the lack of appropriate facilities. Although, institutional delivery has been promoted, home delivery is still common, primarily in hard-to-reach areas. Only Twenty six percent of live births were delivered in a health facility.[10,11]

Place of delivery is a crucial factor which affects the health and wellbeing of the mother and new-born. Institutional delivery helps the women to access skilled assistance, drugs, equipment, and referral transport. According to EDHS 2016, 34% of pregnant women received at least one antenatal care from a skilled provider; Despite the policy change stopping traditional birth attendants (TBAs) from conducting deliveries at home and encouraging all women to give birth at the clinic under skilled care, many women almost one third of pregnant women still give birth at home TBAs are essential providers of obstetric care in rural Ethiopia. Factors influencing mothers' decisions to use facility-based delivery services in study area were not well understood. This study was tried to identify predictors of home delivery in study area.

METHODS

Study area and period

The study was conducted in Gedeo Zone Wonago District. It is located 375 Km to the south of Addis Ababa and 105 km to the south of regional capital, Hawassa between 6° 19' 0 North latitude and 38° 16'0 east longitude with an elevation of 1788 meters above sea level. Based on the 2007 CSA population projection the total population of the District estimated to be 145,635. The District has four urban and 17 rural Keble's. Most of the people depend on traditional subsistence agriculture for a living. The main crops produced in the area are coffee, Enset and maize. Regarding health facility there are six health centres, 20 health posts, two private clinics and three pharmacies are available in the District. The study was conducted from May- June 2018.

Study design

Community based unmatched case-control study design supplemented with qualitative component was employed to determine predictors of home delivery among reproductive age (15-49 years) women in Wonago District, Southern Ethiopia.

Source Population

All reproductive age women (15-49) residing in the District.

Study population

The study population was all reproductive age women (15-49) who gave birth in the last one year preceding data collection period in selected Keeble's.

Study unit

Cases: Mothers who had given birth at home in the last one year preceding data collection period in selected Keeble's.

Controls: - Mothers who had given birth at health institution in preceding last one year during data collection period.

Inclusion criteria

Mothers who had given birth in the last one year

Mothers who fulfils definition of cases and controls.

Exclusion Criteria

Mothers who are critically ill and unable to respond.

Sample size determination

A proportion formula (EPI info software statcalc version 7.1.3.) was used to estimate the sample size required for the study. The following assumptions were made to estimate sample size required for the study. A 95% confidence interval and 90% power were used.56% of births to mothers who attended four and above ANC visits were delivered in a health facility were used as exposure variable for control from EDHS 2016 in the assumption that Antenatal care increases the likelihood of an institutional delivery (20). The calculated sample size to detect an odds ratio of 2.0 and case: control ratio of 1:2. The final estimated sample size was 155 for cases and 310 for controls. Including Non-response rate 10 %(47). The total sample size was 512.

Sampling technique/ procedure

By applying simple random sampling technique Seven Keble's were selected randomly from twenty-one Keble's (six were from rural and one from urban) to represent the District. Then all mothers who gave birth in the last one year were identified in each kebele in two categories through survey. Separate sampling frame was developed by compiling list of mothers who gave birth in the last one year period. The sample was allocated proportionally to represent each Kebele. Simple random sampling was used to select study participants for cases and controls in each kebele according to the allocated number. For every case there were two controls. For qualitative study purposive sampling was used to select reproductive age women residing in the selected kebele who had given birth at home in the last one year, who have a willingness to participate in the study and those who do not participate in the quantitative study was chosen.

Data Collection Technique and procedure

A structured questionnaire adopted from different literatures and published studies were developed and then modified to local context. The questionnaire was prepared originally in English and then was translated to Amharic and to local language Gede'uffa. Different persons who are language experts made retranslation back to English for checking consistencies.

The edited final Gedde'uffa version was used for the actual interview. Nine data collectors, who were Grade 10 complete and above, who can speak local language (Gede'uffa) were selected. One BSc Nurse from the District was selected to supervise the data collectors and check the questionnaire for its completeness and consistency at the end of each data collection day. Both the interviewer and supervisor were given a one day training by principal investigator on the aim of study, confidentiality and data collection techniques by going through the questionnaire on each question.

Focus group discussion (FGD) and in-depth interview was chosen as the tool for qualitative data collection. It aimed to explore and share the experiences of participants on predictors of home delivery. The supervisor assisted recruitment of participants. Three FGDs each with 10-12 women and three in-depth interviews with the mothers were undergone.

The study participants had at least one child in the past one year and were permanent residents in the area. The discussions were designed to gather information on predictors of home delivery. Before the discussion the moderator introduced all participants, the general purpose of the study and topic of the discussions. The participants were informed about the recorder and permission to be recorded was requested. Informed verbal consent was obtained from all individuals participating. The discussion generally took place at the nearest health facility. The principal investigator and trained data collectors led the discussion and it was recorded. Gede'uffa was the language used in all the sessions. The moderator used the topic guide to direct the discussion and cover all of the relevant topics the questions were selected in relation to the research objectives while taking into account local knowledge and cultural sensitivities. The sequence of the topics generally moved from the more general to the specific questions.

Variables of the study

Dependent Variable

Home delivery

Independent Variables

Socio-demographic and economic characteristics:

Age, Marital status, Educational status, Occupation, Family size, Monthly income, husband educational status and distance from health facility

Reproductive Health Related Variables

- Number of ANC visits
- Gestational age at first ANC visit
- Parity
- Pregnancy related danger signs
- Age at first pregnancy

Service Related Variables:

- ANC services attendance
- Health care providers respect
- Husband support

Home delivery: Refers to as non-skilled delivery in a non-clinical setting.

Institutional delivery: Refers to delivery that takes place at the health centre or a hospital.

Cases (Home delivery): Mothers who had gave birth at home in last one year.

Controls (Institutional delivery): Mothers who had gave birth at health Institution in last one year.

Data processing and analysis

The completed questionnaire from each study participant was checked for completeness by the principal investigator. Codes were given to the completed

questionnaires were entered using SPSS 20.0 statistical package for Social Sciences. Data editing and cleaning was performed to check for accuracy, consistency & missing values. Data was summarized and descriptive statistics was computed for all variables according to type. Frequency, mean and standard deviation was calculated for continuous variables and categorical variables were assessed by computing frequencies. Crude odds ratio (OR) and 95% confidence interval (CI) for each variable of interest was calculated. Finally, all variables that was found at p <0.25 under Bivariate analysis were entered into multiple logistic regression models and adjusted odds ratio was also calculated for each exposure variables to see the effect of the independent variables on the dependent variable by controlling for confounders. P < 0.05 was considered as statistically significant. For qualitative study the audio recorded from the discussions were transcribed in full text and translated from Gede'uffa to Amharic and to English. Thematic analysis was used to analyse data. The analysis was started with listening of the audio, reading and re-reading of the text in order to be familiar with the data, codes were created for each information's, themes were searched among codes and before producing final report defining and naming of themes were done. The themes were the category for analysis.

Data Quality Control

Quality assurance measures were undertaken during questionnaire designing, data collection and data management process. Validity of the questionnaire was maintained by using questionnaire adopted from different literatures that were used by other researchers. The questionnaire prepared in English translated to Amharic and to local language and back translated to English to check for consistency by different persons. The instrument was pre-tested on kebele other than the selected Keble's from cases and controls by administering it to a small group of people 27(5 % of the total sample) before the actual implementation of the study and little correction on words and skipping pattern of the questionnaires have been under taken accordingly. Data from pre-test finding was excluded from the actual data. The purpose of the study was explained for the mothers to make them frankly communicate with the data collectors. Intensive training was given for supervisors and data collectors. The principal investigator reviewed the questionnaires on daily basis for completeness and consistency and supervised the data collection sites throughout the stay. Cleaning and exploration of outlier responses was done before data entry and during analysis.

Ethical considerations

Ethical clearance was obtained from Dilla University, College of Medicine and Health Sciences, School of Public Health, Department of Reproductive Health ethical review Committee. Letter of Cooperation was requested from Gedio Zone Health Department and from Wonago District Health Office to have common understand on the research procedure. Verbal informed consent was obtained from all participants. Women was approached individually, giving information regarding the purpose of the study, invited to participate, assuring of confidentiality and reassuring that opting out was not compromise the care they would receive. Only those who are willing to participate were involved. Confidentiality of the interview results was maintained and identifiers were not included and information given by respondents was used only for this study purpose. The right not to respond or refuse participation was respected. Personal privacy and cultural norms was respected properly too.

RESULTS

Socio-demographic and Reproductive Health characteristics of the study participants

A total of 503 respondents (164 cases and 339 controls), participated in the study, giving a response rate of 98.2%.The mean maternal age at interview was 28.6±6.26. One-third 48 (29.3%) of cases and 127(37.5%) controls were in the age range 25-29years, Majority of cases 145 (88.4%) and 302 (89.1%) controls were married and living with their partners. Regarding the occupation of the respondent's 80 (48.8%) cases and majority 231(68.1%) of controls were housewives while their husbands occupation 107(65.2%) cases and 204(60.2%) controls were farmers. Concerning Educational status of the respondents which is 100 (61.0%) cases and 183 (54.0%) controls have no formal education, while partners educational status of cases 36(22.0%) and controls of 75(22.1%) have attended primary education. Regarding family size cases of 88 (53.7%) and controls 180 (53.1%) have a family size greater than six members (Table. 1).

Table 1: Socio-demographic characteristics of Mothers who had given birth in the last one year in Wonago District Southern Ethiopia, May- June 2018.

Variable	Cases n=164 (%)	Controls n=339 (%)
Maternal age at interview		
15-19	5 (3.0%)	4 (1.2%)
20-24	60 (36.6%)	54 (15.9%)
25-29	48 (29.3%)	127 (37.5%)
30-34	24 (14.6%)	71 (20.9%)
35-39	22 (13.4%)	52 (15.3%)
40-44	5 (3.0%)	31 (9.1%)
Marital status		
Married	145 (88.4%)	302 (89.1%)
Divorced	16 (9.8%)	21(6.2%)
Widowed	3 (1.8%)	16 (4.7%)
Educational status		
No formal education	100 (61.0%)	183 (54.0%)
Have formal education	35 (21.3%)	85 (25.1%)
Primary education	24 (14.6%)	42 (12.4%)
Secondary education	5 (3.0%)	19 (5.6%)
College and above	0 (0.0%)	10 (2.9%)
Husband educational status		
No formal education	56 (34.1%)	80 (23.6%)
Have formal education	58 (35.4%)	119 (35.1%)
Primary education	36 (22.0%)	75 (22.1%)
Secondary education	14 (8.5%)	26 (7.7%)
College and above	0 (0.0%)	39 (11.5%)
Occupation		
House Wife	80 (48.8%)	231 (68.1%)
Government employee	11 (6.7%)	31 (9.1%)
Farmer	31 (18.9%)	14 (4.1%)
Merchant	41 (25.0%)	63 (18.6%)
Others	1 (0.6%)	0 (0.0%)
Husband occupation		
Government employee	1 (0.6%)	7 (2.1%)
Farmer	107 (65.2%)	204 (60.2%)
Merchant	55 (33.5%)	117 (34.5%)
Others	1 (0.6%)	11 (3.2%)
Average family monthly income		
<600	110 (67.1%)	164 (48.4%)
600-1499	30 (18.3%)	86 (25.4%)
>1500	24 (14.6%)	89 (26.3%)
Family size		
1-3	46 (28.0%)	49 (14.5%)
4-5	56 (34.1%)	92 (27.1%)
>6	62 (37.8%)	198 (58.4%)

Significant number of cases 97 (59.1%) had first pregnancy in age group (15-19) and controls of 219 (64.6%) were in age group (20-24). Majority of cases 124 (75.6%) there age at marriage were in age group (15-19) but controls of 214 (63.1%) were in-between (20-24). Regarding parity cases 78 (47.6%) had 2-4 children, but 162 (47.8%) controls had five and above (Table 2).

Table 2: Reproductive and obstetric related characteristics of Mothers who had given birth in the last one year in wonago District, Southern Ethiopia, May- June 2018.

Variable	Cases n=164 (%)	Controls n=339 (%)
Age at first pregnancy		
15-19	97 (59.1%)	83 (24.5%)
20-24	65 (39.6%)	219 (64.6%)
25-29	2 (1.2%)	37 (10.9%)
Age at marriage		
15-19	124 (75.6%)	125 (36.9%)
20-24	40 (24.4%)	214 (63.1%)
Parity		
Primiparous	43 (26.2%)	50 (14.7%)
Multiparous	78 (47.6%)	127 (37.5%)
Grand multifarious	43 (26.2%)	162 (47.8%)
Gravidity		
Prim gravid	62 (37.8%)	85 (25.1%)
Multigravida	40 (24.4%)	99 (29.2%)
Grad multigravida	62 (37.8%)	155 (45.7%)
History of still birth		
Yes	24 (14.6%)	28 (8.3%)
No	140 (85.4%)	311 (91.7%)
Ever had abortion		
Yes	24(14.6%)	28(8.3%)
No	140(85.4%)	311(91.7%)
Knowledge about danger signs of pregnancy		
Good Knowledge	24 (32.4%)	132 (49.3%)
Poor knowledge	50 (67.6%)	136 (50.7%)

Health service factors related with Home Delivery

From all respondents 62(37.8%) of cases and the majority of controls 313 (92.3%) had ANC visits during their last pregnancy however 25 (15.2%) of cases and 130(38.3%) controls start ANC 5-7 month of gestational age from this 9 (14.5%) of cases and 287(91.7%) controls had 3 or more of ANC visits through out there pregnancy. Majority of the respondents there reason to use health institution during last delivery were 127(25.2%) for the health of mother and child, Services is given at appropriate time 78(15.5%) followed by Seeking better services 74(14.7) and the main reason for home delivery among cases were 84 (33.2%) need family support followed by 68(26.9%) I do not know the expected date of delivery (Figure 1).

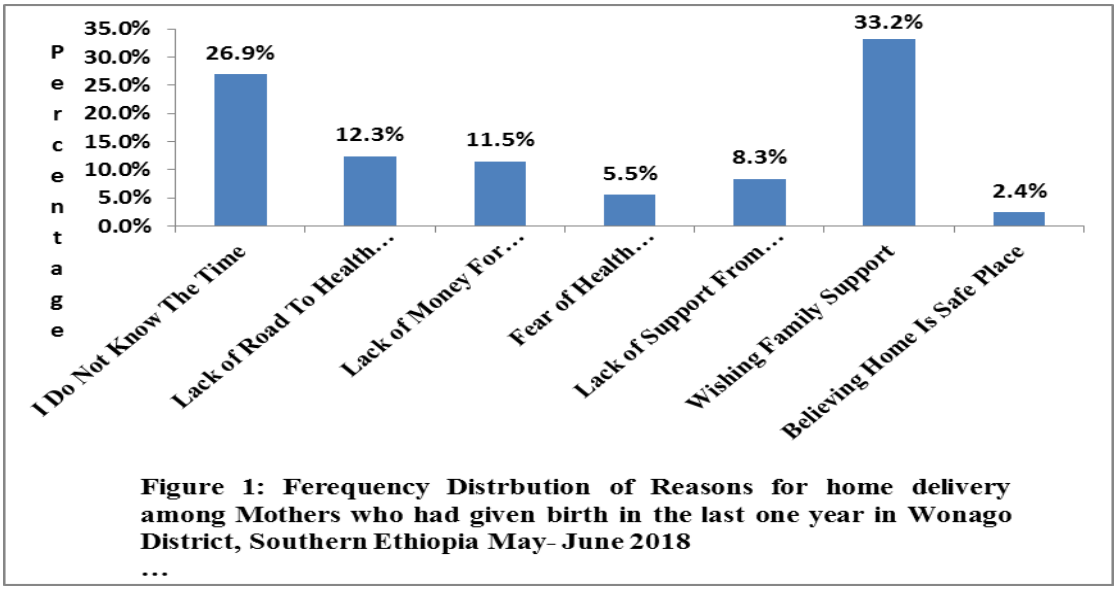

Figure 1: Ferequency Distrbution of Reasons for home delivery among Mothers who had given birth in the last one year in Wonago District, Southern Ethiopia May- June 2018

Figure 1: Frequency Distribution of Reasons for home delivery among Mothers who had given birth in the last one year in Wonago District, Southern Ethiopia May- June 2018.

Predictors of Home Delivery

Gestational Age at First ANC visit, Number of ANC visit, knowledge about danger signs of pregnancy, perceived husband support and perceived quality of care were candidate variable for multivariable logistic regression at ($p<0.25$) on bivariate analysis.

The Hosmer and Lemeshow statistic has chi-square value of 14.402 and a significance of 0.72 which means that Hosmer and Lemeshow test is not statistically significant and therefore the model is quite a good fit. Because p-value exceeds level of significance ($\alpha=0.05$), that shows, there is no significant difference between the observed and predicted model values and hence the model fits the data well. All variables P-value below 0.25 on bivariable analysis were entered into multiple logistic regression models and adjusted odds ratio was calculated for each exposure variables to see the effect of the independent variables on the dependent variable by controlling for confounders.

In multivariable analysis among variable that found significantly associated with home delivery were knowledge about pregnancy related dangers signs, perceived healthcare quality, number of ANC visit and perceived husband support.

This finding did not reveal any supporting evidence that age at interview, occupation, Marital Status, average family size, gestational age at first ANC visit to show a statistically significant difference between cases and controls.

Adjusting for other variables, in this study Knowledge about danger signs of pregnancy was a strong predictor of home delivery. Women with "poor knowledge "of pregnancy related danger signs were 89% more likely to practice home delivery compared to women with "Good knowledge "(AOR=.105, 95%CI: .016-.691.)

Participants of qualitative study believed that delivery is normal and natural and it is better to give birth at home. Mothers were less involved in maternal health related sessions. They were not aware about pregnancy related complications and advantages of maternal health care. When women died at home during delivery, many women believed these deaths were due to the unwillingness of God, and it was due to lack of chance of the mother.

Another associated factor that had significant association with home delivery was Number of ANC visits, women who had ANC visits 1-2 times were 90% more likely to deliver at home(AOR=.065, 95%CI: (.027-.159) compared to those who had 3 or more ANC visits. Findings from qualitative study shows that "Most of the time we women have many responsibilities; caring our children, and we are engaged in farm and household activities. Therefore, even though we know the presence of health facility in our kebele, we don't have time to go to the health facility. For example, given I have six children, how could I go to the health facilities leaving them alone at home? Due to this reasons I decided not to go." 35 years old married women.

"I started going to the clinic when I was 7 months pregnant; I was too sick when I was pregnant and therefore decided to go to the health facility. But I had only two ANC visits because my village is too far from the health post, so I was tired to go in my appointment days" 24 years' old married women.

Concerning respondents perception towards quality of health care services during last ANC visit mothers who didn't perceive good quality healthcare services were 80% more likely to practice home birth(AOR=.167, 95%CI:(.042-.654) compared to those who perceived good quality of healthcare services during their last ANC visit.

Participants from qualitative study pointed out as main barriers were, long distance from their home and the difficulty of transporting a laboring mother for two-three hours, very long waiting time, lack of respect for laboring mother, service given by men, in addition they mentioned that the HEWs were not available in the health posts when needed. All the participants revealed that older mothers were more accepted by the community than health professionals because of their experience and the respect to privacy of the laboring mother. They also perceived that health professionals were not good on handling and respecting the laboring mothers.

The other associated factor which had significant association with home delivery was, respondent's husbands support, women's who didn't get support by their husband for ANC follow up were 70% increased odds of practicing home birth compared to those who get support by their husbands (AOR =.314, 95%CI:.101-.976) findings from qualitative study shows(Table 3).

As 32 years old married woman told us that "They always ask permission to their husbands before they decided about what they want to do. In a similar way they have to ask for to seek care during pregnancy and delivery. At present, the HEW teaches them at home about ANC and institutional delivery. Meanwhile their husband's didn't want to visit health institution, since they have a fear of service fee."

Table 3: Health services related characteristics of Mothers who had given birth in the last one year in wonago District Southern Ethiopia, May- June 2018.

Variables	Cases n (%)	Controls n (%)
Got ANC visit for last pregnancy		
Yes	**62 (37.8%)**	**313 (92.3%)**
No	**102(62.2%)**	**26(7.7%)**
When did you get your First ANC visit		
< 4 months	**14(8.5%)**	**147 (43.4%)**
5-7 months	**25 (15.2%)**	**130 (38.3%)**
8-9 months	**10 (6.1%)**	**6 (1.8%)**
When I feel sick	**13 (7.9%)**	**30 (8.8%)**
Others	**102 (62.2%)**	**26 (7.7%)**
Number of ANC visit		
1-2	**53 (85.5%)**	**26(8.3%)**
3 or more	**9 (14.5%)**	**287 (91.7%)**
The reason to have ANC follow up		
For health of mother	**16 (9.8%)**	**85 (25.1%)**
For health of fetus	**12 (7.3%)**	**67 (19.8%)**
For both	**25 (15.2%)**	**158 (46.6%)**
I do not know	**111 (67.7%)**	**29 (8.6%)**
Source of information about ANC		
Health extension workers	**17 (10.4%)**	**74 (21.8%)**
Health professionals	**18 (11.0%)**	**140 (41.3%)**
Community Health Agents	**9 (5.5%)**	**65 (19.2%)**
Friends/relatives	**18 (11.0%)**	**34 (10.0%)**
No ANC visit	**102 (62.2%)**	**26 (7.7%)**
Do healthcare provider respect during ANC visit and delivery		
Yes	**27(16.5%)**	**270 (79.6%**
No	**35 (21.3%)**	**65 (19.2%)**
I do not know	**102 (62.2%)**	**4 (1.2%)**
Perceived waiting time to get the services		
Short time	**10 (9.8%)**	**143 (42.2%)**
Fair time	**35 (34.3%)**	**121 (35.7%)**
Long time	**57 (55.9%)**	**75 (22.1%)**
Perceived quality of health care		
Good	**10 (6.1%)**	**214 (63.1%)**
Fair	**58 (35.4%)**	**86 (25.4%)**
I do not know	**96 (58.5%)**	**39 (11.5%)**
Perceived husband support		
Supporting	**34 (20.7%)**	**262 (77.3%)**
Not supporting	**130 (79.3%)**	**77 (22.7%)**
Average Time to reach Health Institution in minutes		
<60 minutes	**88 (53.7%)**	**180 (53.1%)**
60-120 minutes	**69 (42.1%)**	**141 (41.6%)**
>120 minutes	**7 (4.3%)**	**18 (5.3%)**

DISCUSSION

In Ethiopia the proportion of women who delivered at home decreased from 95% in 2000 to 90% in 2011 and 73% in 2016[11] this remarkable progress made by government. Even though, the services provided for free, nearly one third of pregnant women give birth at home. As different studies shows that little are known about the predictors' of home delivery most of them are cross-sectional and institution based. This study was conducted in community using case control study design and has provided pertinent information on predictors of home delivery in the study area.

The main reason for home delivery among cases were 84 (33.2%) need family support, 68(26.9%) didn't know the expected date of delivery followed by poor access of transportation to health facilities 31(12.3%). This finding were similar with the study done in Northern Ethiopia and Pakistan which revealed that maternal health is affected by factors that include transport and women's education besides availability of health infrastructure and skilled health workers. Cultural beliefs, attitudes and

practices have also been found to be critical in determining place of delivery.[12,13] This is also consistent with qualitative finding from in-depth interview, a 32 years old women stated that **"*if a mother at labor did not get any transport, the only choice left for her is to give birth at home and to be exposed for life threatening situations*".**

Some of the FGDs participants stated that sudden onset of labor was also a reason for having birth at home. This finding is consistent with previous studies in Ethiopia, Tanzania and Kenya.[7,14]

Adjusting for other variables, in this study Knowledge about danger signs of pregnancy was a strong predictor of home delivery. The odds of home delivery increases by 89% among women with "poor knowledge "of danger signs of pregnancy as compared to women with "Good knowledge "(AOR=.105, 95%CI:.016-.691. This finding is consistent with a study done in Northern Ethiopia.[13]

The odds of home delivery was 8.75 times greater among women with "poor knowledge "of danger signs of pregnancy as compared to women who had "good knowledge"(AOR: 8.75, 95% CI:2.32–32.92). Similar study done in Ethiopia states that the likelihood of delivering at home was greater among mothers with inadequate knowledge of pregnancy related services (AOR = 62, 95% CI: 3, 128.4).[15] Women with good knowledge of danger signs are better able to choose preferred place of delivery and arrange for transport.[16]

The government's endeavor to improve maternal health has generated positive results with more women now attending antenatal care. Yet over 80% of women deliver at home and this was found to be the preferred option. This finding suggests that ANC follow up services give better chance to educate mothers regarding pregnancy related danger signs, expected problems and consequences of home delivery. Similar studies in Ethiopia Indicated that women with no ANC were more likely to deliver at home when compare to women who have ANC visits. In this study antenatal care visit is one of the important predictor in determining home delivery in multivariate analysis.

Another important associated factor that had significant association with home delivery was Number of ANC visits, women who had ANC visits 1-2 times were 90% more likely to delivery at home(AOR=.065, 95%CI: (.027-.159) compare to those who had 3 or more ANC visits. Women who had fewer than four antenatal care visits were more likely to give birth at home compared to those who had four or more visits.

Timely and recommended number of ANC visit is the most favourable contact point for mothers to get more information about the risks and problems they may encounter during delivery. This finding is similar with studies done in Ethiopia, Nigeria and Malawi respectively shown that Women who did not have an ANC follow-up (AOR: 10.41, 95% CI: 2.92–37.19) and those with1-3 ANC visits only (AOR: 4.75, 95% CI: 1.69–13.31) had greater odds of delivering at home compared with women who had 4 or more ANC visits,[17,19]

Regarding respondents perception towards quality of health care services during last ANC visit mothers who didn't perceive good quality healthcare services were 80% more likely to practice home delivery (AOR=.167, 95%CI:.042-.654) compared to those who perceived good quality of healthcare services during last ANC visit. Similarly Women who were not kept privacy by health professionals during ANC follow up services. The finding is consistent with studies done in Ethiopia, Nigeria and Uganda indicate that Regarding quality of ANC service, good service perception is important predictor for choice of place of delivery. Those mothers who were not satisfied in a care while ANC follow up were 5.36 more likely to deliver at home compared to those who were satisfied in the service given in ANC follow up [OR=5.36, 95%CI (2.618-10.594]). Similarly those mothers who were not informed the expected problems during labor and delivery were 4.033 more likely to deliver at home compared to those who were informed [OR=4.033, 95CI;(2.066-7.875)].[13,20]

The other associated factor which had significant association with home delivery was, respondent's husbands support to their wife's for ANC follow-up, Home delivery practice increase by 70% among women who did not have husbands support than to those women who had got husband's support during ANC follow up (AOR=.314, 95%CI: .101-.976).

This finding is consistent with the study done in Bahirdar Ethiopia, Senegal and Nigeria decision-making processes are dominated by men and the male household head is usually responsible for making the final decision. If a long or complicated labor warranted health facility attendance, the decision to take the laboring woman was made by her husband (or father) in consultation with relatives and neighbors present. In several cases, mothers reported family members ignoring their requests to take them to a health facility during labor. In the face of their relatives' opposition, the women were unable to assert themselves and were not in a position to compel others to take action on their behalf.[21,22]

Similar study reveals that, those mothers who had no husband encouragement for institutional delivery were 3.475 times more likely to utilize home as compared to mothers who had husband encouragement [OR=3.475, 95% CI; (1.963-6.149)].

Husband support is strongly associated with home delivery consistent with qualitative finding.

"***We always ask permission to our husbands before we decided about what we want to do. In a similar way we have to ask for to seek care during pregnancy and home delivery. At present, the HEW teaches us at home about ANC and we have some awareness about the use of ANC. Meanwhile our husband does don't want to visit health facilities since they have a fear of service fee."***

Choosing home as place of delivery is best for most women since it is convenient and acceptable place by the community. Besides the above, most mothers didn't know expected date of delivery. So they give birth at home accidentally without birth preparedness. Perceived lack of husband support was significantly associated with home delivery (Table 4).

Table 4: Multivariable analysis of predictive factors associated with home delivery among Mothers who had given birth in the last one year in wonago District, Southern Ethiopia May- June 2018.

Variables	Cases n (%)	Controls n (%)	Crude OR(95% CI)	AOR(95% CI)
Maternal age at interview				
15-19	5 (3.0%)	4 (1.2%)	.129(.026-.651)	.198(.007-5.816)
20-24	60 (36.6%)	54 (15.9%)	.145(.053-.400)	.115(.005-2.481)
25-29	48 (29.3%)	127 (37.5%)	.427(.157-1.161)	.103(.003-3.594)
30-34	24 (14.6%)	71 (20.9%)	.477(.167-1.366)	.020.001-1.564)
35-39	22 (13.4%)	52 (15.3%)	.381(.131-1.109)	5.309(.142-198.927)
40-44	5 (3.0%)	31 (9.1%)	1	1
Marital status				
Married	145 (88.4%)	302 (89.1%)	.391(.112-1.362)	1.457 (.135-15.742)
Divorced	16 (9.8%)	21(6.2%)	.246 (.061-.992)	.547 (.043-7.017)
Widowed	3 (1.8%)	16 (4.7%)	1	1
Family size				
1-3	46 (28.0%)	49 (14.5%)	1	1
4-5	56 (34.1%)	92 (27.1%)	.710(.399-1.264)	2.055 (.057-73.960)
>6	62 (37.8%)	198 (58.4%)	.182(.093-.359)	1.693 (.051-56.232)
Number of ANC visit				
1-2	53 (85.5%)	26(8.3%)	65.004 (28.8-146.5)	.065 (.027-.159)*
3 or more	9 (14.5%)	287 (91.7%)	1	1
When did you got your First ANC visit				
< 4 months	14(8.5%)	147 (43.4%)	.495(.247-.993)	1
5-7 months	25 (15.2%)	130 (38.3%)	.057(.018-.181)	.328(.083-1.301)
8-9 months	10 (6.1%)	6 (1.8%)	.220(.094-.515)	.215(.026-171)
When I feel sick	13 (7.9%)	30 (8.8%)	.024(.012-.049)	.611(.111-3.361)
Others	102 (62.2%)	26 (7.7%)	1	.387(.070-2.13)
Knowledge about danger signs of pregnancy				
Good Knowledge	24 (32.4%)	132 (49.3%)	1	1
Poor knowledge	50 (67.6%)	136 (50.7%)	2.022(1.175-3.478)	.105(.016-.691)*
Perceived quality of ANC service				
Good	10 (6.1%)	214 (63.1%)	1	1
Fair	52 (35.4%)	86 (25.4%)	.069(.034-.142)	.218 (.075-.633)*
I do not know	102 (58.5%)	39 (11.5%)	.019(.009-.040)	.167(.042-.654)*
Perceived husband support				
Supporting	34 (20.7%)	262 (77.3%)	1	1
Not supporting	130 (79.3%)	77 (22.7%)	.077(.049-.121)	.314(.101-.976)*

Limitations
The limitation of this study could be developing sampling frame it was conducted through home to home survey; mothers who gave birth at a health institution or home, which may not be comprehensive.

CONCLUSIONS

This study showed that predictors of home delivery in wonago district. The major findings were Number of Antenatal care visits, perceived quality of ANC services, Knowledge about pregnancy related danger signs and perceived husband's support were significant factors associated with home delivery. As it was stated by most of the respondents from the qualitative findings were economic, social and cultural believes, transport problems, decision making power, awareness about Antenatal care , access of the health facility Were the main reasons why mothers gave birth at home. They pointed out that home delivery reduced unnecessary transport and other costs. Some of the mothers stated that they even gave birth at home after attending ANC services because of long distance of the HF. They also claimed that mothers who had educated family and relatives living in towns and cities had better information about institutional delivery and gave birth at HFs. Findings of this study could be utilised to inform health policymakers and health care providers in order to improve institutional delivery which is the safe place for both mother and new-born care. Factors influencing maternal health services utilization operate at various levels individual, household, community and state. Depending on the indicator of maternal health services, the relevant predictor varies from area to area. Effective interventions to promote maternal health service utilization should target the underlying individual, household, community and policy-level factors. The interventions should reflect the relative roles of the various underlying factors.

List of Abbreviations

ANC:	Antenatal care
AOR:	Adjusted odds Ratio
C.I :	Confidence interval
EDHS:	Ethiopian demographic and health survey
EJHD:	Ethiopian journal of health development
HC:	Health Centre
IRB:	Institutional Review Board
OR:	Odds Ratio
SNNPRS:	South Nations Nationalities Regional state
SPSS:	Statistical Package for Social Science
SSA:	Sub-Saharan African countries
WHO:	World health organization

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Availability of data and material
Data are available from the Correspondent authors and will be given upon request**.**

Authors' contributions
FG conceived the study idea, secured fund from Dilla University, College of Medicine and Health Sciences. FG and have participated in proposal developments write up the document. TW Participated in supervision of data collection process and data analysis and interpretation. FG, TW and ZA have participated in final report writing, manuscript preparation review. All authors read and approved the revised final manuscript.

Competing interests
There was not financial interest or presented data between the funder and the author's. We, the researchers, have no any form of competing financial and non-financial interest between us.

Consent to publication
Not applicable

Ethical Approval and consent to participate
Ethical approval was provided by Dilla University, College of Medicine and Health Sciences Institutional Review Board (Rf. No 019/2018) on 4th may 2018. Letter of permission to undertake the study was obtained from Wonago District Health Office. All study individuals provided with Verbal informed consent for their participation. This was approved by (IRB) of Dilla University to ensure the confidentiality of participants and their information, no patient identifiers were included in the dataset.

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