

## Completion of Maternity Continuum of Care and Factors Associated With It among Mothers Who Gave Birth in the Last One Year in Enemay District, North West Ethiopia

Anguach Shitie Lankrew<sup>1</sup>, Nega Assefa Kassa<sup>2</sup>, Merga Dhressa<sup>3</sup> and Tenagework Dilnessa<sup>4</sup>

<sup>1</sup>Department of Midwifery, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia.

<sup>2</sup>Department of Public Health, College of Medicine and Health Sciences, Haramaya University, Harar, Ethiopia.

<sup>3</sup>Department of Public health, College of Medicine and Health Sciences, Haramaya University, Harar, Ethiopia.

<sup>4</sup>Department of Midwifery, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia.

### Abstract

**Back ground:** Ethiopia still suffers high levels of neonatal and maternal mortality so maternity continuum of care is a continuous framework for the delivery of maternal care from pregnancy to postnatal period. Skilled care during pregnancy, childbirth and the postpartum period are important interventions in reducing maternal and neonatal morbidity and mortality.

**Objective:** To assess completion of maternity continuum of care and factors associated with it among mothers who gave birth in the last one year in Enemay district, North West Ethiopia.

**Method and materials:** A community based cross sectional study was conducted from February 25-March 10, 2019 on 651 women who gave birth in the last one year. The data were collected by face to face interview through pretested and structured questionnaires. Binary logistic regression was used to identify predictors of completion of maternity continuum of care. Variables with P-value<0.05 in multivariable analysis were declared as statistically significant associated factors.

**Result:** This study revealed that about 45% (95% CI: 40.9%, 48.8%) of respondents completed the continuum of care. Women with secondary education (AOR=6, 95% CI:2.26,16.6), Women whose occupation is farming (AOR=0.18 95% CI: 0.1,0.32), Women who have autonomy on health care decision (AOR=4, 95% CI: 2.26,7.2), Women whose have exposure to media (AOR=1.97, 95% CI: 1.2, 3.27), Women with wanted pregnancy (AOR=3.33, 95% CI: 1.87, 5.9), para five and above women (AOR=2.85 95% CI: 1.28, 6.3) and Women whose husband are employer (AOR=4.97 95% CI: 1.16, 21.2) were significantly associated with completion of maternity continuum of care.

**Conclusion and recommendation:** This study showed that less than half of the participants had achieved continuum of care and education level, both respondents and husband occupation, parity, autonomy to health care decision, exposure to the mass media, and wantedness of pregnancy were associated with completion of maternity continuum of care, therefore working on enhancing of the capacity of women autonomy in health care decision making and preventing unintended pregnancy helps to improve completion of maternity continuum of care.

**Keywords:** Maternity continuum of care; Antenatal care; Skill birth attendant; Postnatal care; Ethiopia

### Introduction

#### Background

A continuum of care approach for maternal health is being defended as key program strategies or a means to guarantee that women were given essential services through pregnancy, delivery and the postpartum period [1,2]. The health care services that a woman receives during the continuum of maternal health care (pregnancy, childbirth and the immediate postnatal period are important for the survival and well-being of both the mother and the child [3]. The services included are antenatal care for pregnancy-related health care check-ups, skill birth attendant for delivery and postnatal care through the postpartum period for mothers and newborn. Primarily, all pregnant women should have sufficient and high-quality Ante Natal Care (ANC) during pregnancy [4]

According to World Health Organization (WHO) 2015 estimation, approximately 303,000 maternal deaths occurred globally. Most of the deaths occur during labor, delivery and the immediate postpartum period [5]. Ethiopia is one of the countries with the highest maternal mortality levels in the world, with an estimated 676 deaths per 100,000

live births in 2011 [6]. According to EDHS 2016, Ethiopia maternal mortality rate was 412 deaths per 100,000 [7].

The cause of thousands of women and new born death is still preventable, since those causes are due to pregnancy and child birth related complications, care provided during continuum of maternal health service (pregnancy, childbirth and postnatal period) by skilled health care provider is the important intervention to save the life of both the mother and infant, but many women especially in the country where maternal mortality ratio is highest, do not get all services in the continuum of maternal health service (antenatal care, skilled delivery care and postnatal care) [8].

**\*Corresponding author:** Anguach Shitie Lankrew, Department of Midwifery, College of Medicine and Health Sciences, Wollo University, Ethiopia, Tel: +251935086260; E-mail: [anguachshitie20@gmail.com](mailto:anguachshitie20@gmail.com)

**Received:** December 10, 2020; **Accepted:** March 16, 2020; **Published:** March 23, 2020

**Citation:** Lankrew AS, Kassa NA, Dhressa M, Dilnessa T (2020) Completion of Maternity Continuum of Care and Factors Associated With It among Mothers Who Gave Birth in the Last One Year in Enemay District, North West Ethiopia. J Preg Child Health 7: 428.

**Copyright:** © 2020 Lankrew AS, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

The World Health Organization recommends a minimum of four antenatal care visits [9]. However, global estimates indicate that only half of all pregnant women receive this recommended amount of care. In Ethiopia, Only 32% of Ethiopian women with live birth received at least four visits during the length of their pregnancy [7], which is below the global average (54%). The predominant underlying factors for the low coverage of antenatal care services include: socio-cultural and economic barriers, poor access to health services and poor quality of antenatal care services [10]. Many mothers who attend the recommended number of antenatal care visits fail to use facility delivery and postnatal care services. The most common service women received is at least one ANC visit which is 43%. Utilizations of professional assisted delivery care and PNC is very low. When we see the proportion of women delivery by a skill birth attendant is 11.5 and the proportion of women who received PNC within 24 h is only 5% [11]. The reason for low utilization of delivery and postnatal care service has been stated as the unpredictable onset of labor, making it difficult for women travelling long distances, lack of information, inadequate services, cultural practices as well as some factors associated with the cost of delivery of care [12].

Most studies in Ethiopia focused on the status of the use of one or two components of maternal health care separately and examined factors associated with the utilization of the services. Therefore identification of the magnitude and the possible factors that determine the completion of maternity continuum of care will help to suggest interventions in order to reduce the dropout of maternity continuum of care.

## Methods and Materials

### Study area and period

The study was conducted in Enemay district. Enemay district is one of the district in East Gojjam zone which is located 270 km away from Addis Ababa. Enemay district is bordered on the south by Dejen, on the west by Debay Telatgen, on the north by Enarj Enawga, and on the east by Shebel Berenta. The administrative center of this district is Bichena. It has a total of 36 kebeles from those 28 are rural kebeles and 8 are urban kebeles. It has 7 health centers, 35 health posts and 1 hospital. 2017 statistical figure of Enemay district Health Office report showed that the Antenatal coverage of the district is about 63% and institutional delivery 58%. The study was conducted from February 25 March 10, 2019.

### Sampling procedure

Enemay district has a total of 36 kebles from those 28 are rural and 8 are urban kebeles. From 28 rural kebles 8 kebeles was selected randomly and also from the urban 8 keble 3 kebeles was 14 selected randomly. Totally 11 kebeles was selected from the total thirty six kebles by simple random sampling method. The number of women who delivered in each selected kebles were taken from health extension worker registration book. Then proportionally allocate the sample for each selected kebles. Finally, simple random sampling method was employed to select the women,

### Sample size determination

To determine sample size; single population proportion formula was used for the first objective (dependent variable) by considering Estimated Proportion of completion of maternity continuum of care (P)=50.4% [7], Margin of error d=5% and Confidence interval of 95% is assumed ( $Z_{\alpha/2}=1.96$ ) which gives 384. For the second objective

StatCalc function of Epi Info version 7 software was used by using cohort or cross-sectional sample size calculation technique from Stat Calc and by considering the following assumptions: AOR women with higher education, para 1-2 and rural residence 3.73, 1.97, 0.46 respectively with 95% confidence interval, 80% power, 1 ratio of unexposed to exposed and % outcome in unexposed group for women with higher education, para 1-2 and rural residence 22.2%, 16.1% and 64.5 respectively; sample size by Fleiss W/CC formula from Stat Calc software become 84 for higher education, 414 para 1-2 and 214 for rural residence Therefore the maximum sample size is high for the second objective which is 414 taken as final sample size. After adding non-response rate of 5% and design effect 1.5 to increase power, total sample size will be  $414+20=434$  and design effect  $1.5=434*1.5=651$ .

### Data collection tool, quality control and measurement

Structured and pre tested questionnaires which is adapted from reviewing different literature were used to collect the data. First the tool was prepared in English, translated to Amharic and then translated back to English by expertise to check for consistency. For administering the interview, 11 diploma nurses and 11 guidance were recruited. Four BSc degree nurses were also be used for supervise activities along with the principal investigator. In addition, the data collectors were trained for one day on the techniques of data collection and purpose of the study. Participants pretest was done on 5% of the total study participant and necessary adjustment was made. Data completeness and consistency was checked, cleaned and compiled by the investigator on daily basis.

### Measurements

**Dependent variables:** Complete CoC for maternal health care services was outcome variable of interest. Complete continuum of care was considered complete when the women received the following services at three levels:

- Received at least one antenatal care during pregnancy.
- Childbirth aided by skilled birth attendants
- PNC for the mothers and newborns within 48 h after childbirth.

Complete continuum of care was considered as not completed if the mother missed any one of these steps. All the information mentioned in this research is based on self-reports.

**Independent variables:** Concerning to different variables related to completion of maternity continuum of care we incorporate (residence, women age, marital status, wantedness' of pregnancy, women and husband education status, women and husband employment status, parity, exposure to mass media, autonomy to health care decision) as the factors that might influence utilization of maternal healthcare services.

### Statistical analysis

The collected data were coded and entered into Epi data version 3.1. Then data were exported to windows of Statistical Package for Social Science (SPSS) version 20 for data analysis. Bivariable and multivariable logistic regression analysis was used to determine the association of each independent variable with the dependent variable and those variable with P-value less than or equal to 0.05 in multivariable analysis considered as significant. Multi co-linearity test was checked by using standard error. The goodness of fit was tested by Hosmer-Lemeshow statistic (0.97). Both

## Result

### Socio-demographic characteristics

Out of the total 651 study participants, 621 of them were included in the final analysis giving a response rate of 95.4%. The mean age of women was 30.85 (SD±6.56) years. Majority 352(56.7%) of the respondents were between 25-35 years old, followed by age group >35, 159(25.6%). Two hundred twenty seven (36.6%) were housewife, and 225(36.2%) were farmers.

The largest portion of the participants were Orthodox in religion 473 (76.2%), 513(82.6) were currently married and 455(73.3%) were rural residents constitutes (Table 1).

### Sociocultural and husband related characteristics

The findings highlight that around 46.1% of women had access to mass media, (77.1%) had autonomy in health-care decision-making

and 79.4% of women their pregnancy was wanted. Concerning women husband educational status majority 27.7% had no formal education but they can read and write and regarding women husband occupation majority were farmer 56.8% (Table 2).

### Content, timing and place of care received in the continuum of care

Among women who received antenatal care 61.1% started care in the first Trimester, and 22.8% in the second trimester. Among women who received antenatal care, 98.5% were got advice about danger sign during pregnancy. 96.3% of women were there blood pressure measured during their antenatal care visit. From a total of women under the study, 15% were delivered by caesarean section. Among women who received postnatal care, 99.1, 97.5% were council about family planning and breastfeeding respectively (Table 3).

| Variable                      | Category              | Frequency | Percentage |
|-------------------------------|-----------------------|-----------|------------|
| Respondents age group         | 15-24                 | 110       | 17.7       |
|                               | 25-35                 | 352       | 56.7       |
|                               | >35                   | 159       | 25.6       |
| Respondents Religion          | Orthodox              | 473       | 76.2       |
|                               | Others                | 148       | 23.8       |
| Respondents marital status    | Single/widowed        | 108       | 17.4       |
|                               | divorced              | -         | -          |
|                               | Married               | 513       | 82.6       |
|                               | Cannot read and write | 219       | 35.3       |
| Respondent educational status | Read and write        | 125       | 20.1       |
|                               | Primary               | 163       | 26.2       |
|                               | Secondary             | 68        | 11         |
|                               | Collage and above     | 46        | 7.4        |
| Respondent's occupation       | Housewife             | 228       | 36.7       |
|                               | Merchant              | 127       | 20.5       |
|                               | Farmer                | 226       | 36.4       |
| parity /number of children    | Employer              | 40        | 6.4        |
|                               | 2-Jan                 | 298       | 48         |
|                               | 4-Mar                 | 237       | 38.2       |
| Respondents residence         | >5                    | 86        | 13.8       |
|                               | Rural                 | 455       | 73.3       |
|                               | Urban                 | 166       | 26.7       |

**Table 1:** Distribution of the study participants by their socio demographic characteristics in enemay district, northwest Ethiopia. (n=621).

| Variables                               | Category          | Frequency | Number |
|---|-------------------|-----------|--------|
| Autonomy to health care decision making | Yes               | 479       | 77.1   |
|   | No                | 142       | 22.9   |
| Respondent exposure to media            | Yes               | 286       | 46.1   |
|   | No                | 335       | 53.9   |
| Wantedness of pregnancy                 | Yes               | 493       | 79.4   |
|   | No                | 128       | 20.6   |
| Husband educational status              | cannot read write | 165       | 26.6   |
|   | Read and write    | 172       | 27.7   |
|   | Primary           | 117       | 18.8   |
|   | Secondary         | 124       | 20     |
| Husband occupation                      | Collage and above | 43        | 6.9    |
|   | Merchant          | 213       | 34.3   |
|   | Farmer            | 353       | 56.8   |
|   | Employer          | 55        | 8.9    |

**Table 2:** Socio-cultural and husband related characteristics of women who gave birth in the last one year in enemay district, northwest Ethiopia, 2019 (n=621).

### Place of delivery

In this study around 56.5% of women gave birth in the health institution and 43.5% of the study participant gave birth at home (Figure 1).

### Mode of delivery

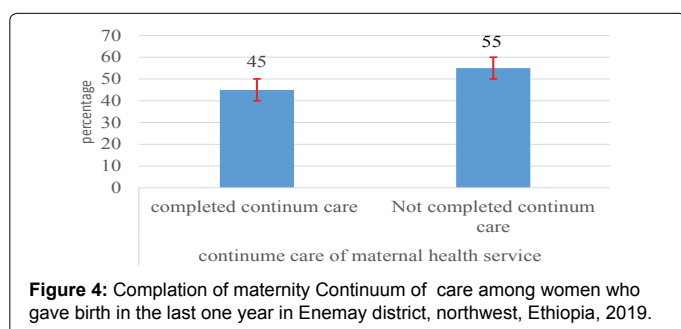
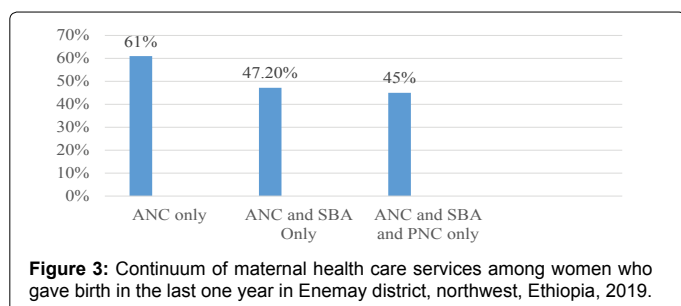
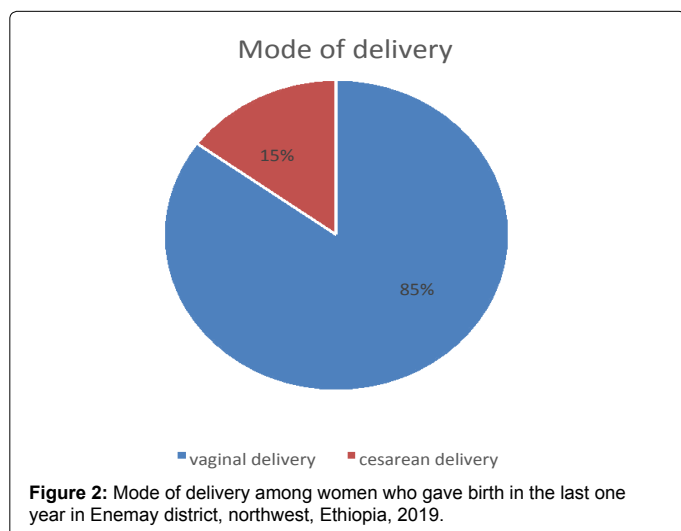
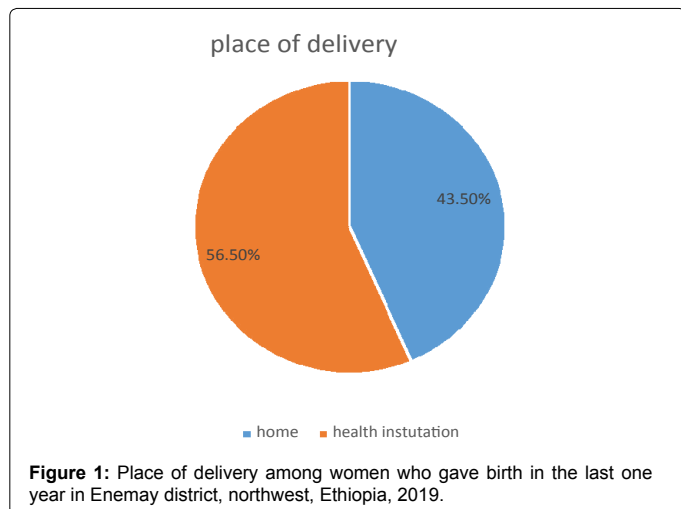
Around 85% of women in this study delivered virginally and fifteen% delivered with caesarean section (Figure 2).

### The continuum of care

Around 61% of women received antenatal care, 13.7% did not continue on the pathway to receive skilled birth attendance. Only 47.2% who received Antenatal care were attended by a skilled health provider at delivery. After delivery, 2.2% women did not go on to receive postnatal care (Figure 3).

| Ante natal care                                    |                            |                           |        |         |
|--|----------------------------|---------------------------|--------|---------|
| Have ANC visit (n=378)                             | -                          | -                         | Number | Percent |
| Timing of first ANC visit                          | -                          | -                         | -      | -       |
| First trimester                                    | -                          | -                         | 231    | 61.1    |
| Second trimester                                   | -                          | -                         | 86     | 22.8    |
| Third trimester                                    | -                          | -                         | 16     | 4.2     |
| Don't know   | -                          | -                         | 45     | 11.9    |
| Place of ANC (378 )                                | Public health institution  | -                         | 377    | 99.7    |
| Private health institution                         | -                          | -                         | 21     | 5.6     |
| Blood pressure measured during ANC                 | -                          | Yes                       | 364    | 96.3    |
|  | -                          | No                        | 14     | 3.7     |
| Blood sample taken during ANC                      |                            | Yes                       | 361    | 95.5    |
|  | -                          | No                        | 17     | 4.5     |
| Urine sample taken during ANC                      | -                          | Yes                       | 347    | 91.8    |
|  | -                          | No                        | 31     | 8.2     |
| Got advise /council during ANC (n=378)             | -                          | Yes                       | 334    | 88.4    |
|  | -                          | No                        | 44     | 11.6    |
| Got advise about danger sign during ANC            | -                          | Yes                       | 329    | 98.5    |
|  | -                          | No                        | 5      | 1.5     |
| Got advise about nutrition during ANC              | -                          | Yes                       | 298    | 89.2    |
|  | -                          | No                        | 36     | 10.8    |
| Got advise about birth and emergency plan          | -                          | Yes                       | 290    | 86.8    |
|  | -                          | No                        | 44     | 13.2    |
| Take iron folic acid during ANC                    | -                          | Yes                       | 182    | 48.1    |
|  | -                          | No                        | 196    | 51.9    |
| Take tetanus toxoid vaccine during ANC             | -                          | Yes                       | 165    | 43.7    |
|  | -                          | No                        | 213    | 56.3    |
| Types of delivery (n=621)                          | -                          | Vaginal delivery          | 528    | 85      |
|  | -                          | Caesarian delivery        | 93     | 15      |
| Place of delivery (n=621)                          | -                          | Health institution        | 351    | 56.5    |
|  | -                          | Home                      | 270    | 43.5    |
|  |                            | Postnatal care            | -      | -       |
| Place of PNC (415)                                 | -                          | Public health institution | 415    | 100     |
|  | Private health institution | -                         | 17     | 4.1     |
| Got advise during PNC (n=319)                      | -                          | -                         | -      | -       |
| Got advise about birth spacing and family planning | -                          | Yes                       | 316    | 99.1    |
|  | -                          | No                        | 3      | 0.9     |
| Got advise about breast feeding                    | -                          | Yes                       | 311    | 97.5    |
|  | -                          | No                        | 8      | 2.5     |
| Got advise about hygiene                           | -                          | Yes                       | 240    | 75.2    |
|  | -                          | No                        | 79     | 24.8    |

Table 3: Percent Distribution of women by content of care, timing and place of care received in the continuum of care in enemay district, northwest, Ethiopia, 2019.



### Completion of maternity continuum of care

In this study, 45% (95% CI: 40.9%, 48.8%) of women had completed the continuum of care for and 55% women were not have full range of the continuum of care (Figure 4).

### Factors associated with utilization of antenatal of care

The crude analysis result revealed that some factors such age group, educational status, residence, exposure to media, autonomy to health care decision making, parity, exposure to mass media, wontedness of pregnancy, Husband education and husband occupation were associated with utilization of antenatal care. But in the multivariable analysis only women educational status, autonomy to health care decision making, exposure to media, wontedness of pregnancy and parity had maintained their statically association with utilization of antenatal care.

Women with secondary education were 6 times more likely to complete the continuum of care (AOR=6, 95% CI: 2.26, 16.6) compared to those women who are not read and write. Women whose occupation is farming were 82% less likely to complete the continuum of care compared to that of housewives. (AOR=0.18, 95% CI: 0.1, 0.32) and women who have the autonomy to health care decision making were 4 times more likely to complete the continuum of care (AOR= 4 , 95% CI: 2.26, 7.2) Compared to those who have no autonomy for health care decision making.

Women whose have exposure to media were 2 times more likely to complete the continuum of care (AOR=1.97, 95% CI: 1.2, 3.27) Compared to those women who have not exposure to media. Women with wanted pregnancy were 3.4 times more likely to complete the continuum of care (AOR=3.33 95% CI: 1.87, 5.9) compared to those women whose pregnancy were unwanted and Para five and above women were 2.9 times more likely to complete the continuum of care (AOR=2.85 95% CI: 1.28, 6.3) compared to para 1-2 women. In addition, women whose husband is employer is 5 times more likely to complete the continuum of care (AOR=4.97 95% CI: 1.16, 21.2) compared to women whose husband is merchant. (Table 4)

### Discussion

In this study, the overall completion of maternity continuum of care was 45% (95% CI: 40.9%). About 61% of women received at least one antenatal care but only 45% completed the continuum of care, receiving all three types of maternal services, antenatal care during pregnancy, skilled birth attendance at delivery and postnatal care within 48 hours after delivery. This indicates that about 14% of women drop out from the pathway of maternity continuum of care before reaching postnatal care. Behind the failure of seeking complete maternity continuum of care is that after receiving ANC, majority of the women dropped out from the pathway of continuum of care. This Finding suggests that more dropouts occurred between pregnancy and delivery than between delivery and PNC period, which is similar to studies conducted in Pakistan [13]. The possible reason for dropout might be lack of family support and poor counselling during antenatal care services. The other possible reason for dropout might be unpredictable onset of labor and difference in socio-cultural beliefs between health care provider and the community.

The magnitude of completion of maternity continuum care in this study was 45% which is in line with study done in Nepal (46%) [3]. The finding was lower than study conducted in Cambodia (60%) and Egypt (51%) [14,15]. This discrepancy might be due to difference in healthcare coverage and difference educational status of respondents.



| Variable                | Category              | Completion        |            | COR 95%CI         | AOR 95%CI          |                   |
|-------------------------|-----------------------|-------------------|------------|-------------------|--------------------|-------------------|
|                         |                       | Yes               | No         |                   |                    |                   |
| Age group               | 15-24                 | 60(54.5%)         | 50(45.5%)  | 2.15(1.30, 3.53)  | 1.6(0.73, 3.5)     |                   |
|                         | -                     | 25-35             | 162(46%)   | 190(54%)          | 1.53(1.04, 2.22)   | 1.17(0.66, 2.07)  |
|                         | -                     | >35               | 57(35.8%)  | 102(64.2%)        | 1                  | -                 |
| Marital Status          | Married               | 238(46.4%)        | 275(53.6%) | 1                 | -                  |                   |
|                         | Single/divorced/      | 41(38%)           | 67(62%)    | 0.70 (0.46, 1.08) | -                  |                   |
| Educational status      | Cannot read and write | 66(30.1%)         | 153(69.9%) | 1                 | 1                  |                   |
|                         | -                     | Read and write    | 36(38.8%)  | 89(71.2%)         | 0.94 (0.58, 1.5)   | 0.93(0.48, 1.8)   |
|                         | --                    | Primary           | 82(50.3%)  | 81(49.7%)         | 2.25 (1.54, 3.5)   | 1.9(0.93, 3.94)   |
|                         | -                     | Secondary         | 56(82.4%)  | 12(17.6%)         | 10.8 (5.44, 21.5)  | 6(2.26,16.6)****  |
|                         | -                     | Collage and above | 39(84.8%)  | 7(15.2%)          | 12.9 (5.49, 30.3)  | 0.8(0.137, 4.78)  |
| Occupation              | Housewife             | 130(57%)          | 98(43%)    | 1                 | 1                  |                   |
|                         | -                     | Merchant          | 72(56.7%)  | 55(43.3%)         | 0.98(0.64, 1.5)    | 0.55(0.28-1.07)   |
|                         | -                     | Farmer            | 39(17.3%)  | 187(82.7)         | 0.16(0.10, 0.2)    | 0.18(0.1,0.32)*** |
|                         | -                     | Employer          | 38(95%)    | 2(5%)             | 14.3(3.37, 60.8)   | 8.8(0.42, 74.6)   |
| Parity                  | 2-Jan                 | 148(50%)          | 148(50%)   | 1                 | 1                  |                   |
|                         | -                     | 4-Mar             | 95(40.1%)  | 142(59.9%)        | 0.68(0.48, 0.95)   | 1.6(0.96, 2.77)   |
|                         | -                     | >5                | 36(41.9%)  | 50(58.1%)         | 0.73(0.449, 1.18)  | 2.85(1.28, 6.3)** |
| Residence               | Rural                 | 160(35.2%)        | 295(64.8%) | 1                 | 1                  |                   |
|                         | -                     | Urban             | 119(71.7%) | 47(28.3)          | 4.67(3.165, 6.89)  | 1.28(0.69, 2.36)  |
| Autonomy to health care | Yes                   | 257(53.7%)        | 222(46.3%) | 6.3(3.87, 10.29)  | 4.0(2.26, 7.2)**** |                   |
|                         | -                     | No                | 22(15.5%)  | 120(80.5%)        | 1                  | 1                 |
| Media exposure          | Yes                   | 182(63.3%)        | 104(36.6%) | 4.43(3.15, 6.21)  | 1.97(1.2, 3.27)*** |                   |
|                         | -                     | No                | 97((29%)   | 238(71%)          | 1                  | 1                 |
| Pregnancy Wontedness    | Yes                   | 250(50.5%)        | 243(49.3%) | 3.51(2.24, 5.5)   | 3.3(1.87, 5.9)**** |                   |
|                         | -                     | No                | 29(22.7%)  | 99(77.3%)         | 1                  | 1                 |
| Husband education       | cannot read write     | 57(34.5%)         | 108(65.5%) | 1                 | 1                  |                   |
|                         | -                     | Read and write    | 56(32.6%)  | 116(67.4%)        | 0.91(0.58, 1.49)   | 0.66(0.35, 1.25)  |
|                         | -                     | Primary           | 50(42.7%)  | 67(57.3%)         | 1.41(0.87, 2.3)    | 0.89(0.42, 1.9)   |
|                         | -                     | Secondary         | 78(62.9%)  | 46(37.1%)         | 3.21(1.98, 5.2)    | 0.6(0.26, 1.4)    |
|                         | -                     | Collage and above | 38(88.4%)  | 5(11.6%)          | 14(5.37, 38.6)     | 0.48(0.85, 2.79)  |
| Husband occupation      | Merchant              | 126(59.2%)        | 87(40.8%)  | 1                 | 1                  |                   |
|                         | -                     | Farmer            | 104(39.5%) | 249(70.5%)        | 0.29(0.202, 0.4)   | 1.34(0.65, 2.8)   |
|                         | -                     | Employer          | 49(89.1%)  | 6(10.9%)          | 5.64(2.31, 13.7)   | 4.97(1.16, 21.2)* |

Significant with p= 0.03, \*\* significant with p= 0.01, \*\*\*significant with p=0.008, \*\*\*\*significant with p=0.0001

**Table 4:** Factors associated with completion of maternity continuum of care among mothers who gave birth in the last one year in Enemay district, North West, Ethiopia, 2019, (n=621).

In this study, the proportion of educated women is (44.6%) which is lower than Cambodia (82.5%) and Egypt (52.8%). Since education is one of a strong predictor for completion of the continuum of care. But it was higher than study done in Pakistan (27%), Cambodia Pakistani (5%), South Asia and sub Saharan Africa (16.9%) Nigeria (29%) [11,13,16,17] . This discrepancy might be due to difference in measurement, variations of the study period and due to difference in the accessibility of services.

This study had identified a number of important factors that were associated with the completion of the continuum of care for maternal health among women in Enemay district. The multivariate regression analysis shows that education, occupation, autonomy to health care decision making, wontedness of pregnancy, exposure to mass media and husband occupation are the most significant predictive factors for the completion of continuum of care.

Women with secondary education were more likely to complete the continuum of care compared to those women who cannot read and

write. This finding is in line with a study conducted in Pakistan, Nepal and Cambodia (13-15).The possible reason might be educated women may have better health knowledge about the importance of receiving maternity care during pregnancy, delivery and postnatal period. The other possible reason might be education is likely to enhance female autonomy and help women to develop greater confidence and capability to make decisions about their own health and educated women may have a good chance to approach the written information about maternal health service.

Having autonomy to health care decision making was statically and positively associated with completion of maternity continuum of care. This study is in line with study done in Pakistan and South Asia and sub-Saharan Africa [13, 11]. This might be due to that women who had autonomy to health care decision making might have freedom of movement, might not have financial problems and can go and received the care by their own self. Additionally, Autonomy may also be associated with other variables like education of women and urban residence, both of which are factors that increase the likelihood of the use of maternal health services.

Completion of maternity continuum of care was better observed on those women with wanted pregnancy which is similar with study done in Ghana [18]. The possible reason might be women with wanted pregnancy are careful to their pregnancy, likely hood of developing better motivation and prepared emotionally and financially for the demand of pregnancy and childbearing compared to women with unwanted pregnancy.

Para five and above women were higher odds of completing the continuum of care compared to para1-2 women. This study is in contrary to study done in Pakistan [13]. The possible reason for this discrepancy might be women with higher parity might have better information about the advantage of receiving maternal health service and also women with higher parity may face different complication before and have better awareness about the importance of utilizing all the maternal health service. Another possible reason might be women with higher parity might have frequent contact with health providers in their previous pregnancy and might got educational messages and counselling from health workers before.

Exposure to media was also associated with completion of maternity continuum of care. This study is in agreement with study conducted in Nepal, Egypt and Pakistan [3, 13, 15]. This might be that media is as one of the means of access to resources for awareness and knowledge so women who had exposure to media might have got information about the importance of receiving maternal health services and also they might get different educational message regarding maternal health service.

Women whose occupation was farming were less likely to complete the continuum of care compared to that of housewives. This might be due to that farmers might have lack of time to go to health institution and most of farmers live in rural area they might face problem of accessing health service. The other possible reason might be farmers might have less information about the advantage of utilizing maternal health service. Husband employment status was also significantly associated with completion of maternity continuum of care. This study is in line with study done in Egypt [15]. The possible reason might be women with employed husband might not have any financial problems and employed husband might have better information about maternal health service and they might encourage their wife to use the service.

## Limitation of the Study

Inferring casual association is difficult due to the cross sectional nature of the study. It is also difficult to measure the quality of service that women got during their antenatal, delivery and postnatal period. In addition information in the survey is based on self-reports there may be social desirable bias and recall bias

## Conclusion

Less than half of the study participant's complete maternity continuum of care. Mother's educational level and mother's occupation, autonomy to health care decision making, wontedness of pregnancy, and exposure to media, parity/number of children and husband occupation were significantly associated with completion of maternity continuum of care.

## Declarations

**Ethical Consideration:** Ethical clearance was got from Haramaya University Institutional Health Research Ethics Review Committee

(IHRERC). Participation was voluntary and information was collected anonymously after obtaining voluntary, written, signed informed consent from each respondent by assuring confidentiality throughout data collection period. Participants were told the objective of the study and their right to refuse or answer the questionnaires and were given the right to stop or withdraw at any time of data collection. Confidentiality was maintained by omitting their name and personal identification.

**Availability of data and materials:** Full data for this research is available through the corresponding author up on request.

## Competing interests

The authors declare that they have no competing interests.

## Funding

Ambo University

## Authors' contributions

All authors (AS, NA, MD and TD) contributed to the design of the study and the interpretation of data.

## Acknowledgements

I would like to express deepest heartfelt thanks to Ambo University for funding and Haramaya University for allowing the conduct of this research. I would like to thank Enemay district administration office town health bureau.

## References

1. Kerber K, Johnson J, Bhutta Z, Okong P, Starrs A, et al (2007) Continuum of care for maternal, newborn, and child health: From slogan to service delivery. *The Lancet* 370: 1358-1369.
2. Wang W, Hong R (2015) Levels and determinants of continuum of care for maternal and newborn health in cambodia- evidence from a population-based survey. *BMC Pregnancy Childbirth* 15:62.
3. Tamang TM (2017) Factors associated with completion of continuum of care for maternal health in Nepal. 1-23.
4. Vogel J, Habib NA, Souza J, Gülmezoglu A, Dowswell T (2013) Ante natal care packages with reduced visits and perinatal mortality, A secondary analysis of WHO ante natal trial. *Reprod Health* 10: 19.
5. WHO. (2015) Worled Health Stastics.
6. EDHS. (2011) Central statistical agency, international . Ethiopia Demographic and Health Survey 2011, Addis Ababa Ethiopia and Calverton USA: Central Statistical Authority and ICF International.
7. EDHS, CSA, ICF (2016) Ethiopia demographic and health survey 2016: Key indicators report. Addis ababa, Ethiopia, Rockville, Maryland, USA.
8. Anastasi E, Borchert M, Campbell O, Sondorp E, Kaducu F, et al. (2015) Losing women along the path to safe motherhood: Why is there such a gap between women's use of antenatal care and skilled birth attendance? A mixed methods study in Northern Uganda. *BMC Pregnancy Childbirth* 15: 287.
9. WHO. (2002) WHO antenatal care randomied trial mannual for the implimentation of the new model.
10. Yosef g, desalegn a, fasil m, serebe a, mamuye h. (2017) improving antenatal care services utilization in Ethiopia: An evidence-based policy brief. *Int J Health Econ Policy* 2: 11-117.
11. Singh K, Story W, MA (2016) Assessing the continuum of care pathway for maternal health in South Asia and Sub-Saharan. *Africa Matern Child Health* 29: 281-289.
12. Regassa N. (2011) Antenatal and postnatal care service utilization in southern ethiopia: A population-based study *Afr. Health Sci.* 11: 390-397.
13. Iqbal S, Maqsood S, Zakar R, Zakar M.Z, Fischer F. (2017) Continuum of care in maternal, newborn and child health in Pakistan: Analysis of trends and determinants from 2006 to 2012. *BMC Health Serv Res* 17: 189.
14. Wang W, Hong R. (2013) Completing the continuum of care for maternal and newborn health in cambodia: Who drops out? DHS further analysis reports no. 85. Calverton, Maryland, USA:ICF International.

- 
15. Hamed AF, Roshdy E MS (2018) Egyptian status of continuum of care for maternal, newborn, and child health: Sohag governorate as an example. *Int J Med Sci Public Health* 7: 417-426.
  16. Kikuchi K, Yasuok J, Nanishi K, A A, Nohara Y, Nishikitani M, et al. (2018) Postnatal care could be the key to improving the continuum of care in maternal and child health in Ratanakiri, Cambodia. *Plos One* 13.
  17. Akinyemi JO, Afolabi RF, Awolude OA (2016) Patterns and determinants of dropout from maternity care continuum in Nigeria. *BMC Pregnancy Childbirth* 16: 282.
  18. Yeji F, Shibanuma A, Oduro A, Debpuur C, Kikuchi K, et al. (2015) Continuum of care in a maternal, newborn and child health program in Ghana: Low completion rate and multiple obstacle factors. *Plos One* 10: e0142849.