

Complete postnatal care utilizations and its associated factors among women who gave birth in the last 12 months in Ezha district, Southern Ethiopia, 2019 (Community-based cross-sectional study , compliance with WHO recommendation)

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Abstract

Background: Postnatal care service is preventive care, practices and assessments that are designed to identify and manage complications for both the mother and the newborn within the first six weeks of birth. A clear understanding of factors associated with complete PNC services utilization is important to help in the development and the implementation of evidence-based approaches to increase utilization of PNC services. The aim of the study was to identify the Prevalence of complete postnatal care utilizations and associated factors among women gave birth in the last 12 months in Ezha district, southern Ethiopia.

Methods: A community based cross-sectional study was conducted in Ezha district. A two stage sampling technique was applied. A total of 568 mothers from ten selected kebeles were included in the study by using computer generated random numbers. Data were collected using pretested semi-structured questionnaire through face to face interview and entered to EpiData3.1 and exported to SPSS version 23. Principal component analysis (PCA) was performed to assess wealth status of the participants. Bivariate and Multivariable logistic regression analysis were performed in order to identify the factors significantly associated with Complete post natal care utilization at the level of significance of p value <0.25 with 95% CI of COR and <0.05 with 95% CI of AOR respectively.

Results: The prevalence of complete post natal care utilization in the study area was 19.6%. The factors; maternal education of secondary and above [AOR: 4.3; 95%CI: (2.15, 8.05)], having antenatal visits [AOR:3.75; 95%CI:(1.78, 7.92)], Caesarean delivery [AOR:3.96; 95%CI: (1.5,7.94)], having good knowledge on PNC [AOR: 5.31; 95%CI:(2.34,10.05)] and being model house hold [AOR:3.61; 95%CI: (1.97,6.64)] were identified as independent factors for complete postnatal care utilization in multivariable logistic regression analysis.

Conclusion: Complete postnatal care service utilization in the study area was low. Strengthening information education and communication on the importance of complying with recommended postnatal care, work on model house hold creation, and increasing number of antenatal care visits are the necessary measures that should be done by concerned bodies to enhance complete postnatal care utilization in the district.

Keywords: Postnatal care, complete postnatal care, utilization, district, associated factors.

Background

World health organization (WHO) states Postnatal care (PNC) services as a preventive care, practices and assessments that are designed to identify and manage or refer complications for both the mother and the newborn immediately following the expulsion of the placenta and extending through the first six weeks of child birth[1]. Recognizing the role of appropriate PNC during this critical period for mothers and babies, WHO recommended at least three PNC visits for all nursing mothers to ensure their survival and that of their newborns. The recommended numbers of postnatal visits were within the first 24 hours as crucial visit, on day three, between days 7 and 14, and 6 weeks of delivery[1, 2]. Receiving recommended PNC promotes and maintain the well-being of mother and new born by identifying and managing complications that aroused as a result of child birth and it provides health information that is beneficial to both mother and baby [1, 3, 4]. Moreover, Post natal Contacts in the first few weeks enable women to meet their breastfeeding goal and to address these common postpartum concerns and problems; due to this all women should ideally have at least three contacts with a maternal care provider within the first 42 days of postpartum[5]

To optimize the health of women and infants, postpartum care should be delivered with multiple visits, rather than a single encounter, with cares and support tailored to address acute postpartum issues and each woman's and newborn's individual needs[6]. Evidences asserted that postpartum visits by the community health workers within the first week of life increases the survival rate of both the mothers and their neonates [7]. Achieving those recommended three clinical visit regimen of care at a 90% level of coverage could avert up to 310,000 newborn deaths per year in Africa [8]. Despite the establishment of a number of global and national initiatives to improve maternal and newborn health, death is still continued as global challenge[9]. Around 303,000 maternal deaths occurred worldwide in 2015 and Sub-Saharan Africa (SSA) accounting for the huge number of deaths (201,000) which accounts for more than 65% of maternal death worldwide. Country Ethiopia accounts for maternal mortality ratio (MMR) of 353 in 100000 live births with neonatal mortality ratio of 29 in 1000 live births[10]. Even there are myriad of reasons, most of those deaths were occurred at birth or within the early postnatal period due to inadequacy of care[8, 11].

Even though Post natal care has all increased over the past 20 years, there are huge inequities in comprehensiveness and coverage[12, 13]. More than 90% of women in developed regions, such as the Americas and Europe, adhere to the WHO's PNC recommendations where as in low and middle income countries, only 37% and 51% of women receive a postnatal visit within 48 hours of giving birth respectively[14]. Nearly 41% of sub-Sahara African mothers attend a PNC visits within 48 hours of childbirth [15]. Only 13% of the mothers in the sub-Saharan Africa were received postnatal care checkup appropriately in line with WHO recommendation[14, 16].Although improvement has been made in increasing the accessibility for most of maternal and child health services, reports showed that national prevalence of PNC service utilization in Ethiopia is still low with 17% coverage[16]. Studies conducted in few countries namely Myanmar, India, rural Ghana, Tanzania and Ethiopia showed that the magnitude of complete PNC utilization lies within the range of 10–60% [17–21].

Inadequacy or lack of appropriate PNC could result in significant ill health to both mother and newborn with corresponding increment in women's functional and psychological limitations like maternal infections and bleeding, infertility, failure to practice exclusive breastfeeding, birth asphyxia, trauma, breathing problems, sepsis, malaria, and other prominent childhood infections that remain as dominant causes of death, which results in negative financial and productivity consequences[5, 12, 22]. Despite few studies were carried out on complete PNC utilization, the average and the range in the number of visits that women and their infants have with their health-care providers and the level of receiving contents of care during postpartum visits(PPVs) were not well addressed. A clear understanding of factors associated with complete PNC services utilization is important to help in the development and the implementation of evidence-based approaches to increase utilization of PNC services. Therefore, the aim of the study was to determine utilization of complete PNC and its associated factors among women who gave birth in the last 12 months in Ezha district, Guraghe zone, Southern Ethiopia in 2019.

Methods

Study design and area

A community based cross-sectional study was conducted in Ezha District, which is located 198 km South of Addis Ababa (the capital city of Ethiopia), 303 km south of Hawassa (the capital of the regional state of Southern Nations, Nationalities and Peoples). The district had population of 112,948 inhabitants of whom 55345 were men and 57603 were female who lives in 28 rural kebeles (kebele is the smallest administrative unit in Ethiopia). There were four health centers, one non-profitable NGO clinic and 28 health posts (one in each kebele) constitute the primary health care units providing maternal and child health services. Mothers who gave birth within the last 12 months and resident of study area for at least 6 months were included and Mothers with postpartum period (PPP) of less than 6 weeks to the study period and mothers who were critically ill during data collection period were excluded from the study.

Sample size and sampling Technique

The sample size for this study was calculated using statcalc menu of Epi-info software version 7 by using the parameters for single population proportion with estimated prevalence of complete postnatal care utilization 28.4% obtained from study done in Northern Ethiopia, confidence level of 95%, 5% degree of precision, design effect of 1.5 and non-response rate of 10% which gives 515. Secondly, a two-population proportion with consideration of factors affecting complete postnatal care was made. Among the biological plausible factors selected, the largest sample size was obtained using the assumptions of 80% power, 95% confidence level, percent of outcome in unexposed(i.e. below secondary education =16.06%), odds ratio (AOR=2.16) from study done in Myanmar[17]. After adding non-response rate of 10% and using design effect of 1.5 was the sample size was 568. Since the sample size obtained using two population proportion considerations (n=568) was larger than the sample size for single population proportion (n=515), it was used as the final sample size for the study.

A two stage sampling technique was employed to get study participants in the district. The district consists of 28 kebeles and ten kebeles were selected randomly by lottery method. The list of women who gave birth in the last 12 months was obtained from health post record of each kebele (the smallest administrative unit in Ethiopia) and cross-checked with family folder by using health extension workers. Study participants were selected from the record of each health post. Eligible women in each selected kebele were enumerated and reassured with health extension workers. Then Codes/numbers were given for those houses with eligible study participants and sampling frame had been formed. The sample size for selected kebeles was calculated by proportional allocation. Finally, study participants were selected by using computer generated random number and interviewed at house hold level. If there were more than one eligible woman dwells in the same house, only one study participant was selected by lottery method. When the selected households were closed during data collection, the interviewers revisited the households at least three times at different time intervals.

Data collection procedures

The data were collected by using by using six trained diploma nurses from different health centers within supervision of two trained public health officers. A pre-tested structured questionnaire was developed by reviewing of relevant literatures with reasonable modifications. First, it was prepared in English, translated to Amharic and then back to English in order to ensure its consistency. The questionnaire was designed in the way to capture information on socio demographic, obstetric and health service related characteristics of respondents. Face-to-face interview was cascaded at the study participants' household after proper orientation and getting verbal consent. The principal investigator and supervisor were conducting a day-to-day follow-up during the whole period of data collection. Every day, after data collection, each questionnaire was reviewed and checked for completeness by the supervisors and the principal investigator and the necessary feedbacks were given to the data collectors to the next day.

Variables and measurements

The outcome variable for this study is complete postnatal care service utilization. Women were having completed PNC when they received all four of WHO recommended visits within the first six weeks of their last child birth; within 24 hours, on day 3 (48-72 hrs.), 7–14 days and at sixth week subsequently through home visits by skilled health care providers or by going to nearby health facility [1]. Women who have received the service during all four periods were considered to have complete utilization. This self-reported visit was cross-confirmed by reviewing postnatal registration records. Finally, the outcome variable was dichotomized as 1: complete PNC utilization and 0: sporadic PNC utilization.

Different groups of explanatory variables have been considered in the study by reviewing related literatures and theories.

1. Individual and household socio-demographic factors were considered, include woman's age, marital status, educational status, occupation, Husbands Educational and occupational status, family size and house hold wealth status (*a composite indicator of socio-economic status of women which divides the households into five categories and were derived using principal component analysis based on information from agricultural land, crop production, monthly income, housing characteristics and ownership of live stocks and household durable assets*).
2. Obstetric factors include; Parity, frequency of ANC visits, maternal illness during postpartum period, planning status of pregnancy, place of delivery, course of pregnancy and Mode of delivery
3. Neonatal factors include; neonatal illness during postpartum period, neonatal death and birth outcome.

Knowledge of PNC and postnatal danger sign: This is a familiarity or awareness of services available in the post-natal care, having information on PNC, advantages of PNC, contents of car, timing of PNC, awareness of maternal and newborn danger sign...Etc. A composite indicator of knowledge on PNC and postnatal danger signs was constructed and ranked into poor, moderate and good knowledge when a participant responded at most three, 4-5 and at least 6 of ten assessment questions in the right way respectively [23]. Being model house hold (MHH) was measured by implementation status of the family towards all health extension packages and that was recognized by concerned bodies with certificates of appreciation[24].

Decision making capacity to maternity care: It is the ways of determining and control over resources when women should seek maternal health care services and categorized as

1. Autonomous: if women are usually make decision alone or jointly with their husbands for seeking maternal health service.
2. Non-autonomous: when the women's access to the service was determined by the husband and their family willingness[16].

Wantedness of pregnancy: measured in terms of planning status of last pregnancy; whether planned and unplanned (unwanted + mistimed pregnancies).

Accessible distance to nearby health facility: mother being no more than an hour from health facility or availability of health facility within one-hour travel on foot or by local means[25].

Data Quality Management

Properly designed data collection instruments were provided after translation into Amharic language. Intensive training that lasts two days was provided for both data collectors and supervisors by principal investigator on the objectives of the study, data collection techniques and procedures, contents of the questionnaire, how to fill the data collection format and how to keep confidentiality of information. A pretest was done for 5% of sample size in Cheha district one week before the actual data collection. All the necessary corrections were made based on the pretest result to avoid any confusion and for better completion of the questionnaires. The principal investigator and supervisors did on-site supervision during the data collection period and review all filled questionnaires for redundant, incomplete and incoherent responses. A remark was given during the next morning of each data collection and corrective measures were undertaken prior to data entry.

Data Processing and Analysis

The data were coded, cleaned, and entered by EpiDta3.1 and exported to statistical package for social science (SPSS) version 23.0 for further analysis. Descriptive statistics like frequency distributions, mean, median and standard deviation were computed. Wealth index of the individual household was analyzed by principal component analysis (PCA) method. Both bivariate and multivariable logistic regression analyses were performed to identify associations between dependent and independent variables. Crude and adjusted odds ratio with their 95% CI were calculated to determine the strength and presence of association. Variables having p value <0.25 in the bivariate analysis were

candidate for multivariable logistic regression. Factors significantly associated with Complete post natal care utilization in the final model were identified at p value <0.05 with 95% CI of AOR. The results were presented by using tables, figures, and texts.

Ethical Considerations

Ethical clearance was obtained from Institutional Review Board/IRB of Arba Minch University, College of Medicine and Health Science, School of Public Health. Following the approval, Official letter of co-operation was written to concerned bodies by the Department of Public Health of Arba Minch University. Permission was obtained from Ezha district Health office, respective health centers and health posts. Prior to the interview respondents were informed about the objective and purpose of the study and written consent and assent was obtained from each respondent based on their age. Confidentiality of the information was being assured and privacy of the respondent was being maintained.

Results

Socio- Demographic Characteristics of respondents

Of a total of 568 sampled women who gave birth within the last 12 months, 556 were participated in the study which yielded a response rate of 97.8%. The maternal age was ranged from 18–42 with average of 28.84 ± 5.306 years. Majorities (79.1%) of respondents were between 20–34 years. Almost half (49.5%) of the respondents were orthodox by religion and Guraghe was the predominant ethnic group, 518 (93.2%) (Table 1).

Table 1
Distribution of Socio-demographic characteristics among women who gave birth in the last 12 months in Ezha District, Southern Ethiopia, from March1-30, 2019

Variables	Categories	Frequency(n)	Percent (%)
Age (in years) (n = 556)	< 20	19	3.4
	20–34	437	79.1
	35+	96	17.5
Maternal Educational status	No formal education	246	44.3
	Primary education	167	30.0
	Secondary education	125	22.5
	College and above	18	3.2
Marital status	Married	530	95.3
	Single	12	2.1
	Divorced	9	1.6
	Widowed	5	1.0
Ethnicity	Guraghe	518	93.2
	Others	38	6.8
Religion	Orthodox	275	49.5
	Muslim	243	43.7
	Protestant	38	6.8
Maternal occupation	House wife	392	70.5
	Merchant	113	20.3
	Daily laborer	40	7.2
	Civil servant	11	2.0
Husband Educational status	No formal education	222	41.9
	Primary education	194	36.6
	Secondary education	93	17.5
	College and above	21	4.0
Husband occupation	Farmer	380	71.7
	Merchant	119	22.4
	Civil servant	20	3.8
	Daily laborer	11	2.1
Number of family	< 5	283	50.9
	≥ 5	273	49.1
Wealth index in quintiles	Lowest	109	19.6
	Low	114	20.5
	Middle	111	20.0
	High	114	20.5
	Highest	108	19.4

Two hundred eighty (50.4%) of participants were multiparous. Majority (89.2%) of respondents were received at least one antenatal care (ANC) visit during their last pregnancy and among them 124(22.3%) of participants received four or more visits. With respect to place of delivery 405(72.8%) of mothers gave their last birth at health center. Forty one (7.4%) of mothers delivered their last child by Caesarean section. Persistent vomiting 58(38.9%) and gush of fluid before the onset of labor 31(20.8%) accounted for the major complaints reported (Table 2).

Table 2
Obstetric characteristics of respondents who gave birth within the last 12 months in Ezha district, Southern Ethiopia, March 2019

Variables	Categories	Frequency(n)	Percent (%)
Parity	Primiparous	87	15.6
	Multiparous	280	50.4
	Grand multiparous	189	34.0
Previous history of NND	Yes	45	8.1
	No	511	91.9
Planning status of last pregnancy (n = 553)	Intended	438	79.2
	Unwanted	42	7.6
	Mistimed	73	13.2
ANC visits	No	60	10.8
	One visit	165	29.7
	Two visits	94	16.9
	Three visits	113	20.3
	Four and more visits	124	22.3
Last Birth outcome	Live birth	540	97.1
	Still birth	16	2.9
Place of delivery	HC	405	72.8
	Hospital	94	16.7
	HP	20	3.8
	Others *	37	6.7
Mode of delivery	Caesarean delivery	41	7.4
	Instrumental delivery	53	9.5
	Spontaneous vaginal delivery (SVD)	462	83.1
Key: Others * (delivery took place at home or on the way to health facility)			

Out of total respondents 132(23.7%) mentioned that they faced at least one maternal health problem during post-partum period. Breast problems (31.8%), abnormal vaginal bleeding (34.4%), high grade fever (sepsis) (26.2%), severe abdominal pain (7.7%) and swelling of the body parts (2.5%) were the major health problems reported by the mothers.

On the other hand one quarter (25%) of respondents reported that they faced newborn illness during postpartum period with at least one reported health problem. Unable to breast fed (53.1%) and breathing difficulty (30.4%) accounted for majorly reported newborn health problems followed by umbilical area infections(11.7%), vomiting(9.4%) and high grade fever(8.6%).

Level of Maternal Knowledge on Post Natal Care and Postnatal Danger Signs

A composite indicator of knowledge was constructed, whereby just over one fifth (21.6%) of the women had good knowledge about recommended postnatal care services and postpartum danger signs. Majority 45.0% and 33.4% of respondents had poor and moderate knowledge regarding to post-natal care and danger signs following delivery.

Regarding exposure to information, 355(63.8%) got any information about recommended PNC service. Majority 266(74.9%) got from Health Extension workers followed by from health institutions 156(43.9%). In addition, 121(34.1%) and 31(8.7%) of respondents got information from their friends and radio respectively. Nearly half (49.2%) of mothers knew at least one advantage of receiving recommended PNC. Around a quarter (23.3%) of respondents knew the time for PNC service delivery (i.e. following delivery and lasts till six weeks) whereas only 102(18.4%) knew the recommended number of postnatal visits(i.e. at least three visits). Furthermore, 54.9% and 57.4% of mothers knew at least one maternal and newborn danger signs during postpartum periods respectively.

Prevalence of Complete Post Natal Care Utilization

Interviewed women were categorized into two groups; women who got three and more PNC visits (complete PNC) and those who did not (sporadic PNC). From a total of 556 respondents (19.6%); [95%CI: (16.5, 23.2)] received complete PNC service.

Four hundred fifty eight (82.4%) mothers got at least one postpartum visit. Regarding timing of PNC visits, majority 305(66.6%) received their postnatal contact within the first 24 hours after delivery. In addition, 264(57.6%) and 224(48.9%) of respondents received postnatal visit on day 3(48–72 hrs.) and 7–14 days respectively. Relatively, few mothers (12.8%) got the service at sixth week. Regarding to service delivery platform for majority of visits, 398 (86.9%) respondents got the service by health extension workers through home to home visit and/or at health post level while the remaining 60(13.1%) got the service in at health center and hospital by skilled health providers.

Reasons for not receiving CPNC services

From a total of 447 respondents with sporadic PNC, 161(36.2%) and 146(32.6%) of respondents mentioned lack of information on the importance of complying with recommended visits and health care providers related problems as the main reason for not receiving CPNC service respectively.

Table 3
Reasons for not completing recommended PNC among mothers who gave birth in the last 12 months in Ezha district, Southern Ethiopia, March 2019

Reason for not completing	count	Percent
Having no information about PNC	161	36.0
Health care provider related problems	146	32.6
Cultural issues(seclusion)	109	24.4
Being healthy	82	18.3
Long distance	42	9.4
Lack of transportation	24	5.4
Contents of Care Given During Service Delivery		

Regarding contents of care received during service delivery, 321(70.1%) of respondents got health education on exclusive breast feeding (EBF). Three hundred eighteen (69.4%) and 294(64.3%) got examination for abnormal bleeding and cord care respectively. Around half of the mothers were provided with information regarding to postnatal danger signs (51.8%). When compared to other services few respondents got blood pressure measurement, breast examination and iron folate supplementation (Table 4).

Table 4
Distribution of contents of care among respondents who gave birth in the last 12 months, in Ezha district, SNNPR, southern Ethiopia, March2019

Contents of care(458)	Frequency (%)
Health education on exclusive breast feeding (EBF)	321(70.1)
Examination of abnormal vaginal bleeding (AVB)	318(69.4)
Counseling on danger signs	288(62.8)
Counseling on personal hygiene	188(41.0)
Health education on contraception	257(56.1)
Health education on HIV/AIDS transmission	170(37.1)
Iron folate supplementation(IFAS)	93(20.1)
Cord care given to the new born by using clorhexidine, "Yemisrach"	294(64.2)
Eye care given	118(25.8)
Breast examination	69(15.0)
Measuring body temperature of the newborn	208(45.6)
Getting referral service	92(20.1)
Measuring body weight of the new born	242(43.5)

Great Variations were noticed among mothers in receiving recommended contents of cares between mothers with complete PNC and their counterparts. Among a total of 109 respondents who got complete PNC, majority (90.8%) got counseling on exclusive breast feeding and 102(93.5%) were examined for abnormal vaginal bleeding. In contrast, most of those service uptakes were low among respondents with sporadic PNC category (Table 5).

Table 5
Distribution of contents of care among respondents who gave birth in the last 12 months, in Ezha district, southern Ethiopia, february10-March10, 2019

Contents of care(N = 556)	Level of completion		From total respondents(N = 556)
	Complete(n = 109)	Incomplete (n = 447)	
Health education on exclusive breast feeding (EBF)	99(90.8%)	222(49.6%)	321(57.7%)
Examination of abnormal vaginal bleeding (AVB)	102(93.5%)	216(48.3)	318(57.1%)
Counseling on danger signs	69(63.3%)	219(48.9%)	288(51.7%)
Counseling on personal hygiene	81(74.3%)	107(23.9%)	188(33.8%)
Health education on contraception	69(63.3%)	188(42.0)	257(46.2%)
Health education on HIV/AIDS transmission	72(66.0%)	98(21.9%)	170(30.6%)
Iron folate supplementation(IFAS)	41(37.6%)	52(11.6%)	93(16.7%)
Cord care given to the new born by using clorhexidine	93(85.3%)	201(44.9%)	294(52.8%)
Eye care given with tetracycline ointment (TTC)	39(35.7%)	79(17.7%)	118(21.2%)
Measuring body temperature of the newborn	64(58.7%)	144(32.2%)	208(37.4%)
Getting referral service	14(12.8%)	32(7.1%)	46(8.3%)
Measuring body weight of the new born	74(67.9%)	168(37.6%)	242(43.5)
Source: field work, 2019			

Factors Associated with Complete postnatal care Utilization.

Multi variable logistic regression analysis was performed and maternal education was found to be significantly associated with complete postnatal care (CPNC) utilization. Mothers who attend secondary education and above were more than 4 times [AOR: 4.3; 95%CI: (2.15, 8.05)] more likely to get complete postnatal care than mothers with no formal education. Similarly, Mothers who got four and more ANC visits were more than 3.75 times [AOR: 3.75 95%CI: (1.78, 7.92)] more likely to utilize CPNC service when compared to those who got at most one visits. Furthermore, mothers who gave birth by cesarean section were nearly four times (AOR: 3.96; 95%CI: (1.50, 7.94) more likely to get CPNC services than mothers who gave birth by spontaneous vaginal delivery (Table 6).

Table 6

Bivariate and multivariable logistic regression analysis of factors associated with complete postnatal care service utilization among study participants in Ezha district, Southern Ethiopia, March 2019.

Variables	Categories	PNC status		COR(95%CI)	AOR(95%CI)
		Complete(=1)	Sporadic(=0)		
Maternal Educational status	No formal education	16	230	1	1
	Primary education	43	124	4.98(2.69,9.21)	2.46(1.22,4.92)* *
	Secondary and above	50	93	7.73(4.19,14.26)	4.30(2.15,8.05)* *
Maternal age	35+	5	91	1	1
	20-34	98	342	5.21(2.06,13.19)	2.25(0.78,6.50)
	< 20	6	14	7.80(2.09,21.01)	2.09(0.35,12.29)
Family size	≥ 5	40	233	1	1
	< 5	69	214	1.88(1.22, 2.89)	0.67(0.38,1.18)
Planning status of last pregnancy (n = 553)	Planned	102	336	4.68(2.11, 9.38)	2.34(0.92,5.18)
	Unplanned***	7	108	1	1
Number of ANC visits	≤ one visit	15	210	1	1
	Two visits	17	77	3.09(1.47,6.49)	2.18(0.92,5.14)
	Three visits	31	82	5.29(2.71,10.31)	2.49(1.15,5.39)* *
	Four or more	46	78	8.25(4.36,15.63)	3.75(1.78,7.92)* *
Parity	Grand multiparous	20	169	1	1
	Multiparous	61	219	2.35(1.37,4.05)	1.26(0.51,3.07)
	Primiparous	28	59	4.01(2.1,7.65)	1.24(0.58,2.64)
Mode of delivery	SVD	71	391	1	1
	Instrumental	20	33	3.34(1.81,6.14)	1.57(0.76,3.26)
	C/S	18	23	4.31(2.213,8.39)	3.96(1.5,7.94)* * *
Maternal waiting room utilization	No	61	330	1	1
	Yes	48	117	2.22(1.44,3.42)	1.55(0.91,2.64)
Knowledge on PNC and postnatal danger sign	Poor	15	171	1	1
	Moderate	51	199	2.92 (1.58,5.38)	2.17(1.00,4.70)
	Good	43	77	6.37(3.34,12.15)	5.31(2.34,10.04)* *
Time To reach nearby HF	Far (> 1hr)	27	168	1	1
	Close (< = 1hr)	82	279	1.83(1.14,2.94)	1.17(0.63,2.19)
Being MHH	Yes	91	178	7.64(4.45,13.1)	3.61(1.97,6.64)* *

**= statistically significant at p < 0.01,

1: reference category; COR: crude odds ratio; AOR: adjusted odds ratio.

*** Unplanned pregnancy (mistimed and unwanted pregnancy)

	No	18	269	1	1
**= statistically significant at $p < 0.01$,					
1: reference category; COR: crude odds ratio; AOR: adjusted odds ratio.					
*** Unplanned pregnancy (mistimed and unwanted pregnancy)					

Discussion

A community-based cross-sectional study was conducted to assess the prevalence and determinants of postnatal care utilization among women who gave birth in the last 12 months in Ezha district. The current study revealed that 19.6% of mothers in the district got complete postnatal care services. The finding was lower as compared to the reports from studies conducted in Myanmar, in 2016 and Northern Ethiopia, in 2017 where 25.2% & 28.4% of the mothers had attended complete postnatal care within the first six weeks of delivery respectively [17, 21]. Furthermore, huge variation was noticed in two additional studies done in India in 2013 and rural Ghana (Builsa and Mamprusi districts) in 2016 where 61% & 62% of mothers got at least three recommended PNC visits respectively [18, 19]. This disparity might be explained by the socio-demographic variation between the study participants such as educational level and living standard as well as nature of the study area including better access to healthcare and information and health education.

On the other hand, the result was higher when compared to analysis of survey conducted in three rural districts of Tanzania for full PNC [20]. The discrepancy might be attributed to the time gap difference as there would be an improvement on access to healthcare and awareness about the service through time. Moreover, comparing to the proportions of ANC attendance, general PNC and health facility delivery, full PNC utilization is markedly lower among the study participants.

This study revealed that attainment of secondary education and above increase the odds of complete postnatal care utilization by four folds. This finding was supported by results from studies in Myanmar and Debire Birhan (Northern Ethiopia), where mothers with higher education were 2.16 and 3.2 times more likely to utilize CPNC respectively [17, 21]. Similar studies in India also reported that CPNC utilization was increased by double among educated women [18]. This could be explained by the notion that education is a key factor in empowering maternal decision making towards health care services, eventually leading to the improved health seeking behavior [21]. Furthermore, mothers with higher educational level are more likely to seek health information about maternal and child health services, including newborn care, and the consequences of not attending recommended PNC from various sources of information with better information processing skill which leads to the mothers to utilize CPNC than their counterparts.

The study found that frequency of ANC visit had significant association with utilization of the complete post natal care. This finding was in tandem with prior studies done in Ghana in 2016, where mother with four and more antenatal visits were 5.23 times more likely to receive CPNC [19]. It has been known that antenatal care exposes pregnant women to counseling and education about their own health and care of their children and may be particularly advantageous for those mothers and newborns in limiting settings, where health seeking behaviors are inadequate and access to health services is limited [2, 4]. In addition, women who make at least four ANC attendances are more likely to be those who adhere to health recommendations and therefore with higher chance of complying with the required number of PNC visits [19]. The potential reason behind this could be, as a mother had more frequent contact with health care providers, she might have more chance to be counseled on the importance of PNC, its availability, recommended timing and targeted frequency of postnatal visits, and could result in CPNC utilization.

The study also revealed that maternal knowledge towards recommended post natal care services and postnatal danger signs was found to be significantly associated with complete postnatal care utilization. Mothers with good knowledge were 5.3 times higher chance of receiving CPNC compared to those mothers with poor knowledge on PNC and postnatal danger sign. This was in line with a study conducted in Myanmar, in which mothers who know postnatal danger sign were 2.1 times more likely to complete postnatal services [17]. Similar study done in India also revealed that those mothers with good level of knowledge on PNC services were 2.3 times higher chance of completing three or more PNC visits [18]. This might be explained by the more a mother had adequate knowledge on postnatal care (like its advantages, contents, timing, consequence of not receiving the service, maternal and newborn danger signs), she might have more chance of complying with the recommended PNC visits. In addition, this might be due to the fact that awareness of postnatal danger signs is an important factor in motivating women and their families to attend health care service as the earliest opportunity with the intention of prevention and early detection [26]. These possible justifications were strongly supported by the current study in which, only 8% of respondents with poor knowledge were received CPNC.

The present study revealed that being from model house hold (MHH) had a positive influence on full PNC utilization. This result can be supported by study conducted in Gindeberet, where mother from model family were 6.7 times more likely to utilize postnatal care when compared to their counterparts [24]. This might be due to the fact that, Health Extension Workers (HEWs) spend more time on capacity building

part for model HHs by giving intensive training, support and follow up with practical demonstration and family education on maternal and child health services for those who were selected to be role models[27, 28]. Those successive training, support and follow up might bring skill development and made them too well practice recommended postnatal visits compared to their counterparts. In addition, they might had chance to involve in larger community meetings where all residents in a kebele will participate in regular basis and these larger public conferences provide a platform to discuss prioritized bottlenecks and strategies regarding to basic maternal health services and make them to utilize the service. Findings from previous studies revealed that, model families have good utilization of maternal health services [24, 29, 30].

Limitations of the Study

There might be a possibility of recall bias since women were asked for events which have already happened within the past one year prior to this study despite the consideration of more recent births. Causality cannot be inferred due to the cross-sectional nature of the study. The study might be among few studies which tried to assess the level of complete postnatal care based on the WHO's recommended timing and frequency of postnatal visits.

Conclusion

The finding from the study revealed that level of complete post natal care service utilization was found to be low. The services were predominantly accessed within the first 24 hours of delivery. The prominent reasons mentioned by respondents for not completing postnatal care service were lack of information on the importance of complying with recommended visits and health care providers related problems (i.e. late arrival and /or in frequent contacts). Maternal education, ANC visits, mode of delivery, Knowledge on recommended PNC and postnatal danger signs and being model house hold were factors found to be significantly associated with complete postnatal care utilization in the study area.

Abbreviations

AOR

Adjusted Odds Ratio; ANC:Antenatal care; HEWs:Health Extension Workers; MMR:maternal mortality ratio; MHH:model households; PCA:Principal Component Analysis; PNC:Post Natal Care; PPV:postpartum visits; WHO:World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the institutional review board of Arba Minch University.

Formal letter of cooperation was written for zonal health department and district health office from Arba Minch university department of public health. Permission was obtained from Ezha district Health office, respective health centers and health posts. Written consent was obtained from each study participants. Confidentiality of information and privacy was maintained.

Availability of the data and materials: The datasets used and/or analyzed during the current study are available for those who need on reasonable request.

Competing interests:

As an expert scientist and along with co-authors of concerned field, the paper has been submitted with full responsibility, following due ethical procedure, and there is no duplicate publication, fraud, plagiarism, or concerns about human study participants. It is to specifically state that "No Competing interests are at stake and there is No Conflict of Interest" with other people or organizations that could inappropriately influence or bias the content of the paper.

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Authors' contributions

AH: Conceived and designed the study, conducted data collection and analysis and wrote the draft manuscript. AH and FG: Conceived and designed the study, supervised data collection, performed the statistical analysis and wrote the first draft manuscript. MS: Assisted in the

design of the study, supervised data collection, participated in data analysis and interpretation and preparation of the draft manuscript. SD and MG: participated in data collection, analysis, interpretation and preparation of the draft manuscript. All authors read and approved the final manuscript.

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