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Early postnatal care services utilization and associated factors among postnatal women in Wolkite town, southeast Ethiopia, 2021

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ABSTRACT

Objective: To assess the prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, southeast Ethiopia.

Design: A community-based cross-sectional study was conducted on postnatal women (n=301) of Wolkite town from 15 May to 15 June 2021.

Measurements: Data were collected using a structured interviewer-administered questionnaire. The multivariate logistic regression model was fitted to identify the factors associated with early postnatal care services utilization; adjusted OR (AOR) with a 95% CI was computed to assess the strength of associations.

Results: The study revealed that the prevalence of early postnatal care services utilization was 23.3% with 95% CI 18.9 to 27.9. Wanted pregnancy (AOR=4.17, 95%CI 1.93 to 9.03), had more than 4 histories of pregnancy (Gravida≥4) (AOR=2.90, 95%CI 1.18 to 7.11) and had spontaneous vertex delivery (AOR=2.18, 95%CI 1.07 to 9.39) were factors associated with early postnatal care service utilization.

Conclusion: The prevalence of early postnatal care service utilization was low. Wanted pregnancy, had more than 4 histories of pregnancy (Gravida≥4), and had spontaneous vertex delivery were predictors of early postnatal care services utilization. Therefore, this study suggests health care providers should prove health education focus their efforts on increasing early postnatal care service utilization in those who may not have wanted to be pregnant, those who have first pregnancy, and those who deliver by cesarean section.

Key words: Early postnatal care, Utilization, Southern Ethiopia

Strength and Limitations of this study

- This study identified the factors associated with early postnatal care services utilization among postnatal women in the study area.
- As this is a community-based study with an adequate sample size and its finding is highly generalizable for the town and the study might be used to develop strategy in order to increase early postnatal care service utilization in the town.
- This study also assessed both maternal and newborn postnatal components, while the previous study focused only maternal components.
- The community- based cross-sectional study has possible limitations that may arise from postnatal women's readiness and ability to provide information about them and their families correctly during data collection, therefore recall bias may be introduced during data collection, so the study could be improved by longitudinal study.

INTRODUCTION

Globally, approximately 810 women die every day from preventable causes related to pregnancy and childbirth complications, 94% of women's death occur in low and middle-income countries[1]. According to world health organization (WHO) report, more than 60% of global maternal deaths occur in the postpartum period[2]. Three-fourths of maternal mortality occurred within the first week of delivery(3)

The first six weeks (42days) after giving birth is known as the postpartum period [4, 5]. The first week (7 days) is an intense time and requires all sorts of care for women and newborn babies. Early postnatal care refers to health care services provided to mother and newborn baby by health care professionals within first weeks after giving birth[2, 6].

Globally, 30% of mothers follow postnatal care, thus 13% of the postnatal follow-up in sub-Saharan Africa [7]. Research findings also showed that the prevalence of early postnatal care utilization varied to a certain extent among regions in Africa. For instance, Uganda [8] and South Sudan[9] reported 15.4% and 11.4%, respectively. Variations were also noted research conducted in Ethiopia, like Southern Ethiopia at Hawassa Zuria[10] and Wonango District[11] North Ethiopia(12) reported 29.7%,13.7%, and 34.3%, respectively.

Globally, every year three million infants die in the first week of life, and 900 000 die in the next three weeks [13, 14]. According to a united nations international children emergency fund (UNICEF) report in Ethiopia, nearly 240 babies will die each day before reaching their first month of life[15]. The Ethiopian demographic and health survey(EDHS) 2019 report, revealed that the neonatal mortality rate (NMR) of the country is 29 deaths per 1,000 live births [16, 17], neonatal deaths occur at birth, and early postnatal period due to inadequacy of care [18, 19].

In developing countries, there are different factors that decrease early postnatal care services utilization like home delivery, illiteracy, low income, and cultures[20, 21]. This makes the early postnatal care services program the weakest of all reproductive and child health programs. As a result of low adherence to recommended postnatal care (PNC) regimens, women in sub-Saharan Africa posed a significant risk to infant and maternal morbidities and mortality [22].

Despite the establishment of a number of global and national initiatives to improve maternally and child health, maternal mortalities and mortality is still continued as a global challenge [4]. Early postnatal care service is the most important maternal and child health care service to detect early maternal and newborn danger signs and complications by health care providers[23].

Recognizing early postnatal care service utilization offers an opportunity to reduce postnatal maternal and newborn complications. Moreover, as per the knowledge of the principal investigator, few studies were done on early postnatal care service utilization and associated factors. Even though studies assessed only maternal postnatal components, this study was included both maternal and newborn postnatal components and few are known regarding the prevalence of early postnatal service utilization in Ethiopia. Hence, this study was aimed to assess the prevalence of early postnatal service services utilization and associated factors among mothers who gave birth in the last 12 months in Gurage Zone, SNNPR, and Ethiopia.

METHODS AND MATERIALS

Study design and setting

This was a community-based cross-sectional study conducted from 15 May to 15 June 2021, at Wolkite Town, southeast Ethiopia. The town is located 155 km south of Addis Ababa, the capital city of Ethiopia. According to the 2007 Census conducted by the Central Statistical Agency of Ethiopia, Wolkite town has a total population of 28,856 of whom 15,068 were males and13, 788 females (24) residents served by one public hospital, three health centers, and nine private clinics.

Source and Study Population

Postnatal women aged 18 years and above who gave birth in the last 12 months living in the town and its selected sub-cities were the source and study populations, respectively. Individuals who gave birth more than 12 months and were critically ill during the data collection period were excluded from the study.

Patient and Public Involvement

Patients were not involved in the study

Sample Size Determination

The sample size was determined by using a single population proportion formula using the following assumptions: a confidence interval of 95%, the margin of error of 5%, and the prevalence of early postnatal service utilization of 23.7% [10]. By adding a 10% non-response rate, the final sample size was 306. The study participants were selected using a systematic random sampling technique.

Sampling Techniques

The list of women who gave birth in the last 12 months was obtained from delivery registers and cross-checked with the community health information system (CHIS) of health posts. Wolkite town has 11 kebeles from which 4 were selected using the lottery method, and then a sample was allocated proportionally to each kebeles. Finally, the study participants were selected by using a systematic random sampling technique, and 301 eligible mothers who gave birth within the last 12 months preceding the survey were interviewed. Hence five (5) study participants were non-respondent after three consecutive home visits.

Data Collection Instruments and Procedures

The data collection tool was prepared in English after reviewing related literature and then translated to the Amharic language. The questionnaire consisted of socio-demographic characteristics, obstetrics characteristics, service-related characteristics, and sources of knowledge about early postnatal care **(Annex 1)**. Data were collected using pre-tested structured interviewer-administered questionnaire. To assure the quality of data: Four diploma midwives were trained for data collection and two BSc midwives were assigned as a supervisor under the supervision of the principal investigator. Filled questionnaires were daily checked for completeness and consistency. The reliability of the questionnaire was checked by Cronbach's alpha value, which was 0.78.

Study Variables and Data Measurement

The dependent variable was early postnatal care utilization. Independent variables were as follows: socio-demographic characteristics (Age, Marital status, religion, ethnicity, educational level, occupational status, Husbands educational status, Husbands occupation, Estimated monthly income, and Family size), Obstetrics characteristics (Gravidity, Parity, Having ANC visit, Number of visits, Place of last ANC visit, Course of pregnancy, Place of delivery, Delivery

attendant, Mode of delivery , Birth outcome, Any history of neonatal death, Wantedness of pregnancy, Getting advice on importance of PNC, Maternal complication during postnatal period, and Newborns complication during pregnancy), Service-related characteristics (Means of transportation, Decision maker on maternity care, Getting help for health services, Maternity waiting room, Duration of stay) and Sources of knowledge (Know the advantages of PNC, Know the recommended postnatal visits, Know the correct timing of PNC, Knows that PNC is free service, Knows at least one components of the service, Knows at least one newborn danger signs, Know consequences of not receiving recommended PNC, Place where PNC is delivered).

Early postnatal care utilization: In this study, if a mother had at least one postnatal care check-up for the last delivery by skilled health care providers within 7 days after delivery, "Yes for early postnatal care utilization, otherwise no"[8, 24, 25].

Skilled health care providers: Include (Nurses, Midwives, Health Officers, HEW, and Doctors)[26].

Data Management and Analysis

Data were cleaned and entered into Epi Data 3.1 and exported to SPSS 25 for analysis. The data was cleaned by running frequency, checking missing values, and the presence of outliers. We summarized proportions of categorical variables by using mean with standard deviation (SD) based on the distribution of data for continuous variables. Normality was checked using the Shapiro–Wilk test. The factors associated with the dependent variable were analyzed using binary logistic regression. Bivariate analysis, crude odds ratio (COR) with 95% CI, was used to see the association between outcome variable with each independent variable. Variables with a p-value of ≤0.25 in the bivariate analysis were selected for the multivariable logistic regression model. Multi-collinearity was checked to see the linear correlation among the independent variables. Model goodness of fitness was tested by Hosmer-Lemeshow statistic. The strength of the association between dependent and independent variables was assessed using an adjusted odds ratio (AOR) with a 95% confidence interval. A p-value was used to report the level of significance of each independent variable with a dependent variable.

RESULTS

Socio-demographic characteristics

A total of 301 study participants were involved in this study, with a response rate of 98.4%. the majority of the respondents 280(93.0%) were married, 144(47.8%) of the respondents were Orthodox religion followers, 275(91.4%) were Gurage by ethnicity, 142(47.2%) had no formal education, more than two-thirds, 188 (62.5%) of the participant were housewife, more than two-fifth, 129(42.9%) of husbands of the respondents had no formal education, almost three-fourth, 225(74.8%) of the respondent were farmers and nearly one-half, 149(49.5%) of the respondents' had income below the mean level (597.4 birrs). The minimum and maximum numbers of family sizes were 2 and 8, respectively, with the mean of 4± (standard deviation of 1) (**Table 1**).

Table 1: Socio-demographic characteristics of early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021 (n=301)

Category	Frequency	Percent (%)
Age of the mother		
Less than 20	22	7.3
20-34	206	68.4
≥35	73	24.3
Marital status		
Married	280	93
Unmarried	13	4.3
Divorced	6	2.0
Widowed	2	0.7
Religion		
Orthodox	144	47.8
Muslim	122	40.5
Protestant	31	10.3
Catholic	4	1.3
Ethnicity		
Gurage	275	91.4
Amhara	24	8.0
Oromo	2	0.7
Educational status		
No formal education	142	47.2
Grade 1-8	70	23.3
Secondary 9-12	77	25.6
College and above	12	4.0
Occupational status		
House wife	188	62.5
Civil servant	11	3.7
Merchant	76	25.2

Daily laborer	18	6.0
Farmer	8	2.7
Husbands educational status		
No formal education	129	42.9
Grade 1-8	108	35.9
Secondary 9-12	53	17.6
College and above	11	3.7
Husbands occupation		
Farmer	225	74.8
Civil servant	13	4.3
Merchant	55	18.3
Daily laborer	8	2.7
Estimated monthly income		
Below average (597.4 ETB)	149	49.5
More than average (597.4 ETB)	152	50.5
Family size		
Less than average (4)	154	51.2
More than average (4)	147	48.8

Obstetrics related characteristics

Among the respondents, almost two-fifths, 119(39.5%) had been pregnant for the first time and more than four-fifths, 268(89.0%) had ANC visits. Of the ANC attendants, 83(30.9%) have one ANC visit and 80(29.8%) have four and above visits. Regarding the place of last ANC visit, 208(77.6%) was at the health center. Related to the course of pregnancy, almost two-fifths, 112(37.2%) of the respondents had a complicated pregnancy, four-fifths, 236(78.4%) of the respondents were given birth at a health center and most of the respondents, 284(94.4%) were attended by health professionals. According to the mode of delivery, more than four-fifths, 254(84.4%) of the respondents were delivered by SVD (**Table 2**).

Maternal complications

Among the respondents, 18.3% had maternal complications' during the early postnatal period. Of the complications 4.3% were sepsis, and 3.7% were PPH (**Figure 1**).

New born complications

Among the respondents, 27.9% had newborn complications during the early postnatal period. Of the complications, 16.3% were unable to breastfeed, and 7% were having breathing difficulties (**Figure 2**).

Table 2: Obstetrics characteristics of early postnatal care services utilization among postnatal women in Wolkite town, Gurage zone, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency	Percentage
Gravidity	One	119	39.5
	2-4	106	35.2
	≥5	76	25.2
Parity	One	119	39.5
	2-4	106	35.2
	≥5	76	25.2
Having ANC visit	Yes	268	89.0
	No	33	11.0
Number of visits	One	83	31
	Two	55	20.5
	Three	50	18.6
	Four and above	80	29.8
Place of ANC visit	Health center	208	77.6
	Hospital	51	19
	Health post	9	3.3
Course of pregnancy	Complicated	112	37.2
	Un complicated	189	62.8
Place of delivery	Health center	236	78.4
	Hospital	50	16.6
	Health post	6	2.0
	Home	9	3.0
Delivery attendant	Health professionals	284	94.4
	Health extension workers	15	5.0
	Others	2	0.7
Mode of delivery	SVD	254	84.4
	Instrumental delivery	16	5.3

	CS	31	10.3
Birth outcome	Live birth	292	97
	Still birth	9	3.0
Any history of neonatal death	Yes	10	3.3
	No	291	96.7
Wantedness of pregnancy	Wanted	222	73.8
	Unwanted	79	26.2
Getting advice on importance of PNC	Yes	167	55.5
	No	134	44.5
Maternal complication during postnatal period	Yes	55	18.3
	No	246	81.7
Newborns complication during pregnancy	Yes	84	27.9
	No	217	72.1

Service related characteristics

Among the respondents, more than two-thirds, 190(63.1%) of the respondents were traveled by foot to the health facility, while more than two-fifths, 141(46.8%) of the respondents were decided by themselves to have early PNC. More than two-thirds, 228(75.7%) of the respondents were getting help from their husbands about health services. Of those who used the maternity waiting room, 50(16.6%) stayed for less than a week and 40(13.3%) stayed for one week (**Table 3**).

Table 3: Service related characteristics of early postnatal care services utilization among postnatal women in Wolkite town, Gurage zone, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency	Percentage
Means of transportation	Foot	190	63.1
	Vehicles	111	36.9
Decision maker on maternity care	Herself	141	46.8
	Husband	49	16.3
	Joint decision	111	36.9
Getting help for health services	Husband	228	75.7
	Relatives	65	21.6
	Families	8	2.7
Maternity waiting room	Yes	90	29.9
	No	211	70.1
Duration of stay (n=90)	Less than a week	50	55.6
	For one week	40	44.4

Sources of knowledge about early PNC

Among the respondents, 220(70.9%) have information about EPNC. Most of the respondents, 150 (68.2%) acquired information about EPNC utilization from television. Nearly one-fifths, 81(26.9%) of the respondents have not known the advantages of postnatal care and four-fifth, 243(80.7%) of the respondents were known recommended postnatal visits. Nearly four-fifths, 256(85.0%) of the respondents did not know the correct timing of EPNC. Nearly one-half, 133 (44.2%) of the respondents knew that EPNC was a free service, and nearly two-thirds, 188(62.5%) of the respondents did not know at least one component of the service (**Table 4**).

Table 4: Knowledge about early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency(n)	Percentage (%)
Know the advantages of PNC	Yes	220	73.1
	No	81	26.9
Know the recommended postnatal visits	Yes	58	19.3
	No	243	80.7
Know the correct timing of PNC	Yes	45	15.0
	No	256	85.0
Knows that PNC is free service	Yes	133	44.2
	No	168	55.8
Knows at least one components of the service	Yes	113	37.5
	No	188	62.5
Knows at least one newborn danger signs	Yes	150	49.8
	No	151	50.2

Know consequences of not receiving recommended PNC	Yes	48	15.9
	No	253	84.1
Place where PNC is delivered	Yes	102	33.9
	No	199	66.1

Factors associated with early postnatal care utilization

Multivariable analysis revealed that the odds of having early postnatal care utilization among mothers who had more than four pregnancies were two times (AOR: 2.90; 95%CI: 1.18, 7.11) more likely as compared with those who had one history of pregnancy. The odds of utilizing early PNC among mothers who had the desire to last pregnancy were four times (AOR: 4.17; 95%CI: 1.93, 9.03) more likely as compared with their counterparts. The odds of utilizing early PNC among mothers delivered by SVD were two times (AOR: 2.18; 95%CI: 1.07, 9.39) more likely as compared with those who delivered by CS (**Table 5**).

Table 5: Factors associated with early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Variables	EPNC Utilization		COR (95%CI)	AOR (95%CI)	P-value
	Yes	No			
Estimated monthly income					
Below average	43	106	1	1	
>Average	75	77	2.40(1.49, 3.87)	1.22(0.67, 2.23)	0.517
Number of pregnancy (Gravidity)					
One	31	88	1	1	
2-4	41	65	1.79(1.02, 3.15)	1.22(0.54, 2.77)	0.629
More than 4	46	30	4.35(2.35, 8.06)	**2.90(1.18, 7.11)**	**0.020**
Parity					
Primparous	35	84	1	1	
Multiparous	41	65	1.51(0.87, 2.64)	1.18(0.51, 2.76)	0.699
Grand Multiparous	42	34	2.97(1.63, 5.40)	1.09(0.46, 2.62)	0.844
Desire to last pregnancy					
Yes	103	119	3.69(1.98, 6.87)	**4.17(1.93, 9.03)**	**0.0001**
No	15	64	1	1	
Having ANC follow up					
Yes	111	157	2.63(1.10, 6.26)	0.39(0.12, 1.28)	0.121
No	7	26	1	1	
Course of pregnancy					
Complicated	60	52	2.61(1.61, 4.23)	1.57(0.85, 2.92)	0.151
Uncomplicated	58	131	1	1	
Mode of delivery					
SVD	107	147	2.38(1.04, 6.01)	**2.18(1.07, 9.39)**	**0.038**
CS	11	36	1	1	

Any newborn illness/complication					
Yes	42	42	1.85(1.11, 3.09)	1.59(0.84, 2.99)	0.155
No	76	141	1	1	
Obstetrics complication					
Yes	41	14	6.43(1.01, 9.48)	9.12(0.34, 12.53)	0.0001
No	77	169	1	1	
Knowledge on PNC					
Poor	45	115	1	1	
Good	73	68	2.74(1.70, 4.42)	1.86(0.99, 3.49)	0.051

Discussion

This study assessed early postnatal care services utilization and associated factors among postnatal women in Wolkite town, Gurage zone, SNNPR State, Ethiopia. We found the prevalence of early postnatal care service utilization was 23.3 %(95% CI: 18.9-27.9). The prevalence of early postnatal care services utilization in this study is lower than the study conducted in Myanmar(72.1%)[27], Zambia (63%)[28], Builsa district (62%)[29], Hadiya Zone(51.4%)[30], Uganda (50%)[8], Assela town (37.5%)[31], Adigrat Town (34.3%)[32] and Debremarkos town (33.5%)[33] The variation might be due to different of the study design and setting and sociodemographic characteristics of the study participants.

However, this finding is higher than the study conducted in china (17%)[34], Tanzania (10.4%)[35],South Sudan(11.4%)[9], and Debremarkos town in Ethiopia (16.2%)[36]. The differences might be due to different of the sociodemographic characteristics of the study participants. This finding indicates the importance of wanted pregnancy to gate early postnatal care follow up visits at the right time.

Women who had wanted pregnancy in a previous pregnancy were 4.17 times more likely to utilize early post-natal care when compared with counterparts. Antenatal care and institutional delivery provide the opportunity to get information about early post-natal care services utilization. This finding is similar to studies conducted in Tanzania and Benin[35, 37]. This could be explained by the various advantages of public enlightenment on planning for pregnancy. Once the pregnancy is planned and wanted, the couples may be well prepared and more likely to welcome the newborn baby with joy and communication with health care providers to have recommendations on early postnatal care services.

Mothers who had more than four previous pregnancies were 2 times more likely to utilize early post-natal care when compared with counterparts. This is consistent with the study conducted in Debre Birhan[38]and Mekele city[39]. This indicates that former pregnancy shared experience.

Mothers who had SVD were three times more likely compared to those who delivered by CS. This finding is consistent with the study conducted in Debre Birhan[38] and Debremarkos[33]. This might be related to the knowledge acquired through frequent visits to the health facilities, those mothers who gave birth by CS were stayed in their home until the healing of the cesarean wound.

Conclusion

Nearly one-fourth of postnatal women utilized early postnatal care services in Wolkite town, Gurage zone, SNNPR State, Ethiopia. Wanted pregnancy, had more than 4 histories of pregnancy and had spontaneous vertex delivery were significantly associated with early postnatal service utilization. Strengthening women's awareness on wanted pregnancy, postnatal maternal and newborn complications increases women's access to early postnatal care service utilization and helps to reduce maternal and newborn morbidity and mortality. Health care providers should try to prove health education focus their efforts on increasing early postnatal care service utilization in those who may not have wanted to be pregnant, those who have their first pregnancy, and those who deliver by cesarean section.

Policy makers' strategy should focus on maternal health care on wanted pregnancy to improve early postnatal care services utilization.

Patient consent for publication

Not required.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are not publicly available

Competing interests

The authors declare that they have no competing interests

Ethical Approval and Consent to Participants

The ethical clearance was obtained from the institutional review board (IRB) of Wolkite University College of Health Science and Medicine with reference number RCSUILC/021/2021. Written informed consent was obtained from all study participants before the study; because this study has no potential harm or doesn't breach the confidentiality of the participants and approved by IRB of Wolkite University.

They were also informed about the possibility to refuse participation at any time of data collection. Confidentiality of the data was assured and kept; code number was assigned to the study participants without mentioning the name, the information that was collected for the study was kept in a file, and locked with a key.

Author Contributions

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References

1. WHO. Trends in maternal mortality 2018 [Available from: https://documents1.worldbank.org/curated/en/793971568908763231/pdf/Trends-in-maternal-mortality-2000-to-2017-Estimates-by-WHO-UNICEF-UNFPA-World-Bank-Group-and-the-United-Nations-Population-Division.pdf.
2. WHO. WHO recommendations on Postnatal care of the mother and newborn. 2014.
3. Yaya S, Ghose B. Global Inequality in Maternal Health Care Service Utilization: Implications for Sustainable Development Goals. Health Equity. 2019;3(1):145-54.
4. WHO U. UNFPA, World Bank Group and the United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF. UNFPA, World Bank Group and the United Nations Population Division. Geneva; 2015.
5. Organization WH. Health in 2015: from MDGs, millennium development goals to SDGs, sustainable development goals. 2015.
6. WHO. Postnatal Care for Mothers and Newborns Highlights from the World Health Organization 2013 Guidelines. 2015.
7. Kassa GM. Mother-to-child transmission of HIV infection and its associated factors in Ethiopia: a systematic review and meta-analysis. BMC Infect Dis. 2018;18(1):216.
8. USAIDS. Determinants of Early Postnatal Care Attendance in Uganda. 2016.
9. Izudi J, Akwang GD, Amongin D. Early postnatal care use by postpartum mothers in Mundri East County, South Sudan. BMC Health Services Research. 2017;17(1).
10. Yoseph S, Dache A, Dona A. Prevalence of Early Postnatal-Care Service Utilization and Its Associated Factors among Mothers in Hawassa Zuria District, Sidama Regional State, Ethiopia: A Cross-Sectional Study. 2021.
11. Tefera Y, Hailu S, Tilahun aR. Early postnatal care service utilization and its determinants among women who gave birth in the last 6 months in wonago district, south ethiopia: A community-based cross-sectional study. 2020.
12. Gebreslassie T, Gebrehiwot, Mekonen HH. Prevalence and Associated Factors of Early Postnatal Care Service Use Among Mothers Who Had Given Birth Within the Last 12 Months in Adigrat Town, Tigray, Northern Ethiopia,. 2018.

13. WHO. WHO Technical Consultation on Postpartum and Postnatal Care Geneva , Switzerland2010 [Available from: http://apps.who.int/iris/bitstream/handle/10665/70432/WHO_MPS_10.03_eng.pdf;jsessionid=977EC87BBE162C1694EBAB559E4D335A?sequence=1.
14. Collaboration Ct. Countdown to 2030: tracking progress towards universal coverage for reproductive, maternal, newborn, and child health. The Lancet. 2018.
15. UNICEF. Maternal and Newborn Health Disparities in Ethiopia,unicef for every child 2017 [Available from: https://data.unicef.org/wp-content/uploads/country_profiles/Ethiopia/country%20profile_ETH.pdf.
16. CSAE. Central statistics agency of Ethiopia, Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF. Ethiopia2016 [cited 2018. Available from: https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf.
17. WHO. global strategies for women's,children and adolescent(2016-2030) 2016 [
18. Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N, De Bernis L, et al. Evidence-based, cost-effective interventions: how many newborn babies can we save? The Lancet. 2005;365(9463):977-88.
19. WHO/UNICEF. Home visits for the newborn child:a strategy to improve survival 2010 [Available from: http://apps.who.int/iris/bitstream/handle/10665/70002/WHO_FCH_CAH_09.02_eng.pdf?sequence=1.
20. DiBari JN, Yu SM, Chao SM, Lu MC. Use of postpartum care: predictors and barriers. Journal of pregnancy. 2014;2014.
21. Organization WH. Every newborn: an action plan to end preventable deaths. 2014.
22. WHO. WHO recommendations on maternal health: guidelines approved by the WHO Guidelines Review Committee Geneva: 2017 [updated 2017. Available from: http://apps.who.int/iris/bitstream/handle/10665/259268/WHO-MCA-17.10-eng.pdf?sequence=1.
23. WHO. Technical Consultation on Postpartum and Postnatal Care. 2010.

24. Ndugga P, Namiyonga NK, Sebuwufu D. Determinants of early postnatal care attendance: analysis of the 2016 Uganda demographic and health survey. BMC Pregnancy and Childbirth. 2020;20(1).
25. An T, D N, A T. Early Postnatal Care Service Utilization and Associated Factors among Mothers Who Gave Birth in the Last 12 Months in Aseko District, Arsi Zone, South East Ethiopia in 2016. Journal of Women's Health Care. 2017;06(01).
26. EDHS. Ethiopia demographic and health survey 2016.
27. Mon AS, Phyu MK, Thinkhamrop W, Thinkhamrop B. women and its determinants: a cross-sectional study. 2018.
28. Chungu C, Makasa M, Chola M, Jacobs CN. Place of Delivery Associated With Postnatal Care Utilization Among Childbearing Women in Zambia. Frontiers in Public Health. 2018;6(94).
29. Sakeah E, Aborigo R, Sakeah JK, Dalaba M, Kanyomse E, Azongo D, et al. The role of community-based health services in influencing postnatal care visits in the Builsa and the West Mamprusi districts in rural Ghana. BMC pregnancy and childbirth. 2018;18(1):295.
30. Belachew T, Taye A, Belachew T. Postnatal care service utilization and associated factors among mothers in Lemo Woreda, Ethiopia. J Women's Health Care. 2016;5(10.4172):2167-0420.1000318.
31. Amane Tumbure1 DA, Elile Fantahun1, Megersa Negusu1, Tsegaw Yitbarek1, Legese Tadesse2* and Tewodros Desalegn2 Assessment of Postnatal Care Service Utilization and Associated Factors in Asella Town, Arsi Zone, Oromiya Regional State, Ethiopia. Global Journal of Reproductive medicine. 2018;6(1).
32. Gebreslassie T, Haftea G, Mekonen H. Prevalence and Associated Factors of Early Postnatal Care Service Use Among Mothers Who Had Given Birth Within the Last 12 Months in Adigrat Town, Tigray, Northern Ethiopia,. 2018.
33. Limenih MA, Endale ZM, Dachew BA. Postnatal Care Service Utilization and Associated Factors among Women Who Gave Birth in the Last 12 Months prior to the Study in Debre Markos Town, Northwestern Ethiopia: A Community-Based Cross-Sectional Study. International Journal of Reproductive Medicine. 2016;2016:1-7.
34. You H, Chen J, Bogg L, Wu Y, Duan S, Ye C, et al. Study on the factors associated with postpartum visits in rural China. PLoS One. 2013;8(2):e55955.

35. Kanté AM, Chung CE, Larsen AM, Exavery A, Tani K, Phillips JF. Factors associated with compliance with the recommended frequency of postnatal care services in three rural districts of Tanzania. BMC pregnancy and childbirth. 2015;15(1):341.
36. Limenih MA, Endale ZM, Dachew BA. Postnatal Care Service Utilization and Associated Factors among Women Who Gave Birth in the Last 12 Months prior to the Study in Debre Markos Town, Northwestern Ethiopia: A Community-Based Cross-Sectional Study. International Journal of Reproductive Medicine. 2016;2016:7.
37. Dansou J, Adekunle AO, Arowojolu AO. Factors associated with the compliance of recommended first postnatal care services utilization among reproductive age women in Benin Republic: an analysis of 2011/2012 BDHS data. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017;6(4):1161-9.
38. Akibu M, Tsegaye W, Megersa T, Nurgi S. Prevalence and Determinants of Complete Postnatal Care Service Utilization in Northern Shoa, Ethiopia. Journal of pregnancy. 2018;2018.
39. Gebrehiwot G, Medhanyie AA, Gidey G, Abrha K. Postnatal care utilization among urban women in northern Ethiopia: cross-sectional survey. BMC women's health. 2018;18(1):78.

Legends:

Figure 1: Types of maternal complication among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Figure 2: Types of newborn complications during postnatal period among postnatal women in Wolkite town, southeast Ethiopia, Ethiopia, 2021(n=301)

Annex 1: English version interviewer administered questionnaire on early postnatal care services utilization among postnatal women in southeast Ethiopia, 2021.

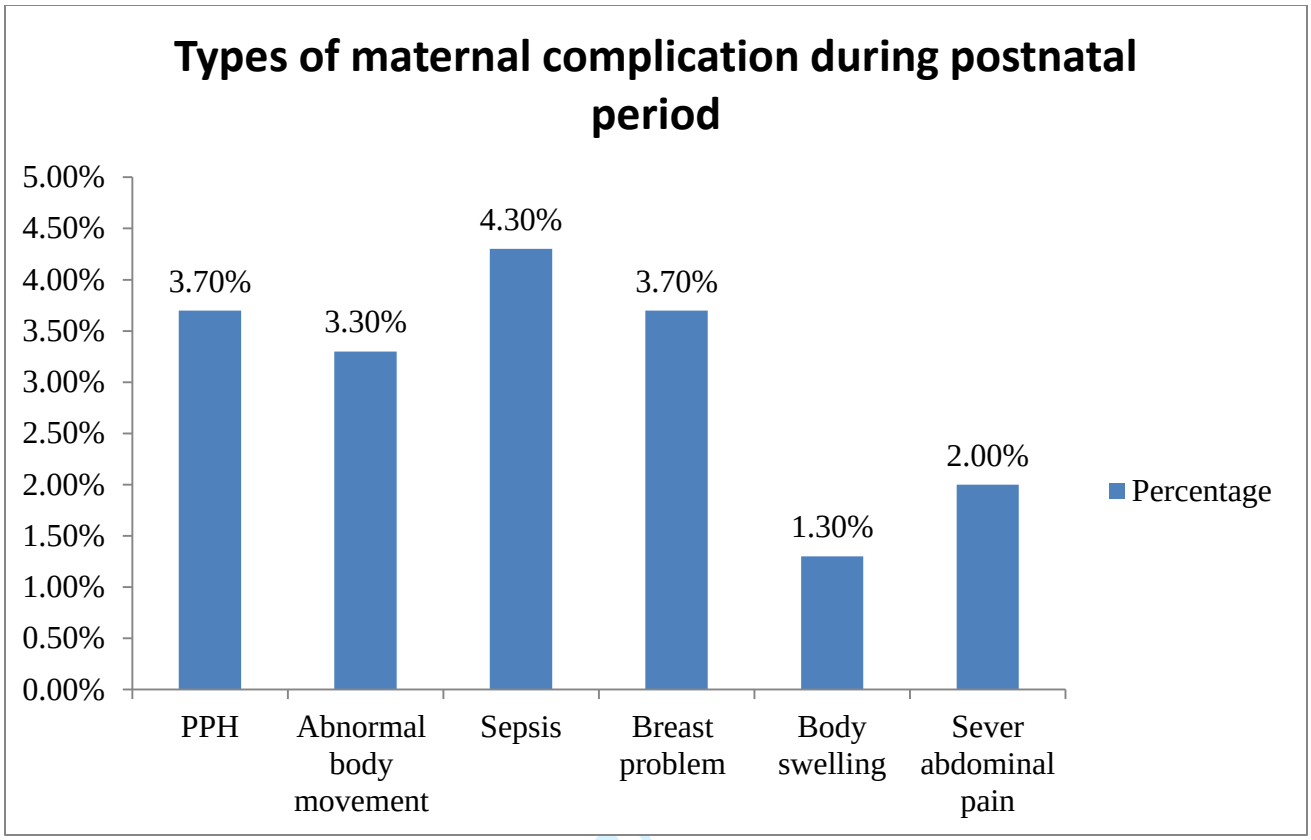

Figure 1: Types of maternal complication among postnatal women in Wolkite town, Southeast, Ethiopia, 2021(n=301)

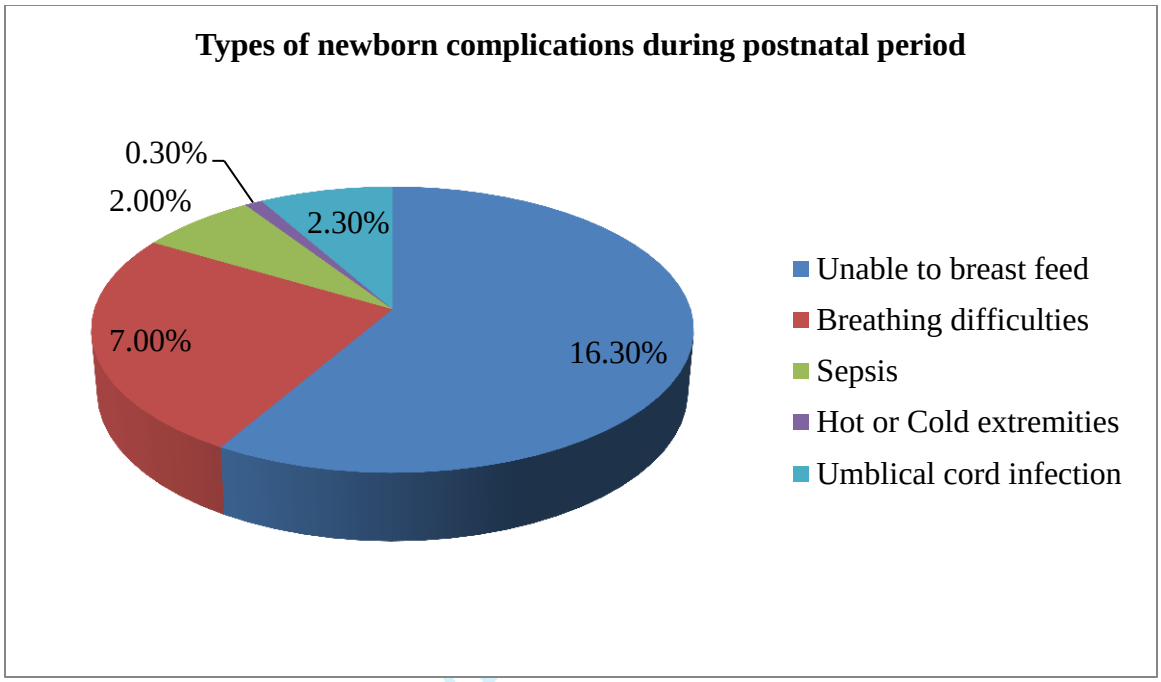

Figure 2: Types of newborn complications during postnatal period among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

APPENDICES

Annex 1: English version Interviewer Administered Questionnaire

Consent form for postnatal women:

Title of research: Prevalence of early postnatal care utilization and associated factors among postnatal women in Wolkite town, Gurage zone, Southern Ethiopia, 2021

Hello my name is----------. I am working as data collector in the research conducted by Yirgalem Yosef. The research is only for academic purposes. I assure you that the views expressed in this questionnaire will under no circumstance be made public or disclosed to a third party. The details of this interview and the information you provide will be held in confidence.

Declaration by Respondent

I certify that I voluntarily agree to answer the research questions, that the study has been explained to me. All my questions have been answered satisfactorily. I understand I am free to discontinue participation at any time if I so choose.

…….....

Signature

Date……..

Researcher's Statement

I certify that the participant has been given ample time to read, learn and understand the study. All questions and clarifications raised by the participant have been addressed.

……..

Yirgalem Yosef (Researcher)

Date…….

Instruction: Please **Circle the appropriate answer** in space provided

Questionnaire Code_____

SECTION 1: Socio demographic characteristics			
S.N	Questions	Answers	Skip
101	Age (in years)	1. [_____] 2. I don't know----------	
102	Current marital status	1. Married 2. Divorced /Separated 3. un married 4. Widowed	
103	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others	
104	Ethnicity	1. Gurage 2. Amhara 3. Oromo 4. Others.	
105	Education status	1. No formal Education 2. 1-8th 3. 9-12th 4. College and above	
106	Occupational status	1. House wife 2. Civil servant 3. Merchant 4. Daily labour 5. Farmer	
107	Husbands educational status	1. No formal Education 2. 1-8th 3. 9-12th 4. College and above	

108	Husbands occupations	1. Farmer 2. Civil servant 3. Merchant 4. Daily labour	
109	Estimated monthly income	1. blow average(597.4 ETB) 2. More than average (597.4 ETB)	
110	Family size	1. less than average (4) 2. more than average (4)	
Section two: obstetric and neonatal characteristics			Code
201	Gravidity	----------	
202	Parity	----------	
203	Having ANC visit	1. Yes 2. No	
204	Number of ANC Visits	1. one 2. two 3. Three 4. Four and above	
205	Place of last ANC visit	1. Health center 2. Hospital 3. Health post	
206	Corse of pregnancy	1. Complicated 2. Uncomplicated	
207	Place of delivery	1. Health center 2. Hospital 3. 3. Health post 4. Home	
208	Delivery Attendant	1. Health professionals 2. Health extension workers 3. Other	
209	Mode of delivery	1. SVD	

		2. Instrumental delivery 3. CS	
210	Birth outcome	1. Live birth 2. Still birth	
211	Any history of Neonatal death	1. Yes 2. No	
212	Wantedness of pregnancy	1. Wanted 2. Unwanted	
213	Have you got advices on Importance of PNC?	1. Yes 2. No	
214	New born complication during pregnancy	1. Yes 2. No	
Section three : Health service related factors (access to skilled maternity care)			**Code**
301	Means of transportation	1. Foot 1. Vehicle	
302	Decision maker on maternity care	1. Herself 2. Husband 3. Joint decision	
303	Getting help for health services	1. Husband 2. Relatives 3. Families	
304	Using Maternity waiting room	1. Yes 2. No	If yes 305
305	Duration of stay	1. Less than a week 2. For one week	
Section four: knowledge of mothers towards early PNC service			Code
401	Knows advantages of PNC	1. Yes 1. No	
402	Knows Recommended PNC	2. Yes 3. No	

403	Know the correct timing of PNC	1. Yes 2. No	
404	Knows that PNC is free services	1. Yes 1. No	
405	Knows at least one component of the services	1. Yes 2. No	
406	Knows at least on newborn danger sign	1. Yes 2. No	
407	know consequences of not receiving recommended PNC	1. Yes 2. No	
408	Know place where PNC is delivered	1. Yes 2. No	

THANK YOU VERY MUCH!!!!!

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Prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, Gurage zone, Southern Ethiopia: a community-based cross-sectional study

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Prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, Gurage zone, Southern Ethiopia: a community-based cross-sectional study

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ABSTRACT

Objective: In developing countries, early postnatal care service utilization is one of the health care service utilization problems, which is related to extensive maternal and neonatal morbidity and mortality. Identification of the factors associated with early postnatal care services utilization is vital to developing intervention measures to mitigate their public health impact. Thus, this study aimed to assess the prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, southeast Ethiopia.

Design: A community-based cross-sectional study design was conducted among 301 postnatal women from 15 May to 15 June 2021.

Measurements: Data were collected using a pretested structured questionnaire. The collected data were cleaned and entered into Epidata3.1 and then exported to SPSS version 23 for analysis. Finally, a multivariate logistic regression model was fitted to identify the factors associated with early postnatal care utilization. The p-value <0.05 was considered statistically significant.

Results: The finding showed that the prevalence of early postnatal care services utilization was 23.3% (95% CI: 18.9 to 27.9). Wanted pregnancy (AOR=4.17, 95%CI 1.93 to 9.03), having more than four previous pregnancies (AOR=2.90, 95%CI 1.18 to 7.11), and having spontaneous vertex delivery (AOR=2.18, 95%CI 1.07 to 9.39) were statistically significant factors of early postnatal care service utilization.

Conclusion: The study has shown that the prevalence of early postnatal care services utilization is found to be slightly low when compared to other studies. Thus, community-based health promotion should be provided on the importance of postnatal care checkups; done by health care professionals.

Keywords: Early postnatal care, Utilization, Southern Ethiopia

Strength and Limitations of this study

- The strengths of this study were it's being a community-based study and that the prevalence of early PNC utilization and associated factors were compared with other studies.
- The limitation of this study related to the survey types and nature of the cross-sectional study which did not draw inferences and show cause and effect relations among variables.
- The sample size of this study was small, even if it was scientifically calculated.
- The study is further limited by the fact that it is based on retrospective information provided by the survey respondents, which may be subject to recall bias.
- However, such bias was tried to minimize some extent by restricting the study to mothers with birth within one year of the survey.

INTRODUCTION

Globally, approximately 810 women die every day from preventable causes related to pregnancy and childbirth complications, 94% of women's death occur in low and middle-income countries.[1] According to the world health organization (WHO) report, more than 60% of global maternal deaths occur in the postpartum period.[2] Three-fourths of maternal mortality occurred within the first week of delivery.[3] The first six weeks (42days) after giving birth is known as the postpartum period. [4,5] The first week (7 days) is an intense time and requires all sorts of care for women and newborn babies. Early postnatal care refers to health care services provided to mother and newborn baby by healthcare professionals within the first weeks after giving birth.[2,6]

Globally, 30% of mothers follow postnatal care, thus 13% of the postnatal follow-up in sub-Saharan Africa. [7] Research findings also showed that the prevalence of early postnatal care utilization varied to a certain extent among regions in Africa. For instance, in Uganda, [8] and South Sudan,[9] reported 15.4% and 11.4%, respectively. Variations were also noted in research conducted in Ethiopia, like Southern Ethiopia at Hawassa Zuria,[10] and Wonango District,[11] North Ethiopia,[12] reported 29.7%,13.7%, and 34.3%, respectively.

Globally, every year three million infants die in the first week of life, and 900 000 die in the next three weeks.[13,14] According to a united nations international children's emergency fund (UNICEF) report in Ethiopia, nearly 240 babies will die each day before reaching their first month of life.[15] The Ethiopian demographic and health survey(EDHS) 2019 report, revealed that the neonatal mortality rate (NMR) of the country is 29 deaths per 1,000 live births, [16,17] neonatal deaths occur at birth and early postnatal period due to inadequacy of care.[18,19]

In developing countries, different factors decrease early postnatal care services utilization like home delivery, illiteracy, low income, and cultures.[20,21] This makes the early postnatal care

services program the weakest of all reproductive and child health programs. As a result of low adherence to recommended postnatal care (PNC) regimens, women in sub-Saharan Africa posed a significant risk of infant and maternal morbidities and mortality. [22]

Despite the establishment of several global and national initiatives to improve maternally and child health, maternal mortalities and mortality is continued as a global challenge. [4] Early postnatal care service is the most important maternal and child health care service to detect early maternal and newborn danger signs and complications by health care providers.[23]

Identification of the prevalence of early postnatal care services utilization and associated factors among postnatal women is imperative to develop intervention measures to mitigate their complications and public health impact. However, the prevalence of early postnatal care services utilization and associated factors among postnatal women were not well known in Ethiopia, particularly in the selected study area. Thus, this study aimed to assess the prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town.

METHODS AND MATERIALS

Study design and setting

A community-based cross-sectional study design was conducted from 15 May to 15 June 2021, at Wolkite Town, southern Ethiopia. Wolkite is the capital city of the Gurage zone. Wolkite town is located 158 km southwest of Addis Ababa, the capital city of Ethiopia. According to the 2007 Census conducted by the Central Statistical Agency of Ethiopia, Wolkite town has a total population of 28,856 of whom 15,068 were males and13, 788 females (24) residents served by one public hospital, three health centers, and nine private clinics.

Source and study population

Postnatal mothers aged 18 years and above who had birth within the last 12 months and lived more than six months in the town selected from sub-cities were the source and study populations, respectively. Individuals who had birth more than 12 months and were critically ill during the data collection period were excluded from the study.

Study variables and data measurement

The dependent variable was early postnatal care utilization. Independent variables were as follows: socio-demographic characteristics (Age, Marital status, religion, ethnicity, educational level, occupational status, Husbands educational status, Husbands occupation, Estimated monthly income, and Family size), Obstetrics characteristics (Gravidity, Parity, Having ANC visit, Number of visits, Place of last ANC visit, Course of pregnancy, Place of delivery, Delivery attendant, Mode of delivery , Birth outcome, Any history of neonatal death, Wantedness of pregnancy, Getting advice on importance of PNC, Maternal complication during postnatal period, and Newborns complication during pregnancy), Service-related characteristics (Means of transportation, Decision maker on maternity care, Getting help for health services, Maternity waiting room, Duration of stay) and Sources of knowledge (Know the advantages of PNC, Know the recommended postnatal visits, Know the correct timing of PNC, Knows that PNC is free service, Knows at least one components of the service, Knows at least one newborn danger signs,

Know consequences of not receiving recommended PNC, Place where PNC is delivered). We used the STROBE checklist to check the overall composition of the study.[24]

Operational definitions: In this study, if a mother had at least one postnatal care check-up for the last delivery provided by skilled health care providers within 7 days after delivery, "Yes for early postnatal care services utilization, otherwise no".[8,25,26] Skilled health care provider includes Nurses, Midwives, Health Officers, HEW, and Doctors).[27]

Patient and public involvement

Patients were not involved in the study

Sample size determination

The sample size was determined by using a single population proportion formula using the following assumptions: a confidence interval of 95%, a margin of error of 5%, and the prevalence of early postnatal service utilization of 23.7%.[10] By adding a 10% non-response rate, the final sample size was 301. The study participants were selected using a systematic random sampling technique.

Sampling techniques

The list of women who gave birth in the last 12 months was obtained from delivery registers and cross-checked with the community health information system (CHIS) of health posts. Wolkite town has 11 kebeles from which 4 were selected using the lottery method, and then a sample was allocated proportionally to each kebeles. Finally, the study participants were selected by using a systematic random sampling technique, and 301 eligible mothers who gave birth within the last 12 months preceding the survey were interviewed. Hence five (5) study participants were non-respondents after three consecutive home visits.

Data collection instruments and procedures

The data collection tool was prepared in English after reviewing related literature and then translated into the Amharic language. The questionnaire consisted of socio-demographic characteristics, obstetrics characteristics, service-related characteristics, and sources of knowledge about early postnatal care **(Annex 1)**. Data were collected using a pre-tested structured interviewer-administered questionnaire. To assure the quality of data: Four diploma midwives were trained for data collection and two BSc midwives were assigned as a supervisor under the supervision of the principal investigator. To minimize information bias data were collected from postnatal mothers aged 18 years and living more than six months in the town.

Filled questionnaires were daily checked for completeness and consistency. The reliability of the questionnaire was checked by Cronbach's alpha value, which was 0.78.

Data management and analysis

Data were cleaned and entered into Epi Data 3.1 and exported to SPSS 23 for analysis. The data was cleaned by running frequency, checking missing values, and the presence of outliers. We summarized proportions of categorical variables by using mean with standard deviation (SD) based on the distribution of data for continuous variables. Normality was checked using the Shapiro–Wilk test. The factors associated with the dependent variable were analyzed using binary logistic regression. Bivariate analysis, crude odds ratio (COR) with 95% CI, was used to see the association between the outcome variable with each independent variable. Variables with a p-value of ≤0.25 in the bivariate analysis were selected for the multivariable logistic regression model. Multi-collinearity was checked to see the linear correlation among the independent variables. Model goodness of fitness was tested by Hosmer-Lemeshow statistic. The strength of the association between dependent and independent variables was assessed using an adjusted odds ratio (AOR) with a 95% confidence interval. The p-value <0.05 was considered statistically significant.

RESULTS

Socio-demographic characteristics of study participants

A total of 301 study participants were involved in this study, with a response rate of 98.4%. the majority of the respondents 280(93.0%) were married, 144(47.8%) of the respondents were Orthodox religion followers, 275(91.4%) were Gurage by ethnicity, 142(47.2%) had no formal education, more than two-thirds, 188 (62.5%) of the participant were housewife, more than two-fifth, 129(42.9%) of husbands of the respondents had no formal education, almost three-fourth, 225(74.8%) of the respondent were farmers and nearly one-half, 149(49.5%) of the respondents' had income below the mean level (597.4 birrs). The minimum and maximum numbers of family sizes were 2 and 8, respectively, with a mean of 4± (standard deviation of 1) (**Table 1**).

Table 1: Socio-demographic characteristics of early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021 (n=301)

Category	Frequency	Percent (%)
Age of the mother		
Less than 20	22	7.3
20-34	206	68.4
≥35	73	24.3
Marital status		
Married	280	93
Unmarried	13	4.3
Divorced	6	2.0
Widowed	2	0.7
Religion		
Orthodox	144	47.8
Muslim	122	40.5
Protestant	31	10.3
Catholic	4	1.3
Ethnicity		
Gurage	275	91.4
Amhara	24	8.0
Oromo	2	0.7
Educational status		
No formal education	142	47.2
Grade 1-8	70	23.3
Secondary 9-12	77	25.6
College and above	12	4.0
Occupational status		
Housewife	188	62.5
Civil servant	11	3.7
Merchant	76	25.2

Daily laborer	18	6.0
Farmer	8	2.7
Husbands educational status		
No formal education	129	42.9
Grade 1-8	108	35.9
Secondary 9-12	53	17.6
College and above	11	3.7
Husbands occupation		
Farmer	225	74.8
Civil servant	13	4.3
Merchant	55	18.3
Daily laborer	8	2.7
Monthly income		
Below average (597.4 ETB)	149	49.5
More than average (597.4 ETB)	152	50.5
Family size		
Less than average (4)	154	51.2
More than average (4)	147	48.8

Obstetrics related characteristics of study participants

The finding showed that the prevalence of early postnatal care services utilization was 23.3% (95% CI: 18.9 to 27.9). Among the respondents, nearly two-fifths, 119(39.5%) had been pregnant for the first time and more than four-fifths, 268(89.0%) had ANC visits. Of the ANC attendants, 83(30.9%) have one ANC visit and 80(29.8%) have four and above visits. Regarding the place of the last ANC visit, 208(77.6%) was at the health center. Related to the course of pregnancy, almost two-fifths, 112(37.2%) of the respondents had a complicated pregnancy, four-fifths, 236(78.4%) of the respondents were given birth at a health center and most of the respondents, 284(94.4%) were attended by health professionals. According to the mode of delivery, more than four-fifths, 254(84.4%) of the respondents were delivered by SVD. **Table: 2**

Maternal complications

Among the respondents, 18.3% had maternal complications' during the early postnatal period. Of the complications 4.3% were sepsis, and 3.7% were PPH (**Figure 1**).

Newborn complications

Among the respondents, 27.9% had newborn complications during the early postnatal period. Of the complications, 16.3% were unable to breastfeed, and 7% were having breathing difficulties (**Figure 2**).

Table 2: Obstetrics characteristics of early postnatal care services utilization among postnatal women in Wolkite town, Gurage zone, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency	Percentage
Gravidity	One	119	39.5
	2-4	106	35.2
	≥5	76	25.2
Parity	One	119	39.5
	2-4	106	35.2
	≥5	76	25.2
Having ANC visit	Yes	268	89.0
	No	33	11.0
Number of visits	One	83	31
	Two	55	20.5
	Three	50	18.6
	Four and above	80	29.8
Place of ANC visit	Health center	208	77.6
	Hospital	51	19
	Health post	9	3.3
Course of pregnancy	Complicated	112	37.2
	Un complicated	189	62.8
Place of delivery	Health center	236	78.4
	Hospital	50	16.6
	Health post	6	2.0
Delivery attendant	Home	9	3.0
	Health professionals	284	94.4
	Health extension workers	15	5.0
	Others	2	0.7
Mode of delivery	SVD	254	84.4
	Instrumental delivery	16	5.3
	CS	31	10.3

Birth outcome	Live birth	292	97
	Stillbirth	9	3.0
Any history of neonatal death	Yes	10	3.3
	No	291	96.7
Having early PNC	yes	70	23.3
	No	231	76.7
Wantedness of pregnancy	Wanted	222	73.8
	Unwanted	79	26.2
Getting advice on the importance of PNC	Yes	167	55.5
	No	134	44.5
Maternal complications during the postnatal period	Yes	55	18.3
	No	246	81.7
Newborns complication during pregnancy	Yes	84	27.9
	No	217	72.1

Service-related characteristics of study participants

Among the respondents, more than two-thirds, 190(63.1%) of the respondents traveled by foot to the health facility, while more than two-fifths, 141(46.8%) of the respondents decided by themselves to have early PNC. More than two-thirds, 228(75.7%) of the respondents were getting help from their husbands with health services. Of those who used the maternity waiting room, 50(16.6%) stayed for less than a week and 40(13.3%) stayed for one week (**Table 3**).

Table 3: Service related characteristics of early postnatal care services utilization among postnatal women in Wolkite town, Gurage zone, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency	Percentage
Means of transportation	Foot	190	63.1
	Vehicles	111	36.9
Decision maker on maternity care	Herself	141	46.8
	Husband	49	16.3
	Joint decision	111	36.9
Getting help with health services	Husband	228	75.7
	Relatives	65	21.6
	Families	8	2.7
Maternity waiting room	Yes	90	29.9
	No	211	70.1
Duration of stay (n=90)	Less than a week	50	55.6
	For one week	40	44.4

Sources of knowledge about early postnatal care

Among the respondents, 220(70.9%) have information about early postnatal care (EPNC) services. Most of the respondents, 150 (68.2%) acquired information about EPNC utilization from television. Nearly one-fifths, 81(26.9%) of the respondents have not known the advantages of postnatal care, and four-fifth, 243(80.7%) of the respondents were known to recommend postnatal visits. Nearly four-fifths, 256(85.0%) of the respondents did not know the correct time of early PNC service utilization. Nearly one-half, 133 (44.2%) of the respondents knew that early PNC was a free service, and nearly two-thirds, 188(62.5%) of the respondents did not know at least one component of the service (**Table 4**).

Table 4: Knowledge about early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency(n)	Percentage (%)
Know the advantages of PNC	Yes	220	73.1
	No	81	26.9
Know the recommended postnatal visits	Yes	58	19.3
	No	243	80.7
Know the correct timing of PNC	Yes	45	15.0
	No	256	85.0
Knows that PNC is a free service	Yes	133	44.2
	No	168	55.8
Knows at least one component of the service	Yes	113	37.5
	No	188	62.5
Knows at least one newborn danger signs	Yes	150	49.8

	No	151	50.2
Know the consequences of not receiving recommended PNC	Yes	48	15.9
	No	253	84.1
Place where PNC is delivered	Yes	102	33.9
	No	199	66.1

Factors associated with early postnatal care service utilization among participants

On bivariate analysis monthly income, Gravidity, parity, the desire for pregnancy, ANC follow up, mode of delivery, any newborn illness/complication, Obstetrics complication, and knowledge of PNC were candidates for multivariate analysis. On multivariable analysis gravidity, the desire for pregnancy and mode of delivery were statistically significant in the final model (**Table 5**).

Multivariable analysis

Of the total participant, 76(25.2%) had more than 4 pregnancies and were 2.90 times (AOR: 2.90; 95%CI: 1.18, 7.11) more likely to utilize EPNC when compared to women who had less than or equal to four pregnancies. On the other hand, participants who have the desire for pregnancy were 4.17 times (AOR: 4.17; 95%CI: 1.93, 9.03) more likely when compared to those who haven't the desire for pregnancy. On the other hand, participants who gave birth by SVD were 2.18 times (AOR: 2.18; 95%CI: 1.07, 9.39) more likely when compared to those who gave birth by CS.

Table 5: Factors associated with early postnatal care services utilization among postnatal women of Wolkite town, southeast Ethiopia, 2021(n=301)

Variables	EPNC		COR (95%CI)	AOR (95%CI)	P-value
	Yes	No			
Estimated monthly income					
Below average	43	106	1	1	
>Average	75	77	2.40(1.49, 3.87)	1.22(0.67, 2.23)	0.517
Gravidity					
One	31	88	1	1	
2-4	41	65	1.79(1.02, 3.15)	1.22(0.54, 2.77)	0.629
More than 4	46	30	4.35(2.35, 8.06)	**2.90(1.18, 7.11)**	**0.020**
Parity					
Primparous	35	84	1	1	
Multiparous	41	65	1.51(0.87, 2.64)	1.18(0.51, 2.76)	0.699
Grand Multiparous	42	34	2.97(1.63, 5.40)	1.09(0.46, 2.62)	0.844
Desire of pregnancy					
Yes	103	119	3.69(1.98, 6.87)	**4.17(1.93, 9.03)**	**0.0001**
No	15	64	1	1	
Having ANC follow up					
Yes	111	157	2.63(1.10, 6.26)	0.39(0.12, 1.28)	0.121
No	7	26	1	1	
Course of pregnancy					
Complicated	60	52	2.61(1.61, 4.23)	1.57(0.85, 2.92)	0.151
Uncomplicated	58	131	1	1	
Mode of delivery					
SVD	107	147	2.38(1.04, 6.01)	**2.18(1.07, 9.39)**	**0.038**
CS	11	36	1	1	
Any newborn illness/complication					

Yes	42	42	1.85(1.11, 3.09)	1.59(0.84, 2.99)	0.155
No	76	141	1	1	
Obstetrics complication					
Yes	41	14	6.43(1.01, 9.48)	9.12(0.34, 12.53)	0.0001
No	77	169	1	1	
Knowledge on PNC					
Poor	45	115	1	1	
Good	73	68	2.74(1.70, 4.42)	1.86(0.99, 3.49)	0.051

Key: EPNC-Early Postnatal Care Utilization, *-Pvalue<0.05, **-Pvalue≤0.01

Discussion

Early postnatal care service utilization in developing countries is one of the health care service utilization problems among postnatal women, which is related to extensive maternal and neonatal complications and mortality. [1, 2,6] Prior studies have noted the importance of early postnatal checkups in improving maternal survival.[8,28] This study was intended to identify the prevalence of early postnatal care services utilization and associated factors among postnatal women in Wolkite Ethiopia.

This study revealed that 23.3 %(95% CI: 18.9-27.9) of women received early postnatal care. This result is lower than the study reported in some African countries such as in Myanmar(72.1%),[29] Zambia (63%),[30] Builsa district (62%),[31] Hadiya Zone (51.4%),[32] Uganda (50%),[8] Assela town(37.5%),[33] Adigrat Town (34.3%),[34], Debremarkos town(33.5%),[35]and Hawassa Zuria District 23.7%,[10] . However, it is higher than the findings of studies conducted in China (17%),[36] Tanzania (10.4%),[37] South Sudan(11.4%),[9] Debremarkos town(16.2%),[38] and Wonango District,[11]. The difference might be due to the difference in statistical analysis employed in the studies and the socio-cultural background of the participants.

In this study wanted pregnancy was found to associated factor with early postnatal care services utilization. This finding is nearly similar to the studies conducted in Uganda (50%),[8] Tanzania, [36] Adigrat Town,[34] Assela town,[33], and Hawassa Zuria District 23.7%,[10]. This could be explained by the various advantages of public enlightenment on planning for pregnancy. The difference between studies might be sample size; the sample size of this study was small, even if it was scientifically calculated; which might make variables insignificant.

This study revealed that having more than four previous pregnancies was among the factors associated with early postnatal care services utilization. This indicates that former pregnancy

shared experience to attend early postnatal checkups. This finding was different from that of the studies conducted in Debre Birhan,[39], Assela town,[33]Adigrat Town,[34]and Mekele city,[40] those studies shows that mothers having one previous pregnancy were utilized early PNC services on time. The difference between the studies might be attributed to the socio-cultural difference in study participants between the studies. This may affect the decision power of women to utilize this service in some communities.

This study revealed that spontaneous vaginal delivery (SVD) was among the factors associated with early postnatal care services utilization. Similarly, a study conducted by Adigrat Town,[34] Debre Birhan,[39] Debremarkos town,[35] and Hawassa Zuria District,[10] shows that clients who have previous experience with SVD were more likely to utilize early postnatal care services. The difference between the studies might be attributed to sampling techniques and cultural differences of study participants; those studies used a simple random sampling technique.

Strengths and limitations of the study

The strengths of this study were it's being a community-based study and the prevalence of early postnatal care services utilization and associated factors were compared with other studies. The finding might assist in an entry into community screening programs among high-risk groups. However, the study has limitation that may be related to the survey types and nature of the cross-sectional study which did not draw inferences and show cause and effect relations among variables. The sample size of this study was small, even if it was scientifically calculated. The study is further limited by the fact that it is based on retrospective information provided by the survey respondents, which may be subject to recall bias. However, such bias was tried to minimize some extent by restricting the study to mothers with birth within one year of the survey.

Conclusions

This study illustrates the prevalence of early postnatal care services utilization and associated factors among postnatal women. The study has shown that the prevalence of early postnatal care services utilization is found to be slightly low when compared to other studies. Wanted pregnancy, having more than four previous pregnancies (> Gravida IV), and spontaneous vertex delivery (SVD) were significantly associated with early postnatal care services utilization.

This study result revealed that almost all study participants' places of delivery were in a health institution, and only 15% of respondents know the correct follow-up schedules for early postnatal checkups, which is in contrast to the place of delivery. Thus, community-based health promotion should be an important recommendation to increase early postnatal care service utilization among postnatal mothers to improve the level of awareness of early postnatal checkup schedules; done by health care professionals.

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Competing interests

The authors declare that they have no competing interests

Patient consent for publication

Not required.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available

Ethical Approval and Consent to Participants

Ethics approval: Ethical clearance was obtained from the institutional review board of Wolkite University College of Medicine and Health Science with the reference number RCSUILC/021/2021.

Informed consent: A permission letter was obtained from Wolkite town administration office authorities. Participation in the study was voluntary and written informed consent was obtained from the study participants. All the information taken from the study participants was kept confidential.

References

1. WHO. Trends in maternal mortality. 2018; https://documents1.worldbank.org/curated/en/793971568908763231/pdf/Trends-in-maternal-mortality-2000-to-2017-Estimates-by-WHO-UNICEF-UNFPA-World-Bank-Group-and-the-United-Nations-Population-Division.pdf.
2. WHO. WHO recommendations on postnatal care of the mother and newborn. 2014.
3. Yaya S, Ghose B. Global Inequality in Maternal Health Care Service Utilization: Implications for Sustainable Development Goals. *Health Equity.* 2019;3(1):145-154.
4. WHO U. UNFPA, World Bank Group, and the United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF. In: UNFPA, World Bank Group, and the United Nations Population Division. Geneva; 2015.
5. Organization WH. Health in 2015: from MDGs, millennium development goals to SDGs, sustainable development goals. 2015.
6. WHO. Postnatal Care for Mothers and Newborns Highlights from the World Health Organization 2013 Guidelines. 2015.
7. Dor A, Pauly M, Eichleay M, Held P. End-stage renal disease and economic incentives:. *the international study of health care organization and financing National Bureau of Economic Research Cambridge, Mass, USA.* 2007.
8. USAID'S. Determinants of Early Postnatal Care Attendance in Uganda. 2016.
9. Izudi J, Akwang GD, Amongin D. Early postnatal care use by postpartum mothers in Mundri East County, South Sudan. *BMC Health Services Research.* 2017;17(1).
10. Yoseph S, Dache A, Dona A. Prevalence of Early Postnatal-Care Service Utilization and Its Associated Factors among Mothers in Hawassa Zuria District, Sidama Regional State, Ethiopia: A Cross-Sectional Study. 2021.
11. Tefera Y, Hailu S, Tilahun aR. Early postnatal care service utilization and its determinants among women who gave birth in the last 6 months in Wonago district, south Ethiopia: A community-based cross-sectional study. 2020.
12. Gebreslassie T, Gebrehiwot, Mekonen HH. Prevalence and Associated Factors of Early Postnatal Care Service Use Among Mothers Who Had Given Birth Within the Last 12 Months in Adigrat Town, Tigray, Northern Ethiopia, 2018.
13. WHO. WHO Technical Consultation on Postpartum and Postnatal Care. 2010; http://apps.who.int/iris/bitstream/handle/10665/70432/WHO_MPS_10.03_eng.pdf;jsessionid=977EC87BBE162C1694EBAB559E4D335A?sequence=1, 2018.
14. Collaboration Ct. Countdown to 2030: tracking progress towards universal coverage for reproductive, maternal, newborn, and child health. *The Lancet.* 2018.
15. UNICEF. Maternal and Newborn Health Disparities in Ethiopia, UNICEF for every child. 2017; https://data.unicef.org/wp-content/uploads/country_profiles/Ethiopia/country%20profile_ETH.pdf. Accessed 11/28, 2018.
16. CSAE. Central statistics agency of Ethiopia, Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF. . 2016; https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf. Accessed 12/21/2018, 2018.
17. WHO. global strategies for women, children, and adolescents (2016-2030). 2016. Accessed 12/6/2018, 2018.

18. Darmstadt GL, Bhutta ZA, Cousens S, et al. Evidence-based, cost-effective interventions: how many newborn babies can we save? *The Lancet.* 2005;365(9463):977-988.
19. WHO/UNICEF. Home visits for the newborn child:a strategy to improve survival. 2010; http://apps.who.int/iris/bitstream/handle/10665/70002/WHO_FCH_CAH_09.02_eng.pdf?sequence=1. Accessed 11/28, 2018.
20. DiBari JN, Yu SM, Chao SM, Lu MC. Use of postpartum care: predictors and barriers. *Journal of pregnancy.* 2014;2014.
21. Organization WH. Every newborn: an action plan to end preventable deaths. 2014.
22. WHO. WHO recommendations on maternal health: guidelines approved by the WHO Guidelines Review Committee. 2017; http://apps.who.int/iris/bitstream/handle/10665/259268/WHO-MCA-17.10-eng.pdf?sequence=1. Accessed NOV 28, 2018.
23. WHO. Technical Consultation on Postpartum and Postnatal Care. 2010.
24. Network E, Penelope.ai. The STROBE checklist https://www.goodreports.org/.
25. Ndugga P, Namiyonga NK, Sebuwufu D. Determinants of early postnatal care attendance: analysis of the 2016 Uganda demographic and health survey. *BMC Pregnancy and Childbirth.* 2020;20(1).
26. An T, D N, A T. Early Postnatal Care Service Utilization and Associated Factors among Mothers Who Gave Birth in the Last 12 Months in Asako District, Arsi Zone, southeast Ethiopia in 2016. *Journal of Women's Health Care.* 2017;06(01).
27. EDHS. Ethiopia demographic and health survey 2016.
28. Izudi J, Denise G, Amongin D. Early postnatal care use by postpartum mothers in Mundri East County, South Sudan. 2017.
29. Mon AS, Phyu MK, Thinkhamrop W, Thinkhamrop B. women and its determinants: a cross-sectional study. 2018.
30. Chungu C, Makasa M, Chola M, Jacobs CN. Place of Delivery Associated With Postnatal Care Utilization Among Childbearing Women in Zambia. *Frontiers in Public Health.* 2018;6(94).
31. Sakeah E, Aborigo R, Sakeah JK, et al. The role of community-based health services in influencing postnatal care visits in the Builsa and the West Mamprusi districts in rural Ghana. *BMC pregnancy and childbirth.* 2018;18(1):295.
32. Belachew T, Taye A, Belachew T. Postnatal care service utilization and associated factors among mothers in Lemo Woreda, Ethiopia. *J Women's Health Care.* 2016;5(10.4172):2167-0420.1000318.
33. Amane Tumbure1 DA, Ellie Fantahun1, Megersa Negusu1, Tsegaw Yitbarek1, Legese Tadesse2* and Tewodros Desalegn2 Assessment of Postnatal Care Service Utilization and Associated Factors in Asella Town, Arsi Zone, Oromiya Regional State, Ethiopia. *Global Journal of Reproductive medicine.* 2018;6(1).
34. Gebreslassie T, Haftea G, Mekonen H. Prevalence and Associated Factors of Early Postnatal Care Service Use Among Mothers Who Had Given Birth Within the Last 12 Months in Adigrat Town, Tigray, Northern Ethiopia,. 2018.
35. Limenih MA, Endale ZM, Dachew BA. Postnatal Care Service Utilization and Associated Factors among Women Who Gave Birth in the Last 12 Months before the Study in Debre Markos Town, Northwestern Ethiopia: A Community-Based Cross-Sectional Study. *International Journal of Reproductive Medicine.* 2016;2016:1-7.

36. You H, Chen J, Bogg L, et al. Study on the factors associated with postpartum visits in rural China. *PLoS One.* 2013;8(2):e55955.
37. Kanté AM, Chung CE, Larsen AM, Exavery A, Tani K, Phillips JF. Factors associated with compliance with the recommended frequency of postnatal care services in three rural districts of Tanzania. *BMC pregnancy and childbirth.* 2015;15(1):341.
38. Limenih MA, Endale ZM, Dachew BA. Postnatal Care Service Utilization and Associated Factors among Women Who Gave Birth in the Last 12 Months before the Study in Debre Markos Town, Northwestern Ethiopia: A Community-Based Cross-Sectional Study. *International Journal of Reproductive Medicine.* 2016;2016:7.
39. Akibu M, Tsegaye W, Megersa T, Nurgi S. Prevalence and Determinants of Complete Postnatal Care Service Utilization in Northern Shoa, Ethiopia. *Journal of pregnancy.* 2018;2018.
40. Gebrehiwot G, Medhanyie AA, Gidey G, Abrha K. Postnatal care utilization among urban women in northern Ethiopia: a cross-sectional survey. *BMC women's health.* 2018;18(1):78.

Legends:

Figure 1: Types of maternal complications among postnatal women in Wolkite town, southwest Ethiopia, 2021(n=301)

Figure 2: Types of newborn complications during postnatal period among postnatal women in Wolkite town, southwest Ethiopia, Ethiopia, 2021(n=301)

Annex 1: English version interviewer-administered questionnaire on early postnatal care services utilization among postnatal women in southwest Ethiopia, 2021.

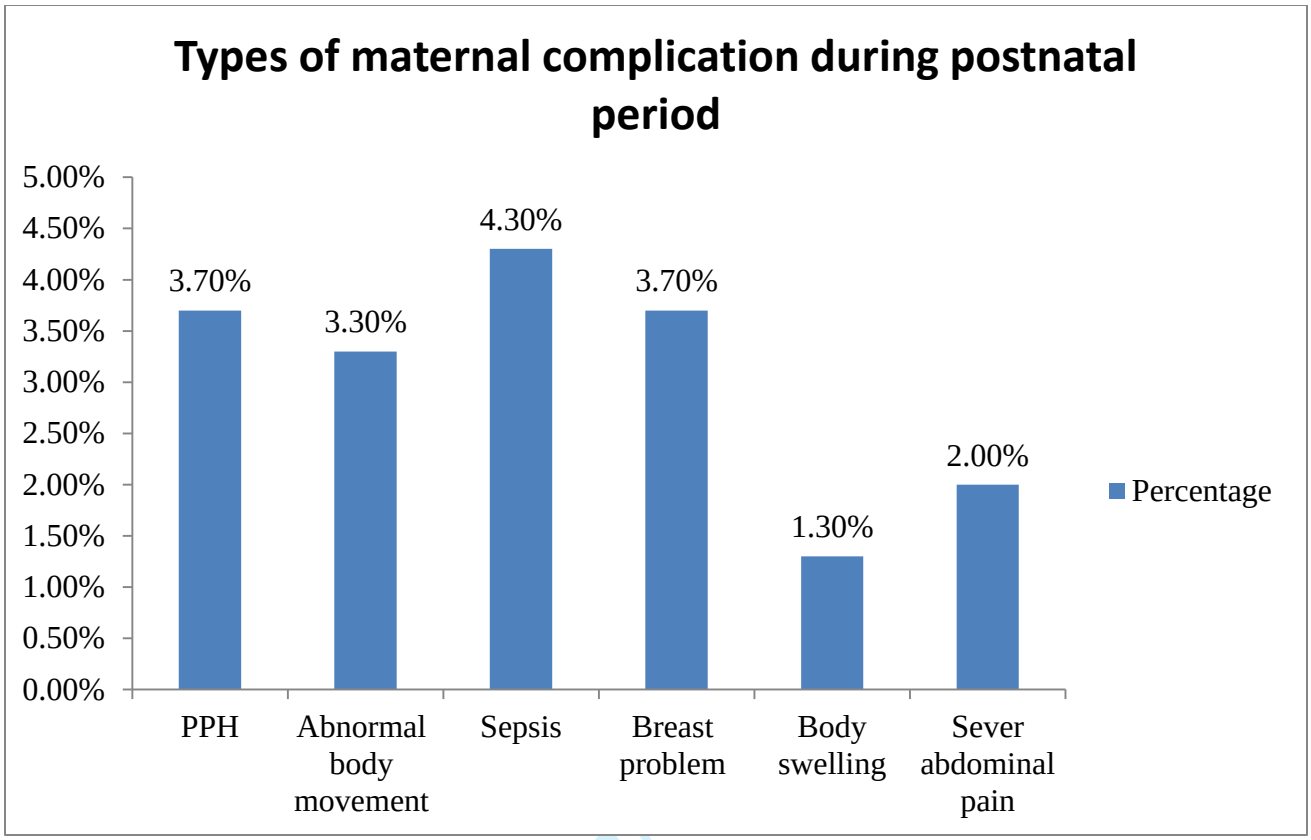

Figure 1: Types of maternal complication among postnatal women in Wolkite town, southwest, Ethiopia, 2021(n=301)

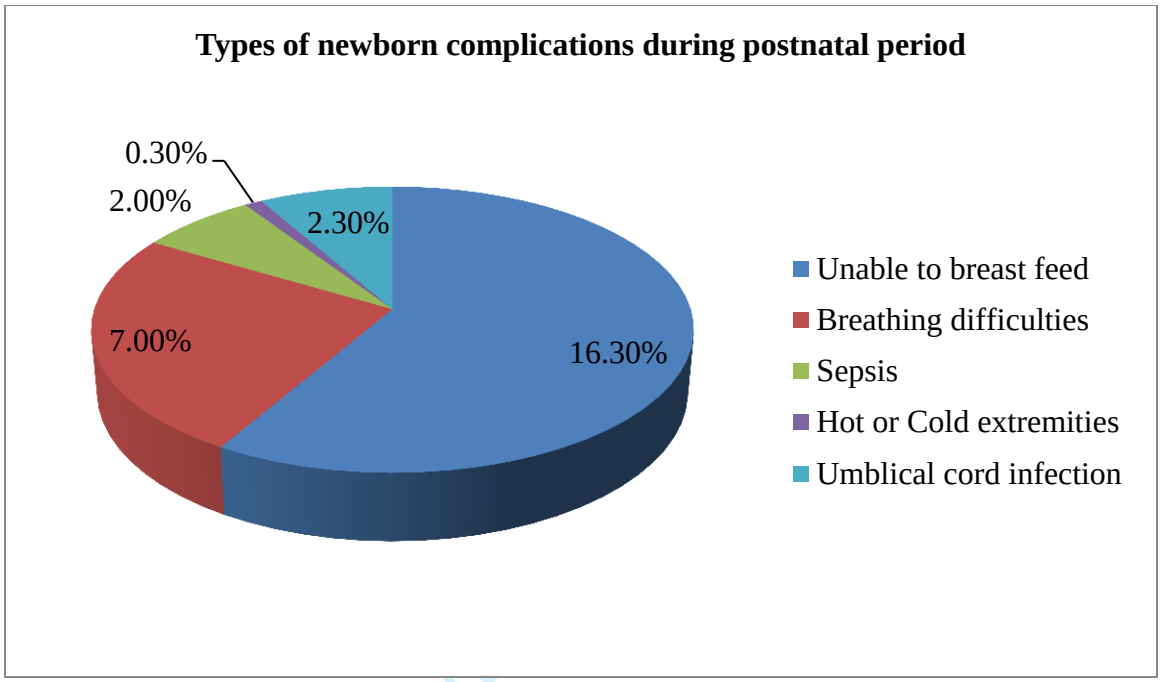

Figure 2: Types of newborn complications during postnatal period among postnatal women in Wolkite town, southwest Ethiopia, 2021(n=301)

APPENDICES

Annex 1: English version Interviewer Administered Questionnaire

Consent form for postnatal women:

Title of research: Prevalence of early postnatal care utilization and associated factors among postnatal women in Wolkite town, Gurage zone, Southern Ethiopia, 2021

Hello my name is----------. I am working as data collector in the research conducted by Yirgalem Yosef. The research is only for academic purposes. I assure you that the views expressed in this questionnaire will under no circumstance be made public or disclosed to a third party. The details of this interview and the information you provide will be held in confidence.

Declaration by Respondent

I certify that I voluntarily agree to answer the research questions, that the study has been explained to me. All my questions have been answered satisfactorily. I understand I am free to discontinue participation at any time if I so choose.

…….....

Signature

Date……..

Researcher's Statement

I certify that the participant has been given ample time to read, learn and understand the study. All questions and clarifications raised by the participant have been addressed.

……..

Yirgalem Yosef (Researcher)

Date…….

Instruction: Please **Circle the appropriate answer** in space provided

Questionnaire Code_____

SECTION 1: Socio demographic characteristics			
S.N	Questions	Answers	Skip
101	Age (in years)	1. [_____] 2. I don't know----------	
102	Current marital status	1. Married 2. Divorced /Separated 3. un married 4. Widowed	
103	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others	
104	Ethnicity	1. Gurage 2. Amhara 3. Oromo 4. Others.	
105	Education status	1. No formal Education 2. 1-8th 3. 9-12th 4. College and above	
106	Occupational status	1. House wife 2. Civil servant 3. Merchant 4. Daily labour 5. Farmer	
107	Husbands educational status	1. No formal Education 2. 1-8th 3. 9-12th 4. College and above	

108	Husbands occupations	1. Farmer 2. Civil servant 3. Merchant 4. Daily labour	
109	Estimated monthly income	1. blow average(597.4 ETB) 2. More than average (597.4 ETB)	
110	Family size	1. less than average (4) 2. more than average (4)	
Section two: obstetric and neonatal characteristics			Code
201	Gravidity	----------	
202	Parity	----------	
203	Having ANC visit	1. Yes 2. No	
204	Number of ANC Visits	1. one 2. two 3. Three 4. Four and above	
205	Place of last ANC visit	1. Health center 2. Hospital 3. Health post	
206	Corse of pregnancy	1. Complicated 2. Uncomplicated	
207	Place of delivery	1. Health center 2. Hospital 3. 3. Health post 4. Home	
208	Delivery Attendant	1. Health professionals 2. Health extension workers 3. Other	
209	Mode of delivery	1. SVD	

		2. Instrumental delivery 3. CS	
210	Birth outcome	1. Live birth 2. Still birth	
211	Any history of Neonatal death	1. Yes 2. No	
212	Wantedness of pregnancy	1. Wanted 2. Unwanted	
213	Have you got advices on Importance of PNC?	1. Yes 2. No	
214	New born complication during pregnancy	1. Yes 2. No	
Section three : Health service related factors (access to skilled maternity care)			**Code**
301	Means of transportation	1. Foot 1. Vehicle	
302	Decision maker on maternity care	1. Herself 2. Husband 3. Joint decision	
303	Getting help for health services	1. Husband 2. Relatives 3. Families	
304	Using Maternity waiting room	1. Yes 2. No	If yes 305
305	Duration of stay	1. Less than a week 2. For one week	
Section four: knowledge of mothers towards early PNC service			Code
401	Knows advantages of PNC	1. Yes 1. No	
402	Knows Recommended PNC	2. Yes 3. No	

403	Know the correct timing of PNC	1. Yes 2. No	
404	Knows that PNC is free services	1. Yes 1. No	
405	Knows at least one component of the services	1. Yes 2. No	
406	Knows at least on newborn danger sign	1. Yes 2. No	
407	know consequences of not receiving recommended PNC	1. Yes 2. No	
408	Know place where PNC is delivered	1. Yes 2. No	

THANK YOU VERY MUCH!!!!!

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the STROBE cross sectionalreporting guidelines, and cite them as:

von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies.

		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1&2
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	4&5
Objectives	#3	State specific objectives, including any prespecified hypotheses	Highlighted on result.
Methods			
Study design	#4	Present key elements of study design early in the paper	6
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	6
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	6&7
Bias	#9	Describe any efforts to address potential sources of bias	8
Study size	#10	Explain how the study size was arrived at	7
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	8
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	8
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	8
Statistical methods	#12c	Explain how missing data were addressed	n/a
Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	n/a
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	9
Participants	#13b	Give reasons for non-participation at each stage	9
Participants	#13c	Consider use of a flow diagram	n/a
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	9-15
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	n/a

Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	
Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	11
Main results	#16b	Report category boundaries when continuous variables were categorized	11
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	18
Discussion			
Key results	#18	Summarise key results with reference to study objectives	20-21
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	21
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	20-21
Generalisability	#21	Discuss the generalisability (external validity) of the study results	22
Other Information			
Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	n/a

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Prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, Gurage zone, Southern Ethiopia: a community-based cross-sectional study

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Prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, Gurage zone, Southern Ethiopia: a community-based cross-sectional study

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ABSTRACT

Objective: Early postnatal care service utilization in developing countries is one of the health care service utilization problems among postnatal women, which is related to extensive maternal and neonatal complications and mortality. Identification of the prevalence of early postnatal care services utilization and associated factors among postnatal women is imperative to develop intervention measures to mitigate their complications and public health impact, which is not well known in Ethiopia, particularly in the selected study area. Thus, this study aimed to assess the prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, southeast Ethiopia.

Design: A community-based cross-sectional study design was conducted among 301 postnatal women from 15 May to 15 June 2021.

Measurements: Data were collected using a pretested structured questionnaire. The collected data were cleaned and entered Epidata3.1 and then exported to SPSS version 23:00 for analysis. Finally, a multivariate logistic regression model was fitted to identify the factors associated with early postnatal care services utilization. The p-value <0.05 was considered statistically significant.

Results: The finding showed that the prevalence of early postnatal care services utilization was 23.3% (95% CI: 18.9 to 27.9). Wanted pregnancy (AOR=4.17, 95% CI 1.93 to 9.03), had over 4 histories of pregnancy (Gravida >4) (AOR=2.90, 95% CI 1.18 to 7.11), and had spontaneous vertex delivery (AOR=2.18, 95% CI 1.07 to 9.39) were statistically significant factors of early postnatal care service utilization.

Conclusion: The study has shown that the prevalence of early postnatal care services utilization was slightly low when compared to other studies. Thus, community-based health promotion should be an important recommendation to increase early postnatal care service utilization

among postnatal mothers to improve the level of awareness of early postnatal checkup schedules; done by health care providers.

Keywords: Early postnatal care, Utilization, Southern Ethiopia

Strengths and Limitations of this study

- This study include mothers with birth within one year of the survey from the community to assess the prevalence of early postnatal care services utilization and associated factors and compares them with other studies.
- The limitation of this study related to the survey types and nature of the cross-sectional study, which did not draw inferences and show cause-and-effect relations among variables.
- The sample size of this study was small, even if calculated by the scientific method.
- The study is further limited because it is based on retrospective information provided by the survey respondents, which may be subject to recall bias.
- However, such bias had tried to minimize some extent by restricting the study to mothers with birth within one year of the survey.

INTRODUCTION

Globally, approximately 810 women die every day from preventable causes related to pregnancy and childbirth complications, 94% of women's death occur in low and middle-income countries.[1] According to the World Health Organization (WHO) report, over 60% of global maternal deaths occur in the postpartum period.[2] Three-fourths of maternal mortality occurred within the first week of delivery. The first six weeks (42days) after giving birth is known as the postpartum period. [3,4] The first week (7 days) is an intense time and requires much care for women and newborn babies. Early postnatal care refers to health care services provided to the mother and newborn baby by health care professionals within the first weeks after giving birth.[2,5]

Globally, 30% of mothers follow postnatal care, thus 13% of the postnatal follow-up in sub-Saharan Africa. [6] Research findings also showed that the prevalence of early postnatal care utilization varied to a certain extent among regions in Africa. For instance, Uganda, [7] and South Sudan,[8] reported 15.4% and 11.4%, respectively. It also noted variations in research conducted in Ethiopia, like Southern Ethiopia at Hawassa Zuria,[9] and Wonago District,[10] North Ethiopia,[11] reported 29.7%,13.7%, and 34.3%, respectively.

Globally, every year, three million infants die in the first week of life, and 900 000 die in the next three weeks.[12,13] According to a united nations international children emergency fund (UNICEF) report in Ethiopia, nearly 240 babies will die each day before reaching their first month of life.[14] The Ethiopian demographic and health survey(EDHS) 2019 report, revealed that the neonatal mortality rate (NMR) of the country is 29 deaths per 1,000 live births, [15,16] neonatal deaths occur at birth and early postnatal period due to inadequacy of care.[17,18]

In developing countries, different factors decrease early postnatal care services utilization like home delivery, illiteracy, low income, and cultures. [19,20] This makes the early postnatal care

services program the weakest of all reproductive and child health programs. Because of low adherence to recommended postnatal care (PNC) regimens, women in sub-Saharan Africa posed a significant risk to infant and maternal morbidities and mortality. [21]

Despite the establishment of several global and national initiatives to improve maternal and child health, maternal mortality and mortality is continued as a global challenge. [3] Early postnatal care service is the most important maternal and child health care service to detect early maternal and newborn danger signs and complications by health care providers.[22]

Even though a high prevalence of maternal and neonatal morbidity and mortality during the early postnatal period, it has done inadequate studies in underdeveloped and developing countries in Africa. In Ethiopia, there are different sociocultural beliefs and sociodemographic variations that affect healthcare services utilization that creates evidence gaps between and within the population. However, the prevalence of early postnatal care services utilization and associated factors among postnatal women were not well known in Ethiopia. Therefore this study should be filled the evidence gap on EPNC service utilization among postnatal mothers. Identification of factors associated with EPNC service utilization among postnatal mothers is imperative to develop intervention strategies and measures to mitigate its public health impact. Thus, this study aimed to assess the prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town.

METHODS AND MATERIALS

Study design and setting

A community-based cross-sectional study was conducted from 15 May to 15 June 2021, at Wolkite Town, southern Ethiopia. Wolkite is the capital city of the Gurage zone. Wolkite town is located 158 km southwest of Addis Ababa, the capital city of Ethiopia. According to the 2007 Census conducted by the Central Statistical Agency of Ethiopia, Wolkite town has a total population of 28,856 of whom 15,068 were males and13, 788 females (24) residents served by one public hospital, three health centers, and nine private clinics.

Source and study population

Postnatal mothers aged 18 years with a birth within the last 12 months living in the town, and it's selected the sub-cities, where the source and study populations, respectively. We excluded individuals who gave birth over 12 months and were critically ill during the data collection period for the study.

Patient and public involvement

Patients were not involved in the study

Sample size determination

The minimum sample size required for the study was determined by using a single population proportion formula $n = \frac{(Z\alpha/2)2p(1-p)}{d2}$ with assumptions of 95% confidence interval (CI), 0.05 margin of error and established prevalence (p=23.7%) of early postnatal-care service utilization and its associated factors among mothers in Hawassa Zuria District, Sidama Regional State, Ethiopia,[9] with adding a 10% non-response rate. Based on the above assumption consideration the final sample size became (n=306).

Sampling techniques

We got the list of women who gave birth in the last 12 months from delivery registers and cross-checked it with the community health information system (CHIS) of health posts. Wolkite town has 11 kebeles, from that 4 were selected using the lottery method, and then a sample was allocated proportionally to the selected kebeles. After the proportional allocation of the sample for the selected kebeles, we employed a systematic random sampling technique to include 301 participants. The sampling fraction (K) was N/ n = 904/306 = 3. Then, the lottery method was employed to identify the first postnatal mother to be interviewed and 3 were drawn from whom the interview started. Postnatal women were identified, and we held an interview every three intervals. Hence, five (5) study participants were non-respondents after three consecutive home visits.

Data collection instruments and procedures

The data collection tool was prepared in English after reviewing related literature and translated into the Amharic language. The questionnaire comprised socio-demographic characteristics, obstetrics characteristics, service-related characteristics, and sources of knowledge about early postnatal care (Annex 1). Data were collected using a pre-tested structured interviewer-administered questionnaire. To assure the quality of data: Four diploma midwives had trained for data collection and two BSc midwives were assigned as a supervisor under the supervision of the principal investigator. Filled questionnaires were daily checked for completeness and consistency. Cronbach's alpha value, which was 0.78, checked the reliability of the questionnaire.

Study variables and data measurement

The dependent variable was early postnatal care utilization. Independent variables were as follows: socio-demographic characteristics (Age, Marital status, religion, ethnicity, educational level, occupational status, Husbands educational status, Husbands occupation, Estimated monthly income, and Family size), Obstetrics characteristics (Gravidity, Parity, Having ANC visit, Number of visits, Place of last ANC visit, Course of pregnancy, Place of delivery, Delivery attendant, Mode of delivery , Birth outcome, Any history of neonatal death, Wantedness of pregnancy, Getting advice on importance of PNC, Maternal complication during postnatal period, and Newborns complication during pregnancy), Service-related characteristics (Means of transportation, Decision maker on maternity care, Getting help for health services, Maternity waiting room, Duration of stay) and Sources of knowledge (Know the advantages of PNC, Know the recommended postnatal visits, Know the correct timing of PNC, Knows that PNC is free service, Knows at least one components of the service, Knows at least one newborn danger signs, Know consequences of not receiving recommended PNC, Place where PNC is delivered).

Early postnatal care utilization: In this study, if a mother had at least one postnatal care check-up for the last delivery by skilled health care providers within 7 days after delivery, "Yes for early postnatal care utilization, otherwise no"[7,23,24].

Skilled health care providers: Include (Nurses, Midwives, Health Officers, HEW, and Doctors)[25].

Data management and analysis

Data were cleaned and entered into Epi Data 3.1 and exported to SPSS 23 for analysis. The data was cleaned by running frequency, checking missing values, and the presence of outliers. We summarized the proportions of categorical variables by using mean with standard deviation (SD) based on the distribution of data for continuous variables. Normality was checked using the Shapiro–Wilk test. The factors associated with the dependent variable were analyzed using binary logistic regression. Bivariate analysis, crude odds ratio (COR) with 95% CI, was used to see the association between the outcome variable with each independent variable. Variables with a p-value of ≤0.25 in the bivariate analysis were selected for the multivariable logistic regression model. Multi-collinearity was checked to see the linear correlation among the independent

variables. Model goodness of fitness was tested by Hosmer-Lemeshow statistics. The strength of the association between dependent and independent variables was assessed using an adjusted odds ratio (AOR) with a 95% confidence interval. The p-value <0.05 was considered statistically significant.

RESULTS

Socio-demographic characteristics

A total of 301 study participants were involved in this study, with a response rate of 98.4%. the majority of the respondents 280(93.0%) were married, 144(47.8%) of the respondents were Orthodox religion followers, 275(91.4%) were Gurage by ethnicity, 142(47.2%) had no formal education, more than two-thirds, 188 (62.5%) of the participant were housewife, more than two-fifth, 129(42.9%) of husbands of the respondents had no formal education, almost three-fourth, 225(74.8%) of the respondent were farmers and nearly one-half, 149(49.5%) of the respondents' had income below the mean level (597.4 birrs). The minimum and maximum numbers of family sizes were 2 and 8, respectively, with a mean of 4± (standard deviation of 1) (**Table 1**).

Table 1: Socio-demographic characteristics of early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021 (n=301)

Category	Frequency	Percent (%)
Age of the mother		
Less than 20	22	7.3
20-34	206	68.4
≥35	73	24.3
Marital status		
Married	280	93
Unmarried	13	4.3
Divorced	6	2.0
Widowed	2	0.7
Religion		
Orthodox	144	47.8
Muslim	122	40.5
Protestant	31	10.3
Catholic	4	1.3
Ethnicity		
Gurage	275	91.4
Amhara	24	8.0
Oromo	2	0.7
Educational status		
No formal education	142	47.2
Grade 1-8	70	23.3
Secondary 9-12	77	25.6
College and above	12	4.0
Occupational status		
Housewife	188	62.5
Civil servant	11	3.7
Merchant	76	25.2

Daily laborer	18	6.0
Farmer	8	2.7
Husbands educational status		
No formal education	129	42.9
Grade 1-8	108	35.9
Secondary 9-12	53	17.6
College and above	11	3.7
Husbands occupation		
Farmer	225	74.8
Civil servant	13	4.3
Merchant	55	18.3
Daily laborer	8	2.7
Monthly income		
Below average (597.4 ETB)	149	49.5
More than average (597.4 ETB)	152	50.5
Family size		
Less than average (4)	154	51.2
More than average (4)	147	48.8

Obstetrics related characteristics

Among the respondents, almost two-fifths, 119(39.5%) had been pregnant for the first time and more than four-fifths, 268(89.0%) had ANC visits. Of the ANC attendants, 83(30.9%) have one ANC visit and 80(29.8%) have four and above visits. Regarding the place of the last ANC visit, 208(77.6%) was at the health center. Related to the course of pregnancy, almost two-fifths, 112(37.2%) of the respondents had a complicated pregnancy, four-fifths, 236(78.4%) of the respondents were given birth at a health center and most of the respondents, 284(94.4%) were attended by health professionals. According to the mode of delivery, more than four-fifths, 254(84.4%) of the respondents were delivered by SVD (**Table 2**).

Maternal complications

Among the respondents, 18.3% had maternal complications' during the early postnatal period. Of the complications 4.3% were sepsis, and 3.7% were PPH (**Figure 1**).

Newborn complications

Among the respondents, 27.9% had newborn complications during the early postnatal period. Of the complications, 16.3% were unable to breastfeed, and 7% were having breathing difficulties (**Figure 2**).

Table 2: Obstetrics characteristics of early postnatal care services utilization among postnatal women in Wolkite town, Gurage zone, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency	Percentage
Gravidity	One	119	39.5
	2-4	106	35.2
	≥5	76	25.2
Parity	One	119	39.5
	2-4	106	35.2
	≥5	76	25.2
Having ANC visit	Yes	268	89.0
	No	33	11.0
Number of visits	One	83	31
	Two	55	20.5
	Three	50	18.6
	Four and above	80	29.8
Place of ANC visit	Health center	208	77.6
	Hospital	51	19
	Health post	9	3.3
Course of pregnancy	Complicated	112	37.2
	Un complicated	189	62.8
Place of delivery	Health center	236	78.4
	Hospital	50	16.6
	Health post	6	2.0
	Home	9	3.0
Delivery attendant	Health professionals	284	94.4
	Health extension workers	15	5.0
	Others	2	0.7
Mode of delivery	SVD	254	84.4
	Instrumental delivery	16	5.3

	CS	31	10.3
Birth outcome	Live birth	292	97
	Stillbirth	9	3.0
Any history of neonatal death	Yes	10	3.3
	No	291	96.7
Wantedness of pregnancy	Wanted	222	73.8
	Unwanted	79	26.2
Getting advice on the importance of PNC	Yes	167	55.5
	No	134	44.5
Maternal complications during the postnatal period	Yes	55	18.3
	No	246	81.7
Newborns complication during pregnancy	Yes	84	27.9
	No	217	72.1

Service-related characteristics

Among the respondents, more than two-thirds, 190(63.1%) of the respondents traveled by foot to the health facility, while more than two-fifths, 141(46.8%) of respondents decided by themselves to have early PNC. More than two-thirds, 228(75.7%) of the respondents were getting help from their husbands about health services. Of those who used the maternity waiting room, 50(16.6%) stayed for less than a week and 40(13.3%) stayed for one week (**Table 3**).

Table 3: Service-related characteristics of early postnatal care services utilization among postnatal women in Wolkite town, Gurage zone, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency	Percentage
Means of transportation	Foot	190	63.1
	Vehicles	111	36.9
Decision maker on maternity care	Herself	141	46.8
	Husband	49	16.3
	Joint decision	111	36.9
Getting help for health services	Husband	228	75.7
	Relatives	65	21.6
	Families	8	2.7
Maternity waiting room	Yes	90	29.9
	No	211	70.1
Duration of stay (n=90)	Less than a week	50	55.6
	For one week	40	44.4

Sources of knowledge about early PNC

Among the respondents, 220(70.9%) have information about early postnatal care (EPNC) services. Most of the respondents, 150 (68.2%) acquired information about EPNC utilization from television. Nearly one-fifth, 81(26.9%) of the respondents have not known the advantages of postnatal care, and four-fifth, 243(80.7%) of the respondents were known of recommended postnatal visits. Nearly four-fifths, 256(85.0%) of the respondents did not know the correct time of early PNC service utilization. Nearly one-half, 133 (44.2%) of the respondents knew that EPNC was a free service, and nearly two-thirds, 188(62.5%) of the respondents did not know at least one component of the service (**Table 4**).

Table 4: Knowledge about early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Variables	Category	Frequency(n)	Percentage (%)
Know the advantages of PNC	Yes	220	73.1
	No	81	26.9
Know the recommended postnatal visits	Yes	58	19.3
	No	243	80.7
Know the correct timing of PNC	Yes	45	15.0
	No	256	85.0
Knows that PNC is a free service	Yes	133	44.2
	No	168	55.8
Knows at least one component of the service	Yes	113	37.5
	No	188	62.5
Knows at least one newborn danger signs	Yes	150	49.8

	No	151	50.2
Know the consequences of not receiving recommended PNC	Yes	48	15.9
	No	253	84.1
Place where PNC is delivered	Yes	102	33.9
	No	199	66.1

Factors associated with early postnatal care service utilization among participants

On bivariate analysis monthly income, Gravidity, parity, the desire of pregnancy, ANC follow-up, mode of delivery, any newborn illness/complication, Obstetrics complication, and knowledge of PNC were candidates for multivariate analysis. On multivariable analysis gravidity, the desire for pregnancy and mode of delivery were statistically significant in the final model (**Table 5**).

Multivariable analysis

Of the total participant, 76(25.2%) had more than 4 pregnancies and were 2.90 times (AOR: 2.90; 95%CI: 1.18, 7.11) more likely to utilize EPNC when compared to women who had less than or equal to four pregnancies. On the other hand, participants who have the desire for pregnancy were 4.17 times (AOR: 4.17; 95%CI: 1.93, 9.03) more likely when compared to those who haven't the desire for pregnancy. On the other hand, participants who gave birth by SVD were 2.18 times (AOR: 2.18; 95%CI: 1.07, 9.39) more likely when compared to those who gave birth by CS.

Table 5: Factors associated with early postnatal care services utilization among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Variables	EPNC Utilization		COR (95%CI)	AOR (95%CI)	P-value
	Yes	No			
Estimated monthly income					
Below average	43	106	1	1	
>Average	75	77	2.40(1.49, 3.87)	1.22(0.67, 2.23)	0.517
Gravidity					
One	31	88	1	1	
2-4	41	65	1.79(1.02, 3.15)	1.22(0.54, 2.77)	0.629
More than 4	46	30	4.35(2.35, 8.06)	**2.90(1.18, 7.11)**	**0.020**
Parity					
Primparous	35	84	1	1	
Multiparous	41	65	1.51(0.87, 2.64)	1.18(0.51, 2.76)	0.699
Grand Multiparous	42	34	2.97(1.63, 5.40)	1.09(0.46, 2.62)	0.844
Desire of pregnancy					
Yes	103	119	3.69(1.98, 6.87)	**4.17(1.93, 9.03)**	**0.0001**
No	15	64	1	1	
Having ANC follow up					
Yes	111	157	2.63(1.10, 6.26)	0.39(0.12, 1.28)	0.121
No	7	26	1	1	
Course of pregnancy					
Complicated	60	52	2.61(1.61, 4.23)	1.57(0.85, 2.92)	0.151
Uncomplicated	58	131	1	1	

Mode of delivery					
SVD	107	147	2.38(1.04, 6.01)	**2.18(1.07, 9.39)**	**0.038**
CS	11	36	1	1	
Any newborn illness/complication					
Yes	42	42	1.85(1.11, 3.09)	1.59(0.84, 2.99)	0.155
No	76	141	1	1	
Obstetrics complication					
Yes	41	14	6.43(1.01, 9.48)	9.12(0.34, 12.53)	0.0001
No	77	169	1	1	
Knowledge on PNC					
Poor	45	115	1	1	
Good	73	68	2.74(1.70, 4.42)	1.86(0.99, 3.49)	0.051

Key: EPNC-Early Postnatal Care, *-Pvalue<0.05, **-Pvalue≤0.01

Discussion

Early postnatal care service utilization in developing countries is one of the health care service utilization problems among postnatal women, which is related to extensive maternal and neonatal complications and mortality. [1, 2,6] Prior studies have noted the importance of early postnatal checkups in improving maternal survival.[7,26] This study was intended to identify the prevalence of early postnatal care services utilization and associated factors among postnatal women in Wolkite Ethiopia.

This study revealed that 23.3 %(95% CI: 18.9-27.9) of women received early postnatal care. This result is lower than the study reported in some African countries such as Myanmar(72.1%),[27] Zambia (63%),[28] Builsa district (62%),[29] Hadiya Zone (51.4%),[30] Uganda (50%),[7] Assela town(37.5%),[31]Adigrat Town (34.3%),[32]and Debremarkos town(33.5%).[33] However, it is higher than the findings of studies conducted in china (17%),[34] Tanzania (10.4%),[35] South Sudan(11.4%), and 8 Debremarkos town in Ethiopia (16.2%).[36] The difference might be due to the analysis type employed in the studies and the socio-cultural background of the participants.

In this study wanted pregnancy was found to be an associated factor of early postnatal care services utilization. This finding is nearly similar to the studies conducted in Tanzania and Benin[35,37]. The various advantages of public enlightenment could explain this in planning for pregnancy. The difference between studies might be sample size; the sample size of this study was small, even if it was scientifically calculated; which might make variables insignificant.

This study revealed that having over four previous pregnancies was among the factors associated with early postnatal care services utilization. This shows that former pregnancies shared the experience of attending early postnatal checkups. This finding differed from that of

the studies conducted in Debre Birhan,[38], and Mekele city,[39] that study shows that mothers having one previous pregnancy used early PNC services on time. Socio-cultural differences study participants between the studies might attribute the differences between the studies. This may affect the decision power of women to use this service in some communities.

This study revealed that spontaneous vaginal delivery (SVD) was among the factors associated with early postnatal care services utilization. Similarly, a study conducted by Debre Birhan and Debremarkos shows that clients who have previous experience with SVD were more likely to use early postnatal care services. [33,38] The difference between the studies might be attributed to sampling techniques and cultural differences of studies participant; those studies used a simple random sampling technique.

Strengths and limitations

This study include mothers with birth within one year of the survey from the community to assess the prevalence of early postnatal care services utilization and associated factors and compare them with other studies.

It may relate the limitation of this study to the survey types and nature of the cross-sectional study, which did not draw inferences and show cause-and-effect relations among variables. The sample size of this study was small, even if it was scientifically calculated. The study is further limited because it is based on retrospective information provided by the survey respondents, which may be subject to recall bias. However, such bias was tried to minimize some extent by restricting the study to mothers with birth within one year of the survey.

Conclusions

This study illustrates the prevalence of early postnatal care services utilization and the associated factors among postnatal women. This study revealed that the prevalence of early postnatal care services utilization was slightly low when compared to other studies. Wanted pregnancy, having over four previous pregnancies (> Gravida IV), and spontaneous vertex delivery (SVD) were significantly associated with early postnatal care services utilization.

This study result revealed that almost all study participants' place of delivery was in a health institution, and only 15% of respondents know the correct follow-up schedules for early postnatal checkups, which is in contrast to the place of delivery. Thus, community-based health promotion should be an important recommendation to increase early postnatal care service utilization among postnatal mothers to improve the level of awareness of early postnatal checkup schedules; done by health care providers.

Competing interests

The authors declare that there is no conflict of interest

Data sharing statement

Our original article accepted by BMJ Open access journal entitled “Prevalence of early postnatal care services utilization and associated factors among postnatal women of Wolkite town, Gurage zone, Southern Ethiopia: a community-based cross-sectional study” data supporting results reports can be found in publicly archived generated in December 6, 2022 with hyperlinks provided blow. We have decided to abandon the submission to Dryad and will proceed to the link below instead.

https://zenodo.org/record/7404686#.Y4819r1KjIV.

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Ethical approval and consent to participants

Ethics approval: We got ethical clearance from the institutional review board of Wolkite University College of Medicine and Health Science with the reference number RCSUILC/021/2021.

Informed consent: A permission letter was obtained from Wolkite town administration office authorities. Participation in the study was voluntary and written informed consent was obtained from the study participants. We kept all the information taken from the study participants confidential.

Authors' Contribution

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References

1. WHO. Trends in maternal mortality. 2018; https://documents1.worldbank.org/curated/en/793971568908763231/pdf/Trends-in-maternal-mortality-2000-to-2017-Estimates-by-WHO-UNICEF-UNFPA-World-Bank-Group-and-the-United-Nations-Population-Division.pdf.
2. WHO. WHO recommendations on Postnatal care of the mother and newborn. 2014.
3. WHO U. UNFPA, World Bank Group, and the United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF. In: UNFPA, World Bank Group, and the United Nations Population Division. Geneva; 2015.
4. Organization WH. Health in 2015: from MDGs, millennium development goals to SDGs, sustainable development goals. 2015.
5. WHO. Postnatal Care for Mothers and Newborns Highlights from the World Health Organization 2013 Guidelines. 2015.
6. Odukogbe A-TA, Afolabi BB, Bello OO, Adeyanju AS. Female genital mutilation/cutting in Africa. *Translational Andrology and Urology.* 2017;6(2):138-148.
7. USAID'S. Determinants of Early Postnatal Care Attendance in Uganda. 2016.
8. Izudi J, Akwang GD, Amongin D. Early postnatal care use by postpartum mothers in Mundri East County, South Sudan. *BMC Health Services Research.* 2017;17(1).
9. Yoseph S, Dache A, Dona A. Prevalence of Early Postnatal-Care Service Utilization and Its Associated Factors among Mothers in Hawassa Zuria District, Sidama Regional State, Ethiopia: A Cross-Sectional Study. 2021.

10. Tefera Y, Hailu S, Tilahun aR. Early postnatal care service utilization and its determinants among women who gave birth in the last 6 months in Wonago district, south Ethiopia: A community-based cross-sectional study. 2020.
11. Gebreslassie T, Gebrehiwot, Mekonen HH. Prevalence and Associated Factors of Early Postnatal Care Service Use Among Mothers Who Had Given Birth Within the Last 12 Months in Adigrat Town, Tigray, Northern Ethiopia, 2018.
12. WHO. WHO Technical Consultation on Postpartum and Postnatal Care. 2010; http://apps.who.int/iris/bitstream/handle/10665/70432/WHO_MPS_10.03_eng.pdf;jsessionid=977EC87BBE162C1694EBAB559E4D335A?sequence=1, 2018.
13. Collaboration Ct. Countdown to 2030: tracking progress towards universal coverage for reproductive, maternal, newborn, and child health. *The Lancet.* 2018.
14. UNICEF. Maternal and Newborn Health Disparities in Ethiopia, Unicef for every child. 2017; https://data.unicef.org/wp-content/uploads/country_profiles/Ethiopia/country%20profile_ETH.pdf. Accessed 11/28, 2018.
15. CSAE. Central statistics agency of Ethiopia, Ethiopia Demographic and Health Survey 2016. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF. . 2016; https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf. Accessed 12/21/2018, 2018.
16. WHO. global strategies for women, children, and adolescents (2016-2030). 2016. Accessed 12/6/2018, 2018.
17. Darmstadt GL, Bhutta ZA, Cousens S, et al. Evidence-based, cost-effective interventions: how many newborn babies can we save? *The Lancet.* 2005;365(9463):977-988.
18. WHO/UNICEF. Home visits for the newborn child: a strategy to improve survival. 2010; http://apps.who.int/iris/bitstream/handle/10665/70002/WHO_FCH_CAH_09.02_eng.pdf?sequence=1. Accessed 11/28, 2018.
19. DiBari JN, Yu SM, Chao SM, Lu MC. Use of postpartum care: predictors and barriers. *Journal of pregnancy.* 2014;2014.
20. Organization WH. Every newborn: an action plan to end preventable deaths. 2014.
21. WHO. WHO recommendations on maternal health: guidelines approved by the WHO Guidelines Review Committee. 2017; http://apps.who.int/iris/bitstream/handle/10665/259268/WHO-MCA-17.10-eng.pdf?sequence=1. Accessed NOV 28, 2018.
22. WHO. Technical Consultation on Postpartum and Postnatal Care. 2010.
23. Ndugga P, Namiyonga NK, Sebuwufu D. Determinants of early postnatal care attendance: analysis of the 2016 Uganda demographic and health survey. *BMC Pregnancy and Childbirth.* 2020;20(1).
24. An T, D N, A T. Early Postnatal Care Service Utilization and Associated Factors among Mothers Who Gave Birth in the Last 12 Months in Asako District, Arsi Zone, South East Ethiopia in 2016. *Journal of Women's Health Care.* 2017;06(01).
25. EDHS. Ethiopia demographic and health survey 2016.
26. Izudi J, Denise G, Amongin D. Early postnatal care use by postpartum mothers in Mundri East County, South Sudan. 2017.
27. Mon AS, Phyu MK, Thinkhamrop W, Thinkhamrop B. women and its determinants: a cross-sectional study. 2018.

28. Chungu C, Makasa M, Chola M, Jacobs CN. Place of Delivery Associated With Postnatal Care Utilization Among Childbearing Women in Zambia. *Frontiers in Public Health.* 2018;6(94).
29. Sakeah E, Aborigo R, Sakeah JK, et al. The role of community-based health services in influencing postnatal care visits in the Builsa and the West Mamprusi districts in rural Ghana. *BMC pregnancy and childbirth.* 2018;18(1):295.
30. Belachew T, Taye A, Belachew T. Postnatal care service utilization and associated factors among mothers in Lemo Woreda, Ethiopia. *J Women's Health Care.* 2016;5(10.4172):2167-0420.1000318.
31. Amane Tumbure1 DA, Elile Fantahun1, Megersa Negusu1, Tsegaw Yitbarek1, Legese Tadesse2* and Tewodros Desalegn2 Assessment of Postnatal Care Service Utilization and Associated Factors in Asella Town, Arsi Zone, Oromiya Regional State, Ethiopia. *Global Journal of Reproductive medicine.* 2018;6(1).
32. Gebreslassie T, Haftea G, Mekonen H. Prevalence and Associated Factors of Early Postnatal Care Service Use Among Mothers Who Had Given Birth Within the Last 12 Months in Adigrat Town, Tigray, Northern Ethiopia, 2018.
33. Limenih MA, Endale ZM, Dachew BA. Postnatal Care Service Utilization and Associated Factors among Women Who Gave Birth in the Last 12 Months before the Study in Debre Markos Town, Northwestern Ethiopia: A Community-Based Cross-Sectional Study. *International Journal of Reproductive Medicine.* 2016;2016:1-7.
34. You H, Chen J, Bogg L, et al. Study on the factors associated with postpartum visits in rural China. *PLoS One.* 2013;8(2):e55955.
35. Kanté AM, Chung CE, Larsen AM, Exavery A, Tani K, Phillips JF. Factors associated with compliance with the recommended frequency of postnatal care services in three rural districts of Tanzania. *BMC pregnancy and childbirth.* 2015;15(1):341.
36. Limenih MA, Endale ZM, Dachew BA. Postnatal Care Service Utilization and Associated Factors among Women Who Gave Birth in the Last 12 Months before the Study in Debre Markos Town, Northwestern Ethiopia: A Community-Based Cross-Sectional Study. *International Journal of Reproductive Medicine.* 2016;2016:7.
37. Dansou J, Adekunle AO, Arowojolu AO. Factors associated with the compliance of recommended first postnatal care services utilization among reproductive age women in the Benin Republic: an analysis of 2011/2012 BDHS data. *International Journal of Reproduction, Contraception, Obstetrics, and Gynecology.* 2017;6(4):1161-1169.
38. Akibu M, Tsegaye W, Megersa T, Nurgi S. Prevalence and Determinants of Complete Postnatal Care Service Utilization in Northern Shoa, Ethiopia. *Journal of pregnancy.* 2018;2018.
39. Gebrehiwot G, Medhanyie AA, Gidey G, Abrha K. Postnatal care utilization among urban women in northern Ethiopia: a cross-sectional survey. *BMC women's health.* 2018;18(1):78.

Legends:

Figure 1: Types of maternal complication among postnatal women in Wolkite town, southeast Ethiopia, 2021(n=301)

Figure 2: Types of newborn complications during the postnatal period among postnatal women in Wolkite town, southeast Ethiopia, Ethiopia, 2021(n=301)

Annex 1: English version interviewer-administered questionnaire on early postnatal care services utilization among postnatal women in southeast Ethiopia, 2021.

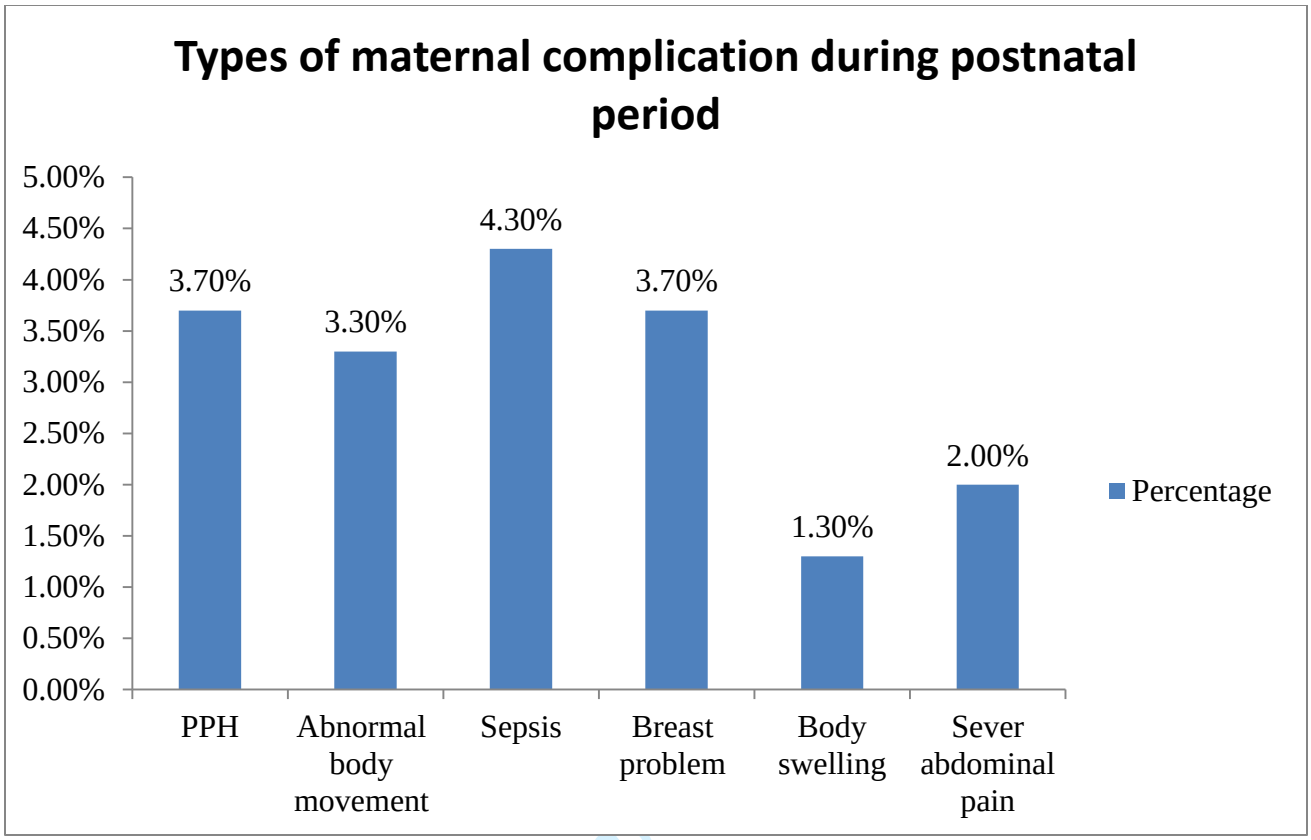

Figure 1: Types of maternal complication among postnatal women in Wolkite town, southwest, Ethiopia, 2021(n=301)

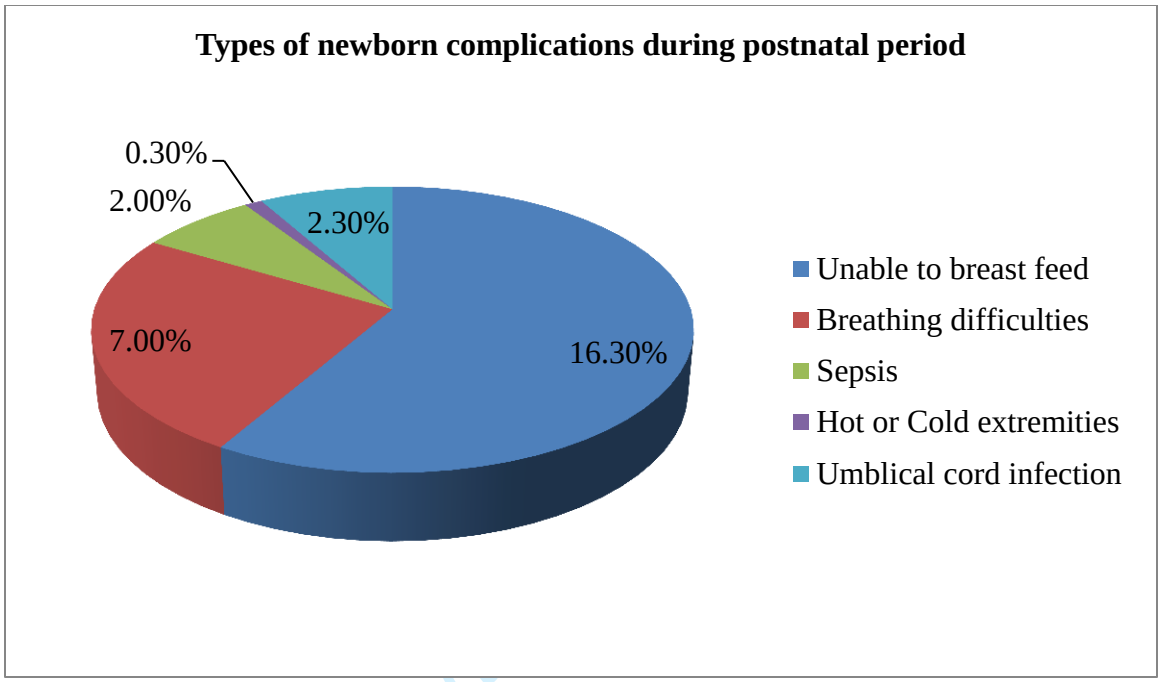

Figure 2: Types of newborn complications during postnatal period among postnatal women in Wolkite town, southwest Ethiopia, 2021(n=301)

APPENDICES

Annex 1: English version Interviewer Administered Questionnaire

Consent form for postnatal women:

Title of research: Prevalence of early postnatal care utilization and associated factors among postnatal women in Wolkite town, Gurage zone, Southern Ethiopia, 2021

Hello my name is----------. I am working as data collector in the research conducted by Yirgalem Yosef. The research is only for academic purposes. I assure you that the views expressed in this questionnaire will under no circumstance be made public or disclosed to a third party. The details of this interview and the information you provide will be held in confidence.

Declaration by Respondent

I certify that I voluntarily agree to answer the research questions, that the study has been explained to me. All my questions have been answered satisfactorily. I understand I am free to discontinue participation at any time if I so choose.

…….....

Signature

Date……..

Researcher's Statement

I certify that the participant has been given ample time to read, learn and understand the study. All questions and clarifications raised by the participant have been addressed.

……..

Yirgalem Yosef (Researcher)

Date…….

Instruction: Please **Circle the appropriate answer** in space provided

Questionnaire Code_____

SECTION 1: Socio demographic characteristics			
S.N	Questions	Answers	Skip
101	Age (in years)	1. [_____] 2. I don't know----------	
102	Current marital status	1. Married 2. Divorced /Separated 3. un married 4. Widowed	
103	Religion	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others	
104	Ethnicity	1. Gurage 2. Amhara 3. Oromo 4. Others.	
105	Education status	1. No formal Education 2. 1-8th 3. 9-12th 4. College and above	
106	Occupational status	1. House wife 2. Civil servant 3. Merchant 4. Daily labour 5. Farmer	
107	Husbands educational status	1. No formal Education 2. 1-8th 3. 9-12th 4. College and above	

108	Husbands occupations	1. Farmer 2. Civil servant 3. Merchant 4. Daily labour	
109	Estimated monthly income	1. blow average(597.4 ETB) 2. More than average (597.4 ETB)	
110	Family size	1. less than average (4) 2. more than average (4)	
Section two: obstetric and neonatal characteristics			Code
201	Gravidity	----------	
202	Parity	----------	
203	Having ANC visit	1. Yes 2. No	
204	Number of ANC Visits	1. one 2. two 3. Three 4. Four and above	
205	Place of last ANC visit	1. Health center 2. Hospital 3. Health post	
206	Corse of pregnancy	1. Complicated 2. Uncomplicated	
207	Place of delivery	1. Health center 2. Hospital 3. 3. Health post 4. Home	
208	Delivery Attendant	1. Health professionals 2. Health extension workers 3. Other	
209	Mode of delivery	1. SVD	

		2. Instrumental delivery 3. CS	
210	Birth outcome	1. Live birth 2. Still birth	
211	Any history of Neonatal death	1. Yes 2. No	
212	Wantedness of pregnancy	1. Wanted 2. Unwanted	
213	Have you got advices on Importance of PNC?	1. Yes 2. No	
214	New born complication during pregnancy	1. Yes 2. No	
Section three : Health service related factors (access to skilled maternity care)			**Code**
301	Means of transportation	1. Foot 1. Vehicle	
302	Decision maker on maternity care	1. Herself 2. Husband 3. Joint decision	
303	Getting help for health services	1. Husband 2. Relatives 3. Families	
304	Using Maternity waiting room	1. Yes 2. No	If yes 305
305	Duration of stay	1. Less than a week 2. For one week	
Section four: knowledge of mothers towards early PNC service			Code
401	Knows advantages of PNC	1. Yes 1. No	
402	Knows Recommended PNC	2. Yes 3. No	

403	Know the correct timing of PNC	1. Yes 2. No	
404	Knows that PNC is free services	1. Yes 1. No	
405	Knows at least one component of the services	1. Yes 2. No	
406	Knows at least on newborn danger sign	1. Yes 2. No	
407	know consequences of not receiving recommended PNC	1. Yes 2. No	
408	Know place where PNC is delivered	1. Yes 2. No	

THANK YOU VERY MUCH!!!!!

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the STROBE cross sectionalreporting guidelines, and cite them as:

von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies.

		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1&2
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	4&5
Objectives	#3	State specific objectives, including any prespecified hypotheses	Highlighted on result.
Methods			
Study design	#4	Present key elements of study design early in the paper	6
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	6
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	6&7
Bias	#9	Describe any efforts to address potential sources of bias	8
Study size	#10	Explain how the study size was arrived at	7
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	8
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	8
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	8
Statistical methods	#12c	Explain how missing data were addressed	n/a
Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	n/a
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	9
Participants	#13b	Give reasons for non-participation at each stage	9
Participants	#13c	Consider use of a flow diagram	n/a
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	9-15
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	n/a

Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	
Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	11
Main results	#16b	Report category boundaries when continuous variables were categorized	11
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	18
Discussion			
Key results	#18	Summarise key results with reference to study objectives	20-21
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	21
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	20-21
Generalisability	#21	Discuss the generalisability (external validity) of the study results	22
Other Information			
Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	n/a