

Birth Preparedness and Complication Readiness among Pregnant Women Attending Antenatal Care Clinics in Public Health Facilities, Harari Region, Eastern Ethiopia

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Abstract

Background: Nearly three million women are dying each year from complications of pregnancy and childbirth. Most of these deaths are occurring in low and lower-middle-income countries. Evidence indicates that promoting birth preparedness and complication readiness has importance in averting maternal morbidity and mortality. Therefore, this study aimed to assess factors associated with birth preparedness and complication readiness practice among pregnant women attending antenatal care clinics in public health facilities, Harari region, Eastern Ethiopia.

Methods: Facility-based cross-sectional study was conducted among pregnant women attending antenatal care from April 01 to May 30, 2018. A systematic random sampling technique was used to select 419 study-participants. A pretested questionnaire was used to collect data. The data were entered to EpiData Version 3.1 and exported to Statistical Package for the Social Sciences Version 21 for analysis. Bivariate and multivariable logistic regressions were done to identify factors associated with the practice of birth preparedness and complication readiness. The adjusted odds ratio at a 95% confidence interval was used for the final interpretation of statistical significance.

Results: Birth preparedness and complication readiness among pregnant women was 52.1% (95% CI: 47.2, 56.9). Participants' age ≥ 35 (AOR=3.62; 95% CI: 1.95, 10.96), being an urban resident (AOR=3.61; 95% CI: 1.46, 8.96), having planned pregnancy (AOR=3.64; 95% CI: 2.17, 6.09), ever heard about birth preparedness and complication readiness (AOR=1.77; 95% CI: 1.08, 2.92), having knowledge about obstetric danger signs during pregnancy (AOR=3.27; 95% CI: 1.88, 5.69), and having knowledge about obstetric danger signs during childbirth (AOR=6.10; 95% CI: 2.60, 14.31) were found to be significantly associated with the practice of birth preparedness and complication readiness.

Conclusion: The proportion of pregnant women who were prepared for birth and complication readiness was low. Women's age ≥ 35 , urban resident, planned pregnancy, prior information about birth preparedness and complication readiness, having knowledge of obstetric danger signs during pregnancy and childbirth were the positively associated factors. Therefore, health information dissemination on birth preparedness and complication readiness; obstetric danger sign during pregnancy, and childbirth should be provided at the community and institutional level.

Keywords: *Antenatal care; Birth preparedness; Complication readiness; Ethiopia; Pregnant women*

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Introduction

Globally, nearly three million women are dying each year from the complications of pregnancy and childbirth (WHO, 2014; WHO, 2017). It is estimated that for every 100,000 live births 450 women die during pregnancy, childbirth, or postpartum period (WHO, 2007; Say *et al.*, 2014), and more than 66% of these deaths occurred in sub-Saharan Africa countries (WHO, 2017). Ethiopia is one of the five countries

which has contributed to more than 50% of the maternal deaths worldwide (Tessema *et al.*, 2017; Hogan *et al.*, 2010). The country achieved the Millennium Development Goals (MDG) 5 by reducing the maternal mortality ratio at the end of 2015. As a result, the reported maternal mortality rate was 412 per 1000 years (CSA, 2016). A big reduction resulted from the presence of skilled attendants at birth and availability of emergency obstetric care (NPCUNE, 2015; WHO, 2004). However, the above figure is still



higher than the expected (267 maternal deaths per 100,000 live birth) (NPCUNE, 2015; Hailu *et al.*, 2011).

Majority of maternal mortalities across low and middle-income countries are due to three delays: delay in health seeking-behavior, delay in reaching a health facility, and delay in getting appropriate treatment (Aden *et al.*, 2019). Lack of knowledge about maternal and neonatal health issues and logistic and financial constraints are the possible causes for the aforementioned delays (Tessema *et al.*, 2017; CSA, 2016).

Birth preparedness and complication readiness (BPCR) is the process of planning for normal birth and anticipating the actions needed in case of emergency (Markos and Bogale, 2014; Kakaire *et al.*, 2011). It is a safe motherhood comprehensive strategy that promotes the timely use of skilled maternal and neonatal care during childbirth or obstetric emergencies (Mutiso *et al.*, 2008). It includes components that encourage mothers; to identify preferred birth-place, arrange for transport to skilled care site in case of emergency, save or arranging funds for birth-related and emergency expense, determining a companion to be with the woman at birth or to accompany her to the nearest appropriate health facility, and identifying a compatible blood donor in case of emergencies (Iliyasu *et al.*, 2010; Maternal, 2001; Agarwal *et al.*, 2010; Hailu *et al.*, 2011; Del Barco, 2004).

Promoting BPCR improves preventive behaviors, increases knowledge of mothers about obstetric danger signs, and leads to improvement in care-seeking during obstetric emergencies (Fullerton *et al.*, 2005; Moran *et al.*, 2006; Mushi *et al.*, 2010; Bintabara *et al.*, 2015). Furthermore, BPCR has paramount importance in scaling up maternal and neonatal health outcome (Del Barco, 2004; Kabakyenga *et al.*, 2012), and improves disease prevention behaviors (Smeele *et al.*, 2018; Agarwal *et al.*, 2010; Manandhar *et al.*, 2004). Evidence has also indicated that maternal morbidity and mortality could be averted significantly if women and their families recognize obstetric danger signs and immediately seek health care (McPherson *et al.*, 2006; Moran *et al.*, 2006).

According to studies conducted in different geographical areas, pregnant women's educational status, marital status, occupation, antenatal care (ANC) follow up, and knowledge of obstetric danger signs (Musa and Amano, 2016; Hiluf and Fantahun, 2008; Markos and Bogale, 2014; Iyasu *et al.*, 2018; Mukhopadhyay *et al.*, 2016; Agarwal *et al.*, 2010) were the identified factors associated with the practice of BPCR.

Despite the wide spectrum importance of BPCR, studies conducted in different parts of Ethiopia have shown birth preparedness and readiness ranging from 20-25% (Iyasu *et al.*, 2018; Hiluf and Fantahun, 2008; Gebre *et al.*, 2015) among the pregnant women, which leads to the lower seeking of health services from skilled birth attendants (28%) (CSA, 2016; WHO, 2015). Moreover, there are differences in socio-demographic and cultural conditions of participants, suggesting a significant geographical and regional variations of BPCR practice (Hiluf and Fantahun, 2008; Markos and Bogale, 2014; Mushi *et al.*, 2010; Bintabara *et al.*, 2015). Therefore, taking the aforementioned gap into account, the present study assessed factors associated with birth preparedness and complication readiness practice among pregnant women attending antenatal care clinics in public health facilities, Harari region, eastern Ethiopia.

Materials and Methods

Study area, design and period

The study was conducted in the governmental health facilities of Harari Regional State, eastern Ethiopia. The region is located 525 km from Addis Ababa, the capital city of Ethiopia. Its population is around 240,000 people and 53,383 were women in the reproductive age group (HRHB, 2015). The total number of the eligible population in the region for ANC, delivery, and postnatal care (PNC) during the study period was around 7604 (HRHB, 2018). This an institution based cross-sectional study was conducted in two public hospitals and eight health centers of Harari Regional State, eastern Ethiopia from April 01 to May 30, 2018.

Population

All pregnant women attending ANC in public health facilities of the Harari region were the source population. The study population were women attending ANC in the second trimester and above during the data collection period and pregnant women who were seriously sick were excluded.

Sample size and sampling techniques

Single population proportion formula was used to determine the sample size: with the assumption of 95% significance level, 5% margin of error, and 53.9% proportion of BPCR (Hailemariam and Nahusenay, 2016), and 10% non-response rate. The final sample size was 419. All public health facilities from Harari Regional State were included. Finally, the sample size was proportionally allocated based on the total number of pregnant women attending to each health facilities. Systematic random sampling technique was employed to select the study participants.

After case review of the previous quarter report, the total number of pregnant women attending ANC at Harari regional state governmental health facilities within the last three months were 2346, the total number of pregnant women attending ANC during the data collection period was estimated to be around 782 and the k value ($782/419$) was approximately determined to be 2 ($k=2$).

Data collection method

Data were collected by trained ten female first-degree holder midwives through face-to-face interviews using a pretested structured questionnaire developed by reviewing relevant studies (Tafa *et al.*, 2018; Mutiso *et al.*, 2008; Hiluf and Fantahun, 2008; Hailemariam and Nahusenay, 2016; Agarwal *et al.*, 2010). The questionnaire was first prepared in English and then translated into Amharic and Afan Oromo language as per the mother tongue of the participants and translated back into English for consistency by language experts. It contained parts like socio-demographic variables, obstetric factors, knowledge, and practice regarding birth preparedness and complication readiness.

Data quality control

The questionnaire was pre-tested on 5% of the sample size in Dilchora Hospital, Dire Dawa. Then, correction and modification of the tool were undertaken accordingly. Trained ten data collectors, female first degree midwives, and two supervisors who were not working in the assigned health facilities were used for data collection. The investigator and supervisors closely monitored the data collection process throughout the data collection period. They checked the collected data for completeness each day and corrective measures were taken accordingly.

Operational definition

Birth preparedness and complication readiness: women who followed at least three of the five BPCR components is said to be prepared for birth and its complication (Musa and Amano, 2016).

knowledgeable on key danger signs during pregnancy: woman who can mention at least two of the three key danger signs for pregnancy (vaginal bleeding, swollen hands/face and blurred vision) (JHPIEGO, 2004).

knowledgeable on key danger signs during childbirth: considered if the pregnant woman can mention at least three of the four key danger signs for labor (severe vaginal bleeding, prolonged labor (>18 hours), convulsion and retained placenta>30 minutes) spontaneously (JHPIEGO, 2004).

knowledgeable on key danger signs during postpartum: woman who can mention three or more danger sign in post partum period (vaginal bleeding, loss of consciousness and fever) (Woldeamanuel *et al.*, 2019).

Data processing and analysis

Data were first coded, and then double-entered on EpiData statistical software Version 3.1. and exported into Statistical Package for Social Science (SPSS) software Version 21 for analysis. The descriptive statistics of each variable (percentages, mean, and standard deviation) were determined. The overall birth preparedness and complication readiness were calculated as the proportion of those mothers readiness who practiced at least three of BPCR components. Hosmer-Lemeshow's and Omnibus goodness-of-fit test was used to check for model fitness. All the variables with a p -value of ≤ 0.25 in the biva-

riate analysis were included in the multivariable model. Crude odds ratios (COR) and adjusted odds ratios (AOR) with their 95% confidence intervals (CI) were calculated; those variables with p -value ≤ 0.05 in the multivariable analysis were declared as significantly associated factors.

Ethical Considerations

Ethical clearance was obtained from the Institutional of Health Research Ethical Review Committee (IH-RERC) of Haramaya University, College of Health and Medical Sciences. Then, a formal letter of cooperation was written to Harari Regional Health Bureau; then the health bureau wrote a letter of support to all public health institutions in the region. The study participant was informed about the purpose, method, anticipated benefit, and risk of the study.

Written and signed consent was obtained from each study participant. Confidentiality and cultural norms of the study participants were also maintained.

Results

Socio-demographic characteristics

In this study, a total of 403 study participants were included with a response rate of 96.18%. Their mean age was 24(± 5.3) years. Majority 311 (77.2%) of the study participants were in the age group of 20-34 years, had formal education 221 (54.8%), Oromo in ethnicity 220 (54.6%), housewives 237 (58.8%), husband have formal education 229 (56.8%). Almost half 196 (48.6%) of the participants had a family size of 4-6. Most 385 (95%) of the participants were married (Table 1).

Table 1: Sociodemographic characteristics of the pregnant women attending ANC in public health facilities of Harari Regional State, eastern Ethiopia, 2018 (n= 403)

Variable	Categories	Frequency	Percentage
Age of respondents	<20	60	14.9
	20-34	311	77.2
	≥ 35	32	7.9
Residence	Urban	197	48.9
	Rural	206	51.1
Marital status	Married	385	95.5
	Single	18	4.5
Educational status	Have no formal education	182	45.2
	Have formal education	221	54.8
Religion	Muslim	315	78.2
	Orthodox	76	18.8
	Protestant	12	3.0
Ethnicity	Oromo	220	54.6
	Amhara	55	13.6
	Harari	76	18.9
	Others*	52	12.9
Occupation	Housewife	237	58.8
	Government employee	74	18.4
	Daily laborer	53	13.2
	Private Employee	26	6.5
	Other**	13	3.2
Husband educational status	Have no formal education	174	43.2
	Have formal education	229	56.8
Family size	1-3	180	44.7
	4-6	196	48.6
	≥ 7	27	6.7

*: Tigray, Gurage, Somali; **: Farmer and non-government employee

Obstetric history and knowledge about obstetric danger sign

Nearly three fourth 289 (71.7%) of the participants were multigravida and majority 366(90.8%) did not have a previous history of stillbirth. On the other hand, 163(46.9%) of the study participants had their current pregnancy unplanned. Regarding their knowledge of obstetric danger signs during pregnancy, 206 (51.1%) and 145 (36%) of the study participants mentioned severe vaginal bleeding and swollen hand or face as a danger sign during pregnancy respectively. Labor lasting for > 18hr was stated as a danger sign during childbirth by 147 (37%) of the study participants; during postpartum, severe vaginal bleeding was a danger sign for 128 (31.8%) of the women. Furthermore, 129 (32%), 56 (13.9%), and 67 (16.6%) were knowledgeable about the danger sign during pregnancy, childbirth, and postpartum respectively (Table 2).

Sources of information on birth preparedness and complication readiness

About 282 (69.9%), 95 (23.6%), and 26 (6.5%) of study participants responded that Health care professionals; health extension workers and families were the main source of information for BPCR respectively.

Practices on birth preparedness and complication readiness components

The study participants had practiced some birth preparedness and complication readiness components. Among these, 229 (74.2%) had identified the place of delivery, 237 (59.1%) saved money, and only 54 (13.4%) identified potential blood donors. The overall practice on birth preparedness and complication readiness was 52.1% (95% CI: 47.3-56.9) (Figure 2).

Table 2: Knowledge of participants about obstetric danger signs during pregnancy, labor and postpartum in public health facilities of Harari Regional State, eastern Ethiopia, 2018 (n= 403)

Obstetric danger sign during	Response	Category	Frequency	Percentage
Pregnancy	Severe vaginal bleeding	Yes	206	51.1
		No	197	48.9
	Blurred vision	Yes	84	20.8
		No	319	79.2
	Swollen hand and face	Yes	145	36.0
		No	258	64.0
Childbirth	Severe vaginal bleeding	Yes	128	31.8
		No	275	68.2
	Labour lasting >18hrs	Yes	149	37.0
		No	254	63.0
	Retained placenta	Yes	73	18.1
		No	330	81.9
Convulsion	Yes	108	26.8	
	No	295	73.2	
Postpartum	Severe vaginal bleeding	Yes	127	31.5
		No	276	68.5
	High fever	Yes	96	23.8
		No	307	76.2
Foul-smelling vaginal discharge	Yes	99	24.6	
	No	304	75.4	
Knowledgeable of key obstetric danger sign during	Pregnancy	Yes	129	32.0
		No	274	68.0
	Childbirth	Yes	56	13.9
		No	347	86.1
	Postpartum	Yes	67	16.6
		No	336	83.4

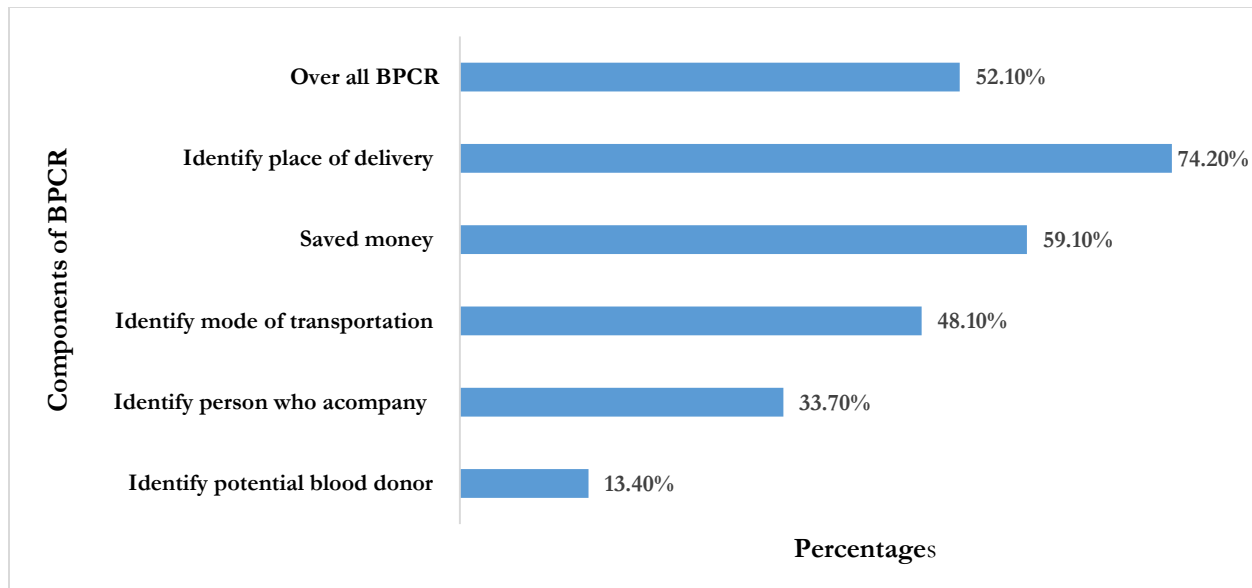


Figure 2: Percentage of pregnant women who practiced on components of birth preparedness and complication readiness in public health facilities of the Harari region, eastern Ethiopia, 2018 (n= 403).

Factors associated with birth preparedness and complication readiness

In bivariable analysis; age category, residence, women's education status, husband's educational status, planned pregnancy, heard about BPCR, knowledge of key danger signs during pregnancy and childbirth were candidates for multivariable analysis.

The final multivariable logistic regression analysis showed women within the age category of ≥ 35 years, of being urban resident, having planned pregnancy, heard the term BPCR, knowledge of key danger signs during pregnancy and knowledge of key danger signs during childbirth were found to be a statistically significant factor with BPCR.

Participants in the age category of ≥ 35 were 3.62 times more likely to practice BPCR compared to their counterparts (AOR=3.62; 95% CI: 1.19, 10.96). The likelihood of practicing BPCR was 3.61 and 3.64 times higher in the participants from urban resident (AOR=3.61; 95% CI: 1.46, 8.96) and among those having planned pregnancy (AOR=3.64; 95% CI: 2.17, 6.09) than their counterparts respectively. The participants who had ever heard the term BPCR were 1.77 times more likely to practice BPCR (AOR=1.77; 95% CI: 1.08, 2.9) compared to their counterparts. Similarly, participants who were knowledgeable about obstetric danger signs during pregnancy were

3.27 times more likely to get prepared for birth and complication compared to their counterparts (AOR=3.27; 95% CI: 1.88, 5.69). Furthermore, the odds of BPCR practice was 6.1 times more common among mothers who were knowledgeable about danger signs during childbirth compared to non-knowledgeable (AOR=6.1; 95% CI: 2.60, 14.31) (Table 3).

Discussion

The overall practice of birth preparedness and complication readiness of pregnant women in the selected public health facilities in public health facilities of Harari regional state was 52.1%. Participants' age (≥ 35 years), residence (urban); and having planned pregnancy, prior information about BPCR, and being knowledgeable of key danger signs during pregnancy and childbirth were positively associated with their practice of BPCR.

In this study, the practice of birth preparedness and complication readiness was 52.1%. This finding is consistent with the reported finding from studies conducted in Ethiopia; Dire Dawa (54.7%) (Musa and Amano, 2016), Debrebirhan (53.9%) (Hailemariam and Nahusenay, 2016), and Wolaita (48.5%) (Azeze *et al.*, 2019); and southern Nigeria (48.4%) (Ibadin *et al.*, 2016), India (49 %-51%) (Mukhopadhyay *et al.*, 2016; Agarwal *et al.*, 2010).

Table 3: Factors associated with BPCR among pregnant women attending ANC in public health facilities of Harari region, Eastern Ethiopia, 2018(n=403)

Variables	Category	BPCR practiced		COR (95%CI)	AOR (95%CI)
		Yes N(%)	No N(%)		
Age category	<20	24(40.0)	36(60.0)	1	1
	20-34	166(53.4)	145(46.6)	1.72(0.98, 3.01)	1.42(0.69,2.9)
	≥35	20(62.5)	12(37.5)	2.50(1.03, 6.04)*	3.62(1.19,10.96)*
Residence	Urban	137 (69.5)	60(30.5)	4.16(2.74, 6.31)*	3.61(1.46,8.96)*
	Rural	73 (35.4)	133 (64.6)	1	
Women's education status	Have no formal education	69(37.9)	113(62.1)	1	
	Have formal education	141(63.8)	80(36.2)	2.89(1.92,4.33)*	0.83(0.35, 1.94)
Husbands educational status	Have no formal education	72(41.4)	102(58.6)	1	1
	Have formal education	138(60.3)	91(39.7)	2.15(1.44,3.21)	0.82(0.473,1.42)
Planned pregnancy	Yes	151 (71.9)	59 (28.1)	5.28(3.45,8.08)*	3.64(2.17,6.09)*
	No	63 (32.6)	130 (67.4)	1	1
Heard about BPCR	Yes	131(62.4)	79(37.6)	3.27(2.17,4.91)*	1.77(1.08,2.92)*
	No	65(33.7)	128(66.3)	1	1
Knowledge of key danger signs during pregnancy	Yes	97(75.2)	32(24.8)	4.32(2.71,6.89)*	3.27(1.88,5.69)*
	No	113(41.2)	161(58.8)	1	1
Knowledge of key danger signs during child birth	Yes	48 (22.9)	162 (77.1)	6.85(3.15,14.9)*	6.10(2.60,14.31)*
	No	8 (4.1%)	185 (95.9)	1	1

*P-value less than 0.05 both in bivariate and multivariate analysis; COR: crude odds ratio; AOR: adjusted odds ratio and BPCR: birth preparedness and complication readiness

This study finding is higher than studies conducted in Wollo, Northwest Ethiopia (24.1%) (Bitew *et al.*, 2016), and Adigrat, North Ethiopia (22%) (Hiluf and Fantahun, 2008). However, it is lower than the study findings from Tanzania (58.2%) (Bintabara *et al.*, 2015) and Nigeria (70.8%) (Sabageh *et al.*, 2017). This discrepancy might be due to the difference in sociodemographic, the geographical location of the participants, nature of health-seeking behavior, study setting and study period, government policy, and knowledge of study participants about BPCR.

In this study, participants age ≥35 years old were more likely to have BPCR than those <20 years old. This is in line with a finding of a study conducted in India (Akshaya and Shivalli, 2017). The possible reason might be previous exposure to health care ser-

vices, experience to certain complications throughout their prior pregnancy. Most of the participants in the current study were multigravida, higher exposure to information, and advice about BPCR from health personals.

In this study, pregnant women living in an urban setting were more likely to practice BPCR compared to their counterparts. This is consistent with previous studies in Amhara (Bitew *et al.*, 2016) and Oromia regions (Markos and Bogale, 2014) of Ethiopia. This similarity might be because pregnant women living in urban might have had better access to health information including possible obstetric complications that might alert them to have BPCR. A similar justification was forwarded in another similar study conducted in Aleta Wando, southern, Ethiopia (Hailu *et al.*, 2011).

The odds of practicing BPCR were higher among the study participants who have a planned pregnancy compared to their counterparts. Similar findings were also reported from Adigrat, Ethiopia (Hiluf and Fantahun, 2008), and Eldoret, Kenya (Morara, 2016). This might be because women who planned to have a pregnancy may use all the available and best health services to have better health outcomes than those without planned pregnancies. A similar finding from India indicated that pregnant women who have planned pregnancy were more likely to adhere to health care providers' counseling and advise services during their ANC visits (Inyangala, 2008) and thus, influencing the preparations undertaken.

The present study showed that the practice of BPCR was significantly associated with pregnant women who ever heard birth preparedness and complication readiness compared to their counterparts. This finding is incongruent with studies conducted in Adama (central Ethiopia) and Adigrat (north Ethiopia) (Girmay *et al.*, 2016; Hiluf and Fantahun, 2008). This might be explained by pregnant women who heard about BPCR might have more information and explanation about what they heard, which will enable them to acquire a better understanding and practice of BPCR.

Knowing obstetrics danger signs may encourage women to be prepared for birth, enhance health-seeking behavior, and decision making on their health status about what to do and where to go (Kabakyenga *et al.*, 2011; Urassa *et al.*, 2012). There was similar findings in the current study, in which women who knew about the key danger signs during pregnancy were more likely to practice BPCR than their counterparts. Besides, in this study, the women who knew about danger signs during childbirth were more likely to be prepared than their counterparts. This illustrates that knowing danger signs might be an important step towards behavioral change, which made them to have prompt attention to take appropriate action to access emergency care or seek support and advice from health care providers (Bintabara *et al.*, 2015; WHO, 1996).

Generally, the study used a comprehensive approach to examine the factors affecting the practice of BPCR in the study area by using a standardized tool. How-

ever, the study is a facility-based; which might not indicate BPCR practice at the community level. It is also difficult to establish a temporal relationship as the study design was cross-sectional.

Conclusion

The proportion of pregnant women who practiced birth preparedness and complication readiness (BPCR) was relatively low. Participants with age ≥ 35 , being an urban resident, having planned pregnancy, prior information about BPCR, having knowledge of key danger signs during pregnancy and childbirth were the factors associated with BPCR. Therefore, maternal, neonatal, and child health care providers in collaboration with health extension workers should work hard to scale up the existing practice of awareness creation about BPCR both at the community and institutional level by giving emphasis on rural pregnant women. Reinforcing counseling services and advice about components of obstetric danger signs during pregnancy and childbirth as a routine activity of health care services should be a must to do activities, to improve the knowledge level about obstetric danger signs. Lastly, the authors recommend further studies focusing on community-based research involving large sample sizes and addressing many confounding variables that influence the practice of BPCR.

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Competing interests

The authors declare that they have no competing interests.

Authors' contributions

FI initiated the research, and all of the author's contributed to proposal writing, data entry and analysis, drafting and revising the paper, and manuscript writing.

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