Barriers to birth preparedness and complication readiness among pregnant women in rural Ethiopia: using a mixed study design, 2020

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ABSTRACT

Objective To assess birth preparedness and complication readiness (BPCR) and associated factors among pregnant women in Bachoo District, Oromia, Ethiopia.

Design A mixed cross-sectional study design was employed to conduct this study.

Setting A community-based cross-sectional study was done in the rural community of Bachoo District of Ilu Abbaa Boor Zone, Oromia Region, Southwest Ethiopia.

Participants A total of 307 pregnant women participated in the quantitative study, 51 respondents were involved in the qualitative part. A simple random sampling technique was used to select the final respondents. Data were entered into Epidata V.3.1 and analysed using SPSS V.22.

Conclusion and recommendation

The prevalence of BPCR was 30.6%. Being governmental employee (adjusted OR, AOR=3.22 95% CI (1.49 to 7.79)), educational status of secondary and above (AOR=1.9 95% CI (1.15 to 3.84)), multigravida (AOR=5.96, 95% CI (1.18 to 3.68)), having four or above ANC visits (AOR=4.25 CI (1.38 to 7.84)), participating in pregnant women conference (AOR=2.11 95% CI (1.07 to 3.78)), having good knowledgeable of obstetrics danger signs (AOR=10.4 95% CI (5.57 to 19.60)), hearing the term BPCR (AOR=4.36, 95% CI (1.93 to 9.82)) were among factors significantly associated with BPCR.

The qualitative study also showed that poor maternal knowledge on birth preparedness and obstetric danger signs, negligence and weak support systems in the community were among the main barriers.

BACKGROUND

Globally, about 295 000 women died during and following pregnancy and childbirth in 2017. The vast majority of these deaths (94%) occurred in low-resource settings, and most could have been prevented. Sub-Saharan Africa (SSA) alone accounted for roughly two-thirds (196 000) of maternal deaths.

Ethiopia is among SSA countries with a high burden of maternal mortality. Ethiopia fell short of meeting the fifth Millennium Development Goal, which was to reduce the maternal mortality ratio by three-quarters between 1990 and 2015, showing only a slow decline.

All women need access to high-quality care during pregnancy, and during and after childbirth. It is particularly important to ensure that all births are attended by skilled health professionals, as it can make the difference between life and death for the mother as well as for the baby.

Birth preparedness and complication readiness (BPCR) is a standard set of indicators (Index) developed by Maternal and Neonatal Health Programme of John Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO). It is described as a process...
of planning for birth and anticipating actions in case of obstetric emergencies in order to reduce delays in seeking skilled care.13

In other words, it is a tool that provides guidance in assessing and monitoring safe motherhood programmes that intervene at multiple levels.12–14 In 2005, BPCR was included in the WHO antenatal care (ANC) package.15

BP/CR is a relatively common strategy employed by numerous groups implementing safe motherhood programmes. However, the applications of the concept are varied and there is no single agreed on definition.12 13

According to the JHPIEGO, BPCR plan contains the following elements: the desired place of birth; the preferred birth attendant; the location of the closest facility for birth and in case of complications; funds for any expenses related to birth and in case of complications; supplies and materials necessary to bring to the facility; an identified labour and birth companion; an identified support to look after the home and other children while the woman is away; transport to a facility for birth or in the case of a complication and identification of compatible blood donors in case of complications.13

It is a comprehensive matrix that includes shared responsibility among the woman and her family, the community, healthcare providers, facilities that serve them and the policies that affect care for the woman and the newborn.16 17

Hence, (BPCR) is strongly recommended by the WHO and even included as an essential element of the ANC package. It is often delivered to the pregnant women by healthcare providers in ANC followed up or through a visit to the home of the pregnant woman by a community health workers.13 18 19

The three delays (delay in seeking care—delay in reaching care, and delay in receiving care—highly contribute to maternal and neonatal death. According to Thaddeus and Maine, these delays can be prevented by BPCR which allows a pregnant woman and her family to plan ahead.20 Previous studies have shown that very low proportions of pregnant women were prepared for childbirth and its complications in Ethiopia.21 Furthermore, studies revealed that low socioeconomic status, a lack of women’s decision-making power, trust in traditional birth attendants, a lack of knowledge and awareness of danger signs during pregnancy, and a fear of travelling to unfamiliar areas were among the identified barriers preventing pregnant women in Ethiopia from accessing healthcare services.3 20 22–25 Meanwhile, the authors were convinced that quantitative study alone is not enough to understand the underlying problems related to BPCR. Hence, the authors conducted a detailed qualitative study to explore the underlying beliefs and problems and to support the findings of the quantitative study. Therefore, this study assessed BPCR and associated factors among pregnant women and explored the underlying barriers and beliefs at individual and family level in south-west Ethiopia by using a mixed approach.

METHODS AND MATERIALS
Study area
This research was carried out in the Bachoo District of the Ilu Aba Bora Zone of Oromia Regional State. Bachoo District is 1 of 14 districts in Iluu Abbaa Boor province (zone). It is bordered on the south by SNNP (southern nation, nationalities and people) regional state, on the southwest by Halu district and on the east by Hurumu district. The district consists of 17 kebeles with a total population of approximately 52837.

The district has an estimated 11692 childbearing women and 1833 pregnant women. There are three health centres and sixteen functional health posts in the district. The Bachoo District health office oversees the district’s overall healthcare activity.

Study design
A community-based cross-sectional study design, supplemented by a qualitative study, was conducted from 1 November 2020 to 30 December 2020.

Population
Study population
The study population was pregnant women who were permanently residing in selected kebeles of Bachoo District, Iluu Abbaa Boor Zone of Oromia State, Ethiopia.

Eligibility criteria
Inclusion criteria
All pregnant women whose pregnancy was in the 3rd trimester (24 or more gestational age) and resided in the sampled kebeles at least for 6 months.

Sample size determination and sampling procedure
For the quantitative study
For the quantitative study, sample size was calculated for both objectives. For the first objective—proportion of pregnant women ready for birth and its complications—sample size was calculated using a single population proportion formula: \( n = \left( \frac{Z_{\alpha/2}}{d} \right)^2 \cdot pq \), with the assumptions of:

\[ Z = 1.96 \text{ at 95% CI} \]

\[ d = \text{Margin of error assumed to be 0.05} \]

P—Proportion of BPCR from previous study at north-west Ethiopia=24.1%26 with 95% CI.

\[ q = 1-p \]

\[ n = \left( \frac{Z_{\alpha/2}}{d} \right)^2 \cdot pq = 1.96 \cdot 1.96 \cdot 0.24 \cdot (1 - 0.24) / 0.05^2 = 280 \]

Adding 10% non-respondent rate, the total sample size was=310.

For the second objective (factors associated with BPCR), sample size was calculated using double population proportion formula. But since the sample size calculated for the first objective was larger than the later, the larger sample size (of the first objective) was used in this study.
Sampling procedure

For the quantitative study
Bachoo District has 17 kebeles, 11 of which were chosen through simple random sampling. The updated lists of pregnant women in the respective (selected) kebeles were obtained and cross-checked from multiple sources (health posts/health extension workers, health centres, district health office). Following that, a list of all pregnant women in the selected kebeles was created based on the eligibility criteria. The total sample size was allocated to the selected kebeles based on the total number of pregnant women in the kebeles using a proportional allocation technique (see figure 1). Then, using the newly created list of pregnant women as sampling frame, systematic random sampling method was employed to reach the final respondents. The interview took place in the selected kebeles at the home of sampled participants (figure 1). All the sampled individuals agreed to participate in the interview except three individuals.

For the qualitative study
A total of 30 participants were purposively selected and divided into 3 focus group discussions (FGDs).

Furthermore, since the nature of FGDs may prevent some participants from freely expressing their opinions, the authors conducted in-depth interviews (IDIs) with 21 key informants including Women’s development army (WDA)* who were not involved in the quantitative interview or FGD to mitigate this limitation.

*The WDA is a form of volunteer community health workers who are selected from the community to support the health extension programme by encouraging families to take responsibility for their own health.27 28

Data collection instrument and procedure

For quantitative study
Data were gathered using a questionnaire developed by JHPIEGO (Maternal, Neonatal Health Programme), an affiliate of Johns Hopkins University’s Bloomberg School of Public Health.12 Then it was translated into Afaan Oromoo by a language expert and translated back to English by another language expert to ensure consistency. Then the tool was pretested on 5% of the sample size at a place different from the study area.

A face-to-face interviewer administered data collection method was used to gather information from pregnant women. Those who met the inclusion criteria in the chosen group were interviewed. Seven midwives were recruited for data collection, and two B.Sc. nurses were assigned as supervisors with the principal investigators.

For qualitative: Open-ended questionnaire for this interview was taken from the JHPIEGO’s individual level BPCR index12 and modified to meet local context. A total of three sessions of FGDs consisting: pregnant women, males (married men who had pregnant wife) and elderly women. But pregnant women and her husband did not participate on the same FGD session. Each group consisted of 10 members. Then discussion was
undertaken to explore the community’s views and experience regarding birth preparedness and complication redness. Twenty-one IDIs were also conducted among pregnant women and WDA who were not participants in quantitative interview and FGD.

Main points addressed during the discussion are: knowledge of danger signs during pregnancy, labour, postpartum and, in newborn, plan to attend at least four ANC visits with a skilled provider; plan to give birth with a skilled provider; plan to save money for a childbirth; plan to identify a mode of transport to the place of delivery; preparing important materials necessary to bring to the facility; any identified labour and birth companion; identified person/support to look after the home and other children while the woman is away; and identification of compatible blood donors in case of complications.

During the entire FGD and IDI, notes were taken and their voices were also recorded using a tape recorder. The discussions were held in the quite room of health posts of each kebele.

Data analysis procedure
Data were checked for completeness and consistency. The collected data were entered into a computer using EpiData software V.3.1 and exported to SPSS V.22 for cleaning, recoding and analysis. Descriptive results like percentage and frequency distributions of all variables were presented using tables and charts. First, univariable logistic regression analysis was run to identify variables candidates for the multivariable logistic regression analysis. Accordingly, variables with \( p<0.25 \) on the univariable logistic regression analysis were considered as candidates for the multivariable logistic regression analysis. The goodness of the fit of the final model was checked using the Hosmer-Lemeshow test, considering a good fit at a \( p>0.05 \) (0.463). Then multivariable logistic regression model was fitted and variables with \( p<0.05 \) at 95% CI were declared to be significant and adjusted odds ratio (AOR) were used to measure the strength of association.

Variables: The main predictor variables identified during univariable logistic analysis were: gravidity, parity, maternal occupation, maternal education, access to mass media and frequency of ANC visit, decision-making on obstetrics care seeking, participation in pregnant women’s conferences, knowledge about obstetrics danger signs and hearing the term BPCR

Qualitative analysis
Prior to analysing the data, all audio records from qualitative interviews were transcribed and translated to English. The authors transcribed each discussion verbatim and carefully checked each transcript for accuracy by simultaneously listening to the audio recording and reading the transcript. Notes taken during the interviews were incorporated in the final transcripts. Preliminary coding of transcripts was done using a hybrid approach (combination of deductive and inductive approach). Then consistent codes were condensed into categories and subsequently into themes. Then manual thematic analysis was done to explore main barriers identified during FGDs and IDIs. Finally, the themes that stemmed from both FGD and IDI were triangulated with quantitative findings.

Measurements
In this study, birth preparedness score was computed from the following key elements of BPCR: arrangement for transportation, saving money for delivery, identified skilled attendants to assist at birth, identifying a health facility for emergency, identifying blood donor in case of emergency and identified who would accompany them during emergency.

The participants who fulfilled at least four of the above-mentioned BPCR practices were considered as ‘prepared’.

Data collectors were trained on how to handle confidentiality and privacy of the participants. Then consent was obtained from the study participants. Confidentiality was assured by excluding participants’ names from the data collection tools. The study purpose, procedure and duration, of the study were clearly explained to study participants. Study participants were informed that they can skip any question they do not want to respond to and can quit the interview at any time if they want to do so.

Patient and public involvement
No patient and public involvement.

RESULT
Sociodemographic characteristics of the participants
A total of 307 pregnant women participated in this study, making the response rate 99.7%. The mean age of respondents was 28.1±5.18SD. Most of the participants (268, or 87.3%) were Muslim. The majority of the participants, 190 (61.9%) were housewives and 140 (45.6%) had primary education, while 111 (36.2%) were not able to read and write. Two hundred and eighty-six (93.2%) were married. One hundred and forty (45.6%) of the study participants’ husbands had completed primary school, while 111 (36.2%) of the women’s husbands could not read or write, and more than three-quarters of them (243, or 79.2%) were farmers (table 1).

Findings from the qualitative study
The main themes that emerged from the FGD and IDI were: the participants’ perception of the importance of emergency maternal and newborn services utilisation; importance of early recognising danger signs and taking actions; the importance of saving money for emergency; the impact of distance from health facility on using routine and emergency maternal healthcare services; the impact of household responsibility on the BPCR and maternal service utilisation; being dissatisfied with ANC care and its impact on the BPCR. The findings summarised under these themes are triangulated with the quantitative findings.

Obstetric and service utilisation characteristics of respondents

Out of 307 respondents, 210 (68.4%) were multigravida (pregnant for the second time or more). Twenty-five (8.14%) of the participants had a history of abortion. Nineteen (6.2%) of the participants had a history of stillbirth. Among the multiparas 141 (60%) and 234 (76.2%) of the mothers had an ANC visit during their previous and current pregnancy, respectively. However, only 25 (10.6%) of them had 4 or more ANC visits. In the same token, only 16 (6.8%) had their first ANC before the end of the first trimester. More than two-thirds (212, 69.2%) of them decide jointly with their husbands for obstetric healthcare seeking (table 2).

The majority of participants in the FDG and IDI reported that the majority of pregnant women usually start ANC visits at nearby health facilities when their pregnancy is past 16 weeks or when they start feeling fetal movement.
The discussants of the FGD raised the importance and benefits of having ANC for the well-being of the mother and fetus as follows.

...Yes, it is important to go to the health center for ANC visits. When I went to the health center, the professional did some checkups for me and told me that my pregnancy was 6 months, the baby was in good condition, and advised me to eat well. They also sent me to the laboratory and took some blood for investigation. They told me that I was healthy and advised me to come back if any unusual signs or symptoms occurred. However, in our village, there are many pregnant women who say “Let God do whatever he likes; I am not going to the health center ...

...Personally, I believe having ANC follow up is important. You know why? When my wife comes home after her ANC visit and tells me that both she and the baby (fetus) are healthy, I feel happy and hopeful. But if she doesn’t go to a health facility and something bad happens to her and the baby (fetus), while she could avoid the problem through ANC services, there is no one to blame for the consequences in the end said A husband of pregnant women.

The majority of respondents believe that unexpected health problems could occur to a mother during pregnancy, labour and delivery, and post partum, and 146 (47.6%) believe that those problems could endanger both the mother and the fetus. Only 76 (24.7%) of respondents had good knowledge about danger signs. The most common danger signs of pregnancy identified by the respondents were vaginal bleeding, 152 (49.5%) (table 3).

<table>
<thead>
<tr>
<th>Danger sign/variables</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents knowledge of key danger signs during pregnancy (multiple responses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td>152</td>
<td>49.5</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>24</td>
<td>7.8</td>
</tr>
<tr>
<td>Swollen hand/face</td>
<td>33</td>
<td>10.7</td>
</tr>
<tr>
<td>Respondents knowledge of key danger signs during labour and delivery (multiple responses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal bleeding (severe/excessive)</td>
<td>191</td>
<td>62.2</td>
</tr>
<tr>
<td>Retained placenta</td>
<td>50</td>
<td>16.2</td>
</tr>
<tr>
<td>Prolonged labour &gt;12 hours</td>
<td>88</td>
<td>28.66</td>
</tr>
<tr>
<td>Convolusions</td>
<td>11</td>
<td>3.5</td>
</tr>
<tr>
<td>Respondents knowledge of key danger signs during the postpartum period (multiple responses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal bleeding (severe/excessive)</td>
<td>113</td>
<td>36.8</td>
</tr>
<tr>
<td>Vaginal discharge (foul smelling)</td>
<td>8</td>
<td>2.6</td>
</tr>
<tr>
<td>High-grade fever</td>
<td>33</td>
<td>10.7</td>
</tr>
<tr>
<td>Others</td>
<td>10</td>
<td>3.25</td>
</tr>
<tr>
<td>Respondents aggregated knowledge of danger sign during pregnancy, labour and delivery and the postpartum period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had good knowledge</td>
<td>76</td>
<td>24.8</td>
</tr>
<tr>
<td>Poor knowledge</td>
<td>231</td>
<td>75.2</td>
</tr>
</tbody>
</table>

**Table 3** Participants knowledge and source of information about danger sign during pregnancy, labour and delivery and postpartum period among respondents (N=307)

<table>
<thead>
<tr>
<th>Practice on BPCR components</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heard the term BPCR</td>
<td>Yes</td>
<td>88</td>
</tr>
<tr>
<td>No</td>
<td>219</td>
<td>(71.3)</td>
</tr>
<tr>
<td>Source of information about BPCR</td>
<td>Health professional</td>
<td>51 (57.9)</td>
</tr>
<tr>
<td>Family/friend/relatives</td>
<td>37</td>
<td>42.1</td>
</tr>
<tr>
<td>Practice of components of BPCR</td>
<td>Saved money</td>
<td>138(45)</td>
</tr>
<tr>
<td>Identified place of delivery</td>
<td>122 (39.7)</td>
<td>185 (60.3)</td>
</tr>
<tr>
<td>Identified means of transportation</td>
<td>106 (34.5)</td>
<td>201 (65.5)</td>
</tr>
<tr>
<td>Identified skilled provider</td>
<td>31 (10.1)</td>
<td>278 (89.9)</td>
</tr>
<tr>
<td>Arranged blood donor</td>
<td>8 (2.6)</td>
<td>299 (97.4)</td>
</tr>
<tr>
<td>Identified who accompany</td>
<td>80 (26.1)</td>
<td>277 (73.9)</td>
</tr>
</tbody>
</table>

BPCR, birth preparedness and complication readiness.
During the qualitative study, the majority of the respondents mentioned the following problems as danger signs: vaginal bleeding, prolonged labour, retained placenta, and blurred vision, back pain, nutritional problems, and vomiting.

During an FGD, one of the pregnant women shared her experience of how she went through during her second pregnancy as follows:

…I remember it was last year (during coffee collecting season) when suddenly I got a head ache and I noticed that I was bleeding and no one was there for me in the house. My husband was in the farm collecting coffee. Then I called my elder brother and he took me to the health center by motor cycle. The health professionals admitted me and checked me and referred me to the hospital. I gave birth by cesarean section in hospital. If I didn’t realize the dangerousness of the problem and go to the health center by the time my baby would die

Another pregnant woman shared her thoughts on the danger signs she was aware of, as shown below:

…health problems could arise during pregnancy, such as vaginal bleeding and back pain, and the placenta may not be delivered during birth; if this occurs, the woman should go to a health center for assistance; the other is that when a woman is pregnant, she may experience vomiting and loss of appetite, and she must eat food; however, only God knows what will happen

Among the study participants, 88 (28.7%) heard the terms ‘birth preparedness’ and ‘complications readiness’. Among the respondents, 80 (26.1%) of them had identified a place of delivery for emergency occasions, 138 (45%) saved money to pay for costs related to childbirth and emergency occasions, 106 (34.5%) had identified a mode of transportation to a nearby health facility in case of emergency, 80 (26.1%) identified who would accompany them and only 8 (2.6%) had identified a potential blood donor. The overall prevalence of BPCR in this study was 30.6%. A lower proportion of pregnant women spontaneously mentioned components of BPCR. See table 3 for more information.

The qualitative study also found that most of the interviewees and discussants reported that they believe in the importance of preparation for childbirth since they obviously observed that labour is not predictable. A male discussant from FDG described what his wife passed through as the following:

… last time when my wife was pregnant for the first time, I was living in the village far away from her, leaving her with her family, which is near to the health center. One day, I went to her place, gave her money, and turned back to the village. As a chance, the night her labor started, heavy rain was falling. Her brothers tried a phone call to get an ambulance. Unfortunately, they couldn’t get an ambulance. They paid one thousand birr from the cash I gave to her and took her to the health center, where she gave birth. If I hadn’t given her that money, bad things could have happened to her and the baby. Next to God, saving money saves your life when such things happen

Factors associated with BPCR

Variables that were identified as candidates for multivariable logistic regression in the binary logistic regression model (p<0.25) were: gravidity, parity, maternal occupation, maternal education, access to mass media and frequency of ANC visit, decision-making on obstetrics care seeking, participation in pregnant women’s conferences, knowledge about obstetrics danger signs and hearing the term BPCR. In multivariable logistic regression, maternal occupation, maternal education, gravidity, frequency of ANC visit, participation in pregnant women’s conferences, knowledge of danger signs during pregnancy, labour and delivery, and post partum, and hearing the term BPCR were found to be significantly associated with BPCR.

Pregnant women who were government employees were 3.2 times ((AOR=3.22 95% CI (1.49 to 11.79)) more likely to be prepared for birth and its complications than those who were housewives. The odds of BPCR among pregnant women with secondary education and above were 1.9 ((AOR=1.9 95% CI (1.15 to 3.68)) times higher than those pregnant women with no formal education. Multigravida women with two pregnancies were 2.1 times more likely to be prepared for birth and its complications ((AOR=2.1, 95% CI (1.2 to 4.4)) than the primigravida. Similarity, multigravida women with 3 or more pregnancies were 6.0 times more likely to be prepared for birth and its complication ((AOR=6.0, 95% CI (1.18 to 7.68)) than the primigravida.

A pregnant woman who participated in the qualitative study described how being a housewife hampered BPCR and what she went through as follows:

…all of the household work is on me; making food, cleaning the house, feeding my children, and there are days when I don’t go to the health center as per my plan, because the time goes by while I am doing the housework, since there is no one to manage the house for me. It takes me two and a half hours to reach the health center on foot. Last time I went there, the health professionals were out for lunch, and I stayed all day without doing anything until they got back

Pregnant women who had four or more ANC visit were 4.3 ((AOR=4.25, 95% CI (1.38 to 7.84)) times more likely to be prepared for birth and its complication than those pregnant women who do not had ANC visits. Those pregnant mothers who participated in pregnant women conference were 2.1 ((AOR=2.11, 95% CI (1.07 to 3.78))
times more likely to be prepared for birth and its complication than who did not participate on it.

Pregnant women who had good knowledge about danger signs of pregnancy were 10.4 ((AOR=10.4, 95% CI (5.57 to 19.6)) times more likely to be prepared for birth and its complication than those who had poor knowledge about danger signs of pregnancy (table 4).

The qualitative study also revealed that having poor knowledge about obstetric danger sign was among the barriers of BPCR:

...In my opinion, a pregnant woman who has problems like vaginal bleeding and headache has to go to the health center so that she may get help and give birth peacefully

Pregnant women who heard the term BPCR were 4.4 times ((AOR=4.36, 95% CI (1.93 to 9.82)) more likely to be prepared for birth and its complications than those who did not hear about it, and those who heard about it from health professional were 2.0 time (AOR=2.04 95% CI (1.08 to 5.47)) more likely to be prepared for birth and its complication than those who heard about it from other persons (table 4).

The qualitative study in general identified that lack of knowledge on BPCR components, poor knowledge of obstetrics danger sign, negligence and weak community support system were barriers of BPCR.

DISCUSSION

Findings of this study revealed that a very low proportions (30.6%) of pregnant women were prepared for birth and its complication. This finding is consistent with systematic review study conducted in Ethiopia (32.0%), but less than studies done in Kofale district, South East Ethiopia of 41.3% and Tehulederi district 43.4%. Difference in the study settings, sociodemographic and sociocultural differences, might have contributed for the observed difference. The finding was higher than the finding from north Ethiopia (24.1%), Duguma Fango district, Wolayta zone 18.3%, in Southern Ethiopia 17% and Adigrat 22.1%. This could be due to better expansion of the Health Extension Programme than those study areas which might have improved the number of ANC attendees in the health facilities which probably increased awareness of obstetric danger signs which improved preparedness for birth and its complication of pregnant women. Another possible justification for the observed disparity with studies conducted in Adigrat and Aleta Wondo is that these studies were conducted long time (2007) immediately after counselling on BPCR as one package of FANC (Focused Anti Natal Care) started in Ethiopia.

Moreover, occupation, parity, gravidity, having ANC visit, participation in pregnant women conference, knowledge about danger signs of pregnancy, hearing the term BPCR and access to media were among significantly associated variables.

Pregnant women who were government employees were more likely to be prepared for birth and its complication than those who were housewives. This finding is in line with the study conducted in Gambella region of Ethiopia. This might be due to the fact that women who are government employees are more educated, have more financial autonomy (could earn more money), and hence are in a better position to save money, have better decision-making capacity, and understand the need for prioritisation of health service matters when compared with housewives, who depend mostly on their husbands for money.

Educational status was the other predictor of BPCR. Those pregnant women with secondary or more educational levels were more likely to be well prepared for birth and its complication than those who had no formal education. This finding is in line with a previous cross-sectional study conducted in Adigrat town, north Ethiopia, in Kofale District of South East Ethiopia, in south Wollo, northwest Ethiopia and Adam town. This is due to the fact that, as mentioned above, education empowers women by increasing their knowledge about the importance of healthcare, paves the way for economic independence and ensures their decision-making autonomy.

Those pregnant women who had access to radio and television were more likely to be prepared for birth and its complications. This can be attributed to the fact that, in the Ethiopian context, pregnant women who have access to television are more likely to be town dwellers, where there is better access to facilities, including access to electricity and other very important infrastructure that enables them to get health information directly from health experts through television, which in turn helps her to be well prepared for delivery.

Even though there is no report which supports this finding, those mothers who had more than two pregnancies were more likely to be prepared for birth and its complication when compared with primigravid mothers, this shows the fact that multigravid mothers are more experienced on birth and related issues than the primigravid mothers and prepare more. Pregnant women with four and more antenatal visits were more likely to be well prepared for birth and its complications than those who had no ANC visits. This is consistent with the finding from Arba Minch Zuria district southern Ethiopia and in Tehulederi district, Northeast Ethiopia. This is due to the fact that pregnant women who duly attend ANC service obtain comprehensive information including about the importance of birth preparedness directly from the reliable source (health professionals). Pregnant women who were participants in a pregnant women’s conference were more likely to be prepared for birth and its complications when compared with those mothers who did not participate. This finding is supported by the study from northwest Ethiopia and Dale district southern Ethiopia. This is due to the fact that the importance of ANC follow-up, BPCR, instructional delivery, early recognition of danger signs of pregnancy and the actions to be taken, and the...
### Table 4  Predictors of BPCR in the selected kebeles of Bachoo District, Iluu Abba Boor Zone from December to November 2020 (N=307)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>BPCR</th>
<th>COR (95% CI)</th>
<th>AOR (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes N (%)</td>
<td>No N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Occupation/women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>50 (26.3)</td>
<td>140 (73.6)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Government employee</td>
<td>15 (68.2)</td>
<td>7 (31.8)</td>
<td>6.2 (2.31 to 15.56)*</td>
<td>3.22 (1.49 to 11.79)*</td>
</tr>
<tr>
<td>Farmer</td>
<td>19 (35.2)</td>
<td>35 (64.8)</td>
<td>1.5 (0.79 to 2.89)</td>
<td>0.41 (0.28 to 1.93)</td>
</tr>
<tr>
<td>Merchant</td>
<td>10 (24.4)</td>
<td>31 (75.6)</td>
<td>0.27 (0.07 to 0.92)*</td>
<td>0.14 (0.12 to 1.13)</td>
</tr>
<tr>
<td><strong>Women education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not educated</td>
<td>28 (28.2)</td>
<td>71 (71.8)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Read and write</td>
<td>4 (36.3)</td>
<td>7 (63.4)</td>
<td>1.45 (0.39 to 5.33)</td>
<td>0.48 (0.21 to 3.08)</td>
</tr>
<tr>
<td>Primary school</td>
<td>20 (18.3)</td>
<td>89 (81.7)</td>
<td>0.57 (0.29 to 1.09)</td>
<td>0.16 (0.10 to 1.01)</td>
</tr>
<tr>
<td>Secondary and above</td>
<td>42 (47.7)</td>
<td>46 (52.3)</td>
<td>2.30 (1.25 to 4.25)*</td>
<td>1.9 (1.15 to 3.84)*</td>
</tr>
<tr>
<td><strong>Mass media access</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>24 (23.5)</td>
<td>78 (76.5)</td>
<td>0.69 (0.38 to 1.27)</td>
<td>0.31 (0.16 to 1.02)</td>
</tr>
<tr>
<td>Television (TV)</td>
<td>6 (17.1)</td>
<td>29 (82.9)</td>
<td>0.46 (0.17 to 1.22)</td>
<td>0.26 (0.07 to 1.10)</td>
</tr>
<tr>
<td>Both TV and radio</td>
<td>27 (55.1)</td>
<td>22 (44.9)</td>
<td>2.78 (1.40 to 5.5)*</td>
<td>2.35 (1.22 to 5.15)*</td>
</tr>
<tr>
<td>No source of information</td>
<td>37 (30.6)</td>
<td>84 (69.4)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>No of pregnancy/gravidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>78 (37.1)</td>
<td>132 (62.9)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14 (19.4)</td>
<td>58 (80.6)</td>
<td>2.44 (1.28 to 4.67)*</td>
<td>2.11 (1.16 to 4.38)*</td>
</tr>
<tr>
<td>≥3</td>
<td>2 (8)</td>
<td>23 (92)</td>
<td>6.75 (1.79 to 43.52)</td>
<td>5.96 (1.18 to 7.68)*</td>
</tr>
<tr>
<td><strong>No of children/parity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>34 (37.8)</td>
<td>56 (62.2)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>41 (36.3)</td>
<td>72 (63.7)</td>
<td>0.93 (0.52 to 1.89)</td>
<td>0.86 (0.43 to 1.72)</td>
</tr>
<tr>
<td>≥3</td>
<td>19 (18.3)</td>
<td>85 (81.7)</td>
<td>0.36 (0.19 to 0.70)</td>
<td>0.23 (0.11 to 1.52)</td>
</tr>
<tr>
<td><strong>Frequency of ANC Visit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>15 (60)</td>
<td>10 (40)</td>
<td>4.02 (1.67 to 9.66)*</td>
<td>2.58 (1.01 to 6.61)*</td>
</tr>
<tr>
<td>2</td>
<td>16 (51.6)</td>
<td>15 (48.4)</td>
<td>1.73 (0.84 to 3.55)</td>
<td>0.4 (0.23 to 1.04)</td>
</tr>
<tr>
<td>3</td>
<td>23 (31.5)</td>
<td>50 (68.5)</td>
<td>1.66 (0.80 to 3.45)</td>
<td>0.46 (0.21 to 1.04)</td>
</tr>
<tr>
<td>≥4</td>
<td>22 (23.9)</td>
<td>70 (76.1)</td>
<td>5.66 (2.18 to 14.7)*</td>
<td>4.25 (1.38 to 7.84)*</td>
</tr>
<tr>
<td>Not attended</td>
<td>18 (20.9)</td>
<td>68 (76.1)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Decision for obstetric healthcare seeking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herself</td>
<td>23 (71.9)</td>
<td>9 (28.1)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Husband only</td>
<td>25 (20)</td>
<td>100 (80)</td>
<td>0.09 (0.04 to 0.24)*</td>
<td>0.91 (0.33 to 1.22)</td>
</tr>
<tr>
<td>Herself and husband</td>
<td>46 (30.7)</td>
<td>104 (69.3)</td>
<td>0.17 (0.07 to 0.40)*</td>
<td>0.67 (0.25 to 1.30)</td>
</tr>
<tr>
<td><strong>Participation in pregnant women conference</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>56 (42.1)</td>
<td>77 (57.9)</td>
<td>2.60 (1.58 to 4.28)*</td>
<td>2.11 (1.07 to 3.78)*</td>
</tr>
<tr>
<td>No</td>
<td>38 (21.8)</td>
<td>136 (78.2)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Knowing danger sign during pregnancy, labour and delivery and postpartum period</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favourable knowledge</td>
<td>54 (71.1)</td>
<td>22 (28.9)</td>
<td>11.72 (6.42 to 21.39)</td>
<td>10.4 (5.57 to 19.60)*</td>
</tr>
<tr>
<td>Unfavourable knowledge</td>
<td>40 (17.3)</td>
<td>191 (82.7)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Heard the term BPCR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>41 (46.6)</td>
<td>47 (53.4)</td>
<td>2.73 (1.62 to 4.59)</td>
<td>4.36 (1.93 to 9.82)*</td>
</tr>
<tr>
<td>No</td>
<td>53 (31.7)</td>
<td>166 (68.3)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Source of information of BPCR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health professional</td>
<td>31 (60.8)</td>
<td>20 (39.2)</td>
<td>4.185 (1.67 to 10.7)</td>
<td>2.04 (1.08 to 5.47)</td>
</tr>
<tr>
<td>Family/friends</td>
<td>10 (27)</td>
<td>27 (73)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
consequence of not taking the recommended actions are among the main contents of the messages communicated during the conference, which increases the likelihood of getting prepared for planned delivery.

Pregnant women, who had good (at least three or more) knowledge of danger signs of pregnancy, were more likely to be prepared for birth and its complication than those who had poor knowledge of danger signs of pregnancy.

This finding was supported by the study from Gambela, Agnuak zone, Ethiopia and Kofale District, South East Ethiopia.\(^{34}\) The odds of being prepared for birth its complication among pregnant women who heard the term BPCR were 4.4 times more than women who did not hear the term BPCR. Pregnant women who heard the term BPCR from health professional was more likely to be prepared for birth and its complication as compared with those who did not hear it. This finding similar with the literature from Abeshige district, Guraghe zone, SNNPR, Ethiopia.\(^{38}\)

A qualitative study found that pregnant women, their families and community members had limited knowledge of the following topics: the importance of BPCR, pregnancy danger signs (the most common being vaginal bleeding and headache) and ANC visits. The qualitative study also showed that socioeconomic conditions like types of pregnant women’s jobs (being housewives), and lack of means of transportation are among the barriers that are preventing pregnant women from accessing healthcare.

In general, the above findings have very important practical implications for policy-makers and those who implement it at different levels. Very low level of BPCR indicates that there are multiple behavioural and resources (including human power and material resources) related obstacles halting access to healthcare services. Ethiopia, as a member state of UN, is working to achieve Sustainable Development Goals particularity goal 3 target 8 which states “Achieve universal health coverage, including financial risk protection, access to quality essential health-care services for all” and goal 5 target 6 “Ensure universal access to sexual and reproductive health and reproductive rights …”.\(^{39}\)

The working Ethiopian national reproductive health strategy (2021–2025) also dictates that ‘…priority will be given to scaling-up of community-based reproductive, maternal and newborn health interventions … the main objective is to achieve universal health coverage with community-based promotive, preventive and curative interventions…’

Therefore, promoting BP/CR can reduce delays in receiving (or providing) appropriate care at the health facility. Furthermore, BP/CR status in a given community reflects both the impact of programmatic interventions and non-programmatic factors such as economic, political and social influences, among others.

In general, BPCR is a very important tool to identify policy-related and non-policy factors, monitor programme implementations, and improve the effective use of key maternal and neonatal services, thus saving the lives of women and newborn babies.

Ethiopia, on the other hand, is currently facing an extreme lack of financial resources (extreme poverty), which is compounded by an overwhelming domestic price increase, a devastating drought, COVID-19 pandemic and a political crisis, posing a greater threat to healthcare access. This urges decision-makers (the Ethiopian government and its allies) to exert more effort in the midst of the crisis to ensure that more people have access to primary healthcare services, especially for the most vulnerable groups like women and children.

In general, Even though PBCR can be measured at six levels (individual woman, partner/family of the woman, community, facility, etc), in Ethiopia, often times, studies carried out on BPCR are highly concentrated at the first level.

In a patriarchal society like Ethiopia, where all resources and decisions are concentrated in the hands of men, BPCR assessment is not an issue that is left to and measured among pregnant women alone.

Using primary data and conducting a community-based study using a mixed approach are among the strengths of this study.

However, this study is not without limitations. This study was conducted among pregnant women. Even though pregnant women represent the primary target population for BP/CR initiatives, there are also disadvantages to interviewing currently pregnant women. Since they have not completed their pregnancies, they may not yet have had the opportunity or need to make arrangements related to BP/CR.

Furthermore, the gestational age of the pregnancy was self-reported by the respondents, it was not confirmed by diagnostic test. The authors employed interviewer-administered data collection method this may induce recall and social desirability bias among some of the study participants.

Therefore, to overcome the limitations encountered in this study, the authors recommend that future researchers go further in assessing the roles of the family and the community in BPCR by following a different approach and using other study designs like follow-up studies.
CONCLUSION
This study showed that BPCR in the study area was very low (30.6%). Women’s occupation, educational status, frequency of ANC visits, gravidity, knowledge of obstetrics danger signs, participation in pregnant women conference, hearing the term BPCR and source of information on BPCR were found factors associated with BPCR. The FGD and IDI showed that lack of awareness on BPCR and poor community resources were among the determinants that negatively impacted BPCR.

Recommendations
For healthcare providers
Providing health education on the importance BPCR, ANC, danger signs of pregnancy, strengthening pregnant women’s conference, with more emphasis (strict follow-up) on those who have no formal education, are house wives, nulligravida.

For healthcare system managers (local, regional and federal levels)
Healthcare system managers at each level should work to alleviate the material and economic constraints that hinders the access to healthcare services.

For further researchers
More strong/interventional research design such as cluster randomised clinical trial might be need to establish cause-and-effect relationships. Furthermore, the authors recommend that future researchers go further in assessing the roles of the family and the community in BPCR by following a different approach and using other study designs like follow-up studies.

Declarations
Consent to participate
Study participants engaged in the study were informed that they could skip any question they did not want to respond to and could quit the interview if they felt discomfort. Then consent was obtained from the study participants who were 18 years of age or older. For those who were less than 18 years, assent was taken from the participants but consent was taken from their representatives based on article 25 of the Declaration of Helsinki.

Twitter Abdi Geda Gedefa @AbdiioromoFree

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Contributors AGG: made a significant contribution to the conception, study design, execution, and acquisition of data, analysis, and interpretation and has agreed on the journal to which the article has been submitted. AAB: took part in conception, study design, execution, drafting, revising and critically reviewing the article; acquired funding; gave final approval of the version to be published; agreed on the journal to which the article has been submitted. KMK: helped with planning, data collection, analysis and interpretation, revising and critically reviewing the article, writing the report, and deciding which journal to submit the article to. LBE: was involved in the planning, data collection, analysis and interpretation; the revision and critical evaluation of the article; the drafting of the report; and the selection of the publication to which the article should be submitted. AGG is responsible for the overall content as guarantor.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and this study was done according to the Declaration of Helsinki. The Research Ethical Committee of Mettu University granted ethical approval for this study, with reference number RP5/04/2012, and informed consent was obtained from the participants after the necessary explanation was given on the purpose and benefits of the study, as well as their right to decide whether or not to participate in the study. All the interviews with respondents were conducted under strict privacy. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information. All data generated or analysed during this study are included in this published article.

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12


