Determinant of Practice of Birth Preparedness and Complication Readiness Plan Among Pregnant Women at Debretabor, North west Ethiopia: A Community Based Cross Sectional Study.

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Research

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Abstract

Background: Nearly all of maternal deaths in the world occurred in sub-Saharan African countries. As Ethiopian demographic health survey report, there were 412 maternal deaths per 100,000 live births in 2016. Delays in decision to seek and receive care are the main causes of these deaths. Birth preparedness and complication readiness plan has been globally endorsed pivotal strategy to decrease these delays. Therefore, this study was aimed to assess the level of practice and factors associated with practice of birth preparedness plan among pregnant women.

Methods: Community based cross-sectional study was done among 356 pregnant women selected by simple random sampling technique from July 1-30/2017 in Debretabor town. We selected samples by simple random sampling technique. Data were collected using interview administered questionnaire. Then, we coded, cleaned and entered data through Epidata version 3.1. Finally, exported and analyzed by SPSS. Logistic regression analysis was done to identify association between explanatory variables and practice of birth preparedness and complication plan. An adjusted odds ratio with 95% confidence interval and p-value less than 0.05 was computed to determine the level of significance in multi-variable logistic regression model.

Results: Prevalence of birth preparedness and complication readiness plan was 73.9% in this study. primary education status (AOR=3.2,95%CI,1.3-7.8) and secondary educational status (AOR=4.1,95%CI,1.6-10.3), Primigravida (AOR=4.7,95%CI,1.9-11.3), partner involvement in birth preparedness and complication readiness plan (AOR=3.4,95%CI,1.9-6.1), initiating antenatal care in first trimester and media exposure (AOR=1.9,95%CI,1.0-3.3) were significantly associated factors with birth preparedness and complication readiness plan in this study.

Conclusions: Level of practice of birth preparedness and complication readiness plan was high in the current study. Higher education status, early ante-natal care initiation, partner involvement in birth preparedness and exposure to media were the factors associated with practice of birth preparedness and complication readiness. Therefore, emphasize on continues education through media, design educational curriculum which should include birth preparedness plan, increase partner participation in birth preparedness and complication readiness plan. Furthermore, early initiation of antenatal care is mandatory.

Plain English Summary

Birth preparedness and complication readiness (BPACR) is one intervention that addresses these delays by encouraging pregnant women, their families, and communities to effectively plan for births and deal with emergencies, if they occur. Inadequacy or lack of birth and emergency preparedness is one of several factors contributing to maternal deaths. Birth and emergency preparedness is an integral component of focused antenatal care which involves planning with the key stakeholders; the health provider, pregnant
women and relatives and the community. Birth preparedness program generally address ‘three delays’ to
care-seeking for obstetric emergencies; delay in recognition of problem, delay in seeking care, and delay
in receiving care at health facility. These delays represent barriers that often result in preventable
maternal deaths.

Birth Preparedness Package activities at community level are major activities of safe motherhood
newborn health. In Ethiopia, a few studies were conducted about knowledge and practice of birth
preparedness and complication readiness plan but there is no study which indicate the level of practice of
birth preparedness and complication readiness plan according to national guideline. Moreover, the current
study shows the detailed activities performed by pregnant women to prepare for delivery. We conducted
community based study in the current area in which there was no previous study.

**Background**

Globally, around 287,000 maternal deaths are occurred in relation to pregnancy and childbirth every year.
Besides, more than 12 million mothers suffer from disease and disabilities resulted from pregnancy
complication. Although these could be eliminated by the use of skilled delivery attendants during
pregnancy, childbirth and post-partum period, almost half of developing nations do not utilize them
totally [1]. Ethiopia is one of the least developed countries which takes a lion share of maternal deaths
among sub-Saharan African counties. Direct and indirect obstetric complications can lead to these poor
outcome of pregnancies. Direct obstetric complications account for 85% of these deaths. Among them,
80% could be managed by integrated reproductive health services [2].

Birth preparedness and complication readiness plan is a key strategy that encourage women to prepare
and decide themselves to use health institution at the time of emergency [3]. A recent studies magnify the
importance of birth preparedness and complication readiness plan. For example, it is a method of
planning and anticipating not only normal birth but also its complications. Furthermore, it can help
women and their family to arrange themselves during pregnancy and childbirth. As a result,
comprehensive and integrated effort is essential to minimize maternal and neonatal mortality rate.
Besides, policy makers, program designers and health care providers should design and implement birth
preparedness and complication readiness plan package in different maternal health programs [4–8].

Maternal health service coverages are still low in Ethiopia. For example, report of Ethiopian demographic
health survey 2016 indicated the following coverages of maternal health services: antenatal care (62%),
delivery (26%) and post-natal care (17%). Moreover, coverage of skilled delivery care was changed little
(28%) in 2016. Even though birth preparedness and complication readiness plan is extraordinary method
to increase utilization of maternal health services, its level of practice is still low until now [9]. Fore
example, demographic health survey in Ethiopia showed that level birth preparedness and complication
readiness plan was 35% in 2016 [9]. Specifically, it was Goba (23.3%) and Jimma (24.1% ), Oromia region,
Ethiopia [10, 11]. According to some evidences, higher education, increased maternal age, higher
autonomy, frequency of ANC care visit and employment status were predictors of practice of birth
preparedness and complication readiness plan among women [11–13]. Fail to identify the level and factors negatively associated with practice of birth preparedness and complication readiness plan may lead to miss the target factors of intervention. Hence, we cannot improve level of this golden health behavior which can alleviate maternal death indirectly. There is lack of evidence on level of practice of birth preparedness and complication readiness plan not only in the study area but also in the whole country. In addition, the current study adapted new measurement tool from the national protocol of birth preparedness and complication readiness plan in Ethiopia and actual context of the problem locally. In summary, this study aimed to assess level of practice and factors associated with birth preparedness and complication readiness plan among pregnant women in Debretabor town, Northwest Ethiopia, in 2019.

Methods And Materials

Study area

Community based survey was conducted in Debretabor town. It is found 667 km Northwest from capital city of Ethiopia ‘Addis Ababa’. South Gondar zone is found in Amhara regional state. Half of its population are females. Debretabor city is divided into 4 Kebeles which are the smallest administrative units in Ethiopia. According to the 2015 population projection estimate, there were 55,596 residents and around half of them were females. There are 3 health centers, 4 health posts, and 1 general hospital providing postnatal care services in the town. There were a total of 1450 pregnant women in the city, in 2019 [14].

Study design and period

Community based cross sectional study was conducted from July1-30, 2019. Mothers who lived less than six months in the study area at the time of interview and who had communication problem were excluded from the study.

Sample size and sampling procedures

The minimum sample size was calculated by using single population proportion formula. Sample size determination was considered the following determinants: Power of the study, precision, baseline magnitude of disrespect and abusive care, quality and cost of the study. But, we computed sample size in consideration of the following assumptions: The sample size for the study conducted among pregnant women was computed as using single proportion formula. The sample size calculation take the following assumptions: 95% confidence level, 5% margin of error, prevalence of birth preparedness and complication readiness plan was taken as 0.30% from a study conducted in Goba woreda, Oromia region, Ethiopia [15]. Finally, we added 10% of non-response rate as sample adjustment. Hence, the total sample was computed as 356. We included all Kebeles in Debretabor town in this study. We have utilized
pregnancy registration of health extension worker as a sampling frame. It consisted a list of pregnant women. Women were registered in their respective Kebeles by health extension worker (community health worker) during house to house visits. There were a total of 1200 pregnant women in the city during data collection period. We have updated the frame based on certain factors. We applied simple random sampling to select study participants. The sampling frame contained information’s like: women’s living Kebele, household number, phone number and antenatal appointment dates. We utilized lottery method to select samples from this frame. We used proportional allocation of samples for each Kebeles. One pregnant women was included by using lottery method when more than one women was presented in the selected household.

Data collection

Data were collected by using semi-structure and interviewer administered questionnaire. The questionnaire was prepared after intensive literature review. Data was collected by five female midwives (BSC) and supervised by two health officers (MPH). One-day intensive training was given about interview technique, data collection procedure and content of questionnaire. Two health officers were assigned as supervisors for the data collectors. Overall supervision also made by the principal investigator.

Data quality control

The quality of data was assured by proper designing and pre-testing of the questionnaires in Woreta town, a nearby town, Debretabor. Firstly, we developed in English and translated to local language (Amharic). Then, it was translated back to English to keep its consistency. Finally, it was re-translated back to English to keep its consistency. Comparison was done between two versions to assess inconsistent and inaccurate data. Finally, any inconsistent and inaccurate data was re-adjusted accordingly. Data collectors were supervised at each site throughout the data collection period. Regular meetings were held among the investigators, collectors and supervisors at each day after data collection. The collected data was checked for its completeness before data entry. Double entry were conducted.

Data processing and analysis

Data was rechecked for its completeness, coded and entered in to Epi-info software version 7. Then, it was exported to and analyzed by SPSS software version 22. For analysis descriptive statistical procedures were utilized. Descriptive statistics like percentage, mean and standard deviation were used for the presentation of demographic data. Tables and graphs were also used for data presentation. Descriptive statistics like frequencies and cross tabulations were performed. Tables and bar charts were used to present the findings of the study. Binary and multi-variable logistic regression were computed to find an association between practice of birth preparedness and complication readiness plan and independent variables. All predictor variables, with p-value less than or equals 0.20, in binary logistic
regression were fitted into the multi-variable logistic regression model. Finally, statistical significant association was considered at P-value less than 0.05 with 95% Confidence interval. Before the actual logistic regression analysis was done, the necessary assumption of logistic regression model was checked.

Operational definition

Knowledge of birth preparedness and complication readiness: Women who answered six and above (average) correct response from 12 items.

Practice of birth preparedness and complication readiness plan: Was considered if women performed four and above items of birth preparedness and complication readiness plan from 7 basic items [16].

Skilled providers:

Are persons with midwifery skills like physicians, nurses, midwives, and health Officers who can manage normal deliveries and diagnose, manage or refer obstetric complications [15].

Results

All of the study participants responded fully for the interview which made a response rate of 100%. The mean age of the study participants was 28.1±5.11 years. Nearly all (99%) study participants were followers of orthodox Christian. Ninety-seven point two (97.2%) of the study participants were from Amhara ethnic group. Most of the study participants (71.3%) were married. Majorities (84%) of the study participants had less than six family member. Most (41%) of the study participants have a monthly household income of 320-600 ETB. Majority (60.1%) of the participants were merchants
| Variables   | Categories       | N  | percent (%) |
|------------|------------------|----|-------------|
| AGE        | 15-19            | 7  | 1.9         |
|            | 20-24            | 71 | 19.9        |
|            | 25-29            | 153| 42.9        |
|            | 30-35            | 86 | 24.1        |
|            | 35 and above     | 39 | 10.9        |
| Religion   | Orthodox         | 265| 74.5        |
|            | protestant       | 91 | 25.5        |
| Marital status | Married         | 254| 71.3        |
|            | Single cohabitated | 31 | 8.7         |
|            | Single           | 44 | 12.4        |
|            | Divorced         | 16 | 4.5         |
|            | Separated        | 9  | 2.5         |
|            | Widowed          | 2  | 0.6         |
| Ethnicity  | Sidama           | 53 | 15          |
|            | Amhara           | 171| 48          |
|            | Wolayta          | 64 | 18          |
|            | Oromo            | 57 | 16          |
|            | Others *         | 11 | 3           |
| Educational status                      |       |     |
|----------------------------------------|-------|-----|
| Illiterate                             | 67    | 18.8|
| Read and write                         | 70    | 19.7|
| Primary education                      | 102   | 28.7|
| Secondary education and above          | 117   | 32.9|

| Husband educational status             |       |     |
|----------------------------------------|-------|-----|
| Illiterate                             | 27    | 7.6 |
| Read and write                         | 42    | 11.8|
| Primary education                      | 69    | 19.4|
| high school                            | 98    | 27.5|
| Secondary and above                    | 120   | 33.7|

| Women's occupation                     |       |     |
|----------------------------------------|-------|-----|
| Merchant                               | 214   | 60.1|
| Government Worker                      | 66    | 18.5|
| Housewife                              | 41    | 11.5|
| Farmer                                 | 7     | 2    |
| Daily worker                           | 9     | 2.5  |
| Student                                | 19    | 5.3  |

| Husband occupation                     |       |     |
|----------------------------------------|-------|-----|
| Farmer                                 | 54    | 15.2|
| Daily worker                           | 36    | 10.1|
| Government worker                      | 93    | 26.1|
| Merchant                               | 93    | 26.1|
| Student                                | 78    | 21.9|
| Others **                              | 2     | 0.6  |

| Monthly income                         |       |     |
|----------------------------------------|-------|-----|
| <320 ETB                               | 63    | 17.7|
Majority (90.2%) of the respondents have got pregnancy after celebrating their 18th birth day. In addition, those respondents who started antenatal care accounted for 308 (86.5%). More than half (55.1%) of the study participants had 2-4 antenatal care follow up. Furthermore, more than half (57.6%) of the study participants followed antenatal care in the first trimester. A few (8.1%) study participants faced complication during pregnancy. Most (44%) of the study participants got information from health personnel (insert table 2). According to figure 1 of this study, 204 (57.3%) of the study participants had knowledge about birth preparedness and complication readiness plan (Figure 1). Two-hundred-sixty-three (73.9%) of the study participants practiced birth preparedness and complication readiness plan in this study (table 3).
Table 2
Reproductive health, source of information characteristics of pregnant women in Debre-tabor town, North Ethiopian;2019. (n=356).

| Variables                                    | Category            | Frequency | Percent (%) |
|----------------------------------------------|---------------------|-----------|-------------|
| Age at first pregnancy                       | less than 18 years  | 35        | 9.8         |
|                                              | Greater than 18 years | 321      | 90.2        |
| Start ANC at current pregnancy               | Yes                 | 308       | 86.5        |
|                                              | No                  | 48        | 13.5        |
| Number of antenatal care attendance          | <=1 visits          | 148       | 41.6        |
|                                              | 2-4 visits          | 196       | 55.1        |
|                                              | > 4 visits          | 12        | 3.4         |
| Time of antenatal care booking?              | 1-3 months          | 205       | 57.6        |
|                                              | 3-6 months          | 116       | 32.6        |
|                                              | 6-9 months          | 35        | 9.8         |
| Problem faced in current pregnancy           | Yes                 | 29        | 8.1         |
|                                              | No                  | 327       | 91.9        |
| Who decided to use ANC?                      | husband             | 152       | 42.7        |
|                                              | Family              | 86        | 24.1        |
|                                              | My self             | 84        | 23.6        |
|                                              | Friends             | 22        | 6.2         |
|                                              | Other               | 12        | 3.4         |
| What is your source of information?          | Health personnel    | 156       | 44          |
|                                              | TV/Radio            | 92        | 26          |
|                                              | Family/Friend       | 68        | 19.1        |
|                                              | Other               | 40        | 11.2        |
Table 3
Practice of birth preparedness and complication readiness plan among high risk pregnant women in public health institution in Hawassa town, South Ethiopia;2019 (n=356).

| Practice of birth preparedness and complication plan | Yes n (%) |
|-----------------------------------------------------|-----------|
| **Save money for delivery**                         |           |
| a. Do you save money for transport?                | 73        |
| b. Do you save money for accommodation in city?    | 67        |
| c. Do you save money for medication not available in health facility? | 52        |
| **Prepare essential item for delivery**            |           |
| a. Do you prepare baby cloth?                      | 78        |
| b. Do you prepare pijama and bed cloth for you?    | 61        |
| c. Do you know prepare soft drinks / hot drinks when coming to delivery? | 54        |
| **Prepare potential blood donor**                  |           |
| a. Do you know your blood type?                    | 65        |
| b. Do you arrange potential blood donor through lab investigation? | 72        |
| **Who is your skilled delivery attendant**         |           |
| a. Midwife                                          | 88        |
| b. Nurse                                            | 53        |
| c. Doctor                                           | 60        |
| d. Health officer /emergency surgeon               | 56        |
| **Arrange transportation**                         |           |
| a. Do you have ambulance number to call during emergency? | 64        |
| b. Do you have the phone for taxi driver?          | 54        |
| c. Do you have phone of Bajaj driver?              | 58        |
| **Who can support during emergency?**              |           |
| a. partner                                          | 72        |
| b. parents                                          | 64        |
| c. children                                         | 68        |
| d. friend                                           | 70        |
| e. other relative                                   | 65        |
Factors associated with practice of birth preparedness and complication plan.

This study identifies six variables associated with practice of birth preparedness and complication plan in binary logistic regression model. However, result of multivariable logistic regression model has shown that only four variables were associated with practice of birth preparedness and complication readiness plan. Table 1 shows the factors associated with practice of birth preparedness and complication readiness plan in the final logistic regression model. Based on it, education is the first statistically significant factor with practicing birth preparedness and complication readiness plan. Attending primary education were 3.2 (AOR=3.2, 95% CI, 1.3-7.8) times more likely to practice birth preparedness and complication readiness plan than those of women who were unable to read and write. In addition, as compared with women of unable to read and write, women who attended secondary education had 4.1 fold of higher odd of practicing birth preparedness and complication readiness plan (AOR=4.1, 95% CI, 1.6-10.3). Being pregnant only one time showed higher odds of practicing birth preparedness than five and above pregnancies (AOR=4.7, 95% CI, 1.9-11.3). The chance of practicing birth preparedness and complication readiness plan in first pregnancy was 3.4 times higher than last trimester (AOR=3.4, 95% CI, 1.9-6.1). Furthermore, study participants who were exposed for media had higher odds of practicing birth preparedness and complication plan than their counterparts (AOR=1.9, 95% CI, 1.0-3.3) (insert table 4).
Table 4  
Factors associated with practice of birth preparedness and complication readiness plan from backward stepwise (Wald) logistic regression in Debre-tabor town, Ethiopia (N=356).

| Variable and categories | Birth preparedness plan | COR(95%CI) | AOR(95%CI) |
|-------------------------|-------------------------|------------|------------|
|                         | Practice                | Not practice |
| **Educational status**  |                         |             |            |
| Unable to read and write| 37                      | 30          | 1          | 1          |
| unable Read and write   | 30                      | 40          | 1.64(1.6-7)| *          |
| Primary education       | 31                      | 71          | 2.8(2.6-12.6) | *  |
| Secondary and above     | 25                      | 92          | 4.5(2.7-15.3) | *  |
| **Time of antenatal visits** |                     |             |            |
| 1-3 months              | 24                      | 157         | 4(1.8-8.7) | *  |
| 3-6 months              | 43                      | 89          | 1.1(0.5-2.4) | **  |
| 6-9 months              | 26                      | 17          | 1          | 1          |
| **Media exposure**      |                         |             |            |
| Yes                     | 51                      | 42          | 2.1(1.3-3.4) | *  |
| No                      | 96                      | 167         | 1          | 1          |
| **Partner involvement** |                         |             |            |
| Yes                     | 44                      | 49          | 2.9(1.8-4.8) | *  |
| No                      | 191                     | 72          | 1          | 1          |

**Key:** ANC: Antenatal Care; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio.

Discussion
The current study reports that the level of birth preparedness and complication readiness plan and its associated factors among pregnant women in Debretabor city, Northwest, Ethiopia. According to this study, 263 (73.9%) of pregnant women practiced birth preparedness and complication readiness plan. This finding is more than findings of studies conducted in Ghana (23%), Tanzania (14.8%) [17] and Uganda (35%) [3]. The possible rational for this inconsistency could be study participants had a better socio-economic status and better awareness about birth preparedness and complication readiness plan in the current study. Furthermore, pregnant women may be concerned a lot and increase their level of awareness and knowledge which intern provoke mothers to engage in to practice. In this study, a statistically significant association was observed between, women's level of education and birth preparedness and complication readiness plan practice. Pregnant women with primary and secondary education were more likely to practice birth preparedness and complication readiness plan than their counter parts who were unable to read and write. These findings were consistent with studies conducted in Robe Woreda, Central Ethiopia [15] and southeastern Nigeria [1, 18]. This is probably because modern education is a universally accepted strategy for improving preventive health behavior in general and educating women is educating the community. Therefore, the more a woman is educated, the more she requires information about her health statutes and the more easily understand and utilizes the information. Educated women can also predict possible dangers and need to prepare herself to overcome such possible problems. Primigravida women were more likely to practice birth preparedness and complication readiness plan than grand multigravida women. This finding is consistent with other studies conducted in Duguna Fang District, South Ethiopia and Nepal [19, 20]. This may be explained by the fact that women with previous positive child birth experiences may perceived pregnancy and child birth as an easy and simple task and overlook the possibility of problems. Therefore, these women may give less attention for birth preparedness and complication readiness plan. Moreover, unlike Primigravida ones, grand multi-gravida women might be too busy by socioeconomic issue and reluctant for maternal health services including ante natal care where they can get rich on the information about birth preparedness and complication readiness plan. Pregnant mothers who started ante-natal care follow-up within the first trimester were 5.6 times more likely to practice birth preparedness and complication readiness plan than those who started during the last trimester. This finding was in line with a study conducted in Robe Woreda, Central Ethiopia [18]. The possible reason might be that as pregnant women start to visit ante-natal care early in pregnancy, they might have a probability of having many visits with better discussion time about what and when to prepare for birth and possible complications. Besides, they might have better health seeking behavior. In addition, women can be exposed for practical complications occurred during their visit which make them more emphasize and practice. Those pregnant women whose partners involved during antenatal follow up were 3.4 times more likely to practice birth preparedness and complication readiness plan than their counterparts. This finding is consistent with studies conducted in Northwest Ethiopia and rural Tanzania [10, 21]. This might be due to increased autonomy of women and shared responsibility and support for pregnant women by their partners. Exposure for media is significantly associated with the practice of birth preparedness and complication readiness plan. Those women exposed for media were almost two fold more likely to prepare well for child birth and possible complications than their counterparts.
Limitation Of The Study

This study represented only urban pregnant women. Since, most of pregnant women in the study zone reside in rural area. Since this study is community based, it did not explore factors related with health providers. It is better to include rural women in future studies. Moreover, further qualitative studies should be conducted on health professionals.

Conclusions And Policy Implication

Level of practice of birth preparedness and complication readiness plan was found to be high in the current study. Higher educational status, mass media exposure, lower gravidity and early initiating of ante-natal care, partner involvement in birth preparedness and complication readiness were factors significantly associated with practice of birth preparedness and complication readiness plan. Health policy makers should focus improvement of family planning program. Moreover, media should focus on messages and programs of birth preparedness and complication readiness plan. Besides, curriculum designers should incorporate birth preparedness and complication readiness plan in education. More efforts should be enhanced to book ante natal care more early in pregnancy. Finally, involving partners during maternal health care services should be encouraged by skilled delivery attendants.

Abbreviations

ANC: Antenatal care; CSA: Central Statistical Agency; EDHS: Ethiopian Demographic and Health survey; SDGs: Sustainable Development Goals.

Declarations

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Availability of data and materials

Necessary data is obtained from the corresponding author on a reasonable request.
Authors’ contributions

BT conceived the study and wrote the proposal, facilitated data collection, analysis, data interpretation, drafted the final report and prepared manuscript.

Ethics approval and consent to participate

Ethical clearance was obtained from department of Midwifery, college of Medicine and Health Sciences, University of Gondar institutional review committee approved after reviewing information sheet and letter of approval with reference number was granted. Verbal consent was obtained for each participants before data collection. Moreover, the researcher, who get verbal consent, must sign and date the information sheet to document each subject's consent.

Consent to publish

Not applicable

Competing interests

Authors declare that they have no competing interest.

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Figures
Figure 1

knowledge of birth preparedness and complication readiness plan among pregnant women in Debretabor city, 2019.
knowledge of birth preparedness and complication readiness plan among pregnant women in Debretabor city; 2019.