Birth Preparedness and Complication Readiness among Pregnant Women in Rural Area of District Sonipat, Haryana, India: A Cross Sectional Community Based Study

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Abstract:

Introduction: Birth Preparedness and Complication Readiness (BPCR) is an important intervention included by WHO as essential elements of antenatal care package. It is often delivered to pregnant women through their active participation by health care provider during antenatal care or initiated/followed up through visits to the homes of pregnant women by community health workers. **Objectives:** To determine the knowledge and practice regarding BPCR and to identify factors associated with it among rural pregnant women**. Method:** Cross-sectional study was conducted in rural field practice area of Community Medicine Department of a medical teaching institutes. A total of 210 pregnant women who were in the second and third trimesters of pregnancy were selected by simple random sampling and interviewed for data collection. **Results:** Mean age of study subjects was 24.14 $\pm$ 3.88 years.The highest number of women was in the age group of 20-29 years (84.8%). More than half (57.6%) mothers had observed at least two or more components of BPCR. Maximum number of females had identified facility for delivery (63.8%) followed by transportation (60.9%). Identification of potential blood donor by mothers was low (14.3%). Bleeding was most commonly identified danger symptom in all three phases of child bearing. Knowledge regarding danger signs was significantly associated with birth preparedness. **Conclusion:** In the present study, practice of all components of BPCR by mothers was very low. Bleeding was the most commonly identified danger symptom during all three phases i.e., pregnancy, child birth and after birth.Knowledge regarding other danger signs was highly inadequate.

Key words : Antenatal care, Birth Preparedness, Complication Readiness

Introduction:

Birth preparedness and complication readiness (BPCR) strategically encourages pregnant women, their families and communities to effectively plan for births and deal with emergencies, if they occur. It is a key component of globally accepted safe motherhood programs. The high levels of maternal morbidity and mortality that are prevalent throughout developing world are major concerns especially in rural areas. Globally, more than 40% of pregnant women may experience acute obstetric problems. The WHO estimates that 300 million women in the developing world suffer from short-term or long-term morbidities brought about by pregnancy and childbirth.[1]The Sustainable Development Goals, set by the United Nations, aimed at reducing global maternal mortality ratio to <70 per 100,000 live

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births by 2030.[2] Currently, India's maternal mortality ratio is declining from 113 in 2016-18 to 103 per 100000 live births in 2017-19, as per Sample Registration System but still lags behind.[3]The greater part of maternal deaths as a result of complications occurs during labor, delivery, and within 24 hours of postpartum period.[4] Reduction in maternal and infant mortality has been an utmost priority of Indian health Services.

Childbirth is one of the greatest events in every woman's life. Safe and healthy pregnancy and childbirth can only lead the mother and the child into a happy and joyous life. Birth preparedness helps in preventing occurrence of the three delays associated with maternal morbidity and mortality.[5] Most of the causes of maternal mortality are preventable and attributed to three delays: Delay in decision to seek care, delay in reaching the place of care, and delay in receiving appropriate care.[6] The common danger signs during pregnancy include severe vaginal bleeding, swollen hands/face and blurred vision. Key danger signs during labor and childbirth include severe vaginal bleeding, prolonged labor, convulsions, and retained placenta. Danger signs during postpartum period include loss of consciousness,severe bleeding following childbirth and fever.[7] Knowledge about these obstetric danger signs during pregnancy, delivery and postpartum is still low in some developing countries.[8] Maternal morbidly and mortality could be prevented significantly if women and their families recognize obstetric danger signs and promptly seek health care. Inadequate care during this critical time breaks the critical link in the continuum of care, and affects adversely both women and new-borns.[9]

Women face several constraints in seeking care during pregnancy and child birth. Lack of finances, transportation problems, unwilling husbands and family members whose permission is often required to visit health facility, are some of the major social barriers for accessing care.[10] BPCR is an intervention included by WHO as an essential element of the antenatal care package.[11] It is often delivered to pregnant woman by the health care provider during antenatal care or initiated/followed up through visits to the homes of pregnant women by community health workers. The key elements of the birth plan package include recognition of danger signs, plan for a birth attendant, plan for the place of delivery, and saving money for transport or other costs in case the need arises. In addition, for birth preparedness, a potential blood donor and a decision-maker (in case of emergencies) need to be identified.

Knowledge of obstetric danger signs and birth preparedness are strategies aimed at enhancing the utilization of skilled care during low-risk births and emergency obstetric care in complicated cases in low-income countries including India. Despite the fact that BPCR is essential for further improvement of maternal and child health, a little is known about its current magnitude and factors influencing it especially in rural areas.

This study, therefore aimed to fill this gap by assessing the knowledge regarding BPCR among rural pregnant women, through a community based cross sectional study.

Objectives:

1. To Assess the knowledge and practices in relation to BPCR among pregnant women in rural area.
2. To identify factors associated with the practices of BPCR among study participants.

Method:

A community based cross sectional study was carried from April 2021 to October 2021 in PHC Khanpur and PHC Juan, the rural field practice areas attached to medical college at Sonipat. The two PHCs comprised of seven health sub-centers serving 45216 population as per the latest annual survey 2021 done by the health workers.

Pregnant women who were in the second and third trimesters of pregnancy and willing to participate in the study were the study subjects. The pregnant women who were not mentally healthy or refused to give consent for participation in study and those who could not be contacted even after three visits were excluded from the study.

Sample size and sampling techniques: Sample size was calculated by assuming the prevalence (p) of BPCR as 50% and taking the absolute error (L) as 7% at 95% level of significance and by using the standard formula for calculation of sample size (N) = $4pq/L^2$ (where q=1-p; the final sample size was 205, rounded of to 210.

Sampling Technique:First of all, total enumeration and enlisting of all pregnant women was done for each of the seven sub-centers of PHCs Khanpur Kalan and Juan. These lists served as sampling frames. From each sampling frame, 30 study subjects were taken randomly. If the selected participant came in exclusion criteria, then women preceding in sampling frame was selected. If that too came in exclusion, then women following the originally selected participant was included for study and so on.

Data collection tools: Before interview, every respondent was explained about the study objectives, procedures and confidentiality of the information obtained from them and then informed consent was obtained. A pretested semi-structured BPCR schedule which was adapted from JHPIEGO (Johns Hopkins Program for International Education in Gynecology and Obstetrics) and prepared in local language was used to interview the women. The schedule included information about socio-demographic characteristics of the respondents, pregnancy characteristics including data on the five basic BPCR practices i.e., questions on having:(i) identified a skilled birth attendant, (ii) identified a health facility in case of emergencies, (iii) identified a potential blood donor, (iv) arranged for transport, and (v) saved money for emergencies and also the questions on the knowledge of maternal danger signs during pregnancy, delivery and after delivery.

Operational definitions:

Birth preparedness and complication readiness: A woman was considered to be prepared for birth preparedness and complications readiness if she had identified at least two of the components of the BPCR items.

Knowledgeable on key danger signs: Pregnant women who spontaneously mentioned at least two danger signs out of nine danger signs as identified during pregnancy, at least two out of seven danger signs during labor and child birth, and at least two out of nine danger signs in post-partum period were considered as some knowledgeable for the respective category. And those who didn't mention even two danger signs for each phase were considered as not knowledgeable.

Data management and analysis: Using R statistical software, the analysis was done. The descriptive statistics was computed and the results were described in terms of mean and standard deviation for continuous/quantitative variables and in the form of frequency and proportion for categorical variables. Pearson's chi square test was applied to find the association. P value <0.05 was considered statistically significant.

Ethical consideration: Ethical approval for the study was obtained from the Institutional Ethics Committee.

Results:

Socio-demographic related characteristics:

A total of 210 women were interviewed for data collection. The highest number of women was in the age group of 20-29 years (84.8%) followed by 30-29 years (8.1%) and <20 years (6.7%). Mean age of study subjects was 24.14 + 3.88 years. More than four fifth (83.8%) women were literate up to secondary or above level. But still 10.5% women were illiterate. The monthly income of about 30% families of women was below five thousand. Most of the women were housewives (92.9%).

Reproductive health related characteristics:

More than half of the mothers (52.9%) were already having one child followed by women who were not having their first child (29.5%). More than half (54.2%) of the mothers were in second trimester and the rest in third trimester. More than three fourths of respondents in third trimester of pregnancy had taken four or more ANC check-ups and remaining respondents also had taken two or

three ANC check-ups. Most of mothers experienced no serious health problem in the past (88.1%). Only 11.9% females had experienced serious health problem in the past like prolonged labour, high fever, retained placenta, tear etc.

BPCR related factors:

Most of mothers (87.6%) were not aware about BPCR while 12.4% had some knowledge about it. Among those who knew, half of the mothers (50%) were informed by Anganwadi worker followed by hospital staff (26.9%) and Accredited Social Health Activist (23.1%).

Regarding practice of BPCR:

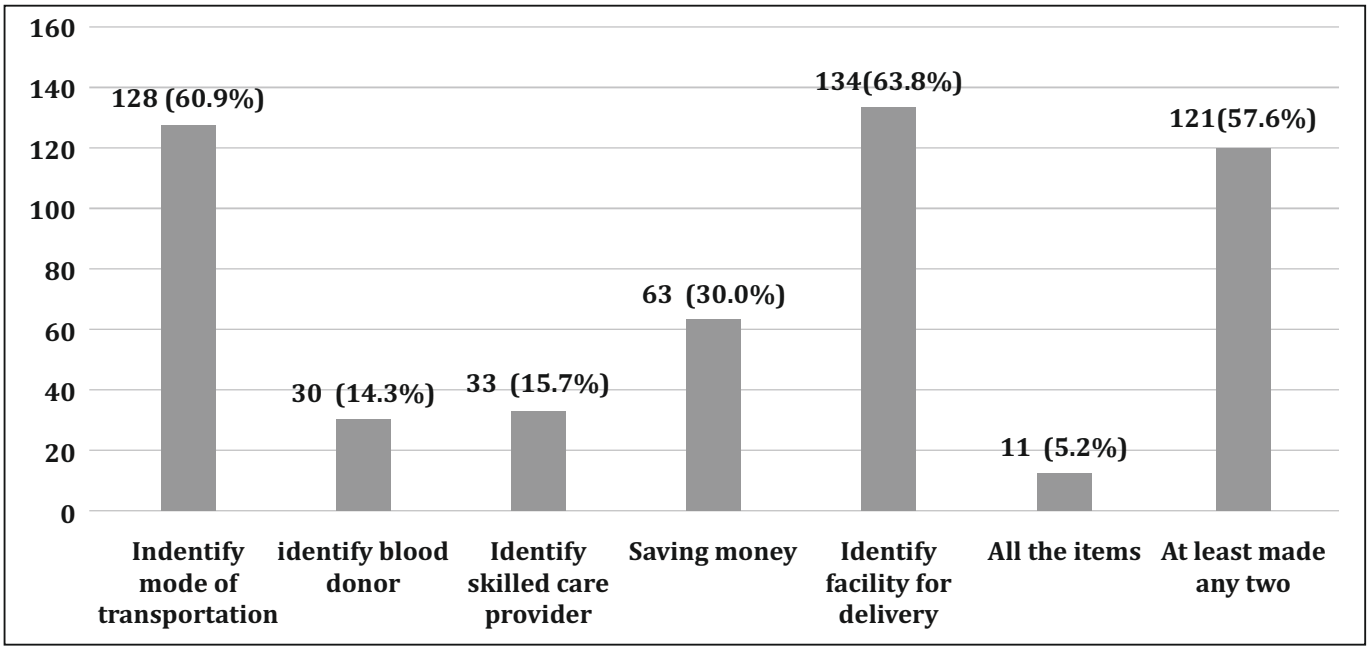
Even in the absence of awareness about BPCR package technically, the components covered under BPCR are still being practised. Approximately two third (67.6%) mothers had made some plans for child birth. Almost same number of mothers had identified facility for delivery (63.8%) followed by transportation (60.9%), saved money (30.8%), a skilled provider (15.7%) and a blood donor (14.3%). Only 5.2 % mothers had done all the arrangements. More than half (57.6%) mothers had done at least two arrangements for the birth of child. (Figure 1) Almost all mothers mentioned the public hospitals (97.6%) as a place to give birth to their babies, whereas some mothers wanted to deliver at home (1.9%) and only 0.5% mothers wanted to give birth in private hospital. More than two third of the mothers (69.5%) used ambulance as the source of transportation followed by private car (18.1%), whereas 3.3% females preferred to go via bus.

Knowledge regarding danger signs:

During pregnancy: Maximum participants knew about bleeding (68.1%) as serious health problem followed by severe abdominal pain (31%), swollen hands and feet (22.9%), loss of consciousness (20.5%), difficulty in breathing (17.6%), high grade fever (13.2%) and headache (7.6%). But 12.9% of women were not aware of any of the danger health problems that can occur during pregnancy. Total 133(63.3%) respondents mentioned at least two danger health problems. (Table 1)

During labor: Above two-third mothers knew about bleeding (68.6%) as serious health problem during labor, followed by delayed labor>12 hours (36.2%), high fever (17.1%) severe head ache (12.4%) and not delivering placenta within 30 minutes (11.4%) and loss of consciousness (6.7%). Somehow, a sizable number of mothers (17.6%) were not aware of any of health problems during labor. About three fifth (59.0%) respondents knew at least two danger problems. (Table2)

Figure 1 : Components of birth preparedness and complication readiness practiced by pregnant women*



* Multiple Responses

Table 1 : Knowledge Regarding Danger Signs during Pregnancy among Pregnant Women (N=210)

Danger Signs	Primigravida* (n=62)	Multigravida* (n=148)	Total*
Bleeding per vagina	36 (58.1)	107 (72.3)	143 (68.1)
Severe abdominal pain	22 (35.5)	43 (29.1)	65 (31.0)
Swollen hands and feet	17 (27.4)	31 (21.0)	48 (22.9)
Loss of consciousness	10 (16.1)	33 (22.3)	43 (20.5)
Difficult breathing	10 (16.1)	27 (18.2)	37 (17.6)
High grade fever	7 (11.3)	21 (14.2)	28 (13.2)
Blurred vision	2 (3.2)	15 (10.1)	17 (8.1)
Severe headache	5 (8.1)	11 (7.4)	16 (7.6)
At least knew two	36 (58.1)	97 (65.5)	133 (63.3)
Do not know any of the above	15 (24.2)	12 (8.1)	27 (12.9)

Note: Figures in parentheses are percentages *Multiple Responses

Table 2 : Knowledge Regarding Danger Signs during Labor among Pregnant Women (N=210)

Danger signs	Primigravida* (n=62)	Multigravida* (n=148)	Total*
Bleeding per vagina	37 (59.6)	107 (72.2)	144 (68.6)
Placenta not delivered within 30 minutes	10 (16.1)	14 (9.4)	24 (11.4)
Labour lasting more than 12 hours	20 (32.2)	56 (37.8)	76 (36.2)
Loss of consciousness	2 (3.2)	12 (8.1)	14 (6.7)
Severe headache	6 (9.6)	20 (13.5)	26 (12.4)
High grade fever	9 (14.5)	27 (18.2)	36 (17.1)
At least knew two	30 (48.3)	94 (63.5)	124 (59.0)
Do not know any of the above	21 (33.8)	16 (10.8)	37 (17.6)

Note: Figures in parentheses are percentages *Multiple Responses

After delivery: About three fifth of mothers knew about bleeding as a serious health problem after delivery (59.5%), followed by loss of consciousness (21.4%), swollen hands and feet (20%), difficulty in breathing (16.2%), malodorous vaginal discharge (10.5%), high grade fever (8.6%) and blurred vision (8.1%). Some females (17.6%) did not know about any of health problems that can occur after delivery. One hundred seventeen (57.7%) mothers mentioned at least two serious health problems after delivery. (Table 3) Multigravida are more aware than primigravida about danger signs in all the three phases of child bearing.

Factors associated with BPCR: Maximum birth preparedness was present in extreme of ages i.e., more than 30 years (88.9%) and less than 20 years (71.4%) as compared to 20-29 years (53.4%). (P value = 0.008). The level of education of a woman is expected to influence her behaviour on issues of health matters. Birth preparedness was slightly more in secondary / Matriculate (58.8%), higher sec. (60.7%) and graduate (57.7%) as compared to illiterate (50%) and primary (50%) but it was not

Table 3 : Knowledge of Danger Signs During Postpartum among Study Subjects (N-210)

Danger signs	Primigravida* (n=62)	Multigravida* (n=148)	Total*
Bleeding per vagina	28 (45.2)	97 (65.5)	125 (59.5)
Severe abdominal pain	14 (22.6)	13 (8.8)	27 (12.9)
Swollen hands and feet	8 (12.9)	34 (23.0)	42 (20.0)
Blurred vision	3 (4.8)	14 (9.5)	17 (8.1)
High grade fever	2 (3.2)	16 (10.8)	18 (8.6)
Difficult breathing	9 (14.5)	25 (16.9)	34 (16.2)
Loss of consciousness	19 (30.6)	26 (17.6)	45 (21.4)
Severe headache	2 (3.2)	9 (6.8)	11 (5.2)
Vaginal discharge	6 (9.7)	16 (10.8)	22 (10.5)
At least knew two	30 (48.4)	87 (58.8)	117 (55.7)
Do not know any of the above	21 (33.9)	16 (10.8)	37 (17.6)

Note: Figures in parentheses are percentages *Multiple Responses

found statistically significant. Literacy, income, parity, and occupation were not associated significantly with BPCR. Birth preparedness was significantly more among those having at least some knowledge about serious health problems that can occur during pregnancy, labour and after delivery ($p < 0.05$). (Table 4)

Discussion:

BPCR matrix has been identified as the single most important intervention and global benchmark indicator to monitor progress towards the goal of maternal and neonatal morbidity and mortality rates reduction particularly in the developing world settings. The findings of the study revealed that57.6% females had observed at least two or more components of BPCR. The observed BPCR practice in the study area was lower than study done by Akshaya KM.[12] and it wasslightly higher than some of other Indian studies conducted in Madhya Pradesh (47.8%, n = 312),[13] Delhi (41%, n = 417)[14] and West Bengal (49.4%, n = 240 and 34.5%, n = 355).[15,16] The reason for this may be difference in criteria for knowledge of BPCR practices in the above mentioned studies or subjects were merely rural-dwelling women where people are presumed to have less information and more problems of accessibility to health services. Another possible reason may be due to the different population charactersthat might resulted in observed differences.

Highest number of pregnant women was in the age group of 20-29 years (84.8%) followed by 30-29 years (8.1%). Mean age of study subjects was 24.14 $\pm$ 3.88. Almost similar findingswere observed in a study done by Akshaya KM in Karnataka,India,[12]The observation clearly reveals that most of the women bear children during the age of 20-29 years.Maximum birth preparedness was present in extreme of ages i.e.,>30 years and <20 years as compared to 20-29 years.The reason for this could be that younger women (<20years) face higher risks of low birth weight, preterm delivery and severe neonatal conditions.Therefore, they need to prepare much more, whereas older women, if they have had an obstetrics issue in the past, ensure not to happen in current pregnancy. The women who were employed in the government and non-government organization were more prepared for birth and its complication as compared to house wives and involved in agriculture but was not significantly associated. These findings are consistent with the study done by Gudeta TA.[17] The reasons could be, that working women are more educated. Education helps in the understanding of obstetric

Table 4 : Characteristic of Participants and their Association with Birth Preparedness

Characteristics*		**Birth Preparedness Present (n=121) n%**	**Birth Preparedness Not Present (n=89) n%**	**Total**	**P value**
Age (years)	<20yrs	10 (71.4)	4 (28.6)	14	0.008 #
	20-29yrs	95 (53.4)	83 (46.6)	178	
	>30yrs	16 (88.9)	2 (11.1)	18	
Parity	Nil	29 (46.8)	33 (53.2)	62	0.101
	One	71 (64.0)	40 (36.0)	111	
	Two	15 (51.7)	14 (48.3)	29	
	Three or more	6 (75.0)	2 (25.0)	8	
Income (Rs.)	<5000	36 (57.1)	27 (42.9)	63	0.087
	5000-10000	13 (43.3)	17 (56.7)	30	
	10001-15000	20 (58.8)	14 (41.2)	34	
	15001-20000	12 (48.0)	13 (52.0)	25	
	20001-25000	10 (52.6)	9 (47.4)	19	
	>25000	30 (76.9)	9 (23.1)	39	
Literacy	Illiterate	11 (50.0)	11 (50.0)	22	0.899
	Primary	6 (50.0)	6 (50.0)	12	
	Secondary	40 (58.8)	28 (41.2)	68	
	Higher Sec.	34 (60.7)	22 (39.3)	56	
	Graduate and above	30 (57.7))	22 (42.3)	52	
Family type	Nuclear	44 (38.5)	70 (61.5)	114	0.01 #
	Joint	54 (56.2)	42 (43.8)	96	
Family size	1-2	49 (50.0)	4 (50.0)	8	0.806
	3-5	69 (56.6)	53 (43.4)	122	
	5or more	48 (60.0)	32 (40.0)	80	
Occupation	House wife	111 (56.9)	84 (43.1)	195	0.432
	Job	7 (77.8)	2 (22.2)	9	
	Agriculture	3 (50.0)	3 (50.0)	6	
Obstetric Variables					
Period of gestation	Second trimester	65 (57.0)	49 (43.0)	114	0.848
	Third trimester	56 (58.3)	40 (41.7)	96	
Gravida	First gravida	38 (61.3)	24 (38.7)	62	0.001
	Second or more	51 (43.4)	97 (65.6)	148	
Antenatal check-ups	< 3	51 (61.4)	32 (38.6)	83	0.364
	3 or more	70 (55.1)	57 (44.9)	127	
Problems related to danger signs in past	Yes	11 (44.0)	14 (56.0)	25	0.142
	No	110 (59.5)	75 (40.5)	185	
Knowledge of at least 2 danger signs during					
Pregnancy	Yes	88 (62.2)	45 (33.8)	133	0.011
Labor	Yes	84 (67.7)	40 (32.3)	124	0.001
After delivery	Yes	81 (69.2)	36 (30.8)	117	0.001

*Row wise percentages are given #Statistically Significant

complications and more chances of seeking health information. Moreover, working women get more opportunities to share their problems with colleagues as compared to housewives.

About two-third mothers had identified facility for delivery (63.8%) followed by transportation (60.9%) in present study which is slightly lower than the findings of 71.7% observed by Akshaya KM. [12]Money saved for child birth by 30.8% women in this study was less than the findings in West Bengal study (40.8%) and 52.2% in Karnataka study.[15,12] Identification of potential blood donor by the study participants was low (14.3%). Probable reasons for this might include fear of blood transfusion among rural community. This is comparable to findings of 15.8% in study done in Karnataka, and other studies.[12,16,18] This component of BPCR is very vital in context of preventing deaths due to PPH etc. when there is urgent need of blood. Hence it is a matter of great concern. Preparedness of the women to identify accompanying person was also not satisfactory (15.7%).This finding of the study is much less than the study finding from Tanzania (86.2%) and some studies in India (69.6%). [19,13]The probable reason might be variation in the definition of knowledgeable and the methodology variation or socio-demographic variation due to the local context. In this study only5.2 % females had practiced all the component of birth preparedness.

In present study about two third (68.1%) of the study subjects mentioned vaginal bleeding as danger sign during pregnancy, 68.6% during child birth and 59.5% after child birth.Bleeding is a most commonly identified danger symptom in all three phases. Similar findings were also observed in some other studies.[18,14]Knowledge regarding other danger signs was highly inadequate in this study. One hundred thirty-three (63.3%) respondents mentioned at least two danger health problems that can occur during pregnancy, 59% during labor and 55.7% after birth. In a study done in Delhi, 27.8 % mentioned about one danger sign in all three phases,[14]where as in Karnataka, 80% of the women were aware of at least one danger sign.[12]This difference is primarily due to variation in the definition of knowledgeable in the above studies.

Mothers who were knowledgeable about danger signs during pregnancy, child birth and postpartum also had significantly increased birth preparedness as compared to those who did not know and vice versa. Other studies[14,20] have also attributed unsatisfactory BPCR practices to poor knowledge of the key danger signs This is also in line with the studies done in southern Ethiopia, Tanzania.[21,19] Thus, the study highlights the importance of knowledge of danger signs to ensure proper birth preparedness. During ANC visits, service providers should impart quality health education to mothers and family members regarding all the danger signs during pregnancy, intrapartum and postpartum to ensure the practice of BPCR and eventually reduction in maternal and newborn mortality and morbidity.

Conclusion:

More than half women (57.6%) mothers had observed at least two or more components of birth preparedness out of five. Maximum number of mothers had identified facility for delivery followed by transportation. Money saved for child birth and identification of potential blood donor by the study participants was very low in this study. All the components of birth preparedness were practiced only by 5.2% women.Bleeding per vagina is the most commonly identified danger symptom during pregnancy, child birth and after birth.Knowledge regarding other danger signs was highly inadequate in this study. Knowledge regarding danger signs is significantly associated with birth preparedness.

Recommendations:

It is proposed that during ANC visits, service providers should impart quality health education to mothers and family members regarding all the danger signs during pregnancy, intrapartum and

postpartum. It is further emphasized that health workers should ensure that mothers and family members have understood properly the importance of practicingall components of BPCR.Thus, the focus shouldnow shift to the quality of ANC services in addition to quantity of health services.

Strengths/Limitations of the Study:

The main strength of current study was that it was a community-based study and used BPCR questionnaire, which was adapted from JHPIEGO. Thus, the study represented the true picture of the facts/situation in the community. Limitations included that the definitions of "adequate knowledge" and "complication readiness/birth-preparedness" as used to express assessment of knowledge of danger signs in pregnancy and BPCR practices are flexible because of lack of uniform standards. Secondly, the income was considered in general instead of appropriate socio-economic classification.

Declaration:

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Conflict of Interest: Nil

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