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Factors associated with birth preparedness and complication readiness among pregnant women in Nepal

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ABSTRACT

Background: Maternal and neonatal mortality is major problem especially affecting newly industrialized and developing countries. Birth preparedness and complication readiness is a strategy used in maternal and new-born health to promote safe and healthy pregnancy and delivery by preparing women and families to avoid complications. This includes utilization of prenatal care, identifying health worker and health facilities, managing budget and transportation, identifying potential complications, and receiving health services.

Objectives: The study aimed to assess the factors associated with birth preparedness and complication readiness among pregnant women in Nepal.

Method: A quantitative, community based cross sectional analytical study was conducted between January and July 2023 among 221 pregnant women who completed 14 weeks of gestational age. Birth preparedness and complication readiness were measured using standard tool of JIPIEGO. Epi-data version 3.1 for data entry and SPSS version 20 was used for further analysis. Chi-square test was used to observe the statistical association, similarly, predictors of birth preparedness and readiness were assessed using binary logistic regression analysis.

Results: The study revealed only one quarter (26.6%) of pregnant women were prepared. Among the participants, 50.7% had selected health facilities, 40% had arranged transportation, 38% saved money, 12.2% identified health workers and 10% identified possible blood donor. Education of mother (AOR=15.275, 95% CI: 1.775-131.421), family income (AOR=4.977, 95% CI: 1.263-19.608) and gestational age (AOR=3.716, 95% CI: 1.200-11.504) were found to be predictors of birth preparedness and complication readiness.

Conclusion: The study showed only about one fourth of the pregnant women were well prepared for birth complications and readiness. Birth preparedness and complication readiness play a vital role in the prevention of maternal and neonatal mortality. Health workers should emphasize to increase awareness and provide counselling during antenatal visits.

Keywords: Birth Preparedness, Complication readiness, Pregnant Women

1. Introduction

Family Welfare Division (FWD) Nepal, has been implementing National Safe Motherhood Program to reduce maternal and neonatal morbidity and mortality and to improve maternal and neonatal health through preventive and promotive activities and, by addressing avoidable factors that cause death during pregnancy, childbirth, and the postpartum period [1]. Ministry of health and population (MoHP) Nepal, implemented a birth preparedness package with the aim to reduce delayed in accessing delivery care, birth preparedness guideline recommend families to arrange transportation, identify the possible blood donor if required, identify and contact health facilities and person, availability of clean delivery kit [2].

Enhancing the seeking, reaching and receiving care for maternal health care is a key focus priority program of at national and international level [3]. As per protocol a pregnant woman have ANC visits at least four times during her fourth, sixth, eighth and nineth month to reduce maternal and neonatal morbidity and mortality through preventive and promotive by addressing avoidable factors that cause death during pregnancy, childbirth and pregnancy[1]. Birth Preparedness and Complication Readiness (BPCR) includes active preparation and timely decision making for childbirth, pregnancy and post-partum by women and families to positively influence the health of mother and newborn by available health services [4]. Each day thousands of women and families are facing unnecessary suffering due to obstetric complication and maternal death which are preventable, majority 99% death occurs in developing countries and nearly one third occurs in South Asia which can be prevented [5].

At individual level, elements of BPCR includes recognizing danger sign during pregnancy, delivery and the postpartum period, identifying skilled birth attendant and healthcare facility, anti-natal examination, preparing for transportation, saving funds, and recognizing a suitable blood donor [6,7]. Birth preparedness and complication readiness have been accepted and use as a major intervention by several countries for reducing maternal and newborn death [8,9]. Birth preparedness help to reduce delay that occurs in obstetric complication i.e., recognizing complication, decision to seek care and reaching the facility to obtain skilled care from qualified provider [10,11].

2. Methods

2.1 Study design, setting and period

A community based cross-sectional study was conducted among pregnant women in

Putalibazar municipality, Syangja District, Nepal. The data was collected from June to July 2023.

2.1.1. Study population

The study population were pregnant women of selected ward of Putalibazar municipality. Pregnant women who were on 14th weeks of gestation.

2.1.2. Sample size

Sample size was calculated as the proportion of birth preparedness and complication readiness was 24.1% according to Ananche and Wodaju study from Ethiopia (12). The Cochran formula was used to calculate the sample size and the final sample was 221.

A multistage probability sampling was used in this study.

First stage: One municipality was selected for the study out of five municipalities of Syangja district.

Second stage: Altogether there are 14 wards in Putalibazar municipality, eight wards of the municipality were chosen randomly.

Third stage: The ward wise list of pregnant women was obtained from gross-root level health facilities and District Health Office, Syangja.

Fourth stage: The respondents were selected randomly from the sampling frame. Sampling frame was generated based on expected pregnancy of municipality and proportionate sampling was used to identify ward wise sample size of each selected ward. Female community health volunteers (FCHVs) and elected member of ward were contacted for the help and support in identifying the respondent's home.

2.2 Data collection

Birth preparedness and complication readiness were assessed using standard tool of JHIPEGO, that contained five domains of BPCR: save money, arrangement of transportation, selection of health facility, selection of health worker and arrange possible blood donor and questionnaire that have four parts: socio-demographic characteristics, obstetric and maternal characteristics, health facilities related characteristics and IEC related characteristics. Interview schedule as a structured questionnaire in printed form was used as data collection tools and face to face interview with respondents was used to collect information. Coding of collected data and confidentiality was maintain in every step. The questionnaire was translated in to Nepali and re-checked via translation from Nepali back to English. The score less than three was

classified as less prepared, score more than or equal three as prepared.

2.3 Statistical analysis

After completion of data collection, entire questionnaire was checked manually for their completeness and accuracy and data were entered in Epi-data (version 3.1) and then were transferred to SPSS (version 20) for further analysis. Univariate analysis by using frequency table was performed for descriptive statistics (frequency and percentages). Frequency tables were generated for categorical variables, while median, inter-quartile range and minimum maximum were calculated for continuous variables.

For bivariate analysis, chi-square test was performed for testing the existing significant association between independent and dependent variables at the level of 95% confidence interval. Similarly binary logistic regression was applied to calculate crude odds ratio for those significant variables with p-value <0.05 in chi-square test. This was followed by multivariable analysis where significant variables with p-value <0.05 in bivariate analysis were further proceed for binary logistic regression model at 95% CI for examining independent association between explanatory variables and binary dependent variables.

2.4 Ethical Approval

Ethical approval for the study was obtained from the Pokhara University-Institutional Review Committee, Research Department (reference number 148 -079/80) prior to commencing the study. The study followed ethical guidelines and obtained informed consent from participants and their parents/guardians.

3. Results

Socio-demographic characteristics

Table 1 showed sociodemographic characteristics of respondents, the median age of respondents was 26 years, more than half (57%) of the respondents were above 25 years. The major religion was Hinduism (84.6%) and more than half (57.4%) of the respondents were educated up to secondary level. More than two third (66.2%) of the respondents were home maker. Regarding husband education more than half (57%) of the respondents had completed secondary education and more than one third (34.4%) had main occupation as foreign employee. Similarly, more than two third (62%) belongs to joint families. Great majority (91.4%) of the respondents had availability of transportation and majority (86.4%) had health facility within 30 minutes.

Table 1: Socio-demographic characteristics

Variables	Frequency (n)	Percentage (%)
Age in years	n=221	
Less than 20	18	8.2
20 to 24	77	34.8
More than 24	126	57.0
Median (IQR) (Min:Max)	26(7) (15:44)	
Ethnicity		
Brahmin	55	24.9
Chhetri	48	21.7
Janajati	48	21.7
Dalit	47	21.3
Muslim	23	10.4
Religion		
Hindu	187	84.6
Buddhist	9	4.1
Muslim	23	10.4
Christian	2	0.9
Educational status		
Literate	7	3.2
Basic education	53	24.0
Secondary education	127	57.4
Bachelor and above	34	15.4
Main Occupation		
Home maker	146	66.2
Agriculture	35	15.6
Job	30	13.6
Business	10	4.5
Education of husband		
Basic education	46	20.8
Secondary level	126	57.0
Bachelor level	41	18.6
Master and above	8	3.6
Agriculture	19	8.5
Job	74	33.5
Business	30	13.6
Foreign employee	76	34.4
Daily wages	22	10.0
Types of family		
Single	77	34.8
Joint	137	62.0
Extended	7	3.2
Monthly Family income in NRs		
Up to 50000	144	65.2
More than 50000	77	34.8
Median (IQR) (Min:Max)	50000 (30000) (7000:300000)	
Decision making on household expenditure		
Mother and father	133	60.2
Husband	26	11.7
Self	10	4.5
Family together	52	23.5
Time to reach nearest health facility		
Up to 30 min	191	86.4
More than 30 min	30	13.6
Median (IQR) (Min:Max)	15 (20) (2:80)	

Variables	Frequency (n)	Percentage (%)
Transportation cost to reach health facility In NRs (n=202)		
Up to 50	122	60.3
More than 50	80	39.6
Median (IQR) (Min:Max)	50 (110) (0:800)	

Obstetric and maternal characteristics

Table 2 illustrates obstetric and maternal characteristics of respondents, the median age of first pregnancy was 22 years and more than half (56.6%) of respondents had first childbirth. Majority (86.4%) had birth spacing more than 24 months, more than one third (67%) of respondents were second trimester of pregnancy during the time of interview. Similarly, more than half (56.6%) had ANC visited three to four times and most of (62.7%) had visited district hospital. Majority of respondents (93.7%) had intended pregnancy, about one fourth (25%) of respondents had some complication in past delivery. About half of respondents (50.2%) had knowledge about complication during pregnancy. Similarly, more than two third (62.9%) of respondents stated that 24- hour delivery services available in visited health facilities. Similarly, more than two third (64.2%) of respondents selected district hospital and about three fifth (40.7%) selected doctor for their current deliver (table2).

Table 2: Obstetric and maternal characteristics

Variables	Frequency (n)	Percentage (%)
Age at first pregnancy (years)		
Less than 20	32	14.5
20 to 24	130	58.8
More than 24	59	26.7
Median (IQR) (Min:Max)	22 (5) (15:31)	
Birth order		
One	125	56.6
More than one	96	34.4
Birth spacing (n=96)		
Less than 24 months	13	13.54
More than 24 months	83	86.4
Gestational age during interview		
Second trimester	148	67.0
Third trimester	73	33.0
Frequency of ANC visit		
Up to two times	58	26.3
Three to four times	125	56.6
More than four times	38	17.1
Visited health facilities for ANC*		
Health post	89	31.2
District hospital	173	62.7
Tertiary hospital	7	2.5
Private hospitals	10	3.6
UHC/BHSC	6	2.1

Variables	Frequency (n)	Percentage (%)
Pregnancy intended		
Intended	207	93.7
Unintended	14	6.3
Had complication in past (n=96)		
Yes	24	25.0
No	72	75.0
Knowledge about complication during pregnancy		
Yes	111	50.2
No	110	49.8
Counselling time during ANC visit by HW		
Up to 10 minutes	123	55.7
More than 10 minutes	98	44.3
Availability of 24-hour delivery services in visited HF		
Yes	139	62.9
No	82	37.1
Selected HF for delivery (n=112)		
Health post	12	10.7
District hospital	72	64.2
Tertiary hospital	23	20.5
Private hospital	5	4.4
Selected HW for delivery (n=27)		
Doctor	11	40.7
Nurse	10	37.0
Trained health workers	6	22.2

*Multiple response

Birth preparedness and complications readiness among participants

Table 3 showed birth preparedness and complication readiness among participants. A woman was considered as well prepared for birth and its complications if she mentioned at least three out of five key components of BPCR, and less prepared if she mentioned less than three. Only about one fourth (26.7%) were prepared for birth complication and readiness. More than one third of respondents (38.5%) have save money, few of the respondents (10%) reported having arranged a possible bold donor, more than two fifth (45.5%) have arranged emergency transportation. Similarly, about half of respondents (50.7%) select health facility and few of the respondents (12.2%) select health workers for their current delivery (table 3).

Table 3: Birth preparedness and complications readiness among participants

Variables	Frequency (n)	Percentage (%)
Saved money		
Yes	85	38.5
No	136	61.5
Arranged transportation		
Yes	100	45.2
No	121	54.8
Selected health facility		
Yes	112	50.7

No	109	49.3
Selected health worker		
Yes	27	12.2
No	194	87.8
Arranged possible blood donor		
Yes	23	10.4
No	198	89.6
Status of birth preparedness and complication readiness		
Well prepared (Mentioned at least 3 out of 5 components)	59	26.7
Less prepared (Mentioned less than 3 out of 5 components)	162	73.3

Association Between different variables on BPCR

Table 4 showed crude odds ratio (OR), 95% confidence interval (CI), and p-value, as well as the adjusted OR, 95% CI, and p-value of the significantly associated variables. Ethnicity Brahmins/Chhetri (COR =2.466, 95% CI: 1.324-4.519), education level secondary education (COR =2.550, 95% CI: 1.053-6.174) and graduates and above (COR=10.816, 95% CI: 3.812-30.692), occupation job and business (COR=4.757, 95% CI: 2.315-9.773), monthly income of respondents more than twenty thousand (COR=0.182, 95% CI: 0.081-0.409), husband education graduated and above (COR =5.045, 95% CI: 2.009-12.668), husband occupation job (COR =2.976, 95% CI: 1.105-8.018) and business (COR =3.889, 95% CI: 1.253-12.074), monthly family income more than fifty thousand (COR =3.081, 95% CI: 1.663-5.710), gestational age second trimester (COR =2.484, 95% CI: 1.327-4.654), counselling time during ANC more than ten minutes (COR =1.894, 95% CI: 1.037-3.459), right response about incentive (COR =0.219, 95% CI: 0.062-0.776), were found significantly associated with BPCR.

Educational level graduated and above (AOR= 15.274, 95 CI: 1.775-131.421), family income more than fifty thousand per month (AOR= 4.977, 95% CI: 1.263-19.608) and gestational age (AOR=3.716, 95% CI: 1.200-11.504) were found to be predictor of birth preparedness and complication readiness (table 4).

Table 4: Association Between different variables on BPCR

Variable	Birth Preparation and complication readiness		COR (95% CI)	p-value	AOR (95% CI)	p-value
	Less prepared n (%)	Well prepared n (%)				
Ethnicity				0.004*		0.633
Other	96 (81.40)	22 (18.6)	1		1	
Brahmins/ Chhetri	66 (64.10)	37 (35.9)	2.446 (1.324-4.519)		0.746 (0.224-2.485)	

Variable	Birth Preparation and complication readiness		COR (95% CI)	p-value	AOR (95% CI)	p-value
	Less prepared n (%)	Well prepared n (%)				
Education of respondents						
Basic level	47 (80.4)	9 (19.6)	1		1	
Secondary level	103 (81.7)	23 (18.3)	2.550 (1.053-6.174)	0.038*	3.283 (0.765-14.095)	0.110
Graduates and above	22 (44.9)	27 (55.1)	10.816 (3.812-30.692)	<0.001*	15.274 (1.775-131.421)	0.013*
Main occupation				<0.001*		0.872
Home maker	114 (79.6)	37 (20.4)	1		1	
Job and business	18 (45.0)	22 (55.0)	4.757 (2.315-9.773)		0.823 (0.077-8.794)	
Education of husband						
Basic	37 (80.4)	9 (19.6)	1		1	
Secondary	103 (81.7)	23 (18.3)	0.918 (0.390-2.164)	0.845	0.816 (0.196-3.404)	0.780
Graduates and above	22 (44.9)	27 (55.1)	5.045 (2.009-12.668)	<0.001*	2.409 (0.373-15.567)	0.356
Husband occupation						
Agriculture	35 (85.4)	6 (14.6	1		1	
Job	49 (66.2)	25 (33.8)	2.976 (1.105-8.018)	0.031*	0.638 (0.120-3.393)	0.598
Business	18 (60.0)	12 (40.0)	3.889 (1.253-12.074)	0.019*	2.126 (0.406-11.138)	0372
Foreign employee	60 (78.9)	16 (21.1)	1.556 (0.557-4.343)	0.399	0.325 (0.049-2.159)	0.245
Monthly family income in NRs				<0.001*		0.022*
Up to 50000	117 (81.3)	27 (18.8)	1		1	
More than 50000	45 (58.4)	32 (41.6)	3.081 (1.663-5.710)		4.977 (1.263-19.608)	
Gestation age during interview				0.004*		0.023*
First trimester	123 (78.8)	33 (21.2)	1		1	
Second trimester	39 (60.0)	22 (40.0)	2.484 (1.327-4.654)		3.716 (1.200-11.504)	
Counselling time during ANC in minutes				0.038*		0.214
Less than 10	97 (78.9)	26 (21.1)	1		1	
More than 10	65 (66.3)	33 (33.7)	1.894 (1.037-3.459)		2.200 (0.635-7.621)	
Response about incentive for institutional delivery and ANC as protocol				0.019*		0.074
Inappropriate	27 (90.0)	3 (10.0)	1		1	
Appropriate	63 (66.3)	32 (33.7)	0.219 (0.062-0.776)		0.212 (0.039-1.10)	

COR= Crude Odds Ratio, AOR=Adjusted Odds Ratio, p value from Chi-square test, *-Significant at p<0.05

4. Discussion

This study aimed to find out the factors associated with birth preparedness and complication readiness among pregnant women in Syangja district Nepal. Our study showed 26.6% pregnant women were prepared for birth complication and readiness. However, 50.7% selected health facilities, 45% arranged transportation, 38% saved money, 12.2% identified health worker and only 10% identified possible blood donor for their current pregnancy. Similar study conducted by Debelew et al, in Ethiopia was inconstant with our study, 73.5% saved money and 60.2% arranged transport, 19.9% arranged blood donor, 32.4% selected health facility and 21.9% identified skilled attendants, which was higher than our study [11],. This may be due to this study was conducted in capital of zone, Zimma town where our study was conducted in municipality of hilly district.

However, study conducted by Hailu et al in South Ethiopia, women were found to be lower level of preparation than present study, 35% save money, 7.7% arranged transportation, 8.1% selected health facilities and 2.3% arranged blood donor [12]. Similarly, study by Gebre et al, in Wolayta zone Ethopia showed less prepared compared to present study, 43.6% select health facility, 18.1% arranged transportation, 54.1% save money, 10.7% select health worker and only few 3% women had arrange possible blood donor [13]. This difference may be explained by lower socio-economic status, availability and accessibility of services or any other interventions in Ethiopia.

In this study, it was identified 26.6% pregnant women were prepared for birth complication and readiness. Similarly, study conducted by Moinuddin et al, in Bangladesh, showed 24.5 % were well prepared for birth which is slightly lower than present study [8]. This may be due to the different definitions applied for determining what constituted being well prepared as this varied among the different studies. Also, this study was conducted in five hard to reach district in rural Bangladesh. This finding was supported by study conducted in Ethiopia by Ananche and Wodajo, reported birth preparedness and complications readiness found to be 24.1% [10]. This difference may be due to, A far region is located far away from capital city with limited health services available and literacy rate below 3% and lower socio-economic status. The study conducted by Agin slums area in Indore city in the state of Madhya Pradesh, India [14] showed inconsistent, 47.8% were well prepared which is higher than our study [14]. This higher

difference may be due to maternal and child health program operated by NGOs and urban health resource center (UHRC) since 2003, five Indore based NGOs implement the program with the technical support from UHRC through a network of slum-based volunteer and filed supervisor. Similarly, the study by Bintabara et al, in central Tanzania showed higher level of preparedness 58.2% compared to present study [15]. This difference may be due to, study was conducted in Tanzania, adequate health services available and study sample were mother who delivered within 2 years.

Our study found education of the respondents is significantly associated with BPCR, respondents had education level graduates and above were more prepared compared to basic and secondary level. Similarly, a study by Kadarkar and Dhok, in India showed practice of birth preparedness and readiness was more in women had education level secondary and above [16]. This can be explained, our study categorized education level in basic, secondary, and graduate and above while this study education level was categorized in illiterate and primary and secondary and above. study in Ethiopia by Debelew et al, found to be inconstant with present study. In this study significant association was found to be primary, secondar and tertiary education compared to women who didn't attend any formal education [11]. But in our study showed significant association with graduates and above. This difference can be explained, this study was conducted in capital of zone, Jimma town of southwest Ethiopia, there may be availability of IEC material compared to our study area. Present study showed education level graduated and above found to be significantly associated with BPCR. But study in Inda by Mukhopadhyay et al, [17], and central Tanzania by Bintabara et al, showed women who had formal education were well prepare as compare to literate [15,17]. This might be due to the counselling provided at ANC and have the capability of making decisions on issues related to their health.

Income of family was found significantly associated with BPCR which is consistent the study done in Nepal by [5], found that husbands involve in agricultural work were 0.02 times less likely to involve those who were in non-agriculture worker. Another study in India by Kadarkar and Dhok, found that women living below the poverty line with average per capital income INR, was found to be less prepared as compared to those above the poverty line socioeconomic status [16]. Similarly, study in Ethiopia by Andarge et al, found that low

income status associated with low birth preparation [18].

Present study revealed gestational age found to be significantly associated with BPCR, women in their 3rd trimester of pregnancy were more prepared compared to second trimester, which is consistent with study by Endeshaw et al, showed pregnant women with a gestational age of 4 to 6 months were more likely to practice BPCR than women whose gestational age was up to three months [19]. Similarly, the study by Bitew et al, revealed women with gestational period of the third trimester were more likely prepared [20]. Similarly, community based cross sectional study in Southwest Ethiopia by Gudeta et al, found women with third trimester of gestational were more prepared compare to second trimester [21]. This can be explained by birth preparation and readiness counselling provided during ANC with gestational age of pregnancy and, women perceived threat and want to be prepared with increase their gestational age.

Findings could have been different if it had included one of the study sites from rural municipality too and large sample size.

5. Conclusion

Only about one fourth of the respondents were well prepared for birth preparation and complication readiness. Ethnicity, educational status, occupation, income, gestational age and, knowledge about pregnancy and delivery complication from individual factors, husband education, husband occupation and family income from factors related to family, counselling time during ANC from factors related to health facility were significantly associated with birth preparation and complication readiness.

Educational status and gestational age from individual factors and family income from factors related to family were predictors of birth preparation and complication readiness. Health workers should emphasize to increase awareness and provide counselling during antenatal visit.

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Conflict of interest

The authors have declared that no competing interest exist.

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