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Original Research Article

A study of Birth Preparedness and Complication Readiness among pregnant women in the field practice areas of Jhalawar Medical College, Jhalawar (Rajasthan), India

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Abstract

Background: Maternal mortality remains a major public health issue in India despite significant progress. Birth Preparedness and Complication Readiness (BPCR) is a key strategy to reduce delays in seeking and receiving care during obstetric emergencies.

Objectives: To assess the knowledge and practices regarding birth preparedness and complication readiness, identify associated factors, and enhance awareness about danger signs among pregnant women in the field practice areas of Jhalawar Medical College.

Methods: A community-based cross-sectional study was conducted among 388 pregnant women during [March to August 2024] in rural (Mandawar) and urban (Jhalrapatan) field practice areas. Data were collected using a pretested semi-structured questionnaire adapted from the JHPIEGO BPCR matrix. Descriptive statistics and chi-square tests were applied using SPSS (Ver. 28 Trial).

Results: Out of 388 participants, the mean JHPIEGO BPCR index was 58.9. Based on criteria, 69.1% were classified as 'well prepared', while 30.9% were 'less prepared'. Birth preparedness was significantly associated with higher maternal age (≥30 years), urban residence, higher education, employment, better socioeconomic status, longer marriage duration, multigravidity, previous obstetric complications, and absence of addiction ($p<0.05$).

Conclusion: The study revealed that although 69.1% of pregnant women were well prepared for birth and complications, gaps remain in financial planning, transport, and blood donor arrangements. Preparedness was positively associated with education, urban residence, higher socioeconomic status, and obstetric experience. Targeted interventions focusing on rural, less educated, unemployed, and primigravid women are crucial to reduce preventable maternal and neonatal mortality.

Keywords: Birth preparedness, complication readiness, maternal health, pregnant women, Rajasthan, BPCR.

Introduction

Pregnancy and childbirth are significant events in a woman's life, but they continue to pose substantial risks, particularly in developing countries. Despite global and national efforts, maternal mortality remains a major public health problem. In 2023, an estimated 260,000 maternal deaths occurred worldwide, corresponding to a maternal mortality ratio (MMR) of 197 per 100,000 live births [1]. India has shown progress, with the MMR declining from 130 (2014–2016) to 97 (2018–2020)[2,3], yet it remains above the Sustainable Development Goal (SDG) target of fewer than 70 deaths per 100,000 live births by 2030[3]. Most maternal deaths are preventable and are often linked to the "three delays" described by Thaddeus and Maine: delay in deciding to seek care, delay in reaching care, and delay in receiving adequate care [4]. To address these challenges, the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) proposed the Birth

Preparedness and Complication Readiness (BPCR) strategy. BPCR emphasizes planning for normal delivery and anticipating emergencies by identifying a skilled birth attendant, selecting a health facility, arranging transport, saving money, and identifying potential blood donors. Complication readiness also includes awareness of danger signs by women, families, and communities to promote timely decision-making and reduce preventable maternal and neonatal deaths [5].

In India, initiatives under the National Health Mission have focused on improving access to skilled care at birth and emergency obstetric services, including financial incentives and free referral transport [6]. However, the effectiveness of such interventions depends largely on the level of preparedness at the individual and community level. While BPCR has been shown to improve maternal and neonatal outcomes in various settings, limited evidence is available from Rajasthan, particularly Jhalawar district.

This study was conducted to assess the status of birth preparedness and complication readiness and to identify factors associated with it among pregnant women in the field practice areas of Jhalawar Medical College, Rajasthan.

The findings are expected to provide useful insights for policymakers and program managers aiming to reduce maternal mortality and improve maternal health in the region.

Aim and Objectives

Aim: To study birth preparedness and complication readiness among pregnant women in the field practice areas of Jhalawar medical college.

Objectives:

1. To assess the knowledge regarding birth preparedness and complication readiness.
2. To know practices regarding birth preparedness and complication readiness.
3. To identify the associated factors with birth preparedness and complication readiness.
4. To increase awareness regarding danger signs and birth preparedness.

Materials and Methods

Study design and setting: Community based Cross-Sectional Study.

Study duration: Six months (March 2024 to August 2024)

Study population & sample size: The study population comprised pregnant women residing in the urban and rural field practice areas of Jhalawar Medical College. Out of a total of 435 eligible women, 388 provided consent and were included in the study

Inclusion Criteria

1. Women having pregnancy.
2. Resident of Urban and rural field practice area of Jhalawar medical college.

Exclusion Criteria

1. Pregnant women who are critically ill.
2. Informed consent not given.

Sampling Method: Complete Enumeration.

Study tool: For recording of the data, a pre-tested, semi-structured schedule was prepared to take a personal interview of the pregnant woman.

The schedule had both open ended and closed ended questions. It included three parts with a leaflet attached having name of the pregnant woman, date of sample collection and Participant ID which after completion of schedule was detached and kept separately to anonymise the samples:

1. Questions to assess the socio-demographic characteristics of the respondents; environment; residence.
2. Questions to assess the obstetric and gynaecological history.
3. Questions to know the BP/CR - Knowledge and practise questions. (a total of 20 questions).

Procedure of Sampling and Data Collection: The study only involved the individual level index of the JHPIEGO BP/CR Index. All the registered ANC cases that is all the pregnant women registered in the rural field practice area and urban field practice area were selected as samples through complete enumeration.

The list was obtained from the ANC Register of the RHTC Mandawar and UHTC Jhalrapatan. After getting the list and checking for any duplicate entries, House to house visit was done and the purpose of visit was explained to the head of family and information sought for the registered pregnant female from the list. The pregnant woman was informed of the purpose and her rights explained and an informed consent was obtained after that woman (called as participant) was administered a schedule in her own language which was Hindi in all the cases. In all visits a female public health staff accompanied the researcher.

Operational definitions ("well prepared" criteria): While to know whether each of the study participant was well prepared or not we reported those who replied correctly at least half of the knowledge and practise questions to assess BP/CR out of total 20 questions to be well prepared while those answering less than half of the question correctly were reported as Less prepared. To find out association between level of preparedness and

other qualitative variables Chi Square test was applied. A p-value less than 0.05 was considered significant for a confidence level of 95 %.

Ethics: Prior permission was obtained from the Institutional Ethical Committee (Permanent Reg No- EC/NEW/INST/2022/RJ/0134) of Jhalawar Medical College with order no. 17 dated 21/02/2024 before starting the study. Prior written informed consent was obtained.

Data analysis: The data from filled schedules was entered into Microsoft Excel which further was analysed using SPSS (Ver. 28 Trial). Graphs were drawn using Microsoft Excel Spreadsheet. To calculate the overall preparedness index of the participants as a whole we used JHPIEGOW BP/CR Index, an index developed by JHPIEGO. It has six sub-indices or levels, each of the sub-indexes can be reported independently. We included in this study only the Individual level sub index. This index has a total score of 100 and contains 12 indicators under three domains: knowledge of key danger signs, service use and planning actions: intentions and behaviours, knowledge of community resources. In each of the indicators, the denominator was the number of respondents and the numerator was the number of the respondents that gave a particular response or had a particular characteristic. The total score was calculated by calculating the mean of the percentages of each individual indicator item on the index.

Table 1: Birth Preparedness and Complication Readiness among Pregnant Women (n=388)

Variable	Frequency yes (n=388)	Percentage (%)
First ANC checkup/registration in 1st trimester	373	96.1
Necessary investigations done (Blood sugar, Urine, Hb)	351	90.5
Identified doctor/health facility for delivery	343	88.4
Saved money for delivery expenses	126	32.5
Arranged transport to reach place of delivery	185	47.7
Arranged transport for higher centre (complications)	185	47.7
Identified blood donor (in case of need)	107	27.6
Got at least one dose of Td injection during pregnancy	356	91.8
Taking FA/IFA and Calcium tablets	344	88.7
Taken any drug for intestinal worms	22	5.7
Identified elderly person to help during delivery	257	66.2
Identified elderly person to stay at home during delivery period	232	59.8
Arranged clean clothes for delivery	119	30.7
Knows ≥3 danger signs of pregnancy	227	58.5
Knows ≥4 danger signs of labour & childbirth	129	33.2
Knows ≥3 danger signs of postpartum period	137	35.3
Knows ≥4 danger signs in a newborn	219	56.4
Minimum 4 ANC checkups during pregnancy	273	70.4
Aware of Govt. financial assistance for pregnant women	269	69.3
Aware of Govt. ambulance service for pregnant & delivered women	360	92.8

Table 2: Birth Preparedness and Complication Readiness (JHPIEGO Score)

S. No.	Indicator	Score (%)
1.1	Percentage of women who know key danger signs during pregnancy	58.5
1.2	Percentage of women who know key danger signs during labour and childbirth	33.2
1.3	Percentage of women who know key danger signs during postpartum period	35.3
1.4	Percentage of women who know key danger signs in the newborn	56.4
1.5	Percentage of women who plan to attend at least 4 ANC visits with a skilled provider	70.4
1.6	Percentage of women who attend first ANC visit with a skilled provider during first trimester	96.1
1.7	Percentage of women who (plan to) give birth with a skilled provider	87.4
1.8	Percentage of women who (plan to) save money for childbirth	32.5
1.9	Percentage of women who (plan to) identify a mode of transport to place of childbirth	47.7
1.10	Percentage of women who know that their community has a financial support system	69.3
1.11	Percentage of women who know that their community has a transportation system	92.8
1.12	Percentage of women who know that their community has a blood donor system	27.6

Table 3: Association between Birth Preparedness and other factors

Variable	Category	Less Prepared n (%)	Well Prepared n (%)	Total	χ^2 value	p-value
Age (years)	<20	0 (0.0)	5 (100.0)	5	18.3	<0.001*
	20–<30	113 (35.6)	204 (64.4)	317		
	≥30	7 (10.6)	59 (89.4)	66		
Residence	Rural	72 (43.1)	95 (56.9)	167	20.4	<0.001*
	Urban	48 (21.7)	173 (78.3)	221		
Religion	Hindu	91 (28.6)	227 (71.4)	318	8.85	0.012*
	Muslim	28 (45.9)	33 (54.1)	61		
	Others	1 (11.1)	8 (88.9)	9		
Education	Graduate & above	3 (5.8)	49 (94.2)	52	64.5	<0.001*
	Sr. Secondary	11 (22.9)	37 (77.1)	48		
	Secondary	21 (19.1)	89 (80.9)	110		
	Primary	7 (19.4)	29 (80.6)	36		
	Illiterate	78 (54.9)	64 (45.1)	142		
Family Type	Nuclear	51 (31.3)	112 (68.7)	163	1.96	0.376 (NS)
	Joint	23 (37.7)	38 (62.3)	61		
	Three Generation	46 (28.0)	118 (72.0)	164		
Employment	Employed	7 (9.1)	70 (90.9)	77	21.4	<0.001*
	Homemaker	113 (36.3)	198 (63.7)	311		
Modified BG Prasad Scale Class	**I**	0 (0)	11(100)	11	9.68	0.046
	II	11(25.6)	32 (74.4)	43		
	III	53 (29.9)	124 (70.1)	177		
	IV	56 (36.6)	97 (63.4)	153		
	V	0 (0)	4 (100)	4		
Duration of Marriage	≤2 years	49 (38.3)	79 (61.7)	128	21.5	<0.001*
	>2–5 years	51 (38.9)	80 (61.1)	131		
	>5 years	20 (15.5)	109 (84.5)	129		
Addiction	Yes	18 (58.1)	13 (41.9)	31	11.6	<0.001*
	No	102 (28.6)	255 (71.4)	357		
Gravida	Primi	75 (40.5)	110 (59.5)	185	15.29	<0.001*
	Multi	45 (22.2)	158 (77.8)	203		
Para	Nulli	67 (38.7)	90 (61.3)	173	17.04	<0.001*
	Multi/Primi	53 (24.7)	178 (75.3)	215		
Obstetric History (n=215)	NVD	70 (42.4)	95 (57.6)	165	20.59	<0.001*
	LSCS	4 (10.5)	34 (89.5)	38		
	Abortion	0 (0.0)	8 (100.0)	8		
	LSCS + Abortion	0 (0.0)	4 (100.0)	4		

Results

The mean age was 23.6 ± 3.2 years; the majority were aged 20–29 years (81.7%), Hindu (82.0%), homemakers (80.2%), and resided in urban areas (57.0%). Nearly half belonged to socioeconomic Class III (45.6%), and 36.6% were illiterate.

Regarding BPCR practices, 96.1% had at least one ANC visit, 88.7% consumed iron and folic acid supplements, and 91.8% had received a tetanus toxoid injection. However, only 32.5% had saved money for delivery, 47.7% arranged transport, and 27.6% identified a potential blood donor. Knowledge of danger signs was moderate (58.5% during pregnancy, 56.4% for newborns).

Overall, the mean JHPIEGO BPCR index was 58.9. Based on criteria, 69.1% were classified as 'well prepared', while 30.9% were 'less prepared'. Birth preparedness was significantly associated with higher maternal age (≥30 years), urban residence, higher education, employment, better socioeconomic status, longer marriage duration, multigravidity, previous obstetric complications, and absence of addiction ($p<0.05$).

Discussion

In the present study, 30.9% of women were classified as less prepared for childbirth, with important gaps noted in transport arrangements (only 47.7% had arranged transport), saving for delivery (32.5%), and recognition of danger signs (58.5% knew at least three pregnancy danger signs, 33.2% knew labour danger signs). When compared with national and state-level data, our findings show both similarities and gaps. According to NFHS-5 (2019–21), early ANC registration in the

first trimester was reported in about 70% of Indian women and ≥4 ANC visits in 58% nationally, while Rajasthan reported slightly better early ANC registration (≈76%) but similar ≥4 ANC coverage (≈55%) [7,8]. In our study, first-trimester ANC attendance was much higher (96.1%) and ≥4 ANC visits were reported by 70.4% of women, suggesting higher service uptake in the study area.

However, knowledge of obstetric danger signs in our population remained limited and is consistent with other Indian studies, which report awareness levels ranging from 32–66% depending on setting and education [9,10]. A facility-based study from Rajasthan similarly found that only about half of women could correctly identify key obstetric danger signs, with education and ANC contact strongly associated with knowledge [9].

The relatively low levels of preparedness, particularly in terms of transport planning, financial readiness, and danger sign awareness, may be explained by multiple interrelated factors. In rural and semi-urban areas, transport facilities are often unreliable or unaffordable, creating barriers to timely institutional delivery [11].

Limited awareness about obstetric complications, often linked to low educational attainment and inadequate counselling during ANC, contributes to poor recognition of danger signs [3,4]. Furthermore, cultural norms and reliance on traditional practices frequently delay decision-making and planning for delivery, with families prioritizing elder approval or local remedies before seeking institutional care [12]. These findings indicate that although ANC coverage indicators in our study exceed national and state averages, functional preparedness elements remain suboptimal, a trend also highlighted in reviews of birth preparedness and complication readiness across India [11,12].

Strength and Limitations

The strength of this study lies in its focus on assessing birth preparedness and complication readiness among pregnant women, the most critical group directly influencing maternal and neonatal outcomes. The relatively large sample size and use of standardized indicators also add robustness to the findings.

However, the study has certain limitations. It was cross-sectional in design, providing only a snapshot rather than trends over time, and it focused solely on pregnant women without including other key stakeholders such as family members, community elders, or health workers, whose roles are crucial in preparedness. Additionally, recently delivered women were not included, which could have provided valuable insights into actual practices and experiences.

Conclusion

The study revealed that although 69.1% of pregnant women were well prepared for birth and complications, gaps remain in financial planning, transport, and blood donor arrangements. Preparedness was positively associated with education, urban residence, higher socioeconomic status, and obstetric experience. Targeted interventions focusing on rural, less educated, unemployed, and primigravid women are crucial to reduce preventable maternal and neonatal mortality.

BPCR was inadequate among pregnant women in the study area. Focused health education and antenatal counseling can improve preparedness and reduce maternal mortality.

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