

# Safer motherhood - birth preparedness and complication readiness assessment among pregnant women residing in urban slums of Marathwada region

Kalpak Shirish Kadarkar<sup>1</sup>, Rajeshree S. Dhok<sup>2</sup>

<sup>1</sup>Department of Community Medicine, Rural Medical College, PIMS-DU, Loni, <sup>2</sup>Department of Community Medicine, B.J Medical College, Pune, Maharashtra, India

## ABSTRACT

**Background:** Birth Preparedness and Complication Readiness (BPACR) is the intervention for planning of normal birth and anticipating the actions needed in case of complications. It is a comprehensive strategy to improve the use of skilled providers at birth, the key measure to reduce maternal mortality. **Objectives:** To assess the status of BPACR and associated sociodemographic factors among pregnant women in community. **Materials and Methods:** A community-based descriptive longitudinal study undertaken at urban slums among 156 pregnant women with >28 weeks of gestation. They were interviewed for BPACR components. **Results:** BPACR index was observed to be lower 48.3%. About 88% were aware about any one danger signs of pregnancy. Nearly, 77% of women availed antenatal care service in first trimester. About 85% women identified skilled birth attendant and mode of transport for delivery, 66% women saved money for delivery. Most common danger sign noted was abdominal pain (65.38%). Mother's education, occupation, parity, and socioeconomic condition were significantly associated with three out of four components of BPACR. **Conclusion:** Low level of BPACR index was attributed to low level of awareness regarding government sponsored schemes and danger signs of pregnancy. This highlights need of more efforts in services provided by health care providers and workers. There is need of intense Information, Education and Communication activity focused on pregnant women and their family members.

**Keywords:** Danger signs, Janani Suraksha Yojana, Marathwada, Maternal and Child Health (MCH), Maternal Mortality Ratio

## Introduction

India has miles to go to reduce maternal mortality ratio (MMR) as according to Sustainable Development Goal 3 (SDG3.1), we have to achieve MMR of less than 70 per 100000 live births by 2030 from the level of 113 per 100000 live births for the last 3 years reported by Sample Registration System (SRS).<sup>[1-3]</sup> Maternal Health Care is one of the important pillar

of RMNCH+A (Reproductive Maternal Neonatal Child and Adolescent Health) Strategy which mainly focus on antenatal care and "at risk" cases management under National Health Mission (NHM) programme.<sup>[4]</sup> High levels of Maternal Mortality Ratio (MMR) (130 per 100000 live births), perinatal (23 per 1000), and neonatal (24 per 1000) mortality rate remain major public health challenge in India.<sup>[5,6]</sup>

In India social factors like socioeconomic status, family size, age at child birth, educational status, transportation problem, home delivery by untrained dais and many more along with obstetrics and nonobstetrics causes are determinants of maternal mortality.<sup>[7]</sup> Birth Preparedness and Complication

**Address for correspondence:** Dr. Kalpak Shirish Kadarkar, Kalpataru Hsg. Society, College Road, Sangamner, Ahmednagar - 422605, Maharashtra, India.  
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Readiness (BPACR) assessment is an appropriate technology from primary health care point of view as it assesses awareness among pregnant women regarding preparedness for childbirth and related complications which helps primary care physician and health care workers to provide accessible, equitable, and affordable health care services at village level. Preparedness for birth and related complications of a child is a process to accelerate the timely use of skilled care, especially during childbirth.<sup>[8,9]</sup>

BPACR is the intervention for planning of normal birth and anticipating the actions needed in case of complications. Marathwada region in Maharashtra had poor record of MCH indicators in DLHS-4.<sup>[10]</sup> This study therefore aimed to assess the status of BPACR and associated sociodemographic factors among pregnant women residing in urban slums.

## Materials and Methods

### Study design, setting and duration

This study was a community-based observational descriptive longitudinal study undertaken at two randomly selected urban slums in Aurangabad. Aurangabad is important city in Marathwada region of Maharashtra with 11.75 lakh population and 87.5% literacy rate. There are 41723 households in slum areas of Aurangabad encompassing 18.81% of total city population.<sup>[11]</sup> Slums under study had total population of about 31000 with 5665 households. The population was covered by health care staff of health-post administered by Aurangabad Municipal Corporation. There were around 380 pregnant women present in study area as per records of health post staffs at the time of survey. Study was conducted from September 2017 to December 2018 which includes preparation, data collection, and data analysis phase.

### Sample size and sampling technique

A community-based longitudinal study was conducted in two urban slums of city. Lottery method was used to select two slums randomly. Line listing of households and marking of households with pregnant women were done with help of health workers. Random number table method was used for selection of eligible cases from line listed cases. In sample size calculations, variable assumed was BPCR index (mean of seven indicators assessing the knowledge of community resources, planned actions, danger signs, and service utilization) of 47.5% in a study conducted at Madhya Pradesh.<sup>[12]</sup> By taking 8.5% as absolute precision and 5% alpha-error (95% confidence level), calculated sample size by using OpenEpi software was 133. Considering 10% loss to follow-up, it was 147. In study area, 192 pregnant women satisfying inclusion criteria (except willingness for participation) were found but 15 were not willing to participate and in 21 cases data was incomplete. So, final sample size was 156.

### Inclusion and exclusion criteria

Pregnant women with more than 28 weeks of gestation were included (as by that time most of BPACR criteria should have followed). Those with mentally incapable and not willing to participate in study were excluded.

## Ethical commitment

Institutional Ethics Committee (IEC) permission was taken before data collection. With assurance of anonymity and confidentiality and after giving detailed information about study procedure in local language, a valid written informed consent was taken.

## Data collection

Information about sociodemographic parameters and ante natal care utilization was collected at first visit. Information about ante natal care utilization was updated again in subsequent visit paid in around 37–39 weeks of gestation. They were interviewed with a pre-tested, semistructured interview schedule for BPACR components along with sociodemographic and other obstetrics factors. BPACR include many components, like: (a) Awareness about danger signs of pregnancy; (b) antenatal care (ANC) registration; (c) arrangement for transportation for delivery; (d) saved money for delivery; (e) identification of skilled birth attendant; (f) knowledge about financial assistance in JSY; and (g) transportation assistance under JSY.

## Statistical analysis

BPACR Index was calculated using above components. BPACR index was developed by the John Hopkin Bloomberg School of Public health.<sup>[3]</sup> Socioeconomic classification was based on poverty line guidelines issued by Government of.<sup>[4]</sup> Data were entered using Microsoft Excel 2013 version and analyzed with SPSS-v. 16. Descriptive statistics like frequency and proportions were used for qualitative data, while mean and standard deviation were used for quantitative data. Chi-square test and multivariate analysis were used as inferential statistics ( $P < 0.05$ ). Graphs and tables were used at appropriate places.

## Results

In this study, total 156 pregnant women (>28 weeks of gestation) were interviewed. The mean  $\pm$  standard D = deviation age of participants was  $22.8 \pm 3.26$  years, ranging from 18 to 30 years. Mean age at marriage was 17.7 years (range 13–22 years) and mean age at 1<sup>st</sup> childbirth was 19.1 (14–27 years). Most of respondents were Muslims (80.8%) and rest were Hindus (19.2%). As depicted in Figure 1, out of 156, 66 (42.3%) were having nuclear family and 57.7% were having joint family. Average per capita income

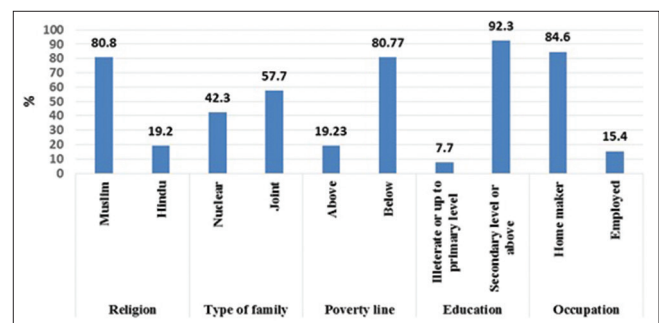


Figure 1: Sociodemographic profile of study participants ( $n = 156$ )

was  $2173 \pm 1095.6$  INR. Only 30 (19.23%) participants belonged to above poverty line socioeconomic status and the rest (80.77%) were below poverty line. Educationally 12 (7.7%) were illiterate or educated up to primary level, whereas 144 (92.3%) were up to secondary or above. Among all respondents, 132 (84.6%) were home maker and 24 (15.4%) were employed. Considering pregnancy status 42 (26.9%) was primigravidae and highest parity was 3.

Table 1 shows awareness and practices among pregnant women about ANC and danger signs during pregnancy and labor. Out of 156 respondents, 76.9% were registered in 1<sup>st</sup> trimester, whereas 19.23% and 3.85% were in 2<sup>nd</sup> and 3<sup>rd</sup>, respectively. Only 19.23% were aware about Mother and Child Tracking System (MCTS) number. One third of respondents (34.6%) were completed four or more ANC visits. Average ANC visits were 3 (range 1–7). Nearly, 66% women knew about significance of iron folic acid tablets during pregnancy. About 92% were aware about tetanus immunization. About 20% were having knowledge about financial assistance provided in JSY and only 3.85% were knowing about transport assistance in JSY. As seen in Table 1 among all participants 87.8% were aware about any one danger signs of pregnancy. None of the women knew >8 danger signs of pregnancy. Most common danger sign noted was abdominal pain (65.38%) followed by edema over face and extremities (62.18%) and bleeding per vaginum (53.85%). About 19% were knew about any one danger sign during labor. [Table 1]

Table 2 highlights levels of BPACR. None of women knew about more than eight danger signs of pregnancy. About one fifth of women were knowing about financial assistance provided by government in JSY. Only 3.8% were aware about transportation component of JSY. Nearly, 77% of women availed ANC service in first trimester. About 85% women identified skilled birth attendant and mode of transport for delivery. Two third women saved money for expenses to be occurred during delivery. BPACR was 48.3%.

Association between maternal factors and various components of BPACR evident from Table 3. Mother's age ( $P = 0.002$ ), occupation ( $P = 0.046$ ), religion ( $P = 0.025$ ), and parity ( $P < 0.001$ ) were statistically significantly associated with awareness about danger signs of pregnancy. But education and socio-economic status were not significantly associated. ANC registration in 1<sup>st</sup> trimester was significantly associated with socioeconomic status ( $P < 0.001$ ), religion ( $P < 0.001$ ), and education ( $P = 0.048$ ). Mother's education, occupation, parity, and socioeconomic condition were significantly associated with saving money for delivery and making arrangements for transportation.

The adjusted multivariate model showed that among all these significantly associated factors, age ( $P = 0.005$ ) was significant predictor for awareness of danger signs of pregnancy and socioeconomic status ( $P = 0.003$ ) for savings for delivery. It clearly stated that women with age more than or equal to 20 have

**Table 1: Awareness and practices about antenatal care (ANC) and danger signs during pregnancy and labor (n=156)**

	No. of women	Percentage
ANC Registration done during		
1 <sup>st</sup> trimester	120	76.92
2 <sup>nd</sup> trimester	30	19.23
3 <sup>rd</sup> trimester	6	3.85
Awareness about mother and child tracking system (MCTS) no.	30	19.23
≥4 antenatal visits	54	34.62
Iron folic acid (IFA) tablets	102	65.38
Immunization against tetanus (IT)	144	92.31
Awareness about financial assistance provided in Janani Suraksha Yojana (JSY)	30	19.23
Awareness about transportation provided in JSY	6	3.85
Awareness of danger signs during pregnancy		
Severe hemorrhage per vaginum	84	53.85
Abdominal pain	102	65.38
Edema over face and extremities	97	62.18
Altered fetal movements	78	50.00
Leakage per vagina	30	19.23
Palpitations, easy fatigability, and breathlessness at rest	9	5.77
Fever for more than 24 h	21	13.46
Headache	28	17.95
Blurring of vision	19	12.18
Excessive vomiting	36	23.08
Awareness of danger signs during labor		
Severe vaginal blood loss	27	17.31
Prolonged labor	23	14.74
Convulsions	8	5.13
Retained placenta	3	1.92

**Table 2: Birth Preparedness and Complication Readiness Index (BPACR) (n=156)**

Factors	Frequency	Percentage
Percentage of the women who knew about >8 danger signs of pregnancy.	0	0
Percentage of the women who knew about financial assistance provided by government in Janani Suraksha Yojana (JSY).	30	19.2
Percentage of the women who knew about transportation provided by government in JSY.	6	3.8
Percentage of the women who availed Antenatal Care (ANC) in 1st trimester by skilled provider.	120	76.9
Percentage of the women who identified skilled birth attendant for delivery.	137	87.8
Percentage of the women who identified mode of transportation.	132	84.6
Percentage of the women who saved money to pay for expenses.	102	65.4
BPACR INDEX = $\Sigma$ indicators/7		48.3

**Table 3: Association between maternal factors and components of Birth Preparedness and Complication Readiness**

Maternal factors	Awareness about danger signs of pregnancy		ANC registration in 1 <sup>st</sup> trimester		Made arrangement for transport		Saved money	
	Yes (n=137) (%)	No (n=19) (%)	Yes (n=120) (%)	No (n=36) (%)	Yes (n=132) (%)	No (n=24) (%)	Yes (n=102) (%)	No (n=54) (%)
Religion								
Hindu (n=30)	30 (100)	0 (0)	30 (100)	0 (0)	24 (80)	6 (20)	18 (60)	12 (40)
Muslim (n=126)	107 (84.9)	19 (15.1)	90 (71.4)	36 (28.6)	108 (85.7)	18 (14.3)	84 (66.7)	42 (33.3)
P; cOR (95% CI)	0.025* <sup>†</sup>		<0.001 * <sup>†</sup>		0.44; 0.67 (0.24-1.86)		0.49; 0.75 (0.33-1.70)	
Mother's Age (years)								
<20 (n=48)	36 (75)	12 (25)	36 (75)	12 (25)	36 (75)	12 (25)	30 (62.5)	18 (37.5)
≥20 (n=108)	101 (93.5)	7 (6.5)	84 (77.8)	24 (22.2)	96 (88.9)	12 (11.1)	72 (66.7)	36 (33.3)
P; cOR (95% CI)	0.002 * <sup>‡</sup> ; 0.21 (0.08-0.57)		0.704; 0.86 (0.39-1.89)		0.026 * <sup>‡</sup> ; 0.38 (0.15-0.91)		0.61; 0.83 (0.41-1.69)	
Education								
Illiterate and primary (n=12)	12 (100)	0 (0)	12 (100)	0 (0)	0 (0)	12 (100)	0 (0)	12 (100)
Secondary and above (n=144)	125 (86.8)	19 (13.2)	108 (75)	36 (25)	132 (91.7)	12 (8.3)	102 (70.8)	42 (29.2)
P; cOR (95% CI)	0.363 <sup>†</sup>		0.048 * <sup>†</sup>		<0.001 * <sup>†</sup>		<0.001 * <sup>†</sup>	
Occupation								
Unemployed (n=132)	113 (85.6)	19 (14.4)	102 (77.3)	30 (22.7)	108 (81.8)	24 (18.2)	78 (59.1)	54 (40.9)
Employed (n=24)	24 (100)	0 (0)	18 (75)	6 (25)	24 (100)	0 (0)	24 (100)	0 (0)
P; cOR (95% CI)	0.046* <sup>†</sup>		0.81; 1.13 (0.41-3.11)		0.027* <sup>†</sup>		<0.001 * <sup>†</sup>	
Parity								
0 (n=42)	30 (71.4)	12 (28.6)	30 (71.4)	12 (28.6)	30 (71.4)	12 (28.6)	18 (42.9)	24 (27.1)
≥1 (n=114)	107 (93.9)	7 (6.1)	90 (78.9)	24 (21.1)	102 (89.5)	12 (10.5)	84 (73.7)	30 (26.3)
P; cOR (95% CI)	<0.001 * <sup>‡</sup> ; 0.16 (0.06-0.45)		0.32; 0.67 (0.29-1.49)		0.006* <sup>‡</sup> ; 0.29 (0.12-0.72)		<0.001* <sup>‡</sup> ; 0.27 (0.13-0.56)	
Socioeconomic condition								
BPL (n=126)	108 (85.7)	18 (14.3)	90 (71.4)	36 (28.6)	102 (81)	24 (19)	90 (71.4)	36 (28.6)
APL (n=30)	29 (96.7)	1 (3.3)	30 (100)	0 (0)	30 (100)	0 (0)	12 (40)	18 (60)
P; cOR (95% CI)	0.099; 0.21 (0.027-1.62)		<0.001 * <sup>†</sup>		0.005 * <sup>†</sup>		0.001* <sup>‡</sup> ; 3.75 (1.64-8.57)	

\*Chi-square P value statistically significant; <sup>†</sup>crude odds ratio could not be calculated as observation in cell contain zero; <sup>‡</sup>statistically significant P value of adjusted multivariate model. cOR: Crude Odds ratio; CI: Confidence interval; BPL: Below poverty line; APL: Above poverty line

higher awareness than women with age less than 20 (adjusted OR: 6.72, CI: 1.79–25.15) and women with below poverty line socioeconomic status did not saved money as compared to above poverty line status in terms of proportions (adjusted OR: 0.26, CI: 0.11–0.62).

## Discussion

BPACR is a managerial tool for primary care physician as it assesses performance of baseline health care staff like ASHA workers, multipurpose workers (MPWs), auxiliary nurse midwife (ANM), etc., regarding creating awareness among women for proper antenatal care, mitigating danger signs during antenatal period and labor, benefits of beforehand identification

of transportation and childbirth facility and use of various national health schemes. Beside this BPACR is a strategy to accelerate the timely use of skilled maternal and neonatal care, especially during childbirth, based on a fact that preparing for childbirth and readiness for complications reduces delays in availing this care.<sup>[12]</sup>

In this study it was noted that ANC registration during first trimester (76.92%) was higher than findings noted in District Level Health Survey (DLHS) 4 i.e. (67.8%).<sup>[13]</sup> Previous studies done in REWA also reported less ANC registration in 1<sup>st</sup> trimester (31.9%).<sup>[12]</sup> Present study reported about 35% women completed four or more ANC visits which was lower than findings noted in DLHS-4, NFHS-4 and study done by

Kakaire *et al.* in Uganda.<sup>[13-15]</sup> Marginally higher prevalence of tetanus toxoid immunized women (92.31) and women who had consumed 100 IFA tablets (65.38%) was noted in our study as compared to DLHS-4 report (90.6% and 42.5%, respectively).<sup>[13]</sup> Awareness and participation of women in government sponsored schemes like financial assistance and transport facility under Janani Suraksha Yojana (JSY) and registration under Mother and Child Tracking System (MCTS) were very less than 20% which is needed to be addressed through proper channel.

Current study found out that about 88% were aware about any one danger signs of pregnancy. Most common danger sign were noted was abdominal pain (65.38%) followed by edema over face and extremities (62.18%) and bleeding per vaginum (53.85%) which was differ from findings of the previous study done Ethiopia which stated that only 15.4% mentioned at least one danger sign and most common danger sign noted was vaginal bleeding (10.9%), blurred vision (2.2%), and swollen hand/face (5.2%) but findings regarding danger signs during labor matched with our study at certain level.<sup>[16]</sup>

BPACR index was calculated based on seven components and was observed 48.3% which closely matches with BPACR index found in study done in REWA (47.5%). Though 88% were knowing about any one danger sign of pregnancy but none knew about > 8 danger sign of pregnancy.<sup>[12]</sup> Also higher proportion was noted in case of 1<sup>st</sup> trimester registration (76.9%), women who had identified mode of transportation (84.6%) and saved money for expenses (65.4%) than findings observed in study done in REWA i.e. (24.1%, 18.6%, and 44.2%, respectively).<sup>[12]</sup> Study conducted in Ethiopia among 743 pregnant women, it was highlighted that only one fourth (20.5%) of pregnant women identified skilled provider which grossly lower than present study finding (87.7%).<sup>[17]</sup> Study done by Akshaya *et al.*<sup>[18]</sup> in Karnataka reported much higher levels of BPACR (79.3%) than present study findings. This difference might be due to lower levels of education, less proportion of institutional delivery and other social factors. Comparable levels of BPACR were reported by studies done in Nepal (31 to 65%) and Tanzania (58.2%).<sup>[19,20]</sup>

Study done by Wayessa *et al.*<sup>[21]</sup> reported 46.3% women practiced four or more BPACR steps. Debelie *et al.*<sup>[22]</sup> conducted a study on 1620 pregnant women found that prevalence of BPCR plan during pregnancy and the practice at the time of delivery were 66.1% and 73.5%, respectively. Only 15% were able to tell at least three of the five basic components of BPACR in study done by Saaka *et al.*<sup>[23]</sup> Findings of above studies are consistent with present study.

On statistical analysis mother's education, occupation, parity, and socioeconomic condition was significantly associated with three out of four components of BPACR and age were associated with two components. Study done in north Ethiopia stated that maternal education was a strong predictor in preparation for birth and complication, there was a statistically

significant association between parity and birth planning. Our study reported slightly different finding than this as age of mother and socioeconomic status were significant predictor of birth plan.<sup>[12]</sup> Many studies reported significant association of literacy levels with BPACR levels but current study did not observed such statistically significant association. This finding was similar to finding reported by Akshaya *et al.*<sup>[18]</sup> and Timsia *et al.*<sup>[24]</sup>

Study done by Limenih *et al.*<sup>[25]</sup> in Ethiopia stated that residence, educational status, antenatal care follow-up, history of stillbirth, knowledge of BPACR plans, knowledge of key danger signs during pregnancy, child birth, and postpartum period were significantly associated with practice of BPACR plan. Debelie *et al.*<sup>[22]</sup> stated that frequency of ANC visits, larger number of family in the household, highest wealth asset, multigravidity, husband involvement in decision making, counseled on BPCR were found to be significantly associated with BPCR practice. Findings of these studies are quite similar to present study. Tunkara-Bah *et al.*<sup>[26]</sup> reported similar findings in their study along with highlighted importance of educating men on maternal health can improve their involvement in birth preparedness.

## Conclusion

This study highlights not only positive things like good ANC registration, higher level of awareness towards IFA supplementation and TT immunization, making arrangement for delivery in terms of transportation and saving of money but also negative things like low awareness regarding danger signs of pregnancy and government sponsored schemes for safe motherhood. BPACR index was observed less (48.3%) in this study which was mainly attributed to low level of awareness and participation in government sponsored schemes like JSY and also low awareness regarding danger signs of pregnancy. This signifies extra efforts that are needed to be exerted by health system through health care providers and health care workers.

## Limitations

Major limitation of study was recall bias about minute details of ante natal care utilization. Partial awareness of few participants about components of BPACR was another limitation.

## Recommendations

BPACR assessment should be frequently conducted by primary care physicians especially in slums, tribal and rural areas to assess performance of baseline health care workers regarding increasing level of awareness among beneficiaries. Bases on assessment intense Information, Education and Communication (IEC) activity focused on pregnant women and their family members. Antenatal care with vigorous counseling regarding safer birth planning is need of a time which will ultimately result in safer motherhood and childhood.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Key Message

Frequent BPACR assessment especially in slums, tribal, and rural areas is key in the hands of primary care physicians for safer motherhood and childhood by reducing maternal and infant mortality.

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## Conflicts of interest

There are no conflicts of interest.

## References

- World Health Organization. World health statistics 2021: Monitoring health for the SDGs. 2021. Available from: [https://cdn.who.int/media/docs/default-source/gho-documents/world-health-statistic-reports/2021/whs-2021\\_20may.pdf?sfvrsn=55c7c6f2\\_18](https://cdn.who.int/media/docs/default-source/gho-documents/world-health-statistic-reports/2021/whs-2021_20may.pdf?sfvrsn=55c7c6f2_18). [Last accessed on 2021 Jun 26].
- Ministry of Health and Family Welfare. Maternal Mortality Rate 2021. The Sample Registration System (SRS) report by Registrar General of India (RGI). Available from: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1697441>. [Last accessed on 2021 Jun 26].
- Govt. of India. National Health Profile- 14<sup>th</sup> Issue-Central Bureau of Health. Available from: <http://www.cbhidghs.nic.in/showfile.php?lid=1147>. [Last accessed on 2021 Jun 26].
- Reproductive, maternal, newborn, child and adolescent health. National Health Mission. Available from: [https://nhm.gov.in/images/pdf/RMNCH+A/RMNCH+A\\_Strategy.pdf](https://nhm.gov.in/images/pdf/RMNCH+A/RMNCH+A_Strategy.pdf). [Last accessed on 2021 Sep 30].
- Govt. of India. Special Bulletin on Maternal Mortality in India 2014-16. SRS, Dec. 2018, Office of Registrar General of India. 2018. Available from: [http://censusindia.gov.in/2011-Common/Sample\\_Registration\\_System.html](http://censusindia.gov.in/2011-Common/Sample_Registration_System.html). [Last accessed on 2019 Dec 25].
- Govt. of India. Sample Registration System Statistical Report 2016, Office of Registrar, General of India. 2017. Available from: [http://censusindia.gov.in/vital\\_statistics/SRS\\_Statistical\\_Report.html](http://censusindia.gov.in/vital_statistics/SRS_Statistical_Report.html). [Last accessed on 2019 Dec 25].
- Park K. Preventive medicine in obstetrics, paediatrics and geriatrics. Textbook of Preventive and Social Medicine. 26<sup>th</sup> ed. Jabalpur: Banarasidas Bhanot Publishers; 2021. p. 590-610.
- Baya B, Sangli G, Maiga A. Measuring the Effects of Behavior Change Interventions in Burkina Faso with Population-Based Survey Results. Baltimore, Maryland, USA: JHPIEGO; 2004. p. 18-45. Available from: [http://reprolineplus.org/system/files/resources/bci\\_%20burkina.pdf](http://reprolineplus.org/system/files/resources/bci_%20burkina.pdf). [Last accessed on 2019 Dec 25].
- Maternal and Neonatal Health Programme. Birth Preparedness and Complication Readiness: A Matrix of Shared Responsibilities. Baltimore, MD: JHPIEGO; 2001. p. 12.
- International Institute for Population Sciences (IIPS). District Level Household and Facility Survey (DLHS-4) Aurangabad, Maharashtra. IIPS Mumbai 2012-13. Available from: [http://rchiips.org/nfhs/FCTS/MH/MH\\_FactSheet\\_515\\_Aurangabad.pdf](http://rchiips.org/nfhs/FCTS/MH/MH_FactSheet_515_Aurangabad.pdf). [Last accessed on 2019 Dec 25].
- Govt. of India. Aurangabad City Census 2011 data. Office of Registrar, General of India. Available from: <https://www.census2011.co.in/census/city/360-aurangabad.html>. [Last accessed on 2019 Dec 25].
- Nandan D, Kushwah SS, Dubey DK, Singh G, Shivdasani JP, Adish V. A study for assessing Birth Preparedness and Complication Readiness intervention in Rewa district of Madhya Pradesh. National Institute of Health and Family Welfare, New Delhi. 2009. <http://www.nihfw.org/doc/RAHI-II%20Reports/REWA.pdf>. [Last accessed on 2021 Oct 05].
- International Institute for Population Sciences (IIPS). District Level Household and Facility Survey (DLHS-4) India. Maharashtra, Mumbai, IIPS; 2012-13. p. 12-5. Available from: <http://rchiips.org/DLHS-4.html>. [Last accessed on 2019 Dec 25].
- Govt. of India. Maharashtra fact sheet. NFHS-4-National Family Health Survey. Ministry of Health and Family Welfare, 2015-16. p. 1-8. Available from: [http://rchiips.org/NFHS/factsheet\\_NFHS-4.shtml](http://rchiips.org/NFHS/factsheet_NFHS-4.shtml). [Last accessed on 2019 Dec 25].
- Kakaire O, Kaye DK, Osinde MO. Male involvement in birth preparedness and complication readiness for emergency obstetric referrals in rural Uganda. *Reprod Health* 2011;8:12.
- Hiluf M, Fantahun M. Birth preparedness and complication readiness among women in Adigrat town, north Ethiopia. *Ethiop J Health Dev* 2007;22:14-20.
- Hailu M, Gebremariam A, Alemseged F, Deribe K. Birth preparedness and complication readiness among pregnant women in Southern Ethiopia. *PLoS One* 2011;6:e21432.
- Akshaya KM, Shivalli S. Birth preparedness and complication readiness among the women beneficiaries of selected rural primary health centers of Dakshina Kannada district, Karnataka, India. *PLoS One* 2017;12:e0183739.
- Karkee R, Lee AH, Binns CW. Birth preparedness and skilled attendance at birth in Nepal: Implications for achieving millennium development goal 5. *Midwifery* 2013;29:1206-10.
- Bintabara D, Mohamed MA, Mghamba J, Wasswa P, Mpembeni RNM. Birth preparedness and complication readiness among recently delivered women in chamwino district, central Tanzania: A cross sectional study. *Reprod Health* 2015;12:44.
- Wayessa Z, Tegegne K. Birth preparation and complication readiness among antenatal care attendants in Bule Hora governmental health facilities in Oromia region, Ethiopia, in 2019. *J Midwifery Reprod Health* 2021;9:2669-78.
- Debelie TZ, Abdo AA, Anteneh KT, Limenih MA, Asaye MM, Lake Aynalem G, *et al*. Birth preparedness and complication readiness practice and associated factors among pregnant women in Northwest Ethiopia: 2018. *PLoS One* 2021;16:e0249083.
- Saaka M, Alhassan L. Prevalence and predictors of birth preparedness and complication readiness in

- the Kassena-Nankana district of Ghana: An analytical cross-sectional study. *BMJ Open* 2021;11:e042906.
24. Timsia L, Marrone G, Ekirapa E, Waiswa P. Strategies for helping families prepare for birth: Experiences from eastern central Uganda. *Glob Health Action* 2015;8:23969.
25. Limenih MA, Belay HG, Tassew HA. Birth preparedness, readiness planning and associated factors among mothers in Farta district, Ethiopia: A cross-sectional study. *BMC Pregnancy Childbirth* 2019;19:171.
26. Tunkara-Bah H, Adeyemo FO, Okonofua FE. Effects of health education on spousal knowledge and participation in birth preparedness in Farafenni Regional Hospital, The Gambia: A randomized trial. *BMC Pregnancy Childbirth* 2021;21:129.