Original Research Article

Birth preparedness: studying its effectiveness in improving maternal health in urban slums of Jamnagar, Gujarat

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Received: 21 September 2017

Revised: 30 October 2017

Accepted: 31 October 2017

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ABSTRACT

Background: Maternal health and healthy outcome of a pregnancy are the core focus of all the programmes related to maternal and child health. Most of the causes of maternal morbidity and mortality are preventable. So we need to introduce new strategies according to the need of beneficiaries to reduce the underlying causes which ultimately lead to morbidities or complications during pregnancy. Birth preparedness is a kind of strategy which can help the mothers to plan out their pregnancy to combat the complications arising during pregnancy, childbirth or puerperium. The aims and objectives were to study the birth preparedness amongst the women, to study effect of various socio demographic determinants on birth preparedness and to find out relation between maternal morbidity and mortality with birth preparedness.

Methods: Cross sectional study was conducted in Jamnagar. 450 women were selected by 30 cluster sampling. Data analysis was done with Microsoft office Excel and SPSS 20, Chi square test was applied.

Results: 11.33% women were fully prepared, 67.33% were partially prepared while 96 women were not prepared at all. Education, place of delivery, parity and knowledge of danger signs has statistically significant association with birth preparedness in cases of both maternal mortalities, women were not at all prepared.

Conclusions: Birth preparedness practices need to be improved. Education, parity, place of delivery, knowledge about danger signs are associated with birth preparedness practices. Birth preparedness can help in decreasing maternal morbidities and mortalities.

Keywords: Birth preparedness, Maternal morbidity, Verbal autopsy

INTRODUCTION

Maternal health and healthy outcome of a pregnancy are the core focus of all the programmes related to maternal and child health. Most of the causes of maternal morbidity and mortality are preventable. So we need to introduce new strategies according to the need of beneficiaries to reduce the underlying causes which ultimately lead to morbidities or complications during pregnancy. Birth preparedness is a kind of strategy which

can help the mothers to plan out their pregnancy to combat the complications arising during pregnancy, childbirth or puerperium.

The global standard for maternal and neonatal care issued by WHO in 2006 recommended that all pregnant women should have a written plan for birth and for dealing with unexpected adverse events in deliveries or immediately after birth. This plan should be discussed with skilled attendant at each antenatal visit or at least one month before delivery.¹

According to SRS 2010-2013 MMR in India was 178/1 lac live births.²

According to a study by Hogan et al, India's Maternal Mortality per 1 lac live birth was 200-299/1 lac live births.³

Lack of advance planning for use of a skilled birth attendant for normal births, and particularly inadequate preparation for rapid action in the event of obstetric complications, are well documented factors contributing to delay in receiving skilled obstetric care.⁴

The determinants of maternal health and mortality interact to produce a complex set of circumstances that involve clients, communities, the health system, and the government. These dynamics become urgent when a life-threatening obstetric emergency occurs.

The delay model (Thaddeus and Maine, 1994) outlines the three delays in obtaining emergency obstetric care and provides an elegant example of these interactions:^{5,6}

Delay one

Recognizing danger signs and deciding to seek care are influenced by a woman's knowledge of pregnancy-related health risks and by her ability to access the resources of her family and community. Poor families in communities with limited information and resources tend to delay decision making or make inappropriate choices when complications arise.

Delay two

Reaching appropriate care is exacerbated for poor rural women and their families, who tend to face higher and less predictable costs of emergency transportation because of distance and poor infrastructure.

Delay three

Receiving care at health facilities is influenced by economic status, discrimination based on gender or ethnic prejudice, and availability of providers. Poor families often have to borrow money to pay up front when complications arise. Frequently, households do not have ready access to sufficient cash in time, and often, credit is withheld for needed supplies, medications, and services.

By utilizing this three delay model the concept of birth preparedness has been developed.

Key elements of birth preparedness include:⁸

- Attending antenatal care at least four times during pregnancy (1st Delay)
- Identification of Danger signs of pregnancy (1st delay)

- Identifying a skilled provider and making a plan for reaching the facility during labour; (Transportation) (2nd delay)
- Setting aside personal funds to cover the costs of travelling to and delivering with a skilled provider and any required supplies (3rd Delay)

Birth preparedness has been globally endorsed as an essential component of safe motherhood programs to reduce delays for care.⁴

Birth preparedness involves not only the pregnant woman, but also her family, community and available health staff. The support and involvement of these persons can be critical in ensuring that a woman can adequately prepare for delivery and carry out a birth plan.

Medical researchers have established the certainty of at least 15% of all pregnant women who will experience a life-threatening complication. Medical solutions on treating these complications as soon as they occur have also been found. The gulf between the occurrence of complication and treatment is, however, obstructed by access, distance, ignorance of danger signs, superstitious beliefs, inadequate investment in emergency obstetric care (EmOC) services, and above all, entrenched gender biases that wrest away women's basic rights, including the right to make decisions concerning their own life.⁹

METHODS

Quantitative method

A cross sectional community based study was conducted in urban slums of Jamnagar Municipal Corporation Area from August 2010 to December 2011. By using Cluster sampling technique 30 clusters were selected and 15 women from each cluster were interviewed who had delivered in last 1 year. The study was carried out by undertaking house to house visits of the area of each cluster. From a random direction in each cluster, study was started by asking the family if there was any woman who had delivered in last one year (1st September 2009 to 31st August 2010- women who delivered in that duration).

Sample size is calculated by formula $n = 4pq/l^2$, Where,

n = required sample size

p =proportion or prevalence of interest

$q=100-p$

l =allowable error (10 – 20%)

An anticipated P value is taken as 50% as per WHO practical manual on sample size determination in health studies by Lwanga and Lemeshow.¹⁰

p is taken as 50%, so as $q=50\%$. If $L=10\%$,

Then, sample size would be.....

$$n = \frac{4 \times 50 \times 50}{5 \times 5} = 400$$

Non-response rate/loss of sample = 10% of sample size

So, total sample size comes out to be 440 for the study. To make round figure, 450 study subjects were chosen.

A pretested semi-structured Performa was used to collect the data through oral questionnaire by visiting them at their home. Prior verbal consent was taken from study subjects. The data entry was done in Microsoft Office Excel 2007. Analysis was done by the use of Medcalc 10.4.8.0., SPSS version 20 and Microsoft office Excel 2007. Prior approval from ethical committee was taken.

Qualitative method

Community based maternal death review (CBMDR) was done with the help of verbal autopsy tool, which was designed with the help of Verbal Autopsies for Maternal deaths by WHO.¹¹ In depth interview of respondent/caretaker of the deceased was taken using structured questionnaire to identify the delay using three delay model and also to elicit cause of death. During data collection if any house was identified having maternal death in last one year was included in study. Verbal consent was taken prior to the interview. Total 2 Maternal deaths were identified and studied.

Birth preparedness

- **Fully prepared:** Women who had identified place for delivery, arranged transportation for emergency conditions and saved money for the same are called fully prepared women.
- **Not prepared:** Women who had not identified place of delivery, not arranged transportation and also not saved money are called not prepared.
- **Partially prepared:** Women who were not fully prepared, but did any kind of arrangement from the three (place of delivery, saving of money, transportation) are called partially prepared.

Inclusion criteria

Married women who have child less than 1 year

Exclusion criteria

Antenatal women and those who denied to participate in study.

RESULTS

The mean age of study subjects was 24.84 years. Amongst them 49% were 20-25 years old. 77.34% were Hindus while others were Muslims. 47.7% women were educated till primary. Only 5.11% were graduates. 72.45% women were from lower socio economic class according to Prasad's classification.

99% women had taken antenatal visits. 59.1% women had consumed IFA tablets for more than 100 days during their last pregnancy, while 96.9% women had received two doses of TT during antenatal period. 61.77% women had knowledge regarding danger signs of pregnancy.

Figure 1: Distribution of women according to their birth preparedness.

Figure 1 shows that only 11.33% women were fully prepared before the delivery. 303(67.33%) women were partially prepared and rest 96 women were not at all prepared for delivery and complications.

About the Birth preparedness, the study revealed that almost three fourth of the women, i.e. 76.44% had identified the place of delivery where they are going to deliver, While delivery only one third women, 37.56% had saved money for delivery and emergency due to complications. Only 15.56% women had managed a vehicle for emergency situation or for labour (Table 1).

Table 1: Distribution of women according various components of Birth preparedness during last pregnancy.

Components of birth preparedness	Frequency (%)
Identified place of delivery and attendant	344 (76.44)
Saved money	169 (37.56)
Prepared vehicle	70 (15.56)

Table 2: Distribution of women according to place of last delivery (n=450).

Place of delivery	Frequency (%)
Government hospital	227 (50.45)
Private hospital	151 (33.55)
Home delivery	46 (10.22)
Quack	26 (5.78)
Total	450 (100)

In the present study, from the 404 women who delivered in health facility, two third of the women i.e. 67.58% had distance of <5 km from the health facility, 28.21% and 4.21% had distance of 5-10 km and >10 km respectively.

In the present study, 378 (84%) women had institutional deliveries, while 72 (16%) women had deliveries either at home or at quack. 50.45%, 33.55% and 10.22% women

had delivered in Government hospitals, private hospitals and at home respectively, while 5.78% women delivered at Quack (Table 2).

Table 3: Distribution of women according to mode of transportation used to reach health facility during labour (n=404).

Mode of transportation	Frequency (%)
Rickshaw	315(77.97)
Chhakada	32(7.92)
Car/taxi/van/private car	25(6.18)
Walking	20(4.95)
Bike/bus	7/1(1.98)
108	4(1)
Total	450(100)

Table 4: Association between different variables and birth preparedness (n=450).

Variable	Birth Preparedness			Total	P value
	Fully prepared	Partially prepared	Not prepared		
Any morbidity					
Yes	37 (72.5)	199 (65.7)	66 (68.8)	302 (67.11)	P=0.582 $\chi^2=1.083$ df=1
No	14 (27.5)	104 (34.3)	30 (31.2)	148 (32.89)	
Total	51 (100)	303 (100)	96 (100)	450 (100)	
History of previous abortion					
No abortion	41 (78.8)	245 (80.9)	78 (81.3)	364 (80.9)	P=0.668 $\chi^2=4.061$ df=6
1	9 (17.4)	48 (15.8)	18 (18.7)	75 (16.7)	
2	1 (3.8)	7 (2.3)	0 (0)	8 (1.8)	
3	0 (0)	3 (1)	0 (0)	3 (0.6)	
Total	51 (100)	303 (100)	96 (100)	450 (100)	
Education of women					
Illiterate	7 (4.9)	89 (62.2)	47 (32.9)	143 (100)	P<0.000 $\chi^2=65.672$ df= 8
Primary	20 (9.3)	153 (71.2)	42 (19.5)	215 (100)	
Secondary	8 (14.6)	40 (72.7)	7 (12.7)	55 (100)	
Higher secondary	4 (28.6)	10 (71.4)	0 (0)	14 (100)	
Graduate & above	12 (52.2)	11 (47.8)	0 (0)	23 (100)	
Total	51 (11.33)	303 (67.33)	96 (21.34)	450 (100)	
Place of last delivery					
Govt. hospital	20 (8.8)	183 (80.6)	24 (10.6)	227 (100)	P<0.000 $\chi^2=173.310$ df=6
Private	28 (18.5)	104 (68.9)	19 (12.6)	151 (100)	
Quack	3 (11.53)	12 (46.2)	11 (42.4)	26 (100)	
Home	0 (0)	4 (8.7)	42 (91.3)	46 (100)	
Total	51 (11.33)	303 (67.33)	96 (21.34)	450 (100)	
Knowledge about danger signs					
Yes	35 (68.6)	131 (43.2)	34 (35.4)	200 (44.5)	P<0.000 $\chi^2=32.243$ df=4
No	13 (25.5)	105 (34.7)	54 (56.3)	172 (38.2)	
Prompted	3 (5.9)	67 (22.1)	8 (8.3)	78 (17.3)	
Total	51 (100)	303 (100)	96 (100)	450 (100)	
Parity					
1	24 (47)	140 (46.2)	26 (27.1)	190 (42.2)	P=0.001 $\chi^2=31.026$ df=8
2	16 (31.4)	93 (30.7)	27 (28.1)	136 (30.2)	
3	9 (17.6)	45 (14.9)	23 (24)	77 (17.1)	
4	2 (3.9)	18 (5.9)	10 (10.4)	30 (6.7)	
>=5	0 (0)	7 (2.3)	10 (10.4)	17 (3.8)	
Total	51 (100)	303 (100)	96 (100)	450 (100)	

Table 5: Study of components of birth preparedness in cases of maternal deaths.

Variables of deceased		Case 1	Case 2
Age		30	40
Education		4 th standard	Illiterate
Gravida		3	8
Para		2	8
Abortion		1	0
Last delivery	Type of delivery	Normal	Normal
	Place of delivery	Home	Home
	Person who conducted delivery	Trained dai	Untrained dai
Time of death		7 th day of delivery	Within 3 hours of delivery
Place where she died		In hospital	On the way to hospital
Cause of death (29)		Puerperal sepsis and severe anaemia	Postpartum haemorrhage
Distance of health facility		60 km.	60 km
Delay	In seeking care		
	In arriving at appropriate level of care		✓
	In receiving care at institution	✓	

The present study revealed that, from the women who had delivered at health facility, almost three fourth i.e. 77.97% women had used Rickshaw for reaching health facility. 7.92%, 6.18%, 1.98% and 1% women used Chhakada, private vehicle, bike and 108 respectively. 4.95% women went to health facility by walking (Table 3).

Figure 3: Knowledge of women regarding danger signs of pregnancy.

Amongst the women who had knowledge regarding danger signs of pregnancy, only 7 (2.5%) women had knowledge regarding all the danger signs. Majority of the women had knowledge about Bleeding per vagina 248(89.20%), leaking P/V (PRM) (71.22%) and foetal distress (54.67%). While very few women had knowledge regarding convulsion (9%), blurring of vision (6.47%) and headache (3.24%) (Figure 2).

Amongst the variables studied, education of women ($p<0.000$), place of last delivery ($p<0.000$), knowledge

regarding danger signs ($p<0.000$) and parity ($p=0.001$) has statistically significant association with Birth preparedness practices. Women who were fully prepared had higher morbidity than those who were not prepared i.e. 72.54% and 68.75%. Partially prepared women had morbidity of 65.67%. The difference is statistically not significant. The reason might be that the women who had experienced any kind of maternal morbidity were more prepared to combat the complications. History of previous abortion also has no association with Birth preparedness practices (Table 4).

By conducting verbal autopsy of maternal death it was found that both women were not at all prepared. Case 1 had delay 3 (In receiving care at institution) and case 2 had delay 2 (In arriving at appropriate level of care) (Table 5).

DISCUSSION

In a study of Hiluf, Fantahun, one hundred eighteen (22.1%) of the total respondents were fully prepared as they identified place of delivery, saved money and identified a means of transport ahead of childbirth while Agarwal and Sidharth in their study showed that overall, 47.8% of the mothers were well-prepared, and 52.2% were less-prepared.^{12,13} Only 40.3% of these respondents were reported well prepared for births and were complication ready (ajibola).

Different studies have reported low preparedness of women towards childbirths in developing countries. For example, only 47.8% of pregnant women in Indor city of India, 17% in Ethiopia, 23% in Ghana, and 34.9% in Ile Ife, Nigeria were birth-prepared as documented in various studies.¹³⁻¹⁵

The women in present study had better birth preparedness than in a study of Hiluf, Fantahun, in which, majority

(85.8%) of the respondents made some arrangement for the birth of their baby. Of those 209 (39.1%) reported that they identified place of delivery, 190 (35.6%) saved money, 56 (10.5%) identified skilled provider and 17 (3.2%) identified a mode of transportation. Considering both unprompted and prompted responses, place of delivery selection (77%) and saving money (69%) were the most commonly identified components of birth preparedness and complications readiness.¹²

Almost similar findings were observed by Agarwal and Sidharth in their study, which showed that over two-thirds (69.6%) of the mothers identified a trained birth attendant for delivery. About two-thirds (63.8%) of the mothers identified a health facility for obstetric emergency. The large majority (76.9%) of the families saved some money and kept it aside for incurring cost of delivery and obstetric emergencies, if needed. Preparedness for transport for emergency was low (29.5%). It emerged from the responses of the mothers that prior arrangement for transport was not considered crucial due to the easy availability of local transport in their slum and vicinity.¹³

In a study of Ul Haq, lack of preparation in terms of transport was reported in 83% cases.¹⁶

In a study conducted by Affipunguh, 57.58% women saved money, 22.1% identified a person who is going to accompany her, 18.01% planned a place of delivery, 10.18% arranged for a transport and 0.47% identified a skilled person.¹⁷ While in a study by Deokinandan et al 44.2% women arranged for transport and 78.7% women saved money for delivery.¹⁸

Sixty-six percent of the women developed at least one complication during the index pregnancy and childbirth, the most common of which were prolonged labour, fever, bleeding, and pre-eclamptic toxemia. Reporting of complications was found to be associated with women's education, parity, and knowledge about obstetric complications.¹⁹

Less institutional deliveries than the present study were found in NFHS-3 (2005-06) and DLHS-3 (2007-2008), i.e. 54.60% and 69.3% respectively.^{20,21} Hiluf and Fantahun in their study in 2008 reported that 65.0% women gave birth in health institutions whereas 35.0% delivered at home.¹²

In a report by H&FW (2003) it was revealed that, 26.7% women used rickshaw for reaching health facility, 20% used van, 13.3% used no transport while 40% used other transportation modes to reach health facility.²²

From the women who died majority (51.1%) were from the distance of >50 kilometres from the health facility, while 37.6% and 11.3% were from the distance of 20-50 kilometres and <20 kilometres respectively.²³

In a report of Deokinandan et al, only 18.6% women had knowledge about danger signs.¹⁸ A study (Mayank et al) of women in the slums of Delhi, (India) reports that among the women who experienced bleeding during pregnancy, 44 percent actually recognized it as a danger signal.²⁴

In a study of Andrea, one in four women recognized severe vaginal bleeding after delivery as a danger sign. Vaginal bleeding during pregnancy (9.6%) and delivery (13%) were mentioned as danger signs.²⁵

The proportion of women who had BP/CR was significantly higher among those in the middle socio-economic group (51.6%, $p<0.05$), those who practiced Christianity (76.4%, $p<0.05$) and those from Yoruba ethnic group (80.1%, $p<0.05$). Respondents in lower socio-economic group were 42% less likely to have prepared for birth compared to women in the high socio-economic class (OR: 0.58, 95% CI: 0.34-0.99).²⁶

BPCR status was not found to be significantly associated with maternal age, literacy, number of family members, monthly income of the family, or with any obstetric factors (e.g., parity, history of stillbirths, ANC). However, the preparedness (well-prepared or less-prepared) was significantly associated with their awareness regarding at least 3 key danger signs during pregnancy ($p=0.009$), delivery/ childbirth ($p=0.036$), and in the newborn period ($p=0.007$). It is also evident that 82.1% of women were well-prepared who were advised about relevant BPCR practices during pregnancy as compared to only 3.1% of women who were not advised accordingly. This difference was also found to be significant ($p<0.001$).²⁷

In a study by Affipunguh et al, rural area ($p=0.044$) and high education ($p=0.007$) were significantly associated with birth preparedness. No statistical association was found between age group, occupation, marital status and religion with birth preparedness.¹⁷

In a report by Deokinandan et al, Birth Preparedness Index of a study population was found to be 47.5%. It was significantly high in Above poverty line women (59.3), high educational level (63.6), in service and business group (59.3), primipara (50.9) as compared to multi para (40.1).¹⁸

The importance of MDR lies in the fact that it provides detailed information on various factors at facility, district, community, regional and national level that are needed to be addressed to reduce maternal deaths. Analysis of these deaths can identify the delays that contribute to maternal deaths at various levels and the information used to adopt measures to fill the gaps in service.²⁸

The main purpose of CBMDR is to identify various delays and causes leading to maternal deaths, to enable the health system to take corrective measures at various

levels. Identifying maternal deaths would be the first step in the process, the second step would be the investigation of the factors/causes which led to the maternal death – whether medical, socio-economic or systemic, and the third step would be to take appropriate and corrective measures on these, depending on their amenability to various demand side and communication interventions.²⁸

CONCLUSION

Two third of the women were partially prepared while one in every five women are not at all prepared. Almost three fourth women have identified place of delivery but very few have saved money and identified mode of transport. Education, parity, knowledge regarding danger signs comes to be associated with Birth preparedness practices. Women who were fully prepared had higher morbidity than those who were not prepared. The reason might be that the women who had experienced any kind of maternal morbidity were more prepared to combat the complications. Both Maternal mortality cases are not at all prepared. Proper birth preparedness can help to reduce maternal morbidity and mortality as well and can have positive impact on maternal health.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Patel NA, Mehta JP, Unadkat SV, Yadav SB. Birth preparedness: studying its effectiveness in improving maternal health in urban slums of Jamnagar, Gujarat. *Int J Community Med Public Health* 2017;4:4569-76.