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Original Research Article

Birth and emergency preparedness and associated factors among postnatal mothers at Base Hospital Balangoda, Sri Lanka

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ABSTRACT

Background: Birth and emergency preparedness is a cost effective and evidence based intervention recommended by the current WHO maternal care model and used in maternal care package in Sri Lanka. The aim of the study was to describe the birth and emergency preparedness and its associated factors among postnatal mothers at Base Hospital, Balangoda, Sri Lanka.

Methods: A descriptive cross sectional study was conducted among 427 postnatal mothers delivered after completion of 37 weeks of period of amenorrhoea. Participants were recruited by systematic sampling. Data was collected using a pre tested interviewer administered questionnaire. Data was analysed using SPSS version 21. Descriptive statistics and multiple logistic regression analysis were done to calculate the adjusted Odds ratio and 95% confidence interval. A probability of $p < 0.05$ was considered significant.

Results: Majority 84.3% (n=338) had registered at antenatal care before 12 weeks and 89.3% (n=358) had received domiciliary care during antenatal period. Majority of the mothers (59.4%, n=238) were well prepared for birth and emergencies. Univariate analysis showed a significant association with well preparedness were ethnicity ($p < 0.001$), religion ($p < 0.001$), married mothers in union ($p < 0.05$), higher educational qualifications by both partners ($p < 0.01$), receiving adequate maternity social support ($p < 0.001$), received domiciliary care by PHM ($p < 0.05$) and participation at antenatal classes by mother ($p < 0.05$). After adjusting for confounders, attained higher educational qualifications by mother (OR=1.89, 95% CI=1.27-2.93) and having received social support (OR=2.64, 95% CI=1.43-4.87) were significant factors associated with birth preparedness.

Conclusions: The overall preparedness for birth and emergencies was satisfactory. Modifiable significant associated factors need due attention.

Keywords: Birth and emergency preparedness, Factors, Postnatal mothers

INTRODUCTION

Birth and emergency preparedness (BAEP) is one of the evidence-based cost effective, behaviour change interventions which improve care seeking for complications during pregnancy and after child birth which concerns both mother and the new born. Today it is considered as an important element in maternal and neonatal care.¹ The Department of Making Pregnancy

Safer in World Health Organization, in 2006 have set up certain standards for BAEP in antenatal care in the programme of Integrated Management of Pregnancy and Childbirth (IMPAC).

According to the standard, every pregnant woman should have a plan for birth of the child and to deal with emergencies that might occur during pregnancy, childbirth, or the early postnatal period. Ideally require a

written plan and should have been discussed with a suitable healthcare worker at every antenatal assessment and finalized at least one month prior to the expected date of delivery.

It includes; the preferred place of birth, identifying a skilled provider for birth, a birth companion, ability to recognize danger signs related to pregnancy and child birth, the distance to closest appropriate healthcare institution, arranging transport to a healthcare institution for the birth and in an emergency, support personnel to accompany her to the healthcare institution and looking after the home and children while mother is away, saving money for birth and emergency expenses and having access in an emergency situation, identification of compatible blood donors in case of an emergency.^{2,3}

BAEP covenants with the three delay model, which describes the causes of maternal mortality. Delay in responding to signs of labour and emergencies have been identified as major drawbacks in reducing the maternal and perinatal morbidity and mortality.⁴ BAEP is a shared responsibility among mothers, their husbands, family members, communities, healthcare providers, healthcare facilities, and policy makers.⁵

It is proven that when the woman is empowered regarding the process of pregnancy and birth, the outcome of pregnancy has been good.³ A study conducted in Southern Ethiopia reported only 17% of antenatal mothers were well prepared.⁶ Findings from Nepal and India have shown this intervention has improved knowledge and care seeking in an emergency.^{7,8} A study conducted among post-partum mothers in Indore City, India revealed 47.8% were well prepared.⁹

A recent study in Sri Lanka among antenatal mothers in Matara reported a well preparedness of 89.4%.¹⁰ The authors reported that among those mothers 99% had planned a healthcare facility for delivery, 92.9% had arranged transport, and 92.7% had saved money and having taken all those three steps had been considered as well prepared. Only 50.8% of mothers with older children had arranged a safe place for them to stay.

The revised maternal care package introduced by the Family Health Bureau (FHB) in 2011 describes on "Developing a birth and emergency plan". BAEP plan has been introduced as a component of the pregnancy record in 2011 since it needs to be kept as a written plan. At the same time this concept is also included as a topic in the antenatal classes, which are conducted as group sessions one for each trimester, giving health education and health promotion messages to the pregnant mothers and their partners.

In addition this topic is discussed by the grass root level field healthcare workers with the pregnant mothers during group sessions at antenatal clinics, opportunistic education during clinic visits and at domiciliary visits by

the public health midwives.¹¹ The aim of the study was to describe the birth and emergency preparedness and to describe the factors associated with well preparedness among postnatal mothers delivered at Base Hospital, Balangoda, Sri Lanka.

METHODS

A descriptive cross-sectional study was conducted to assess the level of BAEP and associated factors among postnatal mothers, delivered at Base Hospital (BH), Balangoda. BH Balangoda is situated in Rathnapura District, 134 km from Colombo which is the capital of Sri Lanka. In the District of Rathnapura, there are four government healthcare institutions supplying comprehensive Obstetrics care services and BH Balangoda is one of them. The hospital provides services for more than 500,000 population.

The study population consisted of postnatal mothers, who had delivered after completion of 37 weeks of period of amenorrhoea. Data was collected once they were fit to discharge from the hospital and those who were mentally retarded were excluded. Minimum sample size was calculated with an estimated proportion of well preparedness for birth and emergencies taken as 50%, considering 95% confidence limits and the desired level of precision as 5%. Non response rate of 10% was added to sample size and the final sample size was 427.

Systematic sampling was applied when recruiting the participants. Pre-tested interviewer administered questionnaire was used. It was made simple to minimize interviewer bias. Checklists were provided with several questions to minimize information bias.

Study instrument was finalized with expert opinion to ensure content validity and amendments were done after the pre-testing. The data collectors were trained by Principal Investigator (PI), regarding study instrument, eligibility criteria, obtaining consent, information sheet and ethical issues concerned.

The questionnaire consisted of four sections; socio-demographic and socio-economic characteristics, questions on birth and emergency preparedness plan and identification of danger signs during pregnancy and birth, health related factors and utilization of antenatal care services. The data collection tool was developed in English and translated into Sinhala and Tamil languages.

A composite scale developed by the PI, with expert opinion from the Family Health Bureau, since the available scales in the literature does not cover all the aspects in the birth and emergency preparedness plan. Judgmental validity of the tool was confirmed. The tool consisted of 13 items with a total mark of fifteen. The first twelve items were scored as 1 if answered "yes" and zero if answered "no".

The items were; decided on a hospital to go for delivery, decided on a hospital to go for an emergency, arranged transport, arranged a person to accompany to hospital, awareness on distance to hospital as decided for delivery and for an emergency, awareness on time to reach hospital for delivery and in an emergency, saved money at home, arranged support for looking after the home and other children, preparation of items needed for hospitalization and discussed the BAEP plan with partner/family members.

The thirteenth item assessed the knowledge on obstetric danger signs during pregnancy, where ability to mention three danger signs was allocated three marks, ability to mention two danger signs was allocated two marks and ability to mention one danger sign was given one mark.

The total score for the composite scale was fifteen marks. Level of knowledge on obstetric danger signs was further described as percentage of women who were able to state at least three danger signs of labour and delivery were considered as having “Good Knowledge”. The maternity social support was measured by a tool validated by Webster et, al, 2006.¹²

Data was analyzed with Statistical Package for the Social Sciences 21st version. Cut off for p value was considered as <0.05. The current need and the value of the research and the benefits to the community were explained verbally and by an information sheet before selecting the study participants. Special care was taken not to disturb the patient care during hospitalization period. Ethical clearance was taken from the Ethical Review Committee of the University of Colombo prior to commencement of the study.

RESULTS

The response rate was 93.9% (401/427). The mean age of mothers and fathers were 28.35 (SD=5.32) and 31.8 (SD=5.83) respectively. A majority of the study population was Sinhalese (n =333, 83%) and Buddhists (n=330, 82.3%). Most participants were married and living together (n=389, 97%), while seven (7) were unmarried. Considering the highest level of education, 65.8% (n=264) mothers had passed General Certificate of Education Ordinary Level (G.C.E.O/L) or studied beyond O/L and similar qualifications were obtained by 63% (n=253) of fathers.

Majority of the mothers were not employed (n=318,79.3) and 5.2% (n=21) were employed in elementary occupations. In contrast 98.8% (n=396) fathers were employed. In considering the average monthly income 53.3% of families were receiving LKR 10,001.00 to LKR 35,000.00 for a month.

Majority of mothers (58.6%; n=235) were living in extended families and 21.9%(n=88) were residing in the estate sector. Maternity social support was measured

using the validated tool reported that 86% of them were having adequate social support (Table 1).

Table 1: Frequency distribution of socio-demographic characteristics of study population (N=401).

Characteristic	Frequency	Percentage
Age of mother in years		
15-19	15	3.7
20-34	336	83.8
≥ 35	50	12.5
Ethnicity		
Sinhala	333	83
Tamil	46	11.5
Muslim	22	5.5
Religion		
Buddhists	330	82.3
Hindu	44	11
Muslim	22	5.5
Christian	5	1.2
Civil status		
Married	389	97
Unmarried	7	1.7
Divorced/ widowed	5	1.3
Educational qualification*		
Below GCE O/L	137	34.2
Passed GCE O/L or above	264	65.8
Employment		
Not employed	318	79.3
Employed	83	20.7
Average monthly income (rupees)		
< 20,000	196	48.9
>20,0001	205	51.1
Type of family		
Extended	235	58.6
Nuclear	166	41.4
Maternal social support		
Low & medium	56	14
Adequate	345	86

Regarding the morbidity conditions, 143 (35.7%) of mothers were suffering from morbidity conditions during current pregnancy. In relation to utilization of antenatal care services, 84.3% (n=338) of mothers had been registered at the local antenatal clinic before twelve weeks and 89.3% (n=338) had received domiciliary care by PHM.

Participation at antenatal classes were high with a better participation by mothers (79.6%; n=319) than the fathers (58.4%; n=234). Nevertheless only 18.7% and 7.2% mothers and fathers had participated in all three antenatal classes respectively. Majority (93.8%; n=376) were satisfied with the help they received from the PHMM in preparing for the birth and emergencies (Table 2).

Table 2: Utilization of antenatal care provided by public health midwife (N=410).

Characteristic	Frequency	%
Period of Amenorrhoea at registration (weeks)		
Less than 12	338	84.3
13-20	49	12.2
>21	14	3.5
Domiciliary care by PHM during antenatal period		
Received	358	89.3
Not received	43	10.7
Participation at antenatal classes		
Mother		
Participated	319	79.6
Not participated	82	20.4
Father		
Participated	234	58.4
Not participated	167	41.6
Satisfaction of mother on provision of care		
Satisfied	376	93.8
Not satisfied	25	7.2

The total score obtained by each participant was plotted on a frequency distribution curve. The mean was 14.29 and both median and mode was 15.

Table 3: Practices related to birth and emergency preparedness (BAEP) among the study participants (N=401).

Characteristic	Yes	
	Frequency	%
Planned on a healthcare facility for delivery	399	99.5
Planned on a healthcare facility for an emergency	397	99
Arranged transport	393	98
Arranged a person to accompany to hospital	393	98
Awareness on distance to hospital for delivery	388	96.8
Awareness on distance to hospital for an emergency	388	96.8
Awareness on time to reach hospital for delivery	399	99.5
Awareness on time to reach hospital for an emergency	399	99.5
Saved money at home	328	81.8
Method to borrow money	350	87.3
Arranged support for looking after the home/children	394	98.3
Identification of a person to inform in an emergency	399	99.5
Prepared items to be carried to hospital	394	98.3
Discussed BAEP with family members	382	95.3

All the participants who had scored above the 50th percentile was considered to be “well prepared” and those who were below the 50th percentile was regarded as “less well prepared”. Considering level of BAEP, 59.4% of mothers (n=238) were well prepared for birth and emergencies.

Practices related to BAEP are described in Table 3. Considering the birth and emergency preparedness, except for two practices more than 95% of mothers had been prepared. Only 81.8% (n=328) had saved money that they will have quick access in an emergency and 12.7% (n=51) did not even had considered a method to borrow money in an emergency. Nearly 50% of mothers had identified “three-wheeler” as mode of transport to travel to hospital in an emergency and 96.7% of mothers had used the planned mode of transport to attend hospital for delivery.

More than 60% of mothers had used their saved money for transport and to buy clothes. Majority of mothers (93.0%) had decided to inform their husbands in an emergency and three mothers had identified PHM as the person to inform. The mode of informing was via telephone by 97.5% of mothers.

More than ninety percent of mothers had discussed the BAEP plan with their husbands and mothers and 80.6% had discussed with their mother-in-laws. The BAEP plan was 100% completely entered in 50.6% (n=203) of the study participants antenatal records and it was not written in 19% (n=76) of participants, which is considered a duty of the PHMM. Mother’s knowledge regarding obstetric danger signs is described in Table 4.

Table 4: Distribution of the study participants according to knowledge on Obstetric danger signs (N=401).

Characteristic	Yes	
	Frequency	%
Watery vaginal discharge	354	88.3
Per vaginal bleeding	340	84.8
On and off abdominal pain	342	85.3
Reduced foetal movements	199	49.6
Severe headache	35	8.7
Visual disturbances	17	4.2
Severe leg /face /hand oedema	13	3.2
Convulsions	5	1.2
Other danger signs ^a	2	0.5
knowledge on obstetric danger signs		
Not known any danger sign	8	2
1	19	4.7
2	66	16.5
3 or more	308	76.8
Level of knowledge on obstetric danger signs		
Not Satisfactory	93	23.2
Satisfactory	308	76.8

Factors which showed a significant association with well preparedness for birth and emergencies at bivariate analysis are described in table 5; ethnicity ($p < 0.001$), religion ($p < 0.001$), married mothers in union ($p < 0.05$), having attained higher educational qualifications by both partners ($p < 0.01$), receiving adequate maternity social support ($p < 0.001$), received domiciliary care by PHM ($p < 0.05$) and participation at antenatal classes by mother ($p < 0.05$).

Table 5: Factors associated with birth and emergency preparedness.

Associated Factor	Well Prepared	Less well prepared	OR (95% CI)
	No (%)	No (%)	
Ethnicity			
Sinhalese	214 (64.3)	119 (35.7)	3.3 (1.9-5.7)
Other	24 (35.3)	44 (64.7)	1
Religion			
Buddhism	211 (63.9)	119 (36.1)	2.9 (1.7-4.9)
Other	27 (38)	44 (62)	1
Education level of mother			
≥ G.C.E. O/L	174 (65.9)	90 (34.1)	2.21 (1.5-3.4)
< G.C.E. O/L	64 (46.7)	73 (53.3)	1
Education level of father			
≥ G.C.E. O/L	164 (64.8)	89 (35.2)	1.8 (1.2-2.8)
< G.C.E. O/L	74 (50)	74 (50)	1
Maternity social support			
Adequate	218 (63.2)	127 (36.8)	3.1 (1.7-5.6)
Not adequate	20 (35.7)	36 (64.3)	1
Antenatal morbidity in current pregnancy			
One or more complication	73 (51)	70 (49)	0.6 (0.4-0.9)
No complication	165 (64)	93 (36)	1
Received domiciliary care by PHM			
Yes	219 (61.2)	139 (38.8)	2.0 (1.1-3.8)
No	19 (44.2)	24 (55.8)	1
Participation at Antenatal classes by mother			
Participated	199 (62.4)	120 (37.6)	1.8 (1.1-3.0)
Not participated	39 (47.6)	43 (52.4)	1

After controlling for the confounders, having attained higher educational qualifications by mother and receiving adequate maternity social support remained as significant

associated factors for well preparedness. The results are described in Table 6.

Table 6: Adjusted Odds Ratio for well preparedness for birth and emergencies following logistic regression analysis.

Factor	Beta	Standard error	Adjusted OR	95% CI
	Co-efficient			
Passed ≥ G.C.E. O/L by mother	0.64	0.22	1.9	1.2-2.9
Adequate maternity social support	0.97	0.31	2.6	1.4-4.9
Morbidity conditions in current pregnancy	-0.43	0.22	0.6	0.4-1.002
Received domiciliary care by PHM	0.63	0.34	1.9	0.96-3.70

DISCUSSION

Our findings showed that majority of mothers (59.4%) were well prepared for birth and emergencies being ready for all the components in BAEP. At the same time 23.9% of mothers were prepared for fourteen steps, indicating a considerable effort in BAEP and only 16.7% were ready for less than fourteen components. The current study used most of the components related to birth and emergency preparedness since it has been stated in several studies as a limitation, that they have used very few components in measuring BAEP.^{10,13}

Sri Lankan study done in Matara, revealed 89.4% of mothers were well prepared. The observed difference could be due to the difference in the measuring scale, where they had only considered three steps (identifying a health facility for emergencies (99%), arranging for transport (92.7%) and saving money (92.7%) and mothers who had taken all three steps were considered well prepared.¹⁰ Variation in the geographic distribution and the socio-demographic characteristics also would have been contributed to the difference.

Research from India, among postnatal mothers showed that 47.8% of mothers were well prepared being ready for three of four components in birth preparedness. The observed low preparedness could be due to the mothers living in a slum based area and only 32% of deliveries were attended by skilled birth attendants.⁹ A prospective cohort study done in Nepal revealed that 65% of mothers were well prepared for birth and emergencies having

considered four of the five birth preparedness practices; identification of a delivery place (86.7%), arranging transport (72.3%), arranging a blood donor (13.8%), saving money (92.5%) and participation at antenatal care (96.7%). The proportion of well preparedness is closer to the current study, and the observed difference could be due to the difference in the scale.¹³

According to current study, saving money (81.8%), was less than the other practices and this could be due to the estate sector participants, who live on daily wages. Findings from India revealed that 77% of the mothers had saved money in that community and eight percent were members of a community health fund groups.⁹

Ekabua had stated that community financial support systems should be encouraged in Nigeria.¹⁴ Kabakyenga et al reported in a study conducted among 764 recently delivered women in Rural Uganda that the women had identified a health professional (61%), had saved money (91%), identified a mode of transport (61%) and arrangement of delivery kits and material needed for delivery and immediate post-partum period (71%). The authors reported in general 35% of the participants were considered as “well prepared”, who had made arrangements for at least three from the above four practices.¹⁵

Our findings showed that the behaviours related to BAEP, though 99.3% of participants had identified a hospital with specialist care for the child birth, only 87.5% had decided to attend such facility in an emergency. This could be due to the long distance they have to travel for a facility with specialist care. The majority of the study participants (96.2%) had used the planned mode of transport in attending to the hospital indicating the effectiveness of prior planning.

Three wheeler had been selected by 50.1% of the participants to come to hospital and the telephone was the mode of informing in an emergency by 97.5% of the participants. This indicates the improvement in communication technology and the increased use of three wheelers by the general population. Agarwal et. al found that among slum women in India that majority did not arrange transport due to the highly availability of local transport within the area.⁹

A descriptive cross sectional study conducted in Nigeria among 400 pregnant women, revealed that 62.3% had made an arrangement for transport in an emergency.¹⁶ Another research done in Tanzania among 600 women who were pregnant and given birth within two years and 82.3% had arranged transport facilities.¹⁷ Ekabua et al., demonstrated that those who were aware about birth preparedness, identified a mode of transport than those who were not aware of birth preparedness, nevertheless the observed difference was not statistically significant ($\chi^2 = 0.3255$; $p = 0.5683$).¹⁴

Our findings showed that more than 80% was able to state three main danger signs namely; watery vaginal discharge, per vaginal bleeding and abdominal pain. The knowledge regarding other danger signs was comparatively poor. Less than 50% mentioned reduced foetal movements as a danger sign and the knowledge regarding pre-eclampsic toxæmic symptoms were very poor. The study done in Matara among antenatal mothers had known at least three danger signs by 73.7%, which was slightly less than the present study and 15.2% had not known any danger signs.¹⁰

The observed difference could be due to the participants being postnatal mothers in the present study and their knowledge would have been increased with their experience. An Ethiopian study revealed that among recently delivered women, those who knew at least three danger signs were more likely to use skilled care during delivery and the association was statistically significant.¹⁸

At bivariate analysis, there was a statistically significant association between BAEP and the ethnicity of the postnatal mothers (OR=3.3, 95% CI=1.9-5.7) and being a Buddhist (OR=2.9, 95% CI=1.7-4.9), yet these were not significant after controlling for the confounding effect. Correspondingly, Ekanayake also demonstrated a significant association between BAEP and ethnicity and religion.¹⁰ Nevertheless, our research did not reveal a significant association between both age of the mother and the father with BAEP which corresponds with the finding among antenatal mothers in Matara.

The educational attainments of both mother and the father also showed a statistically significant association between BAEP, yet after controlling for confounders, higher educational attainment by mother retained as a significant predictor (AOR=1.89, 95% CI=1.22-2.93). This shows the value of good education which is the founder of knowledge and improves the life skills enabling them to be better decision makers, thus improving their survival.

A comparable association with BAEP and education was found by Ekanayake in her study among antenatal mothers in Matara.¹⁰ Likewise, Agarwal et. al, demonstrated that among Indian slum women, the literate mothers were well prepared.⁹ Research from Nigeria and Ethiopia also showed that women with formal education were three times more prepared than their counterparts.^{14,19}

The level of social support received by the mothers during antenatal period, showed a significant association with BAEP. The mothers who received adequate social support, were twice well prepared than the mothers who received low and medium support which was a significant factor associated with BAEP, following multiple logistic regression (AOR=2.64, 95% CI=1.43-4.87).

Our research showed that mothers who had received domiciliary care by the PHM during antenatal period were twice well prepared, compared to their counterparts, yet this association did not retain its significance after multiple logistic regression. Findings from India showed a similar association, that mothers who used antenatal services (through monthly antenatal coverage camps or via a health facility) were more prepared than their counterparts, further stressing the importance of improving antenatal coverage.⁹ Studies from Ethiopia also described that women who attend antenatal care services showed better preparedness for birth and emergencies.^{6,19}

Sri Lanka has a well-organized system with in the country and there are 328 health units and a Public health Midwife (PHM) is supposed to serve a population of 3000.²⁰ PHMM are serving beyond the expected population and the overload of work may affect the quality of their work.²¹

Considering limitations, the study was restricted to postnatal mothers at Base Hospital, Balangoda, which would limit generalization of the results. Due to the descriptive cross sectional study design, the associated factors cannot be regarded as risk factors.

CONCLUSION

The overall preparedness for birth and emergencies was satisfactory among postnatal mothers admitted to Base Hospital, Balangoda. Higher maternal education and having adequate social support were significantly associated with well preparedness for birth and emergencies and the modifiable nature in both these factors need due attention. Further emphasis should be taken in improving the knowledge of obstetric danger signs.

The antenatal classes and the home visits can be used to communicate especially with the husbands and the mother or the mother-in-law who are usually involved in decision making related to pregnancy and child birth affairs. The PHM should be more concerned regarding the social support available for the mothers and should address regarding this issue to their spouses and the community. Since the importance of the PHM is highlighted in the research findings, the researcher suggests that the workload of the PHM should be reduced for a better quality outcome. Although social support services are available at the Divisional level, more focus should be taken at establishing a community support system to the pregnant mothers at MOH level.

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