

## FACTORS RELATED TO KNOWLEDGE ON NEWBORN DANGER SIGNS AMONG THE RECENTLY DELIVERED WOMEN IN SUB-DISTRICT HOSPITALS OF BANGLADESH

Sojib Bin Zaman<sup>1,9\*</sup>, Naznin Hossain<sup>2</sup>, Muhammed Awlad Hussain<sup>3</sup>, Vidhuna Abimanue<sup>4</sup>, Nushrat Jahan<sup>5</sup>, Rafid Bin Zaman<sup>6</sup>, Zubair Ahmed Ratan<sup>2,7</sup>, Raihan Kabir Khan<sup>8</sup>, Shuchita Sharmin<sup>9</sup>

<sup>1</sup>Maternal and Child Health Division, International Centre for Diarrhoeal Disease Research, Bangladesh

<sup>2</sup>Department of Pharmacology, Dhaka Medical College, Bangladesh

<sup>3</sup>Projahnmo Study Site; Johns Hopkin's University Bangladesh

<sup>4</sup>Gordon House surgery, Ealing General Practice Training Scheme, London North West Healthcare NHS trust, UK

<sup>5</sup>Department of Earth and Atmospheric Sciences, University of Alberta, Canada

<sup>6</sup>Notre Dame College, Dhaka, Bangladesh

<sup>7</sup>Department of Biomedical Engineering, Khulna University of Engineering and Technology, Bangladesh

<sup>8</sup>School of Public Health, West Virginia University, Morgantown, West Virginia, USA

<sup>9</sup>Department of Development Studies, University of Dhaka, Bangladesh

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\*Correspondence:

Sojib Bin Zaman

Maternal and Child Health Division, International Centre for Diarrhoeal Disease Research, Bangladesh; 68, Shahid Tajuddin Ahmed Sharani, Mohakhali, Dhaka -1212, Bangladesh; Telephone: +8801717043257

Email: [sojibbz@gmail.com](mailto:sojibbz@gmail.com)

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### ABSTRACT

**Background:** Bangladesh continues to be one of the top ten countries with the highest burden of neonatal mortality. While, most of the neonatal deaths are preventable; health system delays, delayed identification of newborn danger signs, late diagnosis and initiation of treatment are claimed to be the main challenges.

**Objective:** 1) to determine the level of knowledge among the recently delivered women (RDW) about newborn danger signs and 2) to distinguish the factors associated with ability of identifying the danger signs.

**Methods:** A facility based cross-sectional study was conducted in three sub-district hospitals of Bangladesh among 135 RDW between 1 January 2015 and 30 April 2015. Seven key danger signs were identified, and responses were categorized accordingly. Bivariable logistic regression was conducted to determine the likelihood of the association of factors with danger signs identification.

**Results:** About 51% of RDW could identify one key danger sign. Knowledge on “fever” was the most commonly known danger sign (65%). Middle age (OR 1.67, 95% CI: 1.09 - 2.18), high education (OR 2.37, 95% CI: 1.46 - 2.77), increased parity (OR 1.91, 95% CI: 1.17 - 2.89), and previous hospital delivery (OR 1.79, 95% CI: 1.14 - 2.68) were found associated with the knowledge of the danger signs.

**Conclusion:** The findings indicate the immediate need to enhance health education among the RDW about newborn danger signs before their hospital discharge. Community based health education programs can be a cost effective intervention to increase awareness and early recognition of neonatal danger signs.

**Key words:** Knowledge, Newborn danger signs, Recently delivered women

## BACKGROUND

With the introduction of Millennium Development Goals (MDGs), remarkable progress has been made worldwide to reduce childhood mortality. Bangladesh was one of the first 25 countries to reach the targets of MDG in time, as the under-five mortality rate reduced from 133 per thousand live births in 1989-93 to 46 per thousand live births in 2010-14.<sup>1,2</sup> Despite this remarkable achievement, Bangladesh continues to be one of the top ten countries with the highest rate of neonatal mortality.<sup>3</sup> For Bangladesh, achieving health-related targets of Sustainable Development Goals (SDGs) to reduce neonatal mortality by 2030 will pose a big challenge. However, it is very much possible to achieve this SDG through reducing neonatal deaths. Approximately 44% of all under five deaths occur within the first few days of life around the world.<sup>4</sup> Reducing the neonatal mortality has been recognized as both the global and national public health challenge, where Bangladesh is no exception. Neonatal danger signs are the indicators for early recognition of sickness among infants and children. Newborns can develop bacterial infection which is also known as neonatal sepsis. It may turn to septicemia and consequently, can be involved to cause multi-organ dysfunction.<sup>5</sup> Neonatal mortality is highest on the very first day of life particularly within first five-hour of birth which is also known as window period.<sup>6</sup> During this period, newborns are susceptible to develop lifelong complications if they remain untreated.<sup>7</sup> As the day's progress, prematurity, and newborn infection inscribed as the fundamental cause of neonatal death throughout first week of life.<sup>8</sup>

Studies in the past have not only identified targeting reduction of neonatal mortality as a priority, but also highlighted the impact and value of the introduction of

community-based programs during the window period.<sup>9</sup> Research suggests that universal coverage of basic essential interventions could reduce neonatal deaths by an estimated 71%.<sup>10</sup> To make the interventions effective, community mobilization and danger sign identification related health awareness are vital needs. It is also essential to circulate knowledge about maternal and newborn's health condition during gestation and after the delivery so that the recently delivered women (RDW) could take care of their newborns through identifying the danger signs.<sup>11,12</sup> Recognizing danger signs during pregnancy, childbirth, and postnatal period is also essential for neonatal survival as it will ensure early recognition of life-threatening illness and early prompt access to medical care.<sup>13</sup>

Study findings suggest that early diagnosis and proper treatment can prevent a remarkable number of child deaths in resource scarce settings.<sup>14</sup> However, there are information gaps regarding the level of knowledge among RDW about newborn danger signs and also about the factors which can influence the level of knowledge of RDW in Bangladesh. The aim of this study was 1) to determine the level of knowledge among the RDW about the newborn danger signs and 2) to identify the determinant factors associated with identifying the danger signs.

## METHODS

### *Study Design*

The present study was a facility based cross-sectional study which was conducted between 1 January 2015 and 30 April 2015. The study was undertaken in three sub-district hospitals which are located around 120-150 km in the North West to Dhaka City, the capital of Bangladesh. As Part of administrative requirement, each sub-district has a public hospital "Upazila health complex" (UHC) for a population of

300,000-500,000 in the catchment area. The literacy rate in the study area is around 60%, and the main occupations are farming and small business.<sup>15</sup> UHC receives patients directly from the community and conducts 30-35 normal deliveries take place per month. A structured questionnaire was formulated and validated through interjudge validation by a group of public health expertise. For reliability and finalization of the questionnaire, a pre-testing was carried out in two nearby sub-districts.

#### *Data collection*

A total of 135 RDW were purposively selected for the interview (45 from each UHC). Participants were interviewed in the selected UHCs with a structured questionnaire. The questionnaire allowed collection of data about the level of knowledge on newborn sickness, focusing on RDW's recognition of danger signs and determinant factors associated with identifying the newborn danger signs. Inclusion criteria were: women with normal vaginal delivery, live born baby and physically stable. With the help of three nurses, the participants were selected based on inclusion criteria in each UHC. From the selected RDW, data had been collected during their visit to UHCs. Two medical officers supervised the data collection. Finally, a technical team comprising one research officer and three research assistant did quality control during the data entry process.

#### *Variables and measurements*

The study participants were RDW who had given birth in the hospitals where the study took place. Respondents were categorized as "rural" or "semi-urban" according to their place of living. Age was categorized as '< 20 years', '20-25', '26-30' and '>30 years'. A wealth quintile was considered based on possession of electronic items or

vehicles: radio, mobile phone, television, computer, bicycle, and motorcycle. Respondents who possessed less than two items were considered as 'low' in wealth. The education level of the RDW and their husbands were also collected. Occupation was categorized as unemployed, housewife and employed. Women were categorized as housewives if they lived and worked at home without any additional income to look after their family and complete household chores. Employed were those who worked outside of the home and earned a livelihood for her family. RDW were asked about their access and attendance to antenatal care (ANC), parity, and knowledge on danger signs of neonates. Danger signs (hypothermia, hyperthermia, convulsion, lethargic, fast breathing, stopped feeding well, and severe chest in-drawing) were incorporated according to WHO Pocket Book of Inpatient Newborn Care.<sup>16</sup>

#### *Ethics Consideration*

Permission was taken from the health managers of UHC before conducting the study. Informed written consent was received from the participants in their native language. The participating women were informed about the objective of the study and were given the freedom to skip any question. Ethical clearance was taken from the Ethics committee of Community Medicine Department, Dhaka Medical College, Bangladesh.

#### *Statistical Analysis*

All the analyses were performed using STATA version 13 SE (College Station, Texas, USA). Frequency and proportions were used to present categorical variables. Mean, and Standard Deviation (SD) were used for the continuous variables. Bivariable logistic regression analysis was performed to find out factors influencing maternal knowledge on newborn danger

sign identification. Odds ratio (OR) and 95% Confidence interval (CI) were expressed to identify the association of different relevant factors with the knowledge of at least one danger sign among the RDW.

## RESULTS

More than half of the participants (60%) were residents of semi-urban areas. The

mean age of the RDW was 26.8 years, and 40% of them were either 25 years or older. Around 72% of the participants received secondary education, 62% of them came from low-asset households, and 72% of the RDW were categorized as housewives. Around 60% of women had a previous history of hospital delivery (Table 1).

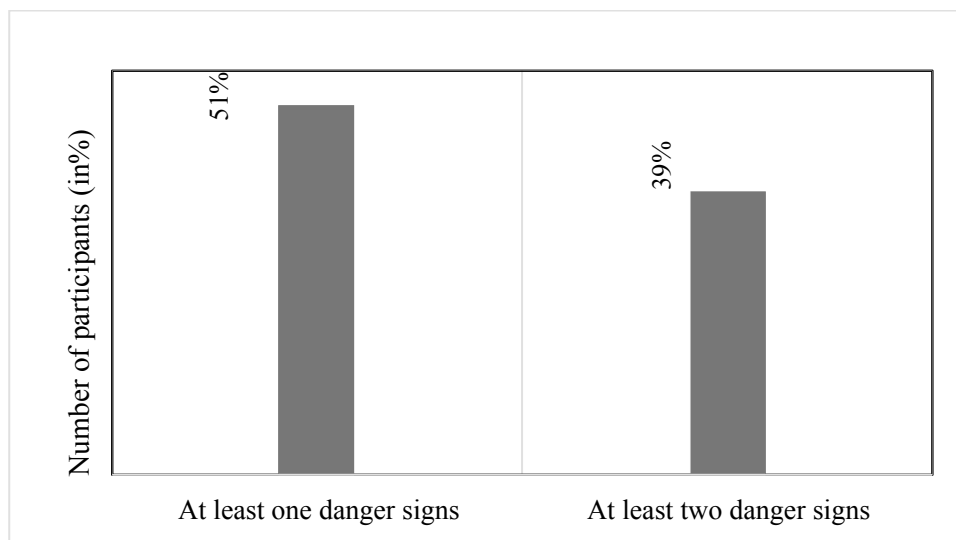
**Table 1.** Basic characteristics of the respondent RDW (n=135)

Variables	Number	Percent (%)
<b>Place of residence</b>		
Rural	54	40.00%
Semi-Urban	81	60.00%
<b>Age</b>		
< 20	31	22.96%
20-24	49	36.30%
25 - 29	37	27.41%
≥ 30	18	13.33%
Mean (SD)	26.8 (8.74)	
<b>Occupation</b>		
Housewife	98	72.59%
Employed	37	27.41%
<b>Mother's Education level</b>		
< SSC (10 class)	47	34.81%
≥ SSC (10 class)	98	72.59%
<b>Number of Parity</b>		
1	24	17.78%
2 to 3	71	52.59%
> 3	40	29.63%
<b>Number of ANC taken</b>		
0	12	8.89%
1	39	28.89%
2 to 3	53	39.26%
≥ 4	31	22.96%
<b>Husband Education</b>		
< HSC (12 class)	87	64.44%
≥ HSC (12 class)	48	35.56%
<b>Household assets</b>		
Low	84	62.22%
Moderate	51	37.78%
<b>Previous hospital delivery</b>		
No	53	39.26%
Yes	82	60.74%

SSC: Secondary School Certificate (Class 10); HSC: Higher Secondary School Certificate (Class 12); ANC: Antenatal care

The number of RDW having knowledge on at least one danger sign was 51% (shown in Figure 1). About 39% of participants

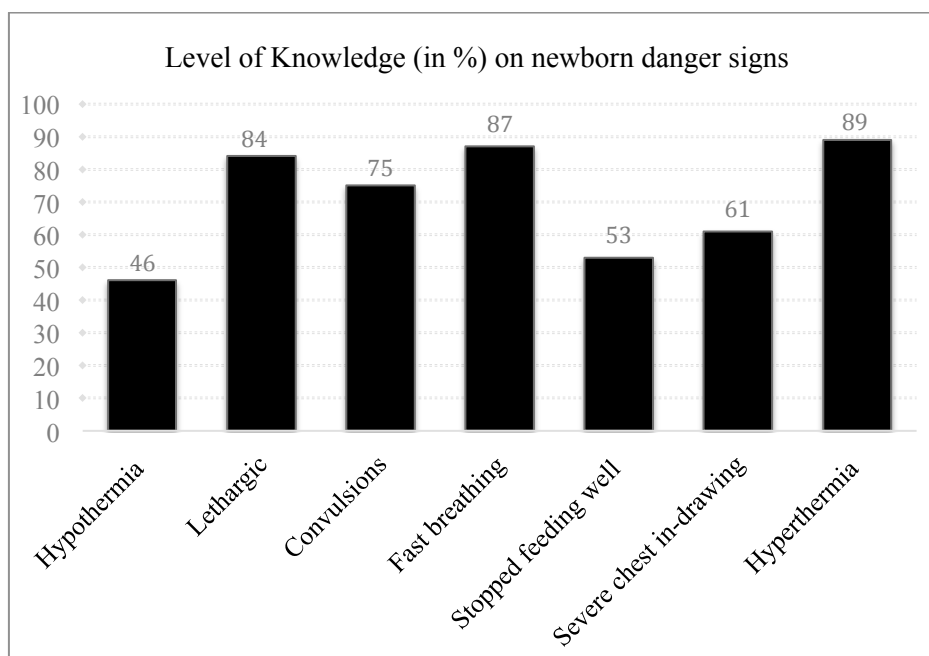
were able to provide correct information on two danger signs.



**Fig 1.** Participants in groups having level of knowledge on newborn danger signs

Figure 2 displays the respondents' knowledge of newborn danger signs. Of the 51% of RDW, Knowledge on "hyperthermia (fever)" was the most commonly known danger sign and referred to by almost 66% of them. More than 62% of them knew about the danger signs "lethargic" and "fast breathing". Less

than 40% of total respondents were able to tell the interviewers about the danger signs of "hypothermia", and "stopped feeding well". Thus the most commonly known three danger signs found were "hyperthermia" followed by "lethargic" and "fast breathing".



**Fig 2.** Knowledge on seven key newborn danger signs among the participants (n=135)

This study found that middle age [OR 1.67, 95% CI: 1.09 - 2.18,  $P < 0.05$ ], high education [OR 2.37, 95% CI: 1.46 - 2.77,  $P < 0.05$ ], increased parity [OR 1.91, 95% CI: 1.17 - 2.89,  $P < 0.05$ ], and previous

hospital delivery [OR 1.79, 95% CI: 1.14 - 2.68,  $P < 0.05$ ] were associated with the knowledge of key newborn danger signs among the participants (Table 2).

**Table 2.** Factors associated with knowing at least one danger sign among the RDW (n=73)

Characteristics	Odds Ratio (95% CI)	P-Value
<b>Location of residence</b>		
Rural	1	
Semi-Urban	1.05 (0.83 - 1.28)	> 0.05
<b>Age</b>		
<25 Years	1	
≥25 Years	1.67 (1.09 - 2.18)	< 0.05
<b>Mother's Occupation</b>		
Housewife	1	
Employed	0.88 (0.51 - 1.23)	> 0.05
<b>Mother's Education level</b>		
< SSC (10 class)	1	
≥ SSC (10 class)	2.37 (1.46 - 2.77)	< 0.05
<b>Husband's Education Level</b>		
< HSC (12 class)	1	
≥ HSC (12 class)	1.17 (0.78 - 1.83)	> 0.05
<b>Parity</b>		
< 3	1	
≥ 3	1.91 (1.17 - 2.89)	< 0.05
<b>ANC taken</b>		
< 2	1	
≥ 2	1.06 (0.91 - 1.21)	> 0.05
<b>Household assets</b>		
Low	1	
Moderate	1.37 (0.78 - 1.82)	> 0.05
<b>Previous Hospital Delivery</b>		
No	1	
Yes	1.79 (1.14 - 2.68)	< 0.05

RDW: Recently Delivered Women; ANC: Antenatal Care

However, no significant association was found between residence or occupation or household assets with having the knowledge of at least one danger sign (Table 2). It was also noted that there was no significant association observed between the knowledge level of danger signs with place of living [Odds Ratio (OR) 1.67, 95% CI: 1.09 - 2.18], mother's occupation [OR 0.88, 95% CI: 0.51 - 1.23] or husband's education [OR 1.17, 95% CI: 0.78 - 1.83] or increase ANC [OR 1.06, 95% CI: 0.91 - 1.21] or household asset

[OR 1.37, 95% CI: 0.78 - 1.82] among the RDW.

## DISCUSSION

This study found that around half of the respondents were able to identify one key danger sign which might be considered as quite poor level of capacity. One study conducted in Uganda revealed that new mother's knowledge of at least one neonatal danger sign was shown to be associated with higher probability of seeking medical care early.<sup>17</sup> The study



had also demonstrated that when the new mothers recognized neonatal danger signs, they were able to reach early to health care services, and as a result, it could act in reducing the neonatal mortality.<sup>11, 18</sup> According to the present study, while only 50% of the respondents were able to identify at least one danger sign, the likelihood of seeking medical care and reaching hospital early also was low which allow us to conclude to be a contributing factor in the neonatal death.

In the present study, knowledge on “hyperthermia (fever) was found to be the most commonly known danger sign and referred by almost 65% of the participants. A study conducted in India also found slightly higher (75%) awareness for the same danger sign than what the present study found.<sup>19</sup> Another Indian study found that 90% of respondents successfully identified hyperthermia as a key danger sign.<sup>20</sup> The present study found that correct response about “lethargic” and “difficulty in breathing” were given by approximately 61% of the participants. A study conducted in Pakistan also found similar results on the level of knowledge of danger signs ‘difficult feeding’ and ‘difficulty in breathing’ in comparison to our study findings.<sup>21</sup> The least known danger signs were “hypothermia”, and “stopped feeding well”, mentioned by less than 40% of the respondents. The similarities in findings may indicate the culture specific common knowledge on danger sign among RDW.

A Study in Tanzania found a substantial relationship between age, educational level, number, and place of deliveries with the awareness of danger signs.<sup>22</sup> However, our study findings contradict the above mentioned study, whereby we have found that maternal variables recognized as favorable determinants of child survival (i.e. maternal education, age and high socio-

economic status) were not significantly associated with knowledge of newborn danger signs. Conversely, looking at other studies conducted in Tanzania and Senegal we learn that some studies indicate that a higher level of education is associated with lower child mortality<sup>23, 24</sup> whereas other studies have shown no association.<sup>25, 26</sup> Despite these conflicting results from previous studies, we believe that our finding on this issue is credible as women's education are important for understanding health-related messages and to be able to make decisions regarding early health seeking behavior. However, higher education can be confounded by many other associated factors such as living with other senior family members, cultural beliefs, women's role in society, and access to healthcare facilities. Thus, our findings allow further scope of study in this regard for a firm conclusion.

According to this study, women with more than three children knew better about recognizing the danger signs. One of the possible explanation could be, participant RDW who had at least one children was exposed to the knowledge of newborn danger sign at some points during their previous ANC and postnatal care. Consequently, previous history of hospital delivery was found to be associated with the increased knowledge of danger signs. Pregnant women also get the opportunity to know newborn danger signs during the antenatal visits.<sup>27</sup> Identification and diagnosis of neonatal danger signs were also found in other studies to be difficult as most of the rural population who live in small villages might encounter access to necessary health education.<sup>28</sup> Strong leadership to implement the community intervention should be taken as a priority to address the health system gaps in reducing neonatal mortality.<sup>29</sup>

This study did not find significant association of place of living, occupation,

husband's education, increase ANC and household asset with the knowledge on danger sign among. Our findings have shown that there was no increased knowledge of danger signs after four visits or more which was similar to other communication.<sup>30</sup> Again, reviewing previous studies conducted in Laos and Malawi, we learn that the importance of ANC attendance in imparting valuable knowledge of danger signs could reveal an early recognition of neonatal danger signs.<sup>31, 32</sup> Husband's education and household assets are important to increase ease of access to healthcare facilities by postnatal mothers, but we did not find any association with knowledge of danger signs.

Other study draw attention to the facts that symptom recognition is not always associated with increased facility care seeking as most of the decisions regarding maternal and newborn care are taken by the senior family members.<sup>33</sup> In this regard, female empowerment in taking decision and gaining knowledge of newborn danger signs among the household members demand a supreme need.<sup>34</sup> Findings of previous studies also highlight the importance of community based education programs to empower and equip local village leaders and senior family members with the knowledge to detect and act on early recognition of danger signs of neonatal illness.<sup>10, 12</sup> These allow the present study to advocate for community mobilization for knowledge dissemination on neonatal danger signs among RDW, senior family members and community leaders to access the universal health coverage.<sup>35</sup>

## STRENGTHS AND LIMITATIONS

A limitation of the present study is that our study findings have all been self-reported by RDW, which may introduce recall bias. However, accurate data was collected as

there were no language barriers, the data collection was conducted by trained healthcare professionals. Several findings of this study were not statistically significant which allow the scope of further studies using qualitative data for an explanation. Finally, our study was one of the first of this kind that was conducted in Bangladesh to identify the level of knowledge on newborn danger signs and related factors among the RDW who delivered in hospitals.

## CONCLUSION

This study has shown a poor understanding of danger signs among the participants. Hence, we have identified that taking the opportunity to inform women before hospital discharge can be a useful intervention to increase mother's awareness of newborn danger signs. Based on field findings and previous research, our recommendation is to increase community engagement of the rural health care providers to enhance efforts for educating the RDW, elderly family members and community leaders on appropriate newborn care and danger sign information.

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