Original Research Article

Nurses Knowledge and Practice to Prevent and Control Neonatal Nosocomial Infection in Maternal and Neonatal Units at Rajshahi Medical College Hospital- Bangladesh

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Abstract

Background: Neonatal hospital infections, in addition to being the cause of a significant number of perinatal, neonatal, and postnatal deaths, are also associated with increased health care costs. This is because hospitalization of infected children is up to threefold longer than that of non-infected children. *Objective:* Our objective is to assess the nurse's knowledge and observe their practice to prevent and control neonatal nosocomial infection in maternal and neonatal unit at Rajshahi Medical College Hospital. *Results:* Age distribution shows highest percentage 48 % in between 40-49 years. All of the respondents were female. Most of the nurses 90% were Muslim, 8% were Hindu. About 100% of the respondents have S. S. C., 30% have H. S. C. and 4% have B.A. / B.Sc. degree, Remaining 4% of the respondents having Masters or others degree. Regarding professional qualification 100% of respondent's have diploma in nursing and midwifery, 20% of B.Sc. in public health, and remaining 14% have M.P.H. In service about 6% of respondent's job experience was1-5years, 12% had 6-10 years and the 24% had 11-15 years, 20% had 16-20years, 10% had 21-25 years and remaining 28% had 26-30years experience. The grading of the knowledge was about 73.5% of nurses had complete knowledge, 15% had partial knowledge, 5.33% gave wrong answer and 6.16% said that they do not know the answer. About 50% of the neonatal age was 5- 10 days, about 20% of 11-16 days, nearly 18% was 17-22 days, and the remaining 12% was 23-28 days. Among them 56% was male and 44% was female. Among the responding parents, family type was mainly nuclear 62% and joint 38%. Educational qualification of the father's was about 22% illiterate, 20% able to write their name, 18% was primary educated, 20% was secondary,14% higher secondary and 6% was graduate. On the other hand mother's educational qualification was about 30% illiterate, 20% was able to write their name, primary education complete about 24% and secondary 18% and higher secondary 8%.According to the data collection the respondents residence in the Rajshahi division was 100%, residence in the rural 70% and urban about 30%. *Conclusion:* Current global evaluations confirm that commitment to improving newborn health makes meaningful socio-economic contributions. Various reasons can be attributed to why the health of the newborn has been neglected despite the huge mortality rates and why most neonatal deaths are unseen and undocumented.
Keywords: Nurses Knowledge, Practice, Neonatal Nosocomial Infection, Bangladesh.

BACKGROUND

The term nosocomial infection or hospital-acquired infection is applied to any clinical infection that was neither present nor was in its incubation period when the patient entered the hospital. Nosocomial infections may also make their appearance after discharge from the hospital, if the patient was in the incubation period at the time of discharge. The prevention and control of neonatal bacterial infections represent a challenge for all professionals involved in hospital care of newborns. Infection outbreaks in nurseries and that result in deaths have been widely reported by the Brazilian press. In other countries, hospital infections are associated with 7 to 73% of neonatal mortality [1]. Our objective to review the main aspects of this broad theme. In most cases, the pathogens invade the newborn through the conjunctive, the respiratory and gastrointestinal tracts, and the skin. The decreased production and function of local and systemic defense (of both innate and specific responses) depend on the antigen and contribute to greater susceptibility to infection during the neonatal period [2]. That is the reason for local natural barriers against

bacterial infections being compromised in newborn infants. The overall rates of nosocomial infections per patient (total number of infections per 100 patients) at US neonatal units range from 1.8 to 15.3 [3]. A study carried out by the Brazilian Ministry of Health, in 1994, in 99 tertiary hospitals located in Brazilian capitals indicated an overall hospital infection rate of 14.4% in neonatology [4]. A study carried out at the Hospital São Paulo from 1994 to 1996 reported a cumulative incidence of hospital infections of 25.6 per 100 discharges for 678 newborns admitted to the ICU, and of 9.3 per 100 patients for all 1,868 newborns admitted to the nursery [5]. The National Nosocomial Infection Surveillance System (NNISS) is an epidemiological surveillance system for hospital infections with the use of protocols called surveillance components. This method is widely used in ICUs. It was developed in the United States during the 1970s [6] and is based on

nosocomial infection rates being associated with risk factors such as average hospital stay in units and number and duration of invasive procedures (central catheters, artificial ventilators, and so on).We will present the formulas for calculating some of the NNISS rates. Epidemiological surveillance is a set of activities aimed at active, systematic and continuous observation of collection, analysis and assessment of data regarding infection [7].

METHODOLOGY

To meet up the objectives, a descriptive, quantitative, cross-sectional study has been employed in Rajshahi Medical College Hospital, Rajshahi from January 2013 to June 2013. Total respondent was 100 (50 Nurse and 50 parents of neonate). The data was collected through a pretested developed questionnaire.

RESULTS

Table-1: Distribution of Demographic information of Nurses (n=100)

Demographic Variable	Frequency (n)	Percentage (%)
Age		
20-29 years	0	0
30-39 years	15	30
40-49 years	24	48
50+ years	11	22
Gender		
Male	0	0
Female	50	100
Marital status		
Single	2	4
Married	45	90
Widow	3	6
Religion		
Muslim	45	90
Hindu	4	8
Christian	1	2
Buddhist	0	0
Academic qualification		
S.Sc	50	100
H.Sc	15	30
B.Sc / BA	2	4
Masters	2	4
Professional qualification		
Diploma in nursing & midwifery	50	100
B.Sc in nursing	10	20
MPH	7	14
B.Sc in nursing		
College of nursing	0	0
Bangladesh open university	10	20
From private university	0	0
Master of Public Health		
Nipsom	0	0
Private university	7	14
Length of service		
(1-5)Years	3	6
(6-10)Years	6	12
(11-15)Years	12	24
(16-20)Years	10	20
(21-25)Years	5	10
(26-30)Years	14	28

Above table shows age distribution shows highest percentage 48 % in between 40-49 years. Among the nurses shows 100% were female. 90% are married, 4% were single and 6% widow. Muslim nurses were 90%, Hindu nurses were 8% and 2% were Christian. Academic qualification shows 100 % participants passed S. S. C, H. S. C. 30%, B. Sc/ B.A 4 % and masters or others 4%. Among 50 nurses, their professional qualification was Diploma in nursing 100%, diploma in midwifery 100%, B. Sc in Nursing 20%, and M.P.H 14%. Among 50 participant 20% completed their B. Sc in Nursing from Bangladesh Open University. 14% nurse completed their MPH degree from Nipsom. Length of the service describe highest service providers are 24% between 11-15 years (Table-1).

Table-2: Knowledge related question for the nurses

Variables	Traits	Frequency (n)	Percentage (%)
Know what is neonatal nosocomial infection	Yes	50	100
	No	0	0
Know where neonatal nosocomial infection are spread	Complete knowledge	42	84
	Partial knowledge	8	16
	Wrong answer	0	0
	Do not know	0	0
Causes of neonatal nosocomial infection	Complete knowledge	44	88
	Partial knowledge	0	0
	Wrong answer	0	0
	Do not know	6	12
Responsible organism for neonatal nosocomial infection	Complete knowledge	32	64
	Partial knowledge	6	12
	Wrong answer	8	16
	Do not know	4	8
Risk factors of neonatal nosocomial infection	Complete knowledge	30	60
	Partial knowledge	14	28
	Wrong answer	0	0
	Do not know	6	12
Complications of neonatal nosocomial infection	Complete knowledge	35	70
	Partial knowledge	0	0
	Wrong answer	10	20
	Do not know	5	10
Know why neonate suffer from neonatal nosocomial infection	Complete knowledge	44	88
	Partial knowledge	6	12
	Wrong answer	0	0
	Do not know	0	0
How these germs get from one neonate to other	Complete knowledge	36	72
	Partial knowledge	14	28
	Wrong answer	0	0
	Do not know	0	0
Hand washing among health workers reduce neonatal nosocomial infection	Yes	48	96
	No	2	4
Nosocomial infection related diseases	Complete knowledge	35	70
	Partial knowledge	7	14
	Wrong answer	2	4
	Do not know	6	12
Environment responsible for neonatal nosocomial infection	Yes	50	100
	No	0	0
Reduction of neonatal nosocomial infection	Complete knowledge	42	84
	Partial knowledge	6	12
	Wrong answer	0	0
	Do not know	2	4
Provide health education and counselling to the patients relatives	Yes	50	100
	No	0	0
Use sterile instrument while taking care of neonate	Yes	50	100
	No	0	0
Sign and symptom about neonatal nosocomial infection	Complete knowledge	31	62
	Partial knowledge	12	24
	Wrong answer	4	8
	Do not know	3	6
Spread of nosocomial infection	Complete knowledge	34	68
	Partial knowledge	8	16
	Wrong answer	6	12
	Do not know	2	4

Ensure proper reporting and record keeping	Yes	50	100
	No	0	0
Giving attention to the individual neonatal condition and talk with their parents	Yes	50	100
	No	0	0
Instruct the patient about spread of neonatal nosocomial infection	Yes	47	94
	No	3	6
Reassure the parents of neonate	Yes	50	100
	No	0	0
Suggest the parents to maintain personal hygiene	Yes	48	96
	No	2	4
Prevention of neonatal nosocomial infection	Complete knowledge	36	72
	Partial knowledge	9	18
	Wrong answer	2	4
	Do not know	3	6
Mean			
Yes		49.3	98.6
No		0.53	1.07
Mean of level of knowledge			
Complete knowledge		36.75	73.5%
Partial knowledge		7.5	15%
Wrong answer		2.66	5.33%
Do not know		3.08	6.16%

The respondent 100% told that yes they knew about neonatal nosocomial infection. Regarding where the nosocomial infection spread immediate care about 84 % had complete knowledge, 16% had partial knowledge, wrong answer was nil and do not have any idea was nil. Knowledge about the causes of neonatal nosocomial infection about 88% respondent had complete knowledge, partial knowledge was 12%, wrong answer and don't know where nil. Their knowledge about the responsible organism for neonatal nosocomial infection according to the data collection their complete knowledge 64% partial knowledge 12% wrong answer 16% don't know 8%. In response to a question about knowledge of risk factors of neonatal nosocomial infection; complete knowledge 60%, partial knowledge 28%, do not know 12% and wrong answer nil. The complete knowledge about the complication of neonatal nosocomial infection was 70%, partial knowledge nil, wrong answer 20%, and the remaining 10% was do not know about the complication of neonatal nosocomial infection. Asked why the neonate suffer from this infection ,respondent described the complete knowledge 88%, partial knowledge 12%, Wrong answer and do not have knowledge was nil . Asked about how the germs get from one another the respondent described the complete knowledge 72%, partial knowledge 28% and Wrong answer and do not have knowledge was nil. In response to the yes/ no question regarding hand washing among health workers reduce neonatal nosocomial infection. 96% respondent told yes that hand washing can reduce it and 4% answered no. In response to a question about nosocomial infection related diseases about 70%

respondent have complete knowledge, 14% have partial knowledge,4% wrong answer and12% do not have knowledge. In response to the yes/no question about environment responsible for nosocomial infection. 100% respondent told yes. In response to a question about how to reduce neonatal nosocomial infection, 84% respondent have complete knowledge, 12% have partial knowledge, wrong answer nil and 4% do not have any knowledge. In response to the yes/no question about provide health education and counselling. 100% respondent told yes. In response to the yes/no question about using sterile instrument, 100% participant answered yes. Asked about sign and symptom of neonatal nosocomial infection, 62% have complete knowledge, 24% have partial knowledge, 8% wrong answer and 6% do not have knowledge about this. In response to this question 68% respondent have complete knowledge, 16% have partial knowledge, 12% answered wrong and 4%do not have knowledge. In response to a yes/no question,100% respondent told yes they ensure proper recording and report keeping. In response to this yes/no question 100% answered yes, they give attention to the individual neonate. In response to this yes/no question 94% told that yes we instruct the parents and 6% no. In response to the yes/no question about reassure of the parents of neonate, 100% respondent answered yes. Presenting part showing the mean of knowledge related answer of nurse's (98.6%) were yes and (1.07%) were no. Presenting part showing the mean of knowledge related answer of nurse's, (73.5%) complete knowledge, (15%) partial knowledge, (5.33%) wrong answer and (6.16%) do not know (Table-2).

Table-3: Demographic information (For the neonates and parents of neonate)

Demographic Variable	Traits	Frequency (n)	Percentage (%)
Age of neonate	5-10 days	25	50
	11-16 days	10	20
	17-22 days	9	18
	23-28 days	6	12
Gender	Male	28	56
	Female	22	44
Weight of neonate	1-3 kg	45	90
	3+	5	10
Religion	Muslim	36	72
	Hindu	14	28
	Christian	0	0
	Buddhist	0	0
Type of family	Nuclear	31	62
	Joint	19	38
Fathers education	Illiterate	11	22
	Able to sign	10	20
	Primary	9	18
	S.Sc	10	20
	H.Sc	7	14
	Graduate	3	6
Mothers education	Illiterate	15	30
	Able to sign	10	20
	Primary	12	24
	S.Sc	9	18
	H.Sc	4	8
	Graduate	0	0
Resident	Rural	35	70
	Urban	15	30
Home location	Between Rajshahi division	50	100
	Other Division	0	0
Monthly income	3000-6000	34	68
	6000-12000	12	24
	12000-15000	3	6
	15000-30000	1	2
Medical payment	Own pay	12	24
	Government support	38	76
	NGO support	0	0
	Others	0	0

Age distribution describes over 50% of the respondents were 5-10days of age, about 20% between 11-16 days, about 18% between 17-22 days, 12% between 23-28 days. Between the neonate about 56% was male child and 44% was female child. Among of them 90% weight between 1-3 kg and over 3 kg was 10%. 72% was Muslim, 28% Hindu; there were no Christian and Buddhist. The educational status of the neonate's father was 22% illiterate, 20% able to sign, about 18% primary educated, about 20% secondary educated, 14% higher secondary, 6% were graduated, on the other hand mothers education was 30% illiterate, 20% was able to write name, 24% was primary education,18% secondary education and 8% higher secondary education. Place of the respondent data show that 70% in rural and remaining 30% in the Urban. Among them about 100% of the respondents home district is in Rajshahi. Distribution of the monthly income and payment of the respondent's family was 68% monthly income as (3000- 6000)/=, 24% (6000-120,00)/=, 6% (12000-15000)/=,2% (15000-30000)/=. They paid the hospital bill by 24% own source, 76% govt. support, No one NGO support recorded (Table-3).

Table-4: Practice of the participated nurses in the Rajshahi Medical College Hospital

Nursing activities	Answer			
	Yes		No	
	No.	%	No.	%
Does the nurse provide information about neonatal nosocomial infection?	45	90	5	10
Does the nurse inform you about the organism of neonatal nosocomial infection?	42	84	8	16
Does the nurse discuss about the causes of this infection of your baby?	39	78	11	22
Does the nurse inform you about the sign and symptom of this infection?	40	80	10	20
Do the nurse's inform you about your baby's condition?	39	78	11	22
Does the nurse come to check your baby's condition?	42	84	8	16
Show caring attitude when listening the statement of the parents	41	82	9	18
Does the nurse teach the family members how to carry out care?	38	76	12	24
Does the nurse discuss about the risk factors for neonatal nosocomial infection?	37	74	13	26
Does the nurse discuss about related disease of neonatal nosocomial infection?	42	84	8	16
Does the nurse inform about treatment plan?	44	88	6	12
Does the nurse teach about health education?	35	70	15	30
Does the nurse give appropriate information about vaccination?	40	80	10	20
Mean	40.308	80.62%	9.69	19.38%

From the data which was collected from the nurses knowledge and practice related among the patient respondent they said about 90% that the nurse's provide information about neonatal nosocomial infection and 10% no, In response to the question about the nurse tell about responsible organism for neonatal nosocomial infection,84% parents of neonate answered yes and 16% no, a question was asked that the nurse discuss about the causes of neonatal nosocomial infection,78% answered yes and 22% no, in response to the question of sign and symptom of neonatal nosocomial infection, neonates parent 80% answered yes and 20% answered no,78% nurse inform about baby's condition and 22%do not,84% staff nurses check the baby's condition and 16% do not,82% nurse show caring attitude, 18% do not.76% teach family members about how to take care of the baby and 24% do not,74% nurse told about the risk factors and 26% do not.84% nurse discuss about related disease and 16% do not.88% nurse discuss about the treatment plan and 12% do not,70% nurse teach health education and 30% do not,80% nurse inform about vaccination and 20% do not. Nurse's practice related answer given by parents of neonate were (80.62%) yes and (19.38%) no (Table -4).

DISCUSSION
Nosocomial infection rates have increased worldwide during the past decade. The increasing number of technology-dependent infants is the primary determinant in the increase in nosocomial infection [8].

This study shows that about 64% respondent have complete knowledge and 12% have partial knowledge about responsible organism for neonatal nosocomial infection. This study also shows that 68% nurses have complete knowledge about spread of neonatal nosocomial infection and 16% have partial knowledge. The presence of resistant strains of these two organisms in hospitals and environment should be of much concern because both patients and hospital staff are exposed to these microorganisms. Neonatal infection rates are 3-20 times higher in developing countries than in developed countries [9].

Neonatal nosocomial infections affect at least 50% of newborns who weigh less than 1500 g, which ends up increasing mortality rates. This study shows that 90% neonates weights were 1-3 kg and about 10% were above 3 kg. This study shows that 72% nurses have complete knowledge application of preventive measures. The mean of complete knowledge of respondent nurse's is 36.75 and percentage 73.5% and mean of partial knowledge is 7.5 and percentage 15%.

The nosocomial infection rate in patients in a facility is an indicator of quality and safety of care. This study shows that about 88% nurse have complete knowledge about why the neonate suffer from this infection. Surveillance, by itself, is an effective process to decrease the frequency of hospital-acquired infections [10]. The results of this survey, which covered 47 hospitals of size ranging from 227 to 1502 beds (mean 614) showed a wide range of nosocomial infections, with prevalence varying from 3% to 21% (mean 8.4%) in individual hospitals.

This study shows that about 100% respondent knows that environment responsible for neonatal nosocomial infection Good infection control practice should be established to improve health outcomes and prevent negative outcomes such as morbidity, mortality, increased health care costs and possible litigation. About 84% respondent in this study have complete knowledge and 12% have partial knowledge about reduction of neonatal nosocomial infection. About 96% respondent believe that proper hand washing among health workers can reduce neonatal nosocomial infection.

The efficacy of nosocomial infection control showed [11] beyond doubt that increase in surveillance activities is able to directly bring down the rates of nosocomial infections. To prevent cross-infection, it is necessary to identify the different sources that facilitate transmission of pathogens to patients. One of the major factors for cross-infection is the transfer of pathogens from the hands of healthcare workers to patients [12].

As mentioned previously, Nosocomial infections are an increasingly important cause of morbidity and mortality in modern medicine. Studies conducted by World Health Organization and others have found that the highest prevalence of nosocomial infections occurred in intensive care units. Nosocomial infections have been found to add functional disability, emotional stress and in some cases, have led to disabling conditions that reduced the quality of life. According to medical dictionary, infection control refers to policies and procedures used to minimize the risk of spreading infections, especially in hospitals. This study shows that about 60% respondent have complete knowledge and 28% have partial knowledge about risk factors of neonatal nosocomial infection. Nosocomial infections have been reported to have a financial impact in the healthcare system by increasing the total cost of healthcare services and length of stay.

Cleaning and disinfecting the hospital environment has so far been the most fundamental method applied in infection control, however it is yet to be regarded as an evidence-based science and consequently receives little attention from the scientific community [13]. This study also shows that 84% nurses have complete knowledge that management of hospital environment and patient isolation can reduce neonatal nosocomial infection.

About 100% respondent in this study shows that use of sterile instrument is very much useful in this regard. Antibiotic resistance develops when microorganisms are exposed to effective doses of an antibiotic within a shorter period or when the microorganisms are exposed to smaller concentrations or residues of the antibiotic over a longer period of time [14]. Isolation guidelines recommended by the CDC, and per hospital guidelines, aid in preventing the transmission of pathogens.

Despite the availability of low-cost interventions for infection prevention and control, the compliance with standard infection control practices remains very low, particularly in low-income and middle income Countries. This study shows that about 34% monthly income between (3000-6000). This study shows about 80.62% nurse's practice about how to control this infection. If they take proper step along with the Government to prevent and control neonatal nosocomial infection then we can get healthy neonate who will be our future asset and who will take the responsibility of our country in the future.

CONCLUSION

Newborn health and survival depend on the care given to the newborn, although newborn care is a very essential element in reducing child mortality especially for those who is suffering neonatal nosocomial infection. There is the need for a combined approach to the mother and her baby during pregnancy, to have someone with knowledge and the skills with her during child birth and effective care for both mother and baby after birth. Addressing neonatal mortality requires a continuity in the elements of care, which is lacking in many settings/communities with care for the neonate often receiving little attention in either maternal or child health programmes.

Ethics Approval and Consent to Participate
The approval was obtained from the Institutional review board of Rajshahi Medical College Hospital. This is the Government hospital in Bangladesh where many neonates admit every day and get proper care and treatment.

Consent for Publication: During data collection, the participants were explained about the purpose and goal of the study before collecting data and consent was obtained.

Availability of Data and Materials: Not Applicable.

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Conflict of Interest: The authors declare no conflict of interest, financial or otherwise.

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