



Knowledge And Practice Of Neonatal Sepsis And Its Management Of The Senior Staff Nurses Working In M Abdur Rahim Medical College Hospital, Dinajpur

Mst. Suraiah Parvin

Nursing Instructor

Dinajpur Nursing College, Dinajpur

Dinajpur, Bangladesh

ABSTRACT

This was a cross sectional type of descriptive study which was carried out with a view to assess knowledge and practice on neonatal sepsis of the senior staff nurses working in M Abdur Rahim Medical College Hospital, Dinajpur. The sample size was 322 which was selected purposively. Regarding age distribution of the respondents it was found that majority (73.3%) were in the age group of <30 years and the mean age of the respondents was 28.59 ± 7.95 years. Most (92.9%) of the respondents had monthly family income of Taka 40001-60000 and the mean monthly family income of the respondents was Taka 50034.50 ± 6041.07 . It was found that majorities (79.2%) the respondents were Muslim, most (96.89%) of the respondents were female and 83.54% of the respondents had Diploma in Nursing. Regarding causative organism of neonatal sepsis it was observed that 31.7% of the respondents knew, as multiple, majority (43.5%) of the respondents knew as multiple signs of neonatal sepsis, majority (73.9%) of the respondents knew lethargy, apnea, poor feeding, vomiting, irritability as symptoms of neonatal sepsis and 46.3% of the respondents knew umbilical granuloma as a complication of neonatal sepsis. A large number (32.6%) of the respondents knew unhygienic delivery as the common source of neonatal sepsis and majority (67.7%) of the respondents used Ceftriaxone as drug in neonatal sepsis. Majority (75.8%) of the respondents maintained aseptic technique as nursing management of neonatal sepsis, majority (49.7%) of the respondents knew to maintain aseptic technique for prevention of neonatal sepsis and majority (41.3%) of the respondents knew intrauterine infection as predisposing factors of neonatal sepsis. Majority (37.9%) of the respondents knew multiple techniques to prevent neonatal sepsis and 24.5% of the respondents knew multiple factors for congenital infections of neonatal sepsis. Majority (60.6%) of the respondents knew that there were 2 types of neonatal sepsis, majority (43.5%) of the respondents knew clinical features were the required diagnostic techniques for neonatal sepsis. majority 147.2%) of the respondents knew hospitalization was the prerequisite for management of neonatal sepsis, majority 155.0%) of the respondents knew that maintenance of warmth and ensure normal temperature as nursing care of neonatal sepsis. The relationship between professional qualification, monthly family income of the respondents and knowledge on signs of neonatal sepsis of the respondents was found statistically significant ($p < 0.05$). The relationship between professional qualification of the respondents and nursing management of neonatal sepsis was found statistically non-significant ($p > 0.05$). This study might be the basis for further in-depth study in this regard.

Keywords: Neonatal sepsis, Sepsis management, Neonatal care, Sepsis prevention

INTRODUCTION

Neonatal sepsis is one of the commonest causes of morbidity and mortality in the neonates in Bangladesh compared to the developed countries. It is one of the four leading causes of morbidity and mortality in Bangladesh among the neonates due to delivery and postnatal follow up in an unhealthy environment and low socio economic state leading to material infection and premature delivery. It is absolutely necessary to diagnose early neonatal sepsis and its cause using clinical findings and rapid diagnostic method so that no time is wasted to start the appropriate treatment. If not recognized early, it can cause septicemia leading to, multiple organ dysfunction and invariably death. The neonates who develop sepsis often die rapidly. Although this approach is reasonable given the dire consequence of a missed diagnosis, improvement in our diagnostic accuracy should diminish the exposure to the risk of avoided antibiotic therapy, excess financial and emotional cost to the parents. Sepsis is the commonest cause of neonatal mortality and is responsible for 30-50% of total neonatal deaths each year in developing countries." It is estimated that up to 20% of neonates develop sepsis and approximately 1% die of sepsis related causes.' The term neonatal sepsis, refers to systemic infection of neonates including septicemia, pneumonia, meningitis, arthritis, osteomyelitis, and urinary tract infection. As per National Neonatal Perinatal Database (NNPD) 2002-2003, the incidence of systemic infection is 3% among intramural babies in tertiary care institutions in India, with septicemia being present in three fourth of the cases and pneumonia in one third of neonates. Infection is the primary cause of mortality in 18.6% of intramural neonates in which *Klebsiella pneumoniae* is the most frequent bacterial isolate (32.5%), followed by *Staphylococcus aureus* (13.6%). Sepsis is 12 times more common in extramural admissions (39.7%). In extramural admissions, *Klebsiella* is the commonest bacteria responsible (27.5%), the next common being *S. Aureus* (14.9%). Sepsis is responsible for death in 38.0% of these extramural babies.^{3, 4} Neonatal sepsis is of two types:

Early onset Sepsis (EOS): Early onset sepsis presents within first 72 hours of life. In severe cases the neonate may be symptomatic *in utero* (fetal tachycardia, poor beat to beat variability). Clinically, the neonate usually presents as respiratory distress and pneumonia. Presence of the following risk factors has been associated with an increased risk of EOS:^{6,7}

- Low birth weight (<2500gms) or preterm baby
- Febrile illness in the mother within 2 weeks prior to delivery
- Foul smelling and/or meconium stained liquor amnii.
- Prolonged rupture of membrane (>24 hours).
- More than 3 vaginal examinations during labour.
- Prolonged and difficult delivery with instrumentation.
- Perinatal asphyxia (Apgar score <4 at 1 minute of age) or difficult resuscitation.

Neonates with presence of foul smelling liquor or three of above mentioned risk factors should be considered to have EOS & treated with antibiotics. Presence of ≥ 2 risk factors should be investigated with sepsis screen and treated accordingly.⁸

Late onset Sepsis (LOS): Late onset sepsis usually presents after 72 hours of age. The source of infection is either nosocomial or community acquired and neonates usually present with septicemia, pneumonia or meningitis.^{9,10}

Risk factors for development of LOS include:

- NICU admission
- Poor hygiene
- Low birth weight (LBW)
- Poor cord care
- Prematurity
- Bottle feeding
- Invasive procedure
- Superficial infection (pyoderma, umbilical sepsis)
- Prelacteal feeding
- Ventilation
- Aspiration of feeds

Manifestations of neonatal sepsis are vague and ill defined. Alteration in established feeding behaviour is common and early, but is a nonspecific symptom. Other features are hypothermia or fever (former is more common in LBW babies), lethargy, poor cry, poor perfusion i.e. prolonged capillary refill time (>2 seconds), hypotonic or absent neonatal reflexes, bradycardia or tachycardia, respiratory distress i.e. apnoea or gasping respiration, hypoglycemia or hyperglycemia and metabolic acidosis. Clinical features of sepsis are non-specific in neonates and a high index of suspicion is required for the timely diagnosis of sepsis. Although blood culture is considered the gold standard for the diagnosis of sepsis, it usually takes about 48-72 hrs, to obtain the results of blood culture. Hence there is a need for investigations which are early predictors, & are also reliable markers of neonatal sepsis. Septicemia is potentially life-threatening microbial invasion from the infected focus. It is still a principal cause of neonatal high mortality and morbidity in many countries around the world including India.¹

Septicemia in neonates clinically can be broadly classified on the basis of onset of symptoms into early onset sepsis (EOS; in first week of life) and late onset sepsis (LOS; after 1 week of life). Maternal risk factors as well as neonatal factors do contribute for the occurrence of septicemia among neonates. Maternal causes include group 13 streptococcal colonization, chorioamnionitis, multiple deliveries, prolonged rupture of membranes, urinary tract infection and neonatal factors include preterm birth, low birth weight babies etc. Reported incidence of neonatal septicemia widely varies from region to region within our country also. For instance, it is reported as 8.5 per 1,000 live births for blood culture proven sepsis,² by contrast 64.8% of septicemic neonates were found blood culture positive in a study conducted by Tallur *et al*³ at Hubli-Karnataka. The diagnosis of neonatal septicemia is difficult on clinical grounds alone owing to non-pathognomonic clinical presentation it produces. This has necessitated the consultant pediatricians/neonatologists to seek support of the laboratory procedures, most often blood cultures. A wide variety of bacteria have been isolated from the blood specimen of patients with neonatal septicemia. Gram-negative bacteremias are frequently documented. Reports of Gram-positive bacteremias however are accumulating in the past three decades. Furthermore the bacterial pathogen producing neonatal septicemia has been noted to be different within the regions of the country.⁵⁻⁶ On top of this, reports with regard to increasing trends of high resistance of the bacteria to many antimicrobial agents are on the rise necessitating continuous reevaluation of treatment modalities. Isolation of the infecting bacterium from the blood specimen followed by antibiotic susceptibility testing is paramount for the institution of effective antibacterial therapy and hence this helps to improve neonate recovery from septicemia.

OBJECTIVES

General objective

The study was carried out with a view to assess knowledge and practice on neonatal sepsis and its management of senior staff nurses working in M Abdur Rahim Medical College Hospital, Dinajpur.

Specific objectives

1. To assess knowledge on neonatal sepsis and its management of senior staff nurses.
2. To observe practice of management of neonatal sepsis of senior staff nurses.
3. To find out socio-demographic characteristics of the respondents.
4. To find out the relationship between knowledge on neonatal sepsis and its management and socio-demographic characteristics of the respondents.
5. To find out the relationship between knowledge and practice on management of neonatal sepsis of the senior staff nurses.

RESEARCH QUESTION

Do the senior staff nurses working in M Abdur Rahim Medical College Hospital possess proper knowledge regarding neonatal sepsis and its management?

VARIABLES USED IN THIS STUDY

A. Dependent variable

Knowledge on neonatal sepsis and its management
Practice on management of neonatal sepsis

B. Socio-demographic variables

1. Age of the respondents
2. Sex
3. Education
4. Professional qualification
5. Length of service
6. Religion
7. Monthly family income
8. Any training on infection control

METHODOLOGY

Type of study: This was a cross-sectional type of descriptive study.

Place of study: The study was carried out in Public Health Department of Varendra University.

Duration of the study: This research work was a part of Master of Public Health (MPH) programme of Varendra University with duration of 4 months from May, 2017 to August, 2017.

Study population: All the senior staff nurses working at M Abdur Rahim Medical College Hospital, Dinajpur during the study period constituted the study population.

Sample size: The sample size of this study was 322.

Determination of sample size: The sample size was determined by using the following formula:

$$\text{Sample size, } n = (z^2 pq) / d^2$$

Where, p = Response distribution i.e., proportion of factor in the population or the expected frequency value, $q = 1 - p$, d = Margin of error is the amount of error that one would tolerate. Z = Area under normal curve corresponding to the desired confidence level (CI) and it is the amount of uncertainty that one can tolerate.

Now for the present study, $Z = 1.96$ at 9.5% CI, $p = 0.3$ (Approximately 30% of the senior staff nurses possess knowledge on neonatal sepsis), $q = 1 - 0.3 = 0.7$ and $d = 0.05$,
 $n = [(1.96)^2 (0.3) (0.7)] / (0.05)^2 = 322$

The total sample size taken for this study was 322.

Sampling technique: Purposive sampling technique was followed.

Data collection instruments: A partiall. structured questionnaire which was duly pre-tested was used to collect data from the respondents.

Data collection procedure: The researcher herself collected data from the senior staff nurses in M Abdur Rahim Medical College Hospital, Dinajpur working at the office hours by face to face interview through a partially structured questionnaire. All efforts were made to collect data accurately. For open questions, the respondents were asked in such a manner so that they could speak freely and explain their opinion in a normal and neutral way. No leading questions were asked.

Inclusion criteria of the respondents: All the senior staff nurses working in M Abdur Rahim Medical College Hospital, Dinajpur study period were included in the study.

Exclusion criteria: Unwilling to participate in the study.

Data analysis: After proper verification, data were coded and entered into the computer by using SPSS/PC programme. Data were analyzed according to the objectives of the study by using SPSS/PC+ software computer programme. Descriptive variables were explained with mean and standard deviation. Statistical significance was found by applying relevant statistical tests at appropriate probability level ($p = 0.05$ or $p = 0.01$).

Ethical consideration: Prior to the commencement of the study, the research protocol was approved by the research committee (Local ethical committee) of Varendra University. The aim and objectives of the study, along with its procedure, risk and benefits of the study were explained to the respondents in easily understandable language and then informed consent was taken from each of them. Prior permission was taken from the concern authority of M Abdur Rahim Medical College Hospital, Dinajpur. Then it was assured that all information and records would be kept confidential and would be used only for research purpose and the findings would be helpful in assessing knowledge and practice on neonatal sepsis and might be the basis for further in-depth study in this regard.

RESULTS

Table 1: Distribution of the respondents by age

Age in group	Respondents	
	No.	%
<30 years	236	73.3
30 - 39 years	52	16.1
40 - 49 years	25	7.8
50 - 59 years	9	2.8
Total	322	100

$X \pm SD = 28.59 \pm 7.95$ years

Regarding age distribution of the respondents it was found that out of 322 respondents majority (73.3%) were in the age group of <30 years.. 16.1% were 30-39 years, 7.8% were 40-49 years and 2.8% were 50-59 years of age group. The mean age of the respondents was 28.59 ± 7.95 years.

Table 2: Distribution of the respondents by length of service

Length of service	Respondents	
	No.	%
1 - 10 years	259	80.4
11 - 20 years	8	2.5
21 - 30 years	55	17.1
Total	322	100

Regarding length of service it was observed that 80.4%, 17.1%, and 2.5% of the nurses had length of service of 1-10 year, 21-30 years and 11-20 years respectively.

Table 3: Distribution of the respondents by monthly family income of the respondents

Monthly family income of the respondents	Respondents	
	No.	%
Taka up to 40000	15	4.7
Taka 40001 - 60000	299	92.9
Taka 60001	8	2.5
Total	322	100

$X \pm SD = 50034.5 \pm 6041.07$ taka

From the table, it was found that 92.9% of the respondents had 40001-60000 taka as monthly family income, 4.7% had up to 40000 taka and 2.5% had 60001 taka as monthly family income. The mean monthly family income of the respondents was 50034.5 ± 6041.07 taka.

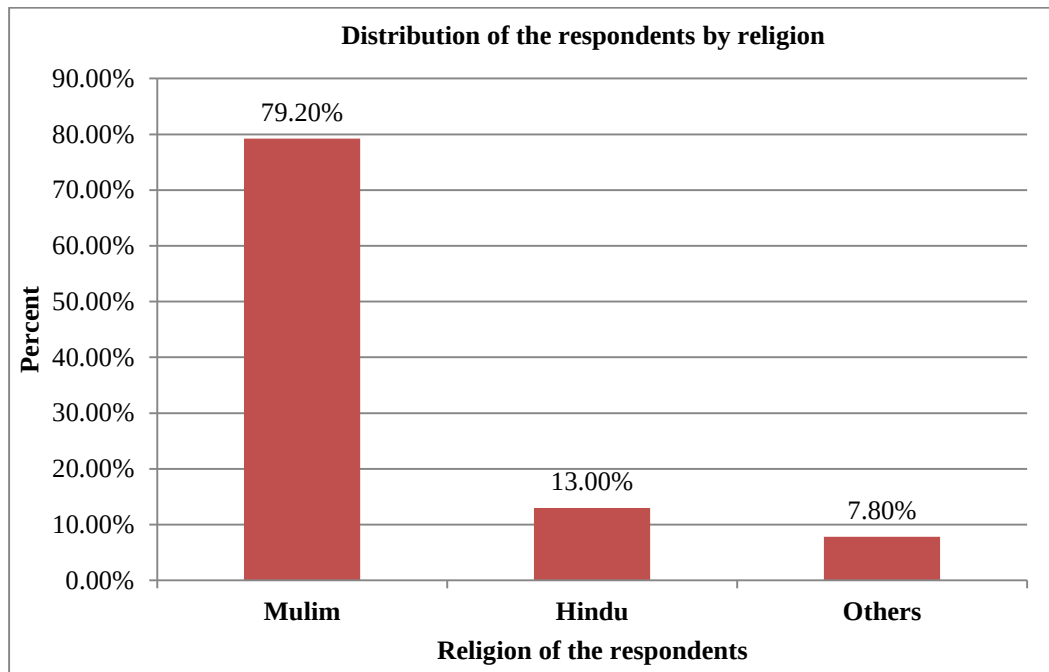


Figure 1: Distribution of the respondents by religion

It was found that most (79.2%) the respondents were Muslim, 13.0% were Hindu and 7.8% were from other religions.

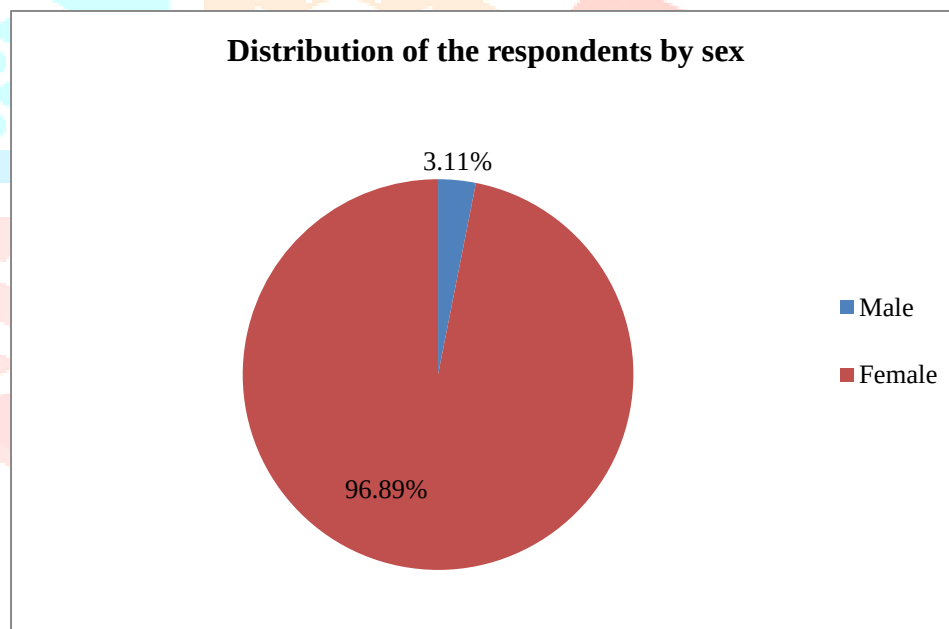


Figure 2: Distribution of the respondents by sex

It was found that majorities (96.89%) of the respondents were female and 3.11% were male.

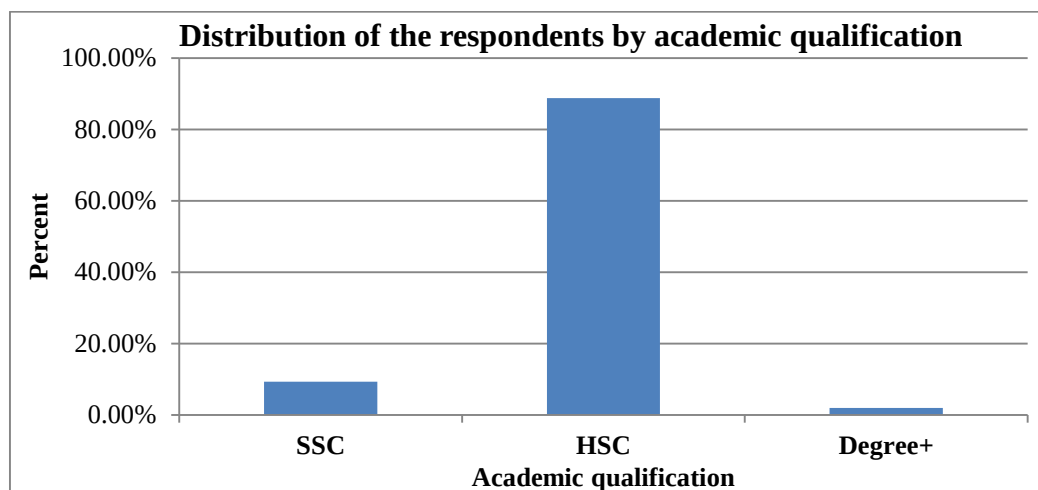


Figure 3: Distribution of the respondents by academic qualification

It has found that 88.8% of the respondents had HSC level of academic education, 9.3% had SSC level of education and 1.9% had more than degree level1 of education.

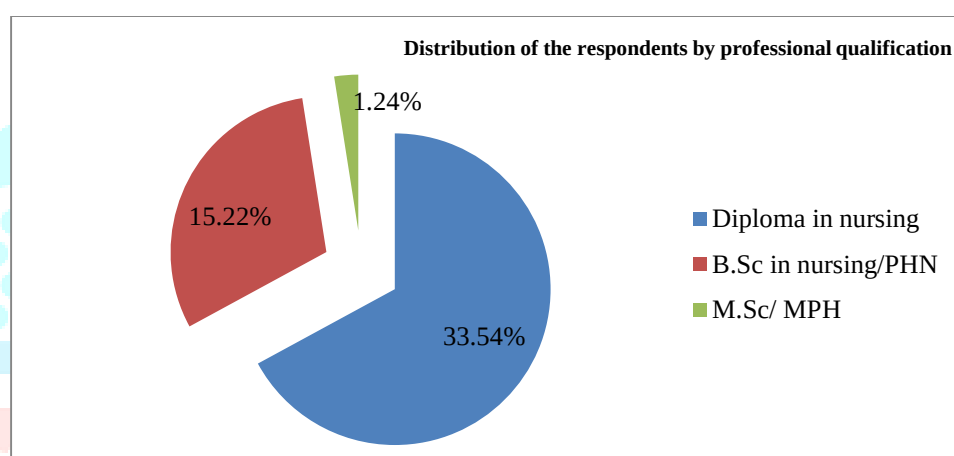


Figure 4: Distribution of the respondents by professional qualification

It was found that 33.54% of the respondents had Diploma in Nursing, 15.22% had Bsc in Nursing/PHN and 1.24% had Msc / MPH level of professional education.

Table 4: Distribution of the respondents by causative organism of neonatal sepsis

Causative organism of neonatal sepsis	Respondents	
	No.	%
Staphylococcus	103	32.0
E. coli	68	21.1
Clostridium tetani	33	10.2
Vibirio cholera	16	5.0
Multiple	102	31.7
Total	322	100

Regarding causative organism of neonatal sepsis it was observed that most (31.7%) of the respondents knew as multiple, 32.0% knew as Staphylococcus, 21.1% knew as E. coli, 10.2% knew as Clostridium tetani and 5.0% knew as Vibirio cholera.

Table 5: Distribution of the respondents by knowledge on signs of neonatal

Knowledge on signs of neonatal	Respondents	
	No.	%
Foul smell	21	6.5
Umbilical discharge	53	16.5
Hyperthermia	92	28.6
Restlessness	16	5.0
Multiple	140	43.5
Total	322	100

Above table showed that most (43.5%) of the respondents knew as multiple signs of neonatal sepsis, 28.6% knew as hyperthermia, 16.5% knew as umbilical discharge, 6.5% knew as foul smelling and 5.0% knew as restlessness.

Table 6: Distribution of the respondents by knowledge on symptoms of neonatal

Know ledge on symptoms of neonatal sepsis	Respondents	
	No.	%
Lethargy, Apnea, Poor feeding, vomiting, irritability	238	73.9
Instability	16	5.0
Respiratory distress, cyanosis	51	15.8
Multiple	17	5.3
Total	322	100

Above table showed that most (73.9%) of the respondents knew lethargy, Apnea, Poor feeding, vomiting, irritability as symptoms of neonatal sepsis, 15.8% knew as respiratory distress, cyanosis, 5.3% knew as multiple symptoms and 5.0% knew as instability.

Table 7: Distribution of the respondents by knowledge on complications of neonatal sepsis

Knowledge on complications of neonatal sepsis	Respondents	
	No.	%
Thrombophlebitis of umbilical vein	77	23.9
Umbilical granuloma	149	46.3
Septicemia	32	9.9
Multiple	64	19.9
Total	322	100

Above table showed that most (46.3%) of the respondents' knew umbilical granuloma as complications of neonatal sepsis, 23.9% knew as thrombophlebitis of umbilical vein, 19.9% knew as multiple and 9.9% knew as septicemia.

Table 8: Distribution of the respondents by knowledge on common sources of Neonatal infection

Knowledge on common sources	Respondents	
	No.	%
Unhygienic delivery	105	32.6
Umbilical catheterization	28	8.7
Contaminated cord cutting	99	30.7
Multiple	90	28.0
Total	322	100

It was revealed that most (32.6%) of the respondents knew unhygienic delivery as common source of neonatal sepsis, 30.7% knew as contaminated cord cutting, 28.0% knew as multiple and 8.7% knew as umbilical catheterization for common source of neonatal sepsis.

Table 9: Distribution of the respondents by knowledge on drugs used in neonatal sepsis

Knowledge on drugs used in neonatal sepsis	Respondents	
	No.	%
Ceftriaxone	218	67.7
Cefradine	50	15.5
Multiple	54	16.8
Total	322	100

It was found that majority (67.7%) of the respondents used Ceftriaxone as drugs used in neonatal sepsis, 16.8% used multiple and 15.5% used Cefradine.

Table 10: Distribution of the respondents by nursing management of neonatal sepsis

Nursing management of neonatal sepsis	Respondents	
	No.	%
Maintain aseptic technique	244	75.8
Cold sponging	16	5.0
Maintaining nutrition	16	5.0
Multiple	46	14.3
Total	322	100

It was found that majority (75.8%) of the respondents maintained aseptic technique as nursing management of neonatal sepsis, 14.3% maintained multiple techniques, 5.0% maintained cold sponging and maintained nutrition.

Table 11: Distribution of the respondents by knowledge on prevention of neonatal infection

Knowledge on prevention of neonatal infection	Respondents	
	No.	%
Must maintain aseptic technique	160	49.7
Antibiotic	49	15.2
Maintaining sanitation	16	5.0
Multiple	97	30.1
Total	322	100

It was found that majority (49.7%) of the respondents knew to maintain aseptic technique for prevention of neonatal sepsis, 30.1% knew as multiple procedure, 15.2% knew as antibiotic and 5.0% knew as maintaining sanitation.

Table 12: Distribution of the respondents by knowledge on predisposing factors

Knowledge on predisposing factors of neonatal sepsis	Respondents	
	No.	%
Intrauterine infection	133	41.3
Meuconium stained liquor	112	34.8
Multiple	77	23.9
Total	322	100

It was found that majority (41.3%) of the respondents knew intrauterine infection as predisposing factors of neonatal sepsis, 34.8% knew as meuconium stained liquor and 23.9% knew as multiple.

Table 13: Distribution of the respondents by knowledge on how neonatal sepsis can be prevented

Knowledge on how neonatal sepsis can be prevented	Respondents	
	No.	%
Clean environment	45	14.0
Control of infection	67	20.8
Maintain hygiene	88	27.3
Multiple	122	37.9
Total	322	100

It was found that majority (37.9%) of the respondents knew multiple techniques to prevent neonatal sepsis, 27.3% knew as maintained hygiene, 20.8% knew as control of infection and 14.0% knew as clean environment.

Table 14: Distribution of the respondents by congenital infections of neonatal sepsis

Congenital infections of neonatal sepsis	Respondents	
	No.	%
Toxoplasmosis	52	16.1
Rubella	50	15.5
Cytomegalo virus	72	22.4
Syphilis	34	10.6
Human	35	10.9
Multiple	79	24.5
Total	322	100

It was found that majorities (24.5%) of the respondents knew multiple factors for congenital infections of neonatal sepsis, 22.4% knew as Cytomegalo virus, 16.1% knew as toxoplasmosis, 15.5% knew as Rubella, 10.9% knew as human and 10.6% knew as Syphilis.

Table 15: Distribution of the respondents by types of neonatal sepsis

Types of neonatal sepsis	Respondents	
	No.	%
2 types	195	60.6
3 types	127	39.4
Total	322	100

It was revealed that majority (60.6%) of the respondents knew that there were 2 types of neonatal sepsis and 39.4% knew as 3 types.

Table 16: Distribution of the respondents by investigations done for neonatal sepsis

Investigations done for neonatal sepsis	Respondents	
	No.	%
Urine for R/E	25	7.8
Need for clinical investigation	140	43.5
Blood culture	62	19.3
Multiple	95	29.5
Total	322	100

It was found that majority (43.5%) of the respondents knew clinical investigations as required investigations for neonatal sepsis, 29.5% knew as multiple, 19.3% knew as blood culture and 7.8% knew as urine for R/E for required investigations of neonatal sepsis.

Table 17: Distribution of the respondents by management of neonatal sepsis

Management of neonatal sepsis	Respondents	
	No.	%
Appropriate antibiotic prescribed by doctor	23	7.1
Hospitalization	152	47.2
Multiple	147	45.7
Total	322	100

It was found that majority (47.2%) of the respondents knew hospitalization as management of neonatal sepsis, 45.7% knew as multiple and 7.1% knew as appropriate antibiotic prescribed by doctor.

Table 18: Distribution of the respondents by nursing care of neonatal sepsis

Nursing care of neonatal sepsis	Respondents	
	No.	%
Maintenance of warmth and ensure normal temperature	177	55.0
Body temperature should be monitored frequently	50	15.5
Maintenance of temperature chart	32	9.9
Multiple	63	19.6
Total	322	100

It was found that majority (55.0%) of the respondents knew maintained of warmth and ensure normal temperature as nursing care of neonatal sepsis, 19.6% knew as multiple, 15.5% knew as body temperature should be monitored frequently and 9.9% knew as maintained of temperature chart.

Table 19: Relationship between professional qualification of the respondents and know ledge on signs of neonatal sepsis

Professional qualification	Know ledge on signs of neonatal sepsis					Total
	Foul smell	Umbilical discharge	Hypert hermia	Restless ness	Multiple	
Diploma in nursing	19 (7.1%)	36 (13.4%)	73 (27.1%)	14 (5.2%)	127 (47.2%)	269 (83.5%)
BSc in nursing/ PHN	2 (4.1 %)	17 (34.7%)	17 (34.7%)	2 (4.1%)	11 (22.4%)	49 (15.2%)
MSc / MPH	(0.0%)	0 (0.0%)	2 (50 0%)	0 (0.0%)	2 (50.0%)	4 (1.2%)
Total	21 (6.5%)	53 (16.5%)	92 (28.6%)	16 (5.0%)	140 (43.5%)	322 (100.0%)

$$\chi^2 = 20.60, df = 8, p < 0.05$$

Above table showed the relationship between professional qualification of the respondents and knowledge on signs of neonatal sepsis. About 47.2% of the respondents who had diploma in Nursing knew multiple sign for neonatal sepsis, 34.7% of the respondent who had BSc in nursing/PHN knew as umbilical discharge and 50.0% of the respondents who had MSc/MPH knew- umbilical discharge as signs of neonatal sepsis. The relationship between professional qualification of the respondents and knowledge on signs of neonatal sepsis of the respondents was found statistically significant ($p < 0.05$).

Table 20: Relationship between monthly family income of the respondents and knowledge on signs of neonatal sepsis

Monthly family income	Know ledge on signs of neonatal sepsis					Total
	Foul smell	Umbilical discharge	Hypert hermia	Restless ness	Multiple	
Taka up to 40000	0 (0.0%)	2 (13.3%)	5 (33.3%)	0 (0.0%)	8 (53.3%)	15 (4.7%)
Taka 40001 - 60000	21 (7.0%)	51 (17.1%)	79 (26.4%)	16 (5.4%)	132 (44.1%)	299 (92.9%)
Taka 60001	0 (0.0%)	0 (0.0%)	8 (100%)	0 (0.0%)	0 (0.0%)	8 (2.5%)
Total	21 (6.5%)	53 (16.5%)	92 (28.6%)	16 (5.0%)	140 (43.5%)	322 (100.0%)

$$\chi^2 = 23.04, df = 8, p < 0.05$$

Above table showed the relationship between monthly family income of the respondents and knowledge on signs of neonatal sepsis. About 53.3% of the respondents who had up to 40000 taka as monthly family income knew multiple signs of neonatal sepsis, 44.1% of the respondents who had 40001-60000 taka as monthly family income knew also multiple signs of neonatal sepsis and 100.0% of the respondents who had more than 60001 taka as monthly family income knew as hyperthermia for the signs of neonatal sepsis. The relationship between monthly family income of the respondents and knowledge on signs of neonatal sepsis was found statistically significant ($p < 0.05$).

Table 21: Relationship between professional qualification of the respondents and nursing management of neonatal sepsis

Professional Qualification	Nursing management of neonatal sepsis				Total
	Maintain aseptic technique	Cold sponging	Maintaining nutrition	Multiple	
Diploma in nursing	202 (75.1%)	14 (5.2%)	14 (5.2%)	39 (14.5%)	269 (83.5%)
BSc in nursing/ PHN	38 (77.6%)	2 (4.1%)	2 (4.1%)	7 (14.3%)	49 (15.2%)
MSc / MPH	4 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (1.2%)
Total	244 (75.8%)	16 (5.0%)	16 (5.0%)	46	322 (100.0%)

$$\chi^2 = 1.53, df = 6, p > 0.05$$

Above table showed the relationship between professional qualification of the respondents and nursing management of neonatal sepsis. About 75.1% of the respondents who had diploma in nursing maintained aseptic technique as nursing management of neonatal sepsis, 77.6% of the respondents who had BSc in nursing/PUN knew the same and 100.0% of the respondents who had MSc/MPH knew maintained aseptic technique as nursing management of neonatal sepsis. The relationship between professional qualification of the respondents and nursing management of neonatal sepsis was found statistically non-significant ($p > 0.05$).

DISCUSSION

This was a cross sectional type of descriptive study which was carried out with a view to assess knowledge and practice on neonatal sepsis of the senior staff nurses working in M Abdur Rahim Medical College Hospital, Dinajpur. The sample size was 322 which was selected purposively. Regarding age distribution of the respondents it was found that out of 322 respondents majority (73.3%) were in the age group of <30 years, 16.1% were 30-39 years, 7.8% were 40-49 years and 2.8% were 50-59 years of age group. The mean age of the respondents was 28.59 ± 7.95 years (Table 1). In another study the mean age was 35.6 years.⁹

Regarding length of service it was observed that 80.4%, 17.1%, and 2.5% of the nurses had length of service of 1-10 year, 21-30 years and 11-20 years respectively (Table 02). It was found that 92.9% of the respondents had 40001-60000 taka as monthly family income, 4.7% had up to 40000 taka and 2.5% had 60001 taka as monthly family income. The mean monthly family income of the respondents was 50034.5 ± 6041.071 taka (Table 3). Monthly family income plays an important role to keep the sound health for a family.¹³

It was found that most (79.2%) the respondents were Muslims, 13.0% were Hindu and 7.8% were from other religions (Fig. 1). It was found that majorities (96.89%) of the respondents were female and 3.11% were male (Fig. 2). It was found that 88.8% of the respondents had HSC level of academic education, 9.3% had SSC level of education and 1.9% had more than degree level of education (Fig. 3). It was found that 33.54% of the respondents had Diploma in Nursing, 15.22% had Bsc in Nursing/PHN and 1.24% had Msc / MPH level of professional education (Fig. 4).

Regarding causative organism of neonatal sepsis it was observed that most (31.7%) of the respondents knew as multiple, 32.0% knew as Staphylococcus, 21.1% knew as E. coli, 10.2% knew as Clostridium tetani and 5.0% knew as Vibrio cholera (Table 4). Neonatal sepsis is the cause of substantial morbidity and mortality. Precise estimates of neonatal sepsis burden vary by setting. Differing estimates of disease burden have been reported from high-income countries compared with reports from low-income and middle-income countries.⁸

Most (43.5%) of the respondents knew as multiple signs of neonatal sepsis, 28.6% knew as hyperthermia, 16.5% knew as umbilical discharge, 6.5% knew as foul smelling and 5.0% knew as restlessness (Table 5). Most (73.9%) of the respondents knew lethargy, Apnea, Poor feeding, vomiting, irritability as symptoms of neonatal sepsis, 15.8% knew as respiratory distress, cyanosis, 5.3% knew as multiple symptoms and 5.0% knew as instability (Table 6). Most (46.3%) of the respondents knew umbilical granuloma as complications of neonatal sepsis, 23.9% knew as thrombophlebitis of umbilical vein, 19.9% knew as multiple and 9.9% knew as septicemia (Table 7). It was revealed that most (32.6%) of the respondents knew unhygienic delivery as common source of neonatal sepsis, 30.7% knew as contaminated cord cutting, 28.0% knew as multiple and 8.7% knew as umbilical catheterization for common source of neonatal sepsis (Table 8). It was found that majority (67.7%) of the respondents used Ceftriaxone as drugs used in neonatal sepsis, 16.8% used multiple and 15.5% used Cefradine (Table 9). Neonatal infections currently cause about 1.6 million deaths annually in developing countries. Sepsis and meningitis are responsible for most of these deaths. Resistance to commonly used antibiotics is emerging and constitutes an important problem worldwide. To reduce global neonatal mortality, strategies of proven efficacy, such as hand washing, barrier nursing, restriction of antibiotic use, and rationalisation of admission to neonatal units, need to be implemented.¹⁴

It was found that majority (75.8%) of the respondents maintained aseptic technique as nursing management of neonatal sepsis, 14.3% maintained multiple techniques, 5.0% maintained cold sponging and maintained nutrition (Table 10). Hospital infection control committee plays an important role to prevent infection. It was found that majority (49.7%) of the respondents knew to maintain aseptic technique for prevention of neonatal sepsis, 30.1% knew as multiple procedure, 15.2% knew as antibiotic and 5.0% knew as maintaining sanitation (Table 11). Neonatal sepsis is also very common in south asia.³

It was found that majority (41.3%) of the respondents knew intrauterine infection as predisposing factors of neonatal sepsis, 34.8% knew as meconium stained liquor and 23.9% knew as multiple (Table 12). It was found that majority (37.9%) of the respondents knew multiple techniques to prevent neonatal sepsis, 27.3% knew as maintained hygiene, 20.8% knew as control of infection and 14.0% knew as clean environment (Table 13). It was found that majorities (24.5%) of the respondents knew multiple factors for congenital

infections of neonatal sepsis, 22.4% knew as Cytomegalo virus, 16.1% knew as toxoplasmosis, 15.5% knew as Rubella, 10.9% knew as human and 10.6% knew as Syphilis (Table 14). The intestine plays a major role in immune development particularly during fetal ontogeny and in the early postnatal period. Major developmental maturation occurs in antimicrobial pattern recognition receptors (PRRs) in humans, until about 33 weeks of gestation. Infants born prematurely during this period have immature PRR responses that are likely to play an important role increasing their infection risk. Alterations in the infant's microbial flora either due to prematurity, alternate mode of delivery, prolonged antibiotic exposure in early life or changes in diet, has been linked to dysbiosis, and in some cases to an increased risk of neonatal sepsis.¹⁹

It was revealed that majority (60.6%) of the respondents' knew there were 2 types of neonatal sepsis and 39.4% knew 3 types (Table 15). It was found that majority (43.5%) of the respondents' knew clinical investigations as required investigations for neonatal sepsis, 29.5% knew as multiple, 19.3% knew as blood culture and 7.8% knew as urine for R/E for required investigations of neonatal sepsis (Table 16). It was found that majority (47.2%) of the respondents' knew hospitalization as management of neonatal sepsis, 45.7% knew as multiple and 7.1% knew as appropriate antibiotic prescribed by doctor (Table 17). It was found that majority (55.0%) of the respondents' knew maintained of warmth and ensure normal temperature as nursing care of neonatal sepsis, 19.6% knew as multiple. 15.5% knew as body temperature should be monitored frequently and 9.9% knew as maintained of temperature chart (Table 18).

The relationship between professional qualification of the respondents and knowledge on signs of neonatal sepsis of the respondents was found statistically significant ($p < 0.05$) (Table 19). The relationship between monthly family income of the respondents and knowledge on signs of neonatal sepsis was found statistically significant ($p < 0.05$) (Table 20). The relationship between professional qualification of the respondents and nursing management of neonatal sepsis was found statistically non-significant ($p > 0.05$) [Table 21].

CONCLUSION

This was a cross sectional type of descriptive study which was carried out with a view to assess knowledge and practice on neonatal sepsis of the senior staff nurses working in M Abdur Rahim Medical College Hospital, Dinajpur. The sample size was 322 which was selected purposively. Regarding age distribution of the respondents it was found that out of 322 respondents majority (73.3%) were in the age group of <30 years, 16.1% were 30-39 years, 7.8% were 40-49 years and 2.8% were 50-59 years of age group. The mean age of the respondents was 28.59 ± 7.95 years. Regarding length of service it was observed that 80.4% of the nurses had length of service of 1-10 year. It was found that 92.9% of the respondents had 40001-60000 taka as monthly family income and the mean monthly family income of the respondents was 50034.5 ± 6041.07 taka. Regarding causative organism of neonatal sepsis it was observed that most (31.7%) of the respondents knew as multiple, 32.0% knew as Staphylococcus, 21.1% knew as E. coli, 10.2% knew as Clostridium tetani and 5.0% knew as Vibrio cholera. Most (43.5%) of the respondents knew as multiple signs of neonatal sepsis, 28.6% knew as hyperthermia, 16.5% knew as umbilical discharge, 6.5% knew as foul smelling and 5.0% knew as restlessness.

Most (73.9%) of the respondents knew lethargy, Apnea, Poor feeding, vomiting, irritability as symptoms of neonatal sepsis, 15.8% knew as respiratory distress, cyanosis, 5.3% knew as multiple symptoms and 5.0% knew as instability. Most (46.3%) of the respondents knew umbilical granuloma as complications of neonatal sepsis, 23.9% knew as thrombophlebitis of umbilical vein, 19.9% knew as multiple and 9.9% knew as septicemia. It was revealed that most (32.6%) of the respondents knew unhygienic delivery as common source of neonatal sepsis, 30.7% knew as contaminated cord cutting, 28.0% knew as multiple and 8.7% knew as umbilical catheterization for common source of neonatal sepsis. It was found that majority (67.7%) of the respondents used Ceftriaxone as drugs used in neonatal sepsis, 16.8% used multiple and 15.5% used Cefradine. It was found that majority (75.8%) of the respondents maintained aseptic technique as nursing management of neonatal sepsis, 14.3% maintained multiple techniques, 5.0% maintained cold sponging and maintained nutrition. It was found that majority (49.7%) of the respondents knew to maintain aseptic technique for prevention of neonatal sepsis, 30.1% knew as multiple procedure, 15.2% knew as antibiotic and 5.0% knew as maintaining sanitation. It was found that majority (41.3%) of the respondents' knew intrauterine infection as predisposing factors of neonatal sepsis, 34.8% knew as meconium stained liquor and 23.9% knew as multiple.

It was found that majority (37.9%) of the respondents knew multiple techniques to prevent neonatal sepsis, 27.3% knew as maintained hygiene, 20.8% knew as control of infection and 14.0% knew as clean

environment. It was found that majorities (24.5%) of the respondents knew multiple factors for congenital infections of neonatal sepsis, 22.4% knew as Cytomegalo virus, 16.1% knew as toxoplasmosis, 15.5% knew as Rubella, 10.9% knew as human and 10.6% knew as Syphilis. It was revealed that majority (60.6%) of the respondents knew there were 2 types of neonatal sepsis and 39.4% knew 3 types. It was found that majority (43.5%) of the respondents knew clinical investigations as required investigations for neonatal sepsis, 29.5% knew as multiple, 19.3% knew as blood culture and 7.8% knew as urine for WE for required investigations of neonatal sepsis. It was found that majority (47.2%) of the respondents knew hospitalization as management of neonatal sepsis, 45.7% knew as multiple and 7.1% knew as appropriate antibiotic prescribed by doctor. It was found that majority (55.0%) of the respondents knew maintained of warmth and ensure normal temperature as nursing care of neonatal sepsis, 19.6% knew as multiple, 15.5% knew as body temperature should be monitored frequently and 9.9% knew as maintained of temperature chart.

The relationship between professional qualification of the respondents and knowledge on signs of neonatal sepsis of the respondents was found statistically significant ($p < 0.05$). The relationship between monthly family income of the respondents and knowledge on signs of neonatal sepsis was found statistically significant ($p < 0.05$). The relationship between professional qualification of the respondents and nursing management of neonatal sepsis was found statistically non-significant ($p > 0.05$). The study provided important information regarding knowledge and practice of senior staff nurses of M Abdur Rahim Medical College Hospital, Dinajpur on neonatal sepsis and its management.

RECOMMENDATIONS

In the light of the present study findings, I would like to make the following recommendations:

1. Special care should be given regarding neonatal sepsis.
2. Training program for the nursing students should be arranged in regular basis to update their knowledge.
3. Hospital based patient education program should be strengthened about neonatal sepsis.
4. There is need for continuing medical education program aimed at improving knowledge of nurses.

REFERENCES

1. Goldstein B, Giroir B, Randolph A, and the International Consensus Conference on Pediatric Sepsis International pediatric sepsis consensus conference: Definitions for sepsis and organ dysfunction in pediatrics. *Pediatr Crit Care Med*. 2005; 6: 2-8.
2. Rivers E, Nguyen B, Haystad S, Ressler J, Muzzin A, Knoblich B, Peterson E, Tomlanovich M, Early Goal-Directed Therapy Collaborative Group Early goal-directed therapy in the treatment of severe sepsis and septic shock. *N Engl J Med*. 2001; 345: 1368-77.
3. Macrae D, Grieve R, Allen E, Sadique Z, Morris K, Pappachan J, Parslow R, Tasker RC, Elbourne D, CHiP Investigators A randomized trial of hyperglycemic control in pediatric intensive care. *N Engl J Med*. 2014; 370: 107-18.
4. Choong K, Bohn D, Fraser DD, Gaboury I, Hutchison JS, Joffe AR, Litalien C, Menon K, McNamara P, Ward RE, Canadian Critical Care Trials Group Vasopressin in pediatric vasodilatory shock: a multicenter randomized controlled trial. *Am J Respir Crit Care Med*. 2009; 180: 632-9.
5. Venkatesh B, Myburgh J, Finfer S, Webb SA, Cohen J, Bellomo R, McArthur C, Joyce CJ, Rajbhandari D, Glass P, Hayward M, ANZICS CTG investigators The ADRENAL study protocol: adjunctive corticosteroid treatment in critically ill patients with septic shock. *Crit Care Resusc*. 2013; 15: 83-8.
6. Patel GP, Balk RA. Systemic steroids in severe sepsis and septic shock. *Am J Respir Crit Care Med*. 2012; 185: 133-9.
7. Sprung CL, Annane I, Keh D, Moreno R, Singer M, Freivogel K, Weiss YG, Benbenishty J, Kalenka A, Forst H, Laterre PF, Reinhart K, Cuthbertson BH, Payen D, Briegel J, CORTICES Study Group Hydrocortisone therapy for patients with septic shock. *N Engl J Med*. 2008; 358: 111-24.
8. Annane D, Sebille V, Charpentier C, Bollaert PE, Francois B, Korach JM, Capellier G, Cohen Y, Azoulay E, Troche G, Chaumet-Riffaud P, Bellissant E. Effect of treatment with low doses of hydrocortisone and fludrocortisone on mortality in patients with septic shock. *JAMA*. 2002; 288: 862-71.
9. Bone RC, Fisher CJ, Clemmer TP, Slotman GJ, Metz CA, Balk RA. A controlled clinical trial of high-dose methylprednisolone in the treatment of severe sepsis and septic shock. *N Engl J Med*. 1987; 317: 653-8.
10. Nguyen TC, Kiss JE, Goldman JR, Carcillo JA. The role of plasmapheresis in critical illness. *Crit*

Care Clin. 2012; 28: 453-68.

11. Kalil AC, Florescu MC. Blood purification: can we purify our patients from sepsis. *Crit Care Med.* 2013; 41: 2244-5.
12. Zhou F, Peng Z, Murugan R, Kellum JA. Blood purification and mortality in sepsis: a meta-analysis of randomized trials. *Crit Care Med.* 2013; 41: 2209-20.
13. Heyland D, Muscedere J, Wischmeyer PE, Cook D, Jones G, Albert M, Elke G, Berger MM, Day AG, Canadian Critical Care Trials Group A randomized trial of glutamine and antioxidants in critically ill patients. *N Engl J Med.* 2013; 368: 1489-97.
14. Heyland DK, Heyland J, Dhaliwal R, Madden S, Cook D. Randomized trials in critical care nutrition: look how far we've come! (and where do we go from here? *JPEN J Parenter Enteral Nutr.* 2010; 34: 697-706.
15. Marik PE, Zaloga GP. Immunonutrition in critically ill patients: a systematic review and analysis of the literature. *Intensive Care Med.* 2008; 34: 1980-90.
16. The INIS Collaborative Group Treatment of neonatal sepsis with intravenous immune globulin. *N Engl J Med.* 2011; 365: 1201-11.
17. Kreymann KG, de Heer G, Nierhaus A, Kluge S. Use of polyclonal immunoglobulins as adjunctive therapy for sepsis or septic shock. *Crit Care Med.* 2007; 35: 2677-85.
18. Qiu P, Cui X, Sun J, Welsh J, Natanson C, Eichacker PQ. Antitumor necrosis factor therapy is associated with improved survival in clinical sepsis trials: a meta-analysis. *Crit Care Med.* 2013; 41: 2419-29.
19. Annane D, Timsit JF, Megarbane B, Martin C, Misset B, Mourvillier B, Siami S, Chagnon JL, Constantin JM, Petitpas F, Souweine B, Amathieu R, Forceville X, Charpentier C, Tesniere A, Chastre J, Bohe J, Colin G, Cariou A, Renault A, Brun-Buisson C, Bellissant E, APROCCHSS Trial Investigators Recombinant human activated protein C for adults with septic shock: a randomized controlled trial. *Am J Respir Crit Care Med.* 2013; 187: 1091-7.
20. Ranieri VM, Thompson BT, Barie PS, Dhainaut JF, Douglas IS, Finfer S, Gardlund B, Marshall JC, Rhodes A, Artigas A, Payen D, Tenhunen J, Al-Khalidi HR, Thompson V, Janes J, Macias WL, Vangerow B, Williams MD, PROWESS-SHOCK Study Group Drotrecogin alfa (activated) in adults with septic shock. *N Engl J Med.* 2012; 366: 2055-64.
21. Levin M, Quint PA, Goldstein B, Barton P, Bradley JS, Shemie SD, Yeh T, Kim SS, Cafaro DP, Scannon PJ, Giroir BP. Recombinant bactericidal/permeability-increasing protein (rBPI₂₁) as adjunctive treatment for children with severe meningococcal sepsis: A randomised trial. *Lancet.* 2000; 356: 961-7.
22. Douglas-Escobar Elliott E, Neu J. Effect of intestinal microbial ecology on the developing brain. *JAMIA Pediatr.* 2013; 167: 374-9.
23. Havey TC, Fowler RA, Daneman N. Duration of antibiotic therapy for bacteremia: A systematic review and meta-analysis. *Crit Care.* 2011; 15: R267.
24. Tsai MH, Hsu HF, Chu SM, Lien R, Huang HR, Chiang MC, Fu RH, Lee CW, Huang YC. Incidence, clinical characteristics and risk factors for adverse outcome in neonates with late-onset sepsis. *Pediatr Infect Dis J.* 2014; 33: e7-13.
25. Als LC, Nadel S, Cooper M, Pierce CM, Sahakian BJ, Garralda ME. Neuropsychologic function three to six months following admission to the PICU with meningoencephalitis, sepsis, and other disorders: a prospective study of school-aged children. *Crit Care Med.* 2013; 41: 1094-103.
26. Conlon NP, Breatnach C, O'Hare BP, Mannion DW, Lyons BJ. Health-related quality of life after prolonged pediatric intensive care unit stay. *Pediatr Crit Care Med.* 2009; 10: 41-4.
27. Davidson JE, Jones C, Bienvenu OJ. Family response to critical illness: postintensive care syndrome-family. *Crit Care Med.* 2012; 40: 618-24.
28. Akcan-Arikan A, Zappitelli NI, Loftis LL, Washburn KK, Jefferson LS, Goldstein SL. Modified RIFLE criteria in critically ill children with acute kidney injury. *Kidney Int.* 2007; 71: 1028-35.
29. Askenazi DJ, Feig DI, Graham NM, Hui-Stickle A, Goldstein SL. 3-5 year longitudinal follow-up of pediatric patients after acute renal failure. *Kidney Int.* 2006; 69: 184-9.
30. Gamin F, Dugas CIA, Chaibou NI, Morneau S, Lebel D, Lacroix J. The impact of clinically significant upper gastrointestinal bleeding acquired in a pediatric intensive care unit. *Pediatr Crit Care Med.* 2001; 2: 294-8.
31. Sananes R, Manlhiot C, Kelly E, Hornberger LK, Williams WG, MacGregor D, Buncic R, McCrindle BW. Neurodevelopmental outcomes after open heart operations before 3 months of age. *Ann Thorac Surg.* 2012; 93: 1577-83.