

Assessment of Nurses' Knowledge and Practices Related Neonatal Sepsis in Neonatal Intensive Care Units at El-Minia Hospitals

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Abstract

Neonatal sepsis is a clinical syndrome of systemic illness accompanied by bacteremia occurring in the first month of life. So, the aim of this study was to assess nurses' knowledge and practices related Neonatal Sepsis in the Neonatal Intensive Care Units at El-Minia Hospitals. Descriptive design was utilized. A convenient sample of 50 nurses was included. This study was conducted in NICUS at Der-Mwas hospitals and Malloway hospitals. The methods of data collection were a structured interview questionnaire, knowledge assessment sheet, and observational checklist. Results: all nurses of nurses had satisfactory knowledge related to environmental risk factors of neonatal sepsis, and more than three quarters of them had satisfactory knowledge related to maternal risk factors and therapeutic management regarding neonatal sepsis (78.0% and 76.0% respectively). Also, the majority of nurses had good practices in caring for neonates with sepsis and the minority of them had poor practice. Conclusion: the majority of nurses' in the neonatal units at der-Mwas hospital and Malloway hospital had satisfactory knowledge and good practices related to neonatal sepsis in the neonatal intensive care units while the minority of them had unsatisfactory knowledge and average practices. Recommendations: Provision of continuing education programs on regular basis is suggested in order to refresh and update nurse's knowledge, as well as reinforce proper practices related to neonatal sepsis in neonatal units.

Keywords: Nurses' Knowledge, Nurses' Practices, Neonatal Sepsis, Neonatal Intensive Care Units

Introduction

Neonatal sepsis is a clinical syndrome of systemic illness accompanied by bacteremia occurring in the first month of life. The condition may be defined both clinically and/or microbiologically, by positive blood and/or cerebrospinal fluid cultures (Bulkowstein, et al., 2016).

It is characterized by signs and symptoms of infection with or without accompanying bacteremia. It encompasses various systemic infections of the newborn such as septicemia, meningitis, pneumonia and urinary tract infections (Verma, et al., 2017).

According to the world health organization (WHO), 130 million neonates are born every year. Each year four million neonates die during the first month of life. Developing countries such as Egypt account for the majority of reported worldwide neonatal deaths. Neonatal infections are currently the reason for about 1.6 million deaths per year in the developing world, and the first cause of newborn mortality is infection (Medhat & Khashana, 2017).

The incidence of sepsis in the newborn infants is greater than any other period of life and varies from one place to another. Although some studies in the developed countries announced that the incidence of neonatal sepsis ranged from 1 to 5 cases per 1000 live births, some other population-based studies in the developing countries reported septicemia rates ranged 49 - 170 per 1000 live births (Medhat & Khashana, 2017).

Bacterial septicemia is the most important cause of neonatal mortality (deaths in the first 28 days of life). It occurs in a range of 1-10/1000 live births and despite development in perinatal care, neonatal infection is still a significant cause of long term morbidity and mortality (Shim, et al., 2011).

The Nurses play vital role in observing the signs and symptoms of the neonatal sepsis, which is very important for early diagnosis and intervention. All nurses working in the neonatal unit should be involved in continuous educational program to improve and maintain neonates' care, and to know

the suitable and active care has been produced. Instruction and direction are active methods for actual nursing care at NICU; also it can change cognition, raise awareness, and transform changes in practice employment Nurses in neonatal unit are the key elements in sepsis care (Hockenberry, Wilson, & Rodgers, 2016).

Continuous physical assessment is vital to identify subtle changes in the infant's condition or behavior. Often times, the neonate may look "unwell" or a parent can voice concerns about behavioral changes. Inspect the infant for visible signs of distress, such as poor tone, lethargy, and pallor or a change in response to stimuli. Watch trends in the infant's vital signs from baseline, including temperature and pulse pressure. Remember to include pain assessment. Intake and output should also be monitored (Boettiger, Tyer-Viola & Hagan, 2017).

Significance of the Study

Neonatal sepsis is a significant cause of morbidity and mortality of hospitalized newborns and premature infants. Worldwide, sepsis accounts for 15% of neonatal deaths (UNICEF, 2015). The incidence of neonatal sepsis is approximately 1-10/1000 live births in developed countries. Rates of sepsis exceeding 50% in (NICU) in Cairo, Egypt, were not controlled by routine antimicrobial therapy (Centers for Disease Control and Prevention, 2013).

Incidence of neonatal sepsis in (Der- Mwas and Malloway) Hospitals is estimated to be (13.6%, 10.5%) respectively of hospitalized newborn in the neonatal period during the year 2016. The incidence of neonatal infection is higher for infants with lower gestational age, with premature infants having three to five times' greater risk of developing sepsis, therefore assessment of nurses' knowledge and practice about neonatal sepsis in the neonatal intensive care units is very important and beneficial in terms of quality of care to decrease morbidity and mortality in addition to lessen the burden on families, hospitals and the community as well.

Aim of the study

This study aimed to assess nurses' knowledge and practice related to neonatal sepsis in neonatal intensive care units

Research questions

- 1) What is the nurses' knowledge level related to neonatal sepsis in neonatal intensive care units at central der-Mwas hospital and general Mallawy hospital?
- 2) What is the nurses' practice level related to neonatal sepsis in neonatal intensive care units at central der-Mwas hospital and general Mallawy hospital?

Subjects and Method

Research Design

Descriptive research design was utilized to meet the aim of this study

Setting

This study was conducted in NICUS at two hospitals. The selected hospitals represented (der-Mwas hospital and Mallawy hospital), these hospitals belonged to Ministry of Health.

Subjects

A convenient sample of all nurses (50) who are working in the neonatal intensive care units (NICUS) in the previously mentioned settings at Minia hospitals

Tools of data collection

Three tools were used for data collection

Tool I:

A **Structured Interview Questionnaire** in Arabic language, it was used for the studied nurses and designed by the investigator after reviewing of the related literature. It included demographic characteristic of nurses as gender, age, marital status, last education level, years of experience in NICU, and training course about neonatal sepsis

Tool II:

Knowledge assessment sheet was adopted by the researcher from **United States agency for international development (USAID) & Ministry of health (MOH), (2010)** about neonatal sepsis was included: general knowledge consist of 15 questions as definition, risk factors, signs and symptoms, laboratory investigation, therapeutic management, and prevention), early and late sepsis knowledge included 4 questions as time of occurrence, and method of transmission causing bacteria)

Scoring system

Scoring system for nurses' knowledge about neonatal sepsis, each correct response had taken one and the wrong answer or do not known response had a score of zero. The total score less than 50% was considered as unsatisfactory while score of 50% and more was considered as satisfactory level of knowledge (**Mohamed, Ismail & Bayoumi 2017**).

Tool III: Observational checklist

Observational checklist was adopted from **United States agency for international development (USAID) &**

Ministry of health (MOH), (2010); Taylor et al., (2011) to assess the nurse's practices included infection control (**universal precaution**) as: (hand washing, aseptic gloves, wearing mask and gown) and **nursing care of neonatal sepsis** included: (I.V cannula, blood sample, cord care, I.V fluid preparation, injection administration, incubator sterilization, and preparation of bottle feeding).

Scoring system

Scoring system of the observational checklist, each step done correctly was took two score, done incorrectly was took one score, and not done was took zero score. The total score < 60% was considered as poor practice while score of $\geq 60\%$ - < 85 % considered as average practice and $\geq 85\%$ considered as good practice (**Mohamed, Ismail & Bayoumi 2017**).

Pilot study

A pilot study was done on 10 % of the total sample (5 nurses) before starting data collection to test the clarity and competency of designed tools and estimate the time required for filling the questionnaire. No modifications were done and they were included in the study sample.

Validity and Reliability

The tools were given to a panel of five experts in the field of Neonatology and Pediatric Nursing to examine the content validity. No modifications of the content were being done according to the panel judgment on the clarity of sentences, appropriateness of content and sequence of add were checked, the content validity index was 0.792. Reliability of tools performed to confirm its internal consistency by Cronbach's Alpha reliability test was 0.82.

Ethical Considerations

For ethical consideration an approval was obtained from the faculty of Nursing ethical committee and an official permission was obtained from the director of the Der- Mawas and Mallawy Hospitals, and permission from the head of NICU after explaining the aim and nature of the study. Nurses were interviewed on individual basis to explain the nature and purpose of the study. Oral informed consent was obtained from nurses who participated in this study. They also were informed that the information obtained will be confidential and will be used only for the purpose of the study. Each assessment sheet was coded and nurses' names didn't appear on the sheets for the purpose of anonymity and confidentiality.

Statistical analysis

The collected data were tabulated & statistically analyzed using statistical package for social science (SPSS version 20.0) to assess nurses' knowledge and practices related neonatal sepsis. The statistically analysis included percentage (%), mean, standard deviation (SD) and Chi square (χ^2). Chi square (χ^2) was used to test the association between two qualitative variables. Fisher's exact test was used to test the association between two qualitative variables or to detect differences between more than two proportions. Graphs were done for data visualization using Microsoft Excel. The P - value of ≤ 0.05 indicates a significant result while, P value of > 0.05 indicates a non-significant result.

Result

Table (1): Personal characteristics of studied nurses' (n=50).

Personal characteristics	No.	%
Age / years		
20- < 25	22	44.0
25- < 30	19	38.0
30 and more	9	18.0
Marital status		
Single	17	34.0
Married	33	66.0
Last education level		
Secondary school of nursing	8	16.0
Technical institute of nursing	29	58.0
Bachelor's degree in nursing	13	26.0
Years of experience in NICU		
Less than 5 years	37	74.0
5- 10	7	14.0
10 and more	6	12.0
Years of experience		
Less than 5 years	43	86.0
5- 10	5	10.0
10 and more	2	4.0
Training program		
(Attended training courses)	43	86.0
(Didn't attend)	7	14.0
Place of work		
Der Maws Hospital	20	40.0
Malawy Hospital	30	60.0

Table (1) shows that all the studied nurses were female, 44.0% of them aged between 20 < 25 years and 66.0% of them were married. Eighty eight percent of studied sample had technical institute of nursing and 74.0% of them, their experience was less than 5 years. Nurses had training courses were Eighty six percent and 60% of them were working in Malawy hospital.

Table (2): Knowledge levels of studied nurses related to neonatal sepsis (n=50).

Nurses' knowledge	Satisfactory knowledge		Unsatisfactory knowledge	
	No.	%	No.	%
Definition of neonatal sepsis	34	68.0	16	32.0
Maternal risk factors	39	78.0	11	22.0
Neonatal risk factors	4	8.0	46	92.0
Environmental risk factors	50	100.0	0	.0
Signs and symptoms				
Respiratory	2	4.0	48	96.0
Body temperature	43	86.0	7	14.0
Gastrointestinal	5	10.0	45	90.0
Neurological	45	90.0	5	10.0
Cardiac	39	78.0	11	22.0
Skin	7	14.0	43	86.0
Umbilical	48	96.0	2	4.0
Laboratory investigations	6	12.0	44	88.0
Therapeutic management	38	76.0	12	24.0
Prevention	4	8.0	46	92.0
Early sepsis	37	74.0	13	26.0
Late sepsis	23	46.0	27	54.0

Table (2) illustrates that all nurses had satisfactory knowledge related to the environmental risk factors of the neonatal sepsis, more than three quarters of them had satisfactory knowledge related to maternal risk factors and therapeutic management regarding neonatal sepsis (78.0% and 76.0% respectively). While the majority of them had unsatisfactory knowledge related to neonatal risk factors, prevention of neonatal sepsis and laboratory investigations required for the neonatal sepsis (92.0%, 92.0 % and 88.0% respectively)

Table (3): Nurses practices levels of studied nurses regarding neonatal sepsis (n = 50).

nurses' practice correctly done	Poor		Average		Good	
	No.	%	No.	%	No.	%
Hand washing	1	2.0	14	28.0	35	70.0
Wearing aseptic gloves	1	2.0	3	6.0	46	92.0
Wearing mask	5	10.0	11	22.0	34	68.0
Wearing protective Eye	16	32.0	0	0.0	34	68.0
Wear Gown	3	6.0	8	16.0	39	78.0
Follow Infection control measures	5	10.0	19	38.0	26	52.0
Perform Cord care	3	6.0	10	20.0	37	74.0
Prepare the bottle feeding	2	4.0	4	8.0	44	88.0
Take care of incubators and supplies	0	0	7	14.0	43	86.0

nurses' practice correctly done	Poor		Average		Good	
	No.	%	No.	%	No.	%
Insert I.V cannulation	0	0	8	16.0	42	84.0
Withdraw Blood sample	0	0	3	6.0	47	94.0
Injection administration	3	6.0	1	2.0	46	92.0
Prepare of I.V infusion	1	2.0	3	6.0	46	92.0

Table (3) shows that, the majority of nurses had good practices in caring for neonates with sepsis and the minority of them had poor practice. Majority of nurses 94% of them had good practice score related item of withdraw blood sample, 92% of nurses had good practice score in item wear a septic gloves, prepare for and administer injection to newborn with neonatal sepsis. In addition more than three quarters of them had good practice score related items prepare of bottle feeding, take care of incubators and supplies, insert IV canula and wear gown 88%, 86%, 84%, and 78% respectively as well as more than half of them had good practice score related the rest of items listed in the table.

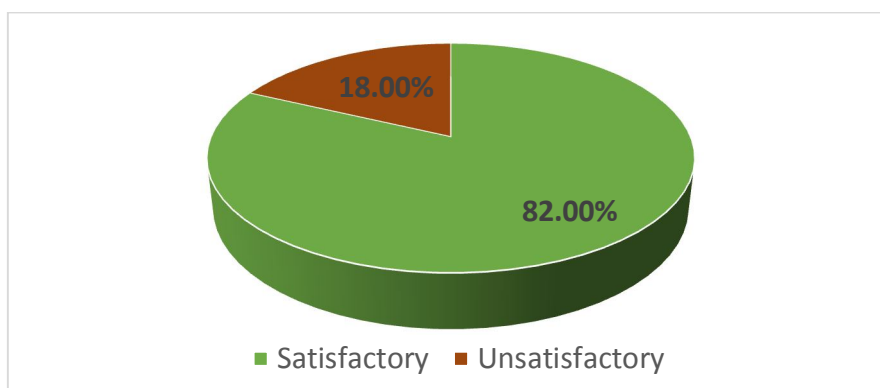


Figure (1): Percentage distribution regarding of nurses' knowledge levels related to neonatal sepsis (n = 50)

Figure (1) illustrates that, 82.0% of nurses had satisfactory knowledge related to neonatal sepsis in neonatal intensive care units while 18.0% of them had unsatisfactory knowledge.

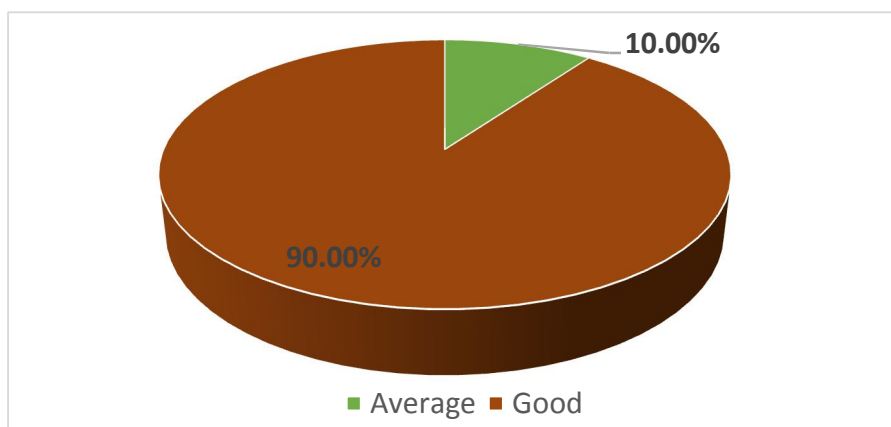


Figure (2): Percentage distribution regarding of nurses' practice levels related to neonatal sepsis.

Figure (2) illustrates that, 90.0% of nurses had good practice level related to neonatal sepsis while 10.0% of them had average practice.

Table (4): Relations between nurses' personal characteristics and their total knowledge levels (n = 50)

Personal characteristics	Unsatisfactory (n= 9)		Satisfactory (n= 41)		Fisher test	P – value
	No.	%	No.	%		
1-Age / years						
20- < 25	5	22.7	17	77.3	28.78	0.00**
25- < 30	1	5.3	18	94.7		
30- < 35	3	33.3	6	66.7		
2-Marital status						
Single	3	17.6	14	82.4	0.02	0.00**
Married	6	18.2	27	81.8		
3-Last educational level						
Nursing diploma	3	37.5	5	62.5	17.98	0.00**
Technical Institute of nursing	5	17.2	24	82.8		
Bachelor degree in nursing	1	7.7	12	92.3		
4-Years of experience in NICU						

Personal characteristics	Unsatisfactory (n= 9)		Satisfactory (n= 41)		Fisher test	P – value
	No.	%	No.	%		
Less than 5 years	6	16.2	31	83.8	27.86	0.00**
5<10	3	42.9	4	57.1		
11-15	0	.0	6	100.0		
5-Training program						
Attended training	7	16.3	36	83.7	1.64	0.00**
Didn't attend	2	28.6	5	71.4		
6-Hospital name						
Malawy	6	20.0	24	80.0	1.51	0.00**
Der Mwas	3	15.0	17	85.0		

***Statistically Significant Differences**

Table (4): Presents that, percentages of nurses who aged between 25 - < 30 years, single, had bachelor degree in nursing , had experience 10- 15 years in NICU, attended training program and working in DerMwas hospital had satisfactory knowledge level than other nurses with highly statistically significance differences which P – value ≤ 0.00.

Table (5): Relations between nurses' personal characteristics and their total practice levels (n= 50)

Personal characteristics	Average (n= 5)		Good (n= 45)		Fisher test	P – value
	No.	%	No.	%		
1-Age / years						
20- < 25	1	4.5	21	95.5	22.3	0.000***
25- < 30	2	10.5	17	98.5		
30-<35	2	22.2	7	77.8		
2-Marital status						
Single	1	5.9	16	94.1	5.86	0.00**
Married	4	12.1	29	87.9		
3-Last educational level						
Nursing diploma	2	25.0	6	75.0	39.26	.000**
Technical institute of nursing	1	3.4	28	96.6		
Bachelor degree in nursing	2	15.4	11	84.6		
4-Years of experience in NICU						
Less than 5 years	3	8.1	34	91.9	5.98	0.00**
5 <10	1	14.3	6	85.7		
11- 15	1	16.7	5	83.3		
5-Training program						
Attended training	4	9.3	39	90.7	1.78	0.00**
Didn't attend	1	14.3	6	85.7		
6-Hospital name						
Malawy	5	16.7	25	83.3	56.41	0.00**
Dermwas	0	.0	20	100.0		

** = Statistical significance differences

Table (5): shows that nurses who aged between 25 - < 30 years, single, experience less than 5 years in NICU, had training program and working in Der Mwas hospital had good practice than other nurses with highly statistically significance differences P – value ≤ 0.000.

Discussion

Regarding relation between nurses' knowledge level and their personal characteristics there were highly statistically significant differences between knowledge level of the nurses and their personal characteristics. These results with the same line with **Obaid et al., (2016)** in their study to assess the level of nurses' knowledge regarding to neonatal sepsis and found out associations between nurses' socio-demographic characteristics and their knowledge in two different pediatric teaching hospitals at Baghdad city. They also reported that more than half of the nurses (62.7%) had accepted knowledge about neonatal sepsis. Moreover their educational level, years of experiences in the NICU, and training courses about sepsis showed associations with their knowledge

Critical care nurses are the health care professionals who have the obligation to protect critically ill patients against infection especially that leading to sepsis, in order to promote patients' recovery and prevent deterioration in their health (**Abd-Allah, 2015**). Intensive care nurses play a critical role in the prevention, early detection and starting therapeutic interventions for neonates with sepsis (**Yousefi, et al., 2012**). Therefore, the purpose of this study was to assess nurses'

knowledge and practice regarding neonatal sepsis in Neonatal Intensive Care Units at El-Minia Hospitals.

In the present study, all nurses were females, near half of them their age between 20- < 25 years, about two thirds of them were married, and approximately three quarters of them, their experience were less than 5 years as shown in table (1). These findings are corroborated by findings of **El Sayed & Ahmed, (2017)** who assessed nurse's knowledge, and practice of Systemic Inflammatory Response Syndrome, diagnostic criteria, sepsis guidelines and the importance of Systemic Inflammatory Response Syndrome (SIRS) recognition in the Neonatal Intensive Care Units at Menofia University Hospital and El Bagour Central Hospital. Egypt. The found that 71.1% of nurses were in the age group (20 - < 25) and majority of them had 1- <5 years of experience.

In the present study, the majority of nurses had training courses. This result disagreed with the study of **El Sayed & Ahmed, (2017)** who showed that none of nurses had any previous training in sepsis or systemic inflammatory response syndrome. This difference in the result may be due to extensive educational and training program for all newly nurses especially in neonatal care units in Minia hospital.

In this regards **Abd-Allah, (2015)** mentioned that updating knowledge and performance of Intensive Care Units (ICU) nurses through continuing in-service educational programs is emphasize the importance of the latest evidence-based practices regarding sepsis in continuing education / training programs and correction of poor practices are required as well as providing training programs for newly joined ICU nurses about sepsis at regular intervals.

In the current study, the majority of nurses had satisfactory knowledge level regarding neonatal sepsis. This results contradicted to result of **Horvat, (2012)** who mentioned in his study that there are poor knowledge of sepsis in identifying the characteristics of SIRS criteria and patients at high risk for sepsis, which are key components of early sepsis recognition. Also, **Alvin, et al., (2014)** who reported that two-thirds (68%) of the studied nurses had unsatisfactory knowledge level and **Zanaty, (2016)** who assessed critical care nurses' knowledge and practices about sepsis bundle among critically ill patients at emergency Hospital, Mansoura University, Egypt and revealed that critical care nurses had it unsatisfactory knowledge and performance level regarding sepsis.

In additional study carried by **Sessa et al. (2011)**, investigate nurses' knowledge, attitude, and practice regarding disinfection procedures in Italy, demonstrated a significant difference in health workers' knowledge according to their educational level. However, a higher proportion of the university graduates had good knowledge about neonatal sepsis, compared to others. This may be explained by the fact that those with university education have been exposed to wider curriculum and self-motivated learning. Moreover, these individuals are likely to have greater knowledge of disease pathology and management than other health workers with lower academic qualifications.

The present study found that the majority of nurses who had good practice and knowledge, their years of experience in NICU less than 5 years the differences were statistically significance. These results are contradictory with the findings of **Abdella, (2010)** who studied nosocomial infection control system and found that, nurses with longer years of experience had better practice regarding universal precaution in a study about nosocomial infection control training program of knowledge and practice in the intensive care unit.

In addition consistence with **Sultan, (2010)**, who assessed nurses' awareness toward infection concept at El Minia University Hospital who found that, there was an improvement in the level of performance with the increase in years of experience in study about assessment of nurses' awareness toward infection concept in Egypt.

On the contrary, the findings of **Abolwafa, et al., (2013)** who reported that higher percentages of satisfactory practice were observed among nurses with years of experience from 5 to 10 years.

This difference in this result may be due to the majority of nurses had training courses while in **Abolwafa, et al., (2013)** study the majority of nurses did not had training courses.

Conclusion

Based on the result of the present study the majority of nurses in neonatal intensive care units at Der-Mwas hospital and Mallawy hospital had satisfactory knowledge and good practices related to neonatal sepsis in neonatal intensive

care units while the minority of them had unsatisfactory knowledge and average practices.

Recommendations

Based on results of the present study it can be recommended that:

Provision of continuing education programs on regular basis is suggested in order to refresh and update nurse's knowledge, as well as reinforce proper practices related to neonatal sepsis in neonatal units. Continuous supervision and evaluation for nurses' is needed to determine any defect related to knowledge or practices, rules and regulation for hospital visitors must be set and applied. Provision of adequate resources and facilities, (such as protective barriers, sinks, soap, and towels, etc.) and equipments related to invasive procedures in neonatal units.

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