Nurses in NICUs’ views on nosocomial infection prevention

Shilpa Gulia, Kiran Kaur, Shankuntala Devi, Sandeep Singh¹, Kusum K. Rohilla²

Abstract:
BACKGROUND: Basic infection control measures are required in India’s health-care setting in Neonatal Intensive Care Units (NICUs) to lower the prevalence of hospital-associated infections. The aim of the present study was to assess practices followed by nurses of NICUs for nosocomial infection prevention.

MATERIALS AND METHODS: From January to February 2020, a descriptive cross-sectional study was conducted. Participants in the study were chosen by total enumeration sampling technique, i.e., 60 nurses were included in this study who working in tertiary care institutions, India. The study respondents’ knowledge and practice for nosocomial infection control strategies were assessed by using a 30-item and 27-item questionnaires, respectively. SPSS (version 23.0) was used to analyze the data collected.

RESULTS: Results showed that all nurses (100%) were females, belongs to the age group of 26–35 years (82%), hold professional qualifications (34%) in GNM as well as post basic BSc nursing, married (72%), had 1–5 years of professional experience (66%), and working in the NICUs for 1–3 years (74%). Most of nurses (55%) had never attended any session on nosocomial infection prevention. Nurses of NICUs (70%) had just a moderate degree of understanding on nosocomial infection prevention. Nurses’ practice showed good practise (60%) for nosocomial infection prevention in NICUs.

CONCLUSIONS: The necessity to adopt health-care policy about nosocomial infections and execution of regular training program to upgrade and refresh nurses’ knowledge and practices regarding for nosocomial infection control measures is indicated to fill gap among knowledge and practices concerning nosocomial infection control and prevention.

Keywords: NICU, nosocomial infection, nurses, practices

Introduction

World Health Organization stated that around 4 million newborns death occur worldwide every year.[1] Among approximately 98% deaths mainly occur in developing countries[2] and are main cause for this are either infections, asphyxia, complications of prematurity, or low birth weights.[3] The incidence of neonatal sepsis in the developing countries is 1–10 per 1000,[4] which is three times higher in developing countries as compared to developed countries.[5]

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Gulia S, Kaur K, Devi S, Singh S, Rohilla KK. Nurses in NICUs’ views on nosocomial infection prevention. J Edu Health Promot 2022;11:158.
1000 patient days.\textsuperscript{[11]} Risk of nosocomial infection in neonates is very high due to severity in their prematurity, illness, systemic infections, congenital defects, invasive monitoring, no judiciary use of antibiotics, and gaps in sterilization and disinfection techniques and various diagnostic procedures.\textsuperscript{[12]}

Nurses are the primary caregivers for infants in the NICU.\textsuperscript{[13]} The hands of the nurse constitute a temporary mechanism of illness transmission in neonates. Handwashing inhibits the spread of the virus and slows it down.\textsuperscript{[14]} Handwashing on a regular basis helps to reduce the spread of infection among newborns.\textsuperscript{[15]} It immediately minimizes pathogenic colonization on hands and infection dissemination in the hospital, particularly in the newborn intensive care unit (NICU).\textsuperscript{[16]}

Nurses working in the neonatal unit must be knowledgeable and skillful in prevention of neonatal infections.\textsuperscript{[17]} If nurses failed to adopt the infection control techniques, it will further lead to septicemia and neonatal death. Hence, the aim of the present study was to assess nurse’s knowledge and practices who are working in neonatal intensive care unit for nosocomial infections.

**Materials and Methods**

The study was a descriptive cross sectional study which was conducted in neonatal intensive care units at Pt. B. D. Sharma, PGIMS, Rohtak, Haryana, from January to February 2020.

**Data collection tools**

Data collection tools consist of three sections. Section I consists of item related to biodemographic variables, i.e., age, professional qualification, marital status, professional experience, experience in NICUs, and attended any workshop. Section II consists of 30 questionnaire to assess knowledge of nurses for nosocomial infection. Section III consists of 27 items to assess practice of nurses for nosocomial infection control.\textsuperscript{[18]} Research tool validity was done by seven experts from field of neonatology and nursing with CVR (0.68) and CVI (0.88) scores. Reliability score of 0.9 shows excellent reliability in research tools, so tools were found reliable, clear, relevant and appropriate. Try out was conducted on 6 nurses working in NICUs to check feasibility of study.

**Sample size and sampling method**

The study’s participants were chosen by using total enumeration sampling technique. A total of 60 nurses who were working in various NICU of tertiary care institutes were included in this study. Sample size for nurses has been calculated by using a 5% margin of error, 95% confidence level, 2% prevalence of infection rate in NICU, and 50% response distribution. Total 60 nurses were included in present study by using purposively sampling technique. Nurses who were working in various neonatal intensive care units (NICU) more than 6 months were included. Twenty-one nurses from MCH, NICU-I department, 21 nurses from MCH, NICU-II department, 9 nurses were from MCH, NICU-III department, 7 nurses were from MCH, NICU-IV department, and 2 nurses were from LR-NICU department were included in this study.

**Data analysis**

Data analysis was done by using IBM SPSS version 23.0. Descriptive statistics, i.e., frequency and percentage, was calculated for biodemographic variables, knowledge, and practices of nurses.

**Ethical considerations**

Ethical approval was obtained from institute ethical committee (PGIMS/IEC/2019/2064) on dated November 23, 2019, of Pt. B. D. Sharma PGIMS, Rohtak, Haryana. Written informed consent was obtained from each nurse participant before enrolling them in the present study.

**Results**

Out of 60 nurses, majority (82%) belongs to age group of 26–35 years, having professional qualified (34%) of GNM and post basic BSc nursing, female (100%), married (72%), having 1–5 years of professional experience (66%), and in which they have experience in NICU from 1 to 3 year (74%). Majority did not attend any workshop (55%) related to prevention of nosocomial infection anytime [Table 1].

Majority of nurses had only moderate level of knowledge (70%) for prevention of nosocomial infection. About 20% of nurses had inadequate knowledge for prevention of nosocomial infection and only 6% had adequate knowledge for nosocomial infection control in NICU [Table 2].

Practice scores of nurses showed that 60% nurses were following good practice for prevention of nosocomial infection in NICUs. About 22% of nurses were following excellent practice and only 18% nurses were following poor practice for prevention of nosocomial infection in NICUs [Table 3].

**Discussion**

Patients’ morbidity, mortality, duration of stay in the hospital, and treatment costs all rise as a result of nosocomial infections. In order to avoid the occurrence of nosocomial infections in health and medical settings, infection prevention and control are essential.\textsuperscript{[19]} It is therefore critical for nurses to understand and apply
This finding is consistent with research\cite{24} who discovered that 44% of the participants had fewer than 5 years of job experience. As a result, young employees appear to be more cooperative than senior employees when it comes to participating in research. The majority of the participants (55%) in the current study did not attend annual infection control continuing education sessions. This finding is inconsistent with another research study who discovered that more than half of nurses participated in infection control and continuing education programs.\cite{25} This conclusion, on the other hand, is inconsistent to the findings of one study, who found that the majority of nurses (64%) had received no nosocomial infection training.\cite{26} This discrepancy in outcomes could be related to differences in setting and target group between studies. Another element that may contribute to this disparity is the gap in in-service training policies.

The majority of nurses have a basic understanding of the subject (70%). However, the current study’s degree of knowledge is lower than that discovered by this research\cite{10} which found 87%. Such disparities in knowledge among nurses in these studies could be attributable to the lack of infection prevention and control training education, as nurses who attended in-service training courses scored highly on knowledge tests. The findings underlined the need for an in-service training course on infection control measures, with a greater emphasis on safe injection techniques and safe linen handling due to nurses’ lack of understanding in these areas.

In general, the survey found that the majority of participants (60%) had a good overall good level of practices, while 18% had exceptional poor practices in terms of various nosocomial infection prevention and control. This conclusion is similar to that of study findings\cite{27} who found that the amount of practice was >58%. However, it is lower than the 74% discovered by research evidence,\cite{10} but it is greater than many other studies, which revealed that this level of practice accounted for 52%,\cite{28} and 58%,\cite{29} respectively. This gap in results could be attributable to individuals’ differing views toward using infection control measures. It could also be because of differences in the operational definition of good practice from one study to the next, or because of differences in the nurses’ knowledge of infection prevention, and control. Furthermore, the nurses demonstrated a good level of practices in the real actions as a strategy to prevent nosocomial infections during everyday activities, while having a fair level of practices about the measures that should be utilized to prevent nosocomial infections. This could be an indicator of the existing gap between theory and practice, highlighting the necessity to connect theoretical and practical parts of infection control curricula.
There are few limitations in our study that should be addressed in future research, as study was limited to public hospitals and their nurses. As a result, the results’ generalizability must be approached with caution. Selection bias could possibly be present in this study. Furthermore, while our study identified self-reported habits, it has to be shown how nurses translate these practices into actual clinical practice.

Limitation and recommendation
The study only had one limitation, i.e., it was limited to one tertiary care center. To increase the universality of study findings, a similar study can be undertaken in many centers. The study also recommended that nurses participate in in-service programs to renew and update their understanding of guidelines, principles, and evidence-based practices.

Conclusions
The majority of Indian nurses have a moderate grasp of nosocomial infection control methods and follow outstanding practices, according to the findings of this study. More and more future research should be focused on assessment and improvement of nurses’ knowledge and practices by different training session i.e., basic training or in-service refresher courses. After each training session, evaluation of their knowledge and practices must be done to check its effectiveness. It is also recommended that further study be conducted in both public and private hospitals.

Acknowledgment
The authors would like to thank all of the nurses who took part in this study for their excellent contributions.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Max Roser, Hannah Ritchie and Bernadeta Dadonaite (2013)‑“Child and Infant Mortality”. Published online at OurWorldInData.org. Retrieved from: ‘https://ourworldindata.org/child-mortality’ [Online Resource]
2. Moss W, Darmstadt GL, Marsh DR, Black RE, Santosham M. Research priorities for the reduction of perinatal and neonatal morbidity and mortality in developing country communities. J Perinatol 2002;22:484‑95.
3. Muhe LM, McClure EM, Nigussie AK, Mekasha A, Worku B, Worku A, et al. Major causes of death in preterm infants in selected hospitals in Ethiopia (SIP): A prospective, cross-sectional, observational study. Lancet Glob Health 2019;7:e1130‑8.
4. Odabasi IO, Bulbul A. Neonatal sepsis. Sisli Etfal Hastan Tip Bul 2020;54:142‑50.
5. Pal A, Manna S, Das B, Dhara FC. The risk of low birth weight and associated factors in West Bengal, India: A community based cross-sectional study. Egypt Pediatr Assoc Gaz 2020;68:27.
6. Williams KG, Patel KT, Stausmire JM, Bridges C, Mathis MW, Barkin JL. The neonatal intensive care unit: Environmental stressors and supports. Int J Environ Res Public Health 2018;15:60.
7. Simonsen KA, Anderson-Beer AL, Delair SF, Davies HD. Early-onset neonatal sepsis. Clin Microbiol Rev 2014;27:21‑47.
8. Tasew H, Ze米cheal M, Teklay G, Mariye T, Ayele E. Risk factors of birth asphyxia among newborns in public hospitals of Central Zone, Tigray, Ethiopia 2018. BMC Res Notes 2018;11:496.
9. Haque M, Sartelli M, McKimm J, Abu Bakar M. Health care-associated infections – An overview. Infect Drug Resist 2018;11:2321‑33.
10. Ramasethu J. Prevention and treatment of neonatal nosocomial infections. Matern Health Neonatol Perinatol 2017;3:5.
11. Kim CJ, Kim HB, Oh MD, Kim Y, Kim A, Oh SH, et al. The burden of nosocomial Staphylococcus aureus bloodstream infection in South Korea: A prospective hospital-based nationwide study. BMC Infect Dis 2014;14:590.
12. Wang L, Du KN, Zhao YL, Yu YJ, Sun L, Jiang HB. Risk factors of nosocomial infection for infants in neonatal intensive care units: A systematic review and meta-analysis. Med Sci Monit 2019;25:8213‑20.
13. Murki S, Kadam S. Role of neonatal team including nurses in prevention of ROP. Community Eye Health 2018;31:S11‑5.
14. Mathur P. Hand hygiene: Back to the basics of infection control. Indian J Med Res 2011;134:611‑20.
15. Parveen S, Nasreen S, Allen JV, Kamur KB, Khan S, Akter S, et al. Barriers to and motivators of handwashing behavior among mothers of neonates in rural Bangladesh. BMC Public Health 2018;18:483.
16. Seema S, Rohilla KK, Kalyani VC, Babbar P. Prevalence and contributing factors for adolescent obesity in present era: Cross-sectional Study. J Family Med Prim Care 2021;10:1890‑4.
17. Murphy GA, Gathara D, Mwaniki A, Nabea G, Mwachiro J, Abuya N, et al. Nursing knowledge of essential maternal and newborn care in a high-mortality urban African setting: A cross-sectional study. J Clin Nurs 2019;28:882‑93.
18. Kalyani CV, Bisht M, Thapliyal S, Rohilla KK. Comparison of practice and attitude of self-treatment in rural and urban population in Uttarakhand, India: A comparative study. Natl J Physiol Pharm Pharmacol 2020;10:1052‑9.
19. Mehta A, Vasudevian S, Parkash A, Sharma A, Vashist H, Krishna V. COVID-19 mortality in cancer patients: A report from a tertiary cancer centre in India. PeerJ 2021;9:e10599.
20. Carrico RM, Garrett H, Balcom D, Glowicz JB. Infection prevention and control core practices: A roadmap for nursing practice. Nursing 2018;48:28‑9.
21. Mahmoodi N, Arbabisarjou A, Rezaeiypoor M, Pishkar Mofrad Z. Nurses' awareness of preterm neonates' sleep in the NICU. Glob J Health Sci 2015;8:226‑33.
22. Mansourian M, Ziapour A, Kazemian M, Damanabad ZH, Rastegarimehr B, Mirzaei A, et al. Assessment of educational performance of nurses in neonatal intensive care unit from parents’ perspective. J Educ Health Promot 2020;9:8.
23. Polit DF, Beck CT. Is there still gender bias in nursing research? An update. Res Nurs Health 2013;36:75‑83.
24. Lee H, Kim DJ, Han JW. Developing nursing standard guidelines for nurses in a neonatal intensive care unit: A delphi study. Healthcare (Basel) 2020;8:320.
25. Adegbuyi MB, Zakari S, Ahmed BA, Olufemi GH. Knowledge, awareness and practice of infection control by healthcare workers in the intensive care units of a tertiary hospital in Nigeria. Afr Health Sci 2018;18:72‑8.
26. Alrubaii G, Baharom A, Shahar HK, Daud SM, Basaleem HO.
Knowledge and practices of nurses regarding nosocomial infection control measures in private hospitals in Sana’a City, Yemen. Saf Health 2017;3:16.

27. Yu M, Park CG. Factors associated with patient safety in neonatal intensive care units: A multicenter study using ordinal logistic regression. Jpn J Nurs Sci 2021;18:e12374.

28. Ebrah HA, Yousif KI. The effect of intervention on nurse’s performance regarding feeding of premature baby in neonate care unit at public hospitals in Hodeida city: Yemen. Open J Pediatr 2020;10:695-706.

29. Alhassan AR, Kuugbee ED, Der EM. Surgical healthcare workers knowledge and attitude on infection prevention and control: A case of tamale teaching hospital, Ghana. Can J Infect Dis Med Microbiol 2021;2021:1-7.