

NICU Healthcare Workers Hand Hygiene Compliance during 6 Months of Direct Observation

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ABSTRACT

Introduction: Hospitalized neonates are at risk of developing nosocomial sepsis, a systemic infection due to unhygienic healthcare, especially in Indonesia where healthcare-associated infection incidence rate is 5.9%-8.3%. Hand hygiene by healthcare workers is an effective measure to prevent it. This study aimed to understand the healthcare workers' hand hygiene compliance towards WHO guidelines 2009 in Dr. Soetomo General Hospital NICU.

Methods: This research was an observational study. The healthcare workers' hand hygiene compliance was obtained through 6 months of direct observation, from November 2018 to April 2019, with doctors and nurses who agreed to be observed and present during the observation period as samples. The observation was recorded with WHO observation form, and processed with Microsoft Excel 2013 to obtain compliance rate.

Results: Overall, the compliance of healthcare worker in NICU Dr. Soetomo General Hospital during the 6 months of study was 84%. Nurses' compliance was higher (87%) than doctors' (78%). Compliance to My 5 Moments of Hand Hygiene indications varied from 82% for moments before patient contact to 93% for moments after patient contact.

Conclusion: In conclusion, hand hygiene compliance of healthcare workers in Dr. Soetomo General Hospital NICU varied between profession categories and each indication. To maintain and improve hand hygiene compliance, intervention in healthcare workers' behavior is needed, so that healthcare-associated infection can be better prevented.

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Introduction

Each year, 5.3 million children under the age of 5 died with the majority occurred during the neonatal period. The main cause of death in developing countries, including Indonesia, is infection which may be transmitted horizontally due to unhygienic healthcare.¹ Failure in maintaining hygiene in the healthcare setting may cause healthcare-associated infection, especially in hospitalized neonates, due to their immature immune system.²

Healthcare-associated infection (HAI) is linked to the increase in mortality, morbidity, healthcare cost, and antimicrobial resistance. Intensive care is associated with higher HAI incidence rate, due to invasive instrumentation and procedure,³ HAI incidence rate varied worldwide in Neonatal Intensive Care Unit (NICU), from 19.7% in Saudi Arabia⁴ to 71% in a study in India. In Indonesian hospitals, the reported HAI rate are 5.9%-8.3%.⁵ However, the study by Zaidi, *et al.* reported the rate of HAI in one NICU in Indonesia is as high as 51-52% of the admitted neonates.⁶

One of the means to reduce HAI is by practicing hand hygiene. Good hand hygiene practice reduce the risk of HAI by preventing pathogen transmission from the healthcare area to the patient through the healthcare workers' hands⁷. In 2009, WHO had issued Guidelines on Hand Hygiene in Health Care. Yet, the healthcare workers' hand hygiene compliance towards WHO guideline is still vary around the world.⁷ A study in an emergency department of an Indonesian hospital stated nurses' hand hygiene compliance was 30%,⁸ and in an Indian Hospital NICU, the healthcare workers' hand hygiene compliance was 46%.³

The healthcare workers' hand hygiene compliance varies, but, to our knowledge, there are still no publication regarding the topic in NICU of Dr. Soetomo General Hospital. Therefore, the aim of this study was to understand the healthcare workers' hand hygiene compliance towards WHO guideline 2009 in Dr. Soetomo General Hospital Emergency Department NICU.

Methods

This was an observational study, with the samples of doctors and nurses in Dr. Soetomo Emergency Department NICU who agreed to be observed and present during the observation period. The study was conducted in a level III NICU of a tertiary hospital with 20 beds. At the time of this study, the existing hand hygiene policy was based on WHO guideline on hand hygiene practice in healthcare in 2009.⁷ Alcohol hand rub dispenser was provided at every bed, and 6 sinks for hand wash were available in the unit.

Healthcare workers' hand hygiene compliance were obtained from direct observation by observer trained by Dr. Soetomo General Hospital Infection Control Team and recorded with WHO hand hygiene observation form⁹. The observation was conducted from November 2018 to April 2019. The observations were done for WHO My 5 moments hand hygiene indications: 1) before touching the patient, 2) before aseptic procedures, 3) after contact with body fluids, 4) after touching the patient, and 5) after touching the patient's surroundings. The presence of one or more indications of hand hygiene is defined as hand hygiene opportunity. Healthcare workers' action towards hand hygiene opportunity may be performed, either by hand rubbing with alcohol-based hand rub or handwash with water and soap, or missed.

The recorded observations were: profession categories (doctors or nurses), hand hygiene action (performed or missed), hand hygiene technique (hand wash or hand rub), and gloves usage. The observation was conducted once a

week, each session lasted for 30-40 minutes, on a randomized time by simple random sampling to avoid bias related to time. To reduce Hawthorne effect, where the subject was aware that he/she was being observed, the observer remained unobtrusively as possible while still allowing an unobstructed view of the healthcare workers' hand hygiene activities. This study was approved by Dr. Soetomo General Hospital's ethical committee. Data on healthcare workers' hand hygiene compliance was collected during the study, then processed with Microsoft Excel 2013 to obtain compliance rate.

Results

Throughout 6 months of study, a total of 412 hand hygiene opportunities were obtained during 27 observation sessions. Overall, Emergency Department NICU healthcare workers' hand hygiene compliance was 84% (347/412). By each profession category, NICU nurses had higher hand hygiene compliance rate than the doctors (87% vs. 78%) (Table 1.).

Table 1. Comparison of hand hygiene compliance by profession category.

Profession	Action	Opportunity	Compliance
Doctors	120	93	78%
Nurses	254	292	87%
Overall	412	347	84%

The healthcare workers' compliance towards My 5 Moments of Hand Hygiene indications varied, with the highest compliance of 93% for moments after touching the patients. Moments before touching the patient had the lowest compliance, which was only 82% (Table 2.).

Table 2. Healthcare workers' compliance towards My 5 Moments of Hand Hygiene indications.

Indication	Opportunity	Performed Action	Compliance
Before touching the patient	181	148	82%
Before aseptic procedures	40	35	88%
After contact with body fluid	54	50	93%
After touching the patient	190	173	91%
After touching patient's surroundings	78	90	87%

Discussion

Neonates are susceptible to infection, due to weakness of their skin integrity, fragile mucous, and immature immune system. Hospitalized neonates, especially in NICU, are more prone to HAI because of invasive instrumentation and procedures.¹⁰ Pathogens from the healthcare area may be transmitted to the neonates through the healthcare workers' hands during unhygienic medical procedures. One way to prevent HAI is by maintaining good hand hygiene practice.⁹

In this 6 months observation study, the overall hand hygiene compliance of Dr. Soetomo Hospital Emergency Department NICU healthcare workers was 84%. This number is quite high compared to hand hygiene compliance in non-NICU settings in another Indonesian hospital with

only 30% compliance rate.⁸ In other NICU settings, the reported hand hygiene compliance ranged from 42%¹¹ to 89%.¹²

During the study, the nurses' hand hygiene compliance (87%) was higher than the doctors (78%). This figure is in-line with other studies summarized in WHO guidelines on hand hygiene in 2009. Kowitt, *et al.* theorized that differences in hand hygiene compliance between nurses and doctors were because of variation in education, work scheme, and staffing structure. Nurses are also thought to have more opportunities to perform hand hygiene, and opportunity cost for doctors to do hand hygiene is higher compared to the nurses.¹³

NICU healthcare workers' compliance towards My 5 Moments of Hand Hygiene in this study ranged from 82% for moments before touching the patient to 93% for moments after contact with body fluids. These findings differ from other study in an Asian hospital, where the lowest compliance was moments before aseptic procedures, followed by after contact with patient's surroundings, and before touching the patient. In the aforementioned study, moments after contact with body fluids and after touching the patient had the highest compliance rate, in-line with our study.¹⁴

Overall, compliance in moments before patient contact (before touching the patient and before aseptic procedures) was generally lower (85%) than after patient contact (89%). Glove usage might hinder hand hygiene performance, especially for moments before aseptic procedures. Healthcare workers tend to perceive that glove usage renders hand hygiene unnecessary before and after usage.^{9,15} Universally, healthcare workers' behavior in hand hygiene tends to be more self-protective rather than patient's safety-centered practice.¹⁵ This also explained the high compliance in moments after contact with body fluids and after touching the patient in this study. Nevertheless, the healthcare workers tend to not wash their hands after touching the patient's surroundings. This was because of the elective responses of the healthcare workers after touching the patient's surroundings, where they tend to not wash their hand if they feel clean and not visibly dirty.^{15,16}

Even though the overall Dr. Soetomo General Hospital Emergency Department NICU healthcare workers' hand hygiene compliance was high, good hand hygiene practice should be further improved and maintained, so that HAI could be properly controlled. Studies showed that monitoring, audit, and feedback are effective in maintaining hand hygiene compliance rate high at a long term.^{9,14,17} To improve hand hygiene compliance, interventions such as hand hygiene education and incentive-giving are proved to increase the healthcare workers' compliance.^{11,14}

Conclusion

Hand hygiene compliance of Dr. Soetomo General Hospital Emergency Department NICU healthcare workers varied between profession categories and each indication. To maintain and improve hand hygiene compliance in healthcare workers, further intervention on the healthcare workers' behavior is needed, so HAI can be better prevented.

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CONFLICT OF INTEREST

The author stated there is no conflict of interest in this study.

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