



Research Article

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Factors Associated with Hand Washing Among Healthcare Personnel in Delivery Points at a Tertiary Care Hospital, South India

Haezel Ann Shibu^{1*}, B Adhisivam², Latha Chathurvedula³ and Abdul Basith⁴

¹Intern, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Gorimedu, Puducherry, India

²Professor, Department of Neonatology, JIPMER, Gorimedu, Puducherry, India

³Professor, Department of Obstetrics and Gynaecology, JIPMER, Gorimedu, Puducherry, India

⁴Junior resident, Department of Preventive and Social Medicine, JIPMER, Gorimedu, Puducherry, India

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***Corresponding author:** Haezel Ann Shibu, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Gorimedu, Puducherry, India

Abstract

Objectives: Neonatal sepsis is a major cause of neonatal mortality worldwide. Inadequate hand hygiene practices of healthcare workers (HCWs) at delivery points are a major causative factor of early-onset sepsis (EOS). This study aims to assess the prevailing hand washing practices of HCWs at delivery points and analyse the factors affecting these practices.

Methods: A questionnaire-based, descriptive study was conducted in JIPMER, a tertiary care hospital in South India. Resident doctors, nurses, and interns posted at delivery points were recruited as participants. Hand hygiene practices of different groups were reported as frequencies and percentages. Factors affecting hand hygiene were scored on a five-point Likert scale and reported as median with inter-quartile range.

Results: Nurses were found to have highest overall hand hygiene compliance, while interns reported the highest proportions of hand hygiene with respect to handling newborns. Non availability of means to dry hands near washing areas, overuse of gloves, staff shortages, emergency situations, and high patient load were some of the factors found to impede hand hygiene. Installation of CCTVs near washing areas and supervision by seniors were reported as factors that could improve hand washing.

Conclusion: Even though nurses reported the highest overall hand hygiene compliance, they need to observe better hand washing practices before handling newborns. Among the factors found to facilitate and impede hand hygiene, some of them can easily be corrected to optimize hand hygiene practices at delivery points, to reduce EOS.

Keywords: Neonatal Sepsis; Hand Washing; Delivery Points; Healthcare Workers; Early Onset Sepsis

Introduction

Globally, neonatal sepsis is a major health problem and the third leading cause of neonatal mortality [1,2]. An estimated 3 million neonates are affected by sepsis worldwide (22 per 1000 live births) with a mortality of 11 - 19% [3]. Its incidence in developing countries like India is 10 times more than in developed countries [4]. 99% of global neonatal mortality due to sepsis occurs in low and middle-income countries [5]. Early onset sepsis (EOS) is the development of sepsis within the first 72 hours of life. One of the major factors contributing to the development of EOS is poor adherence to hand hygiene practices by healthcare workers (HCWs) at delivery points [1]. Other factors like low birth weight,

invasive procedures, delayed or inadequate breastfeeding, and overcrowding in neonatal units can also contribute to neonatal sepsis [6,7]. However, a very easy and cost-effective measure to reduce sepsis in neonates is the implementation of proper hand hygiene practices among HCWs at delivery points [8]. Hence, it is important to analyse the factors that facilitate or impede hand washing among these HCWs, to take appropriate corrective measures. There is a paucity of literature regarding factors leading to reduced hand washing at delivery points in India, which makes this a very relevant study in the Indian context, to make recommendations for better hand hygiene practices.

Methods

After obtaining due approval from the Institute Ethics Committee (JIP/IEC-OS/2022/308), this descriptive study was conducted at Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), a tertiary care hospital, in South India, during Jan - Feb 2023. The participants of the study included three groups of HCWs who worked at the delivery points: resident doctors (senior and junior residents), nurses, and interns. After obtaining informed consent, participants were administered a self-reported questionnaire with responses recorded on a five-point Likert scale. The questionnaire had two parts - the first part assessed the adequacy of hand hygiene practice, whereas the second part assessed the factors affecting hand washing practices. Anonymity of the participants was maintained in the survey. The data collection period was 2 months.

Statistical Analysis

Data was collected using Epicollect-5 and analyzed using STATA v 14 (StataCorp Texas, US). The first seven questions assessed the adequacy of hand hygiene practice among HCWs at delivery points. Responses of 'always' and 'often' were considered satisfactory, while 'sometimes', 'rarely', and 'never' were considered unsatisfactory hand hygiene practices. If a participant had 4 or more responses satisfactory out of seven, their overall hand hygiene practice was reported to be satisfactory. The frequencies and proportions of satisfactory hand hygiene practices among resident doctors, nurses, and interns were calculated. Different groups were compared using Pearson chi-squared or Fisher's exact test. The next part of the questionnaire focused on factors affecting hand hygiene, which were classified as patient factors, peer factors, and work environment related factors. The Likert

scale score for each factor was represented as the median with interquartile range. Kruskal-Wallis and Wilcoxon rank-sum tests were used to assess the statistical significance. A p-value < 0.05 was considered statistically significant.

Results

Responses were collected from 133 participants, including residents (n=24), nurses (n=21), and interns (n=88) posted at delivery points during the study period.

Current Hand Hygiene Practices of Hcw's in Delivery Points

The five moments of hand hygiene, as described by WHO, were followed in the highest proportion by nurses, followed by residents. Interns recorded the lowest proportions in following these practices. All nurses reported that they would wash their hands before and after doing a procedure, compared to 70-80% of interns and more than 90% of residents. The numbers were significantly lower for hand washing before and after touching a patient. Only half of all residents reported hand washing before touching a patient and less than one-third performed hand washing after touching a patient. These numbers were less than 30% for interns, while nurses reported 75-80% compliance. However, the numbers were reversed with respect to hand washing before touching a newborn, with the highest proportions reported by interns (95%), followed by residents (79%), and nurses (62%). With respect to overall hand washing practice, nurses reported the highest satisfactory hand hygiene (95%), while interns reported the lowest satisfactory hand hygiene practices (67%). The responses of HCWs regarding their hand washing practices are described in Table 1 and the overall hand washing practices among HCWs are described in Table 2 respectively.

Table 1: Hand hygiene practices of HCWs in each domain (N=133).

Domains of hand hygiene practice	HCWs with satisfactory hand hygiene			P-value
	Residents (n=24)	Nurses (n=21)	Interns (n=88)	
Do you wash your hands before touching a patient	12 (50)	17 (81)	27 (31)	<0.001
Do you wash your hands before doing a procedure	23 (96)	21(100)	62 (70)	<0.001*
Do you wash your hands after doing a procedure	22 (92)	21(100)	72 (82)	0.060*
Do you wash your hands after touching a patient	15 (63)	18 (86)	39 (44)	0.002
Do you wash your hands after touching a patient's surroundings	7 (29)	16 (76)	19 (22)	<0.001
Do you wash your hands before doing a per vaginal examination	20 (83)	19 (90)	67 (76)	0.327*
Do you wash your hands before touching a newborn	19 (79)	13 (62)	84 (95)	<0.001

*P-value using chi-square/Fischer exact = 0.013.

Table 2: Overall satisfactory hand hygiene practices (satisfactory in >3 domains (N=133).

Category of HCW	HCW with overall satisfactory hand hygiene practices	
	n	Percentage
Residents (n=24)	20	83
Nurses (n=21)	20	95
Interns (n=88)	59	67

Factors Affecting Hand Hygiene Practices

According to resident doctors, the major hindering factor for hand washing was the high patient load in delivery rooms. Another factor that deterred hand washing was emergency situations, for example, if a lady was crowning and they had to immediately conduct the delivery. Most residents reported that supervision by a senior or consultant would increase hand hygiene. They also agreed that they were more likely to wash their hands if the lady was a known case of chorioamnionitis or PROM or if the child was a known preterm or LBW. Residents reported washing their hands before performing invasive procedures (like instrumental delivery, ARM, or amniocentesis). Majority of residents at delivery points were concerned about the health of the baby as well and recognised that if they did not wash their hands, rates of EOS would rise. Nurses posted in delivery points reported to be more concerned about the health of the mother than the baby. However, they would be more likely to wash their hands if the baby was a known preterm or LBW. Nurses also reported that installing CCTVs in washing areas would promote hand washing. In contrast to residents, nurses did not find the high patient load or urgent

situations to be a hindering factor for hand washing. Majority of nurses also reported that sterile gloves were not readily available at delivery points. According to interns posted in labour rooms, the main factor that hindered hand washing was the high patient load. They also reported that they did not feel the need to wash their hands if they were wearing gloves. Like residents, they were more likely to wash their hands if the lady was high risk or if the baby was a known preterm or LBW, and they acknowledged that rates of EOS would rise if they did not wash their hands while handling newborns at delivery points. Supervision by their seniors was another factor that they agreed would increase hand washing. Apart from the set questions, a factor mentioned by many participants that would facilitate hand washing was the availability of a means to dry hands in a sterile manner near washing areas, for e.g. tissues or clean towels. Some participants, especially nurses, mentioned that shortage of staff was a factor that hindered hand hygiene in labour rooms. Increased use of hand sanitizers and gloves was also thought to be a factor that led to reduced hand washing. Table 3 describes the factors affecting hand hygiene among HCWs at delivery points.

Table 3: Factors affecting hand hygiene practices among HCWs (N=133).

Factor influencing hand hygiene	Median (IQR) score for each factor			P-value
	Residents	Nurses	Interns	
Patient factors				
I don't feel the necessity to wash my hands when a lady is crowning, and I have to immediately take the delivery	4 (2-4)	4 (2-4)	2 (2-4)	0.007
Due to the high patient load, I find it difficult to wash my hands regularly	4 (3-4)	2 (1-2)	4 (4-4)	<0.001
If I don't wash my hands, rates of early onset neonatal sepsis in NICU will increase	5 (4-5)	3 (1-4)	5 (4-5)	<0.001
I am more concerned about the health of the mother than the baby	2 (1-3.5)	5 (4-5)	2 (2-3)	<0.001
I am more likely to wash my hands if the baby is a known preterm or low birth weight	4 (3-5)	5 (4-5)	4 (3-5)	0.292
I am more likely to wash my hands if the lady is a known case of chorioamnionitis or PROM	4 (3-4.5)	-	4 (4-5)	0.065
I usually wash my hands before performing procedures like instrumental delivery, ARM or amniocentesis	4.5 (4-5)	-	4 (3-5)	0.42
Peer factors				
Since my colleagues do not perform hand washing frequently, I don't feel it is needed	2 (1-3)	1 (1-3)	2 (1-3)	0.545
I will wash my hands if my senior or consultant is supervising me	4 (2.5-4)	2 (1-3)	4 (3-5)	<0.001
I ensure that my juniors wash their hands regularly	4 (3-4)	2 (1-2)	3 (2-4)	<0.001
Work environment related factors				
I will wash my hands more frequently if a CCTV is installed in the washing area	3 (2-3)	4 (3-4)	2 (2-3)	<0.001
I don't wash my hands regularly because the number of sinks is less or not easily accessible	3 (2-4)	2 (1-2)	2 (2-4)	0.001
When I wash my hands, hand washing solutions or soaps are not readily available	3 (2-4)	2 (1-4)	3 (2-4)	0.17
I don't feel the need to wash my hands while I'm wearing gloves	2 (2-4)	1 (1-2)	4 (2-4)	<0.001
Sterile gloves are not readily available at the delivery points	2 (1-3)	5 (4-5)	2 (2-4)	<0.001

Discussion

This study analysed the current hand hygiene practices of HCWs at delivery points and the factors which affected these practices. With respect to existing hand hygiene practices, the five moments of hand hygiene as described by WHO were reported to be followed in the highest proportion by nurses, followed by residents. Interns reported the lowest numbers in following these practices. A study from Tamilnadu about hand hygiene among HCWs reported similar results. As per the study, nurses were more compliant to appropriate hand hygiene practices than doctors and other healthcare staff [9]. However, interns reported the highest proportions of hand washing before touching a newborn. This shows that they are more aware of the implications of hand hygiene before handling newborns in delivery rooms and its impact on neonatal sepsis. A major factor that hindered hand washing at delivery points was the high patient load. Staff shortage at delivery points was another factor. This is like the findings of a study conducted at a government hospital in Uttarakhand which reports that under-staffing of HCWs and heavy patient load leads to poor adherence to hand hygiene [10].

Some respondents stated that a means to dry hands in a sterile manner near washing areas was not available, which led to decreased hand washing. Therefore, implementing measures like clean towels or tissues near washbasins to dry hands could improve hand hygiene compliance [11]. It was reported that supervision by seniors or consultants and installing CCTVs near the washing areas would likely improve hand hygiene compliance at delivery points. This was in accordance with the findings of studies done in neonatal ICUs in India where it was found that educational interventions, along with healthcare associated infection surveillance, monitoring of hand hygiene using CCTVs, and regular feedback meetings can improve hand hygiene compliance among HCWs [12,13]. Another study conducted in a neonatal and pediatric intensive care unit in India demonstrated that the use of an electronic infrared tap with voice reinforcement significantly improved hand hygiene compliance among HCWs [14].

Many nurses also reported that they were more concerned about the health of the mother than the baby and that they were more likely to wash their hands if the baby was a known preterm or LBW as compared to a normal newborn. Therefore, providing multimodal educational interventions about the importance of hand washing in delivery points and its role in reducing EOS would be beneficial in improving hand hygiene as demonstrated by many studies [8,12,15-19]. Interns reported that they did not feel the necessity to wash their hands if they were wearing gloves. Increased use of gloves was also stated as a factor that hindered hand washing. However, WHO states that gloves should be worn only when indicated, and glove use does not modify hand hygiene indications or replace hand hygiene action [20]. A study

conducted in a tertiary care hospital in India corroborates this observation, stating that glove use is associated with poor hand hygiene compliance [21]. Therefore, educating HCWs about the importance of hand washing before wearing gloves and the proper indications to wear gloves, as described by WHO, could lead to improved hand hygiene practices. The main limitation of this study is that the results are based on self-reported questionnaires.

Conclusion

This study discusses existing hand hygiene practices of HCWs at delivery points and the factors that affect these practices. Nurses reported better compliance with overall hand washing practices compared to other HCW's. However, intern doctors observed better hand hygiene before handling newborns at delivery points, while nurses reported the lowest numbers in this area. High patient load and staff shortages were factors reported to impede hand hygiene. Providing tissues or clean towels near washing areas is an easy and cost-effective measure that could improve hand washing practices. Other measures that could improve hand hygiene compliance include CCTVs to monitor hand hygiene compliance, supervision by seniors/consultants, and providing multimodal educational interventions highlighting the importance of hand washing at delivery points. HCWs also need to be sensitized on the proper indications to use gloves and that glove use does not substitute for hand washing if it is indicated, as per WHO guidelines. Some of these corrective measures could easily be implemented in hospitals to optimize hand hygiene at delivery points and reduce rates of sepsis in neonates.

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Informed Consent

Informed consent has been obtained from all participants of the study. Approval has been obtained from the Institute ethics committee (JIP/IEC-OS/2022/308).

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