

## Original Research Article

# Impact of health education in improving awareness about Methicillin resistant *Staphylococcus aureus* in health care professionals of tertiary healthcare centre in India

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## ABSTRACT

**Background:** Methicillin resistant *Staphylococcus aureus* (MRSA) is a major pathogen causing morbidity and mortality in hospital setup. Healthcare professionals (HCPs) colonized by MRSA, play a key role in transmission of this organism to the patients. Compliance of the HCPs with sanitary guidelines is fundamental to prevent nosocomial Infections. Hence, imparting education and creating awareness is the first step towards this. The aim of this study was to determine baseline knowledge about MRSA in healthcare professionals (HCPs). The further aim of the study was to assess the impact of health education on HCPs.

**Methods:** A total of 104 participants, including 54 nurses and 50 doctors, were surveyed using pre-validated questionnaire, regarding MRSA colonization, modes of transmission, high risk areas in hospital, isolation policy, disinfection and treatment. The survey was followed by a health education session on MRSA. Thereafter a post-test questionnaire was administered to study the impact of the health education session.

**Results:** The study sample of 104 respondents comprised of 50 doctors (48%) and 54 nurses (52%). It was found that baseline awareness regarding MRSA was lesser in the nursing staff as compared to doctors. Statistically significant positive impact of the health education session on all the HCPs was observed when paired t-test was applied. Various challenges expressed by the participants in prevention of MRSA transmission were noted.

**Conclusions:** Due to suboptimal awareness noted in HCPs, educational programs should be conducted to bridge the gap in knowledge and perception of HCPs to prevent spread of MRSA.

**Keywords:** Health care professionals, Health education, MRSA awareness

## INTRODUCTION

*Staphylococcus aureus* has been recognized as an epidemiologically important pathogen. Despite use of antibiotics, staphylococcal infections prevail in hospital set-up and have severe consequences.<sup>1</sup> Methicillin resistant *Staphylococcus aureus* (MRSA) first reported in 1961, is a major nosocomial pathogen known to cause

severe morbidity and mortality.<sup>2</sup> Two major varieties of MRSA are known, viz: Hospital-acquired MRSA and community-acquired MRSA. As the health care workers are at the interface between hospitals, long term care facilities on one hand and community on the other, they may serve as reservoirs, victims and vectors of MRSA transmission.<sup>3</sup>

Infection prevention is a fundamental aspect required for quality of care and patient safety within Healthcare settings, in order to prevent the complications caused by MRSA.<sup>4</sup> Good hand hygiene practices and strict adherence to infection control policies remain essential to control the spread of MRSA.<sup>5</sup>

The HCP's awareness and understanding that they are potential disseminators of this microorganism is fundamental to the daily adoption of measures necessary to break the chain of transmission of these agents in the health care settings.<sup>6</sup> Assumptions cannot be made about adequate knowledge and expertise of staff about MRSA as stated by Kheder et al.<sup>7</sup> Also, Study by Easton et al, revealed knowledge gaps in care and management aspect of MRSA.<sup>8</sup>

Hence, the present study was conducted to determine baseline knowledge about MRSA in HCPs and to assess the impact of health education on HCPs.

## METHODS

After obtaining permission from hospital authorities and Institutional Ethics Committee, this prospective study was undertaken among the nursing staff and doctors of a tertiary healthcare centre in a metropolitan city of India, from October 2017 to October 2018. The sample consisted of nursing staff and doctors working in various departments of this hospital. The written informed consent was obtained from the participants.

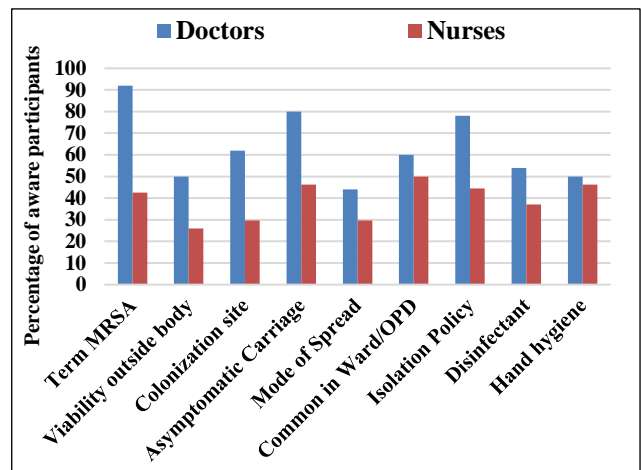
All the participants in the study were interviewed using a pre-validated questionnaire regarding awareness about MRSA. The first part of questionnaire consisted of demography-related questions like, age, sex, work experience, whether the HCP has any known risk factors for carriage of MRSA like diabetes, asthma (use of steroidal drugs), local lesions. The second part of the questionnaire consisted of questions like what is MRSA, mode of its spread, its site of colonization, asymptomatic carriage of MRSA, how long it can survive outside human body, which areas of hospital have highest chances of its spread, whether the MRSA patient needs isolation, what is the effective disinfectant against it, 5 moments of hand hygiene.

A health education session about MRSA, elaborating all the points mentioned above, was conducted. Taking into consideration that, hospital is overcrowded and understaffed, these sessions were undertaken at point of care, in small batches of participants. The demonstration of 6 steps of hand hygiene and explanation of concept of glove pyramid was also undertaken. Thereafter, a post-test questionnaire was administered. The data was tabulated using Microsoft Excel. Mean and standard deviations were calculated. Paired T test was used to find the impact of educational intervention on awareness about MRSA.

## RESULTS

The study sample of 104 respondents comprised of 50 doctors (48%) and 54 nurses (52%). Out of the 50 doctors, 26 (52%) were females, and 24 (48%) were males. All the 54 nurses were females. The mean age for doctors was 27.1 years and for nurses was 39 years. The mean experience of doctors was 7.74 years ( $\pm 5.27$  years) and that of the nursing staff was 17.29 years ( $\pm 10.32$  years). Out of the 104 participants surveyed, 66.34% were aware about the term MRSA.

Though number of nurses participating in the study were more than doctors, it was found that general awareness towards MRSA was lesser than that of doctors (awareness in nurses=42.57%, awareness in doctors=65.42%). Figure 1 depicts the awareness about MRSA amongst doctors and nurses.



**Figure 1: Awareness about MRSA amongst doctors and nurses.**

Only 5.7% of the respondents were very confident about their knowledge on MRSA infection and prevention and 50% were not confident at all. Post the health education session 75% of the respondents felt very confident about their knowledge on MRSA infection and prevention.

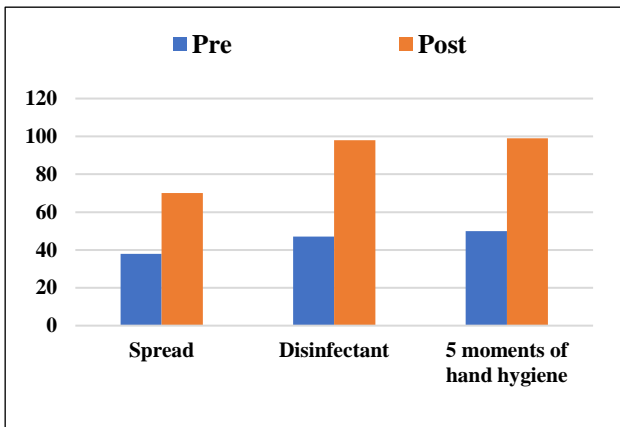
Only 37% of participants had knowledge about correct duration of MRSA survival on outside surfaces. Forty five percent of participants were aware about the most common body site colonized by MRSA.

About 61% participants were aware that asymptomatic carrier of MRSA can transmit MRSA. Only 36% of participants knew that the most common mode of spread of MRSA is contact with health-care workers hands. Rest of the participants thought it to be antibiotic overuse, bedside equipment, or through air.

Out of the different locations in hospitals like OPD, ward, ICU, NICU, OT, 54% of participants were aware that MRSA spread is highest in OPD and wards. Sixty percent

participants were aware that isolation is required for MRSA patients.

Only 45% of participants were aware that chlorhexidine is the disinfectant of choice for MRSA. The awareness regarding five moments of hand hygiene was found to be 48% among the participants. After the health education session, post-test was conducted, and results were noted. Figure 2 depicts impact of health education in improving awareness about MRSA.



**Figure 2: Impact of Health Education in improving awareness about MRSA.**

Null hypothesis was set as ‘there is no significant difference in awareness/knowledge about spread of MRSA before and after educational intervention’

After applying Paired t-test on 104 participants, it was observed that there is enough significant difference between the knowledge about ‘mode of MRSA spread’ after providing health education. (P value=8.26004e-10); the observed standardized effect size is 0.66.

Similarly, significant difference in knowledge about ‘disinfectant for MRSA’ was observed in paired t-test for all 104 participants. (P-0.0000 <0.05). The observed standardized effect size was large (0.98). Also, significant difference in awareness of ‘5 moments of hand hygiene’ was observed in paired t-test for all participants (P-value equals 8.88178e-16) The observed standardized effect size was large (0.94).

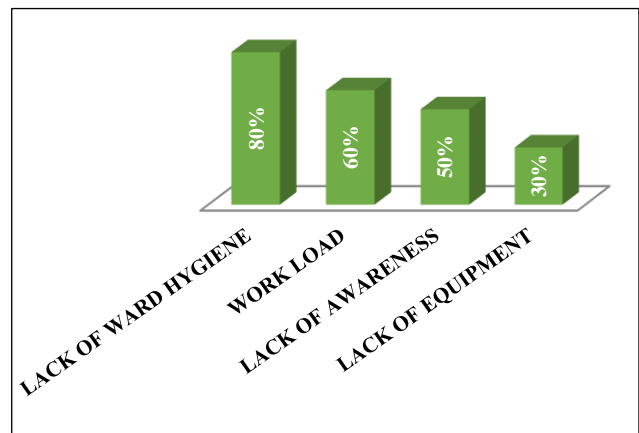
When the impact of the educational session was assessed separately, for doctors and nurses, it was found that there was a significant enough difference between the awareness of spreading MRSA, disinfectant for MRSA and moments of hand hygiene after providing health education to all nurses and doctors  $p < 0.05$  (Table 1).

When asked about challenges faced in prevention of MRSA transmission, multiple challenges were expressed by participants, viz lack of ward hygiene, excessive workload, lack of MRSA awareness and lack of

equipment. Figure 3 depicts the challenges faced by the HCPs in prevention of MRSA transmission.

**Table 1: Impact of health education on doctors and nurses about spread of MRSA, disinfectant used, and 5 moments of hand hygiene P value.**

	P-value (doctors, N=50)	P-value (nurses, N=54)
Spread of MRSA	0.0000152038	0.0000174025
Disinfectant	6.40221E-7	2.13771E-11
5 moments of hand hygiene	1.13047E-7	1.59734E-9



**Figure 3: Challenges faced in prevention of MRSA transmission.**

**DISCUSSION**

Much of the recent work in tackling MRSA has focused on hygiene in hospitals, but it is unclear how much hospital staff know about the treatment and management of patients who are colonized or infected with MRSA.<sup>8</sup> It is observed that increased awareness acts as a motivating factor in infection control among HCPs.<sup>9</sup>

There was higher awareness amongst doctors regarding all the aspects of MRSA surveyed (Figure 1). Nursing staff is in direct contact with the patients for a longer time as compared to doctors.

Hence their knowledge is important for prevention and control of MRSA.<sup>6</sup> In other studies carried out at Brazil and Sudan, lower awareness was found among nurses as compared to doctors.<sup>6,7</sup>

In the current study 66.34% of the respondents were aware about the term MRSA. In another similar study, 78% of respondents had heard the term MRSA.<sup>7</sup> Doctors were more aware about MRSA, as compared to nurses, as seen in the other study.<sup>7</sup> Only 42.5% nurses in current study were aware about MRSA. Two other studies have reported 9% and 56% of nurses being aware about MRSA.<sup>6,7</sup>

In this study, 61% participants were aware that asymptomatic carriers of MRSA can transmit MRSA. Study conducted by Kheder et al, 45% participants were aware about asymptomatic carriage.<sup>7</sup> Anterior nares are the most common anatomical site for MRSA colonization.<sup>1</sup> Out of all participants, 62% doctors and 29.6% nurses were aware of the same.

MRSA can remain on surfaces for days, serving as a reservoir for transmission.<sup>10</sup> Only 36% of the respondents had knowledge about the same.

In current study 36% of participants knew that the most common mode of spread of MRSA is through contact with health-care workers hands. In another study, 41.3% of participants agreed that MRSA could be reduced by hand washing.<sup>7</sup>

In our study, 46.3% of nurses had correct knowledge of 5 moments of hand hygiene according to WHO guidelines.<sup>11</sup> The awareness in doctors regarding this was found similar (50%). It is lesser as compared to 70% reported from Chhattisgarh, India.<sup>12</sup>

There was significant impact of the health education session in improving knowledge about MRSA in HCPs (Figure 2). As stated in Table 1, there was significant impact of health education session on doctors as well as nurses. Post the Health education session, about 76% of doctors and 64% of nurses correctly identified direct contact with HCPs' hands to be more important in transmission of MRSA than bedside equipment or air. At the end of the session 94% of doctors and 94.5% of nurses identified Chlorhexidine as preferred disinfectant over phenol, alcohol or glutaraldehyde. Also, 94% of doctors and 98.14% of nurses could correctly enlist 5 moments of hand hygiene as per WHO guidelines.<sup>11</sup>

The participants expressed various challenges faced in prevention of MRSA transmission like lack of ward hygiene, heavy workload, lack of awareness and lack of equipment (Figure 3). Similarly, various barriers in practice of hand hygiene like lack of education, lack of knowledge of guidelines, high workload, understaffing have been reported by Suchitra et al.<sup>13</sup> Thorough and continuous attention to ward hygiene, removal of dust in addition to standard infection control measures are key factors in control of MRSA outbreak.<sup>14</sup>

## CONCLUSION

There was suboptimal awareness about MRSA amongst HCPs in this tertiary health care centre. Nursing staff had lesser knowledge about MRSA, than doctors. After the health education session, there was significant rise in the awareness in both doctors as well as nurses.

Hence, in the future, such educational programs should be conducted routinely to impart updated knowledge and

to bridge the gap in knowledge and perception of HCPs to reduce MRSA transmission rates considerably.

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