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NURSES' PERCEPTION TOWARDS METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) PREVENTION IN THE CRITICAL CARE UNITS: A CROSS-SECTIONAL STUDY

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Abstract

Background: Nurses play a critical role in preventing healthcare-associated infections, including MRSA. Understanding the knowledge, perceptions, and barriers influencing nurses' practices is essential. Knowledge of MRSA epidemiology and transmission motivates program implementation and adherence to preventive measures. This study assessed nurses' perception of methicillin-resistant Staphylococcus aureus (MRSA) prevention in the critical care unit of King Fahad Hospital, Jeddah, Saudi Arabia. **Methods:** A cross-sectional descriptive design recruited 112 critical care nurses from King Fahad General Hospital, Jeddah, using convenient non-probability sampling**. Results:** Nurses' perception of MRSA prevention across five domains (severity: 4.12, benefits: 4.58, self-efficacy: 4.07, susceptibility: 3.86, cues to action: 3.80) yielded a total mean score of 4.09. There was no significant difference in perception based on length of experience (p = 0.465). **Conclusion**: Regular provision of accurate MRSA information and emphasis on infection control and prevention are crucial for nurses, especially those in frequent contact with MRSA patients. While nurses demonstrated sufficient perception of MRSA prevention, inconsistencies across domains indicate the need for expanded education and support to enhance their understanding of preventive measures for managing MRSA patients**.**

Keywords: Nurses' perception, infection prevention, methicillin-resistant Staphylococcus aureus, MRSA, critical care

INTRODUCTION

The emergence of methicillin-resistant Staphylococcus aureus (MRSA) as a significant nosocomial pathogen has garnered global recognition [1]. MRSA is a staph infection that has developed resistance to commonly used antibiotics, posing a challenge for healthcare providers [2]. Its prevalence has been increasing worldwide, necessitating a deeper understanding of infectious diseases to control and reduce associated mortality rates, especially in the context of pandemics [3].

In the United States, the intensive care unit (ICU) has been identified as a hotspot for MRSA, with approximately 60% of S. aureus isolates found in this setting [3, 4].

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Staphylococcus aureus carriers, including those carrying MRSA, are at a higher risk of developing infections and transmitting the organism. The carriage rate of Staph. aureus in the general population is approximately 33%, with MRSA carriage estimated at around 2% in the United States [5].

In Saudi Arabia, MRSA prevalence has been on the rise, reaching 38% in 2012 compared to 2% in 1988 [3, 6]. The prevalence varies across regions, with the central region reporting 32% and the western region reporting 42% [7]. However, there is a scarcity of current literature addressing healthcare workers' perceptions and their influence on critical care nurses' adherence to MRSA prevention protocols in acute healthcare settings [8, 9].

MRSA infections pose a significant challenge due to their resistance to commonly used antibiotics, leading to higher mortality rates [10]. Overuse and misuse of antibiotics have contributed to the rapid spread of MRSA, necessitating effective prevention strategies [11]. Despite efforts to control antibiotic-resistant bacteria, MRSA infections continue to increase in both hospital and community settings [12].

Notably, community-associated MRSA (CA-MRSA) has gained prevalence, posing a greater health risk to the general population. Prevention measures play a crucial role in combating the rising trend of MRSA, emphasizing the need for knowledge and awareness among critical care nurses, patients, and the wider community [13]. The implementation of MRSA protocols relies on accurate and efficient dissemination of information to healthcare professionals, including public health nurses, who play a vital role in educating the community about MRSA risks and preventive measures. Cost-effectiveness studies, such as the Australian National Hand Hygiene Initiative, have demonstrated the value of such initiatives in reducing MRSA-related infections [14].

MRSA has attracted considerable scientific and political interest globally as one of the most well-known examples of resistant bacteria [15]. Nasal colonization of S. aureus, including MRSA, has been identified as a significant risk factor for subsequent infections and inter-patient transmission [16]. Colonization rates vary among populations, and risk factors for

The aim of this study is to investigate the perceptions and compliance of critical care nurses regarding MRSA prevention protocols in order to identify areas for improvement and develop targeted interventions to enhance infection control practices.

METHODS

Study Design

A cross-sectional descriptive design was employed to assess nurses' perception of MRSA prevention in the critical care units of King Fahad Hospital in Jeddah, Saudi Arabia. This design enables the description of participants' behavior and attitudes at a specific point in time.

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Study Participants and Sample

The study included critical care nurses from the intensive care units (ICUs) and coronary care units (CCUs) of King Fahad General Hospital. A total of 112 critical care nurses were selected using convenient sampling. The sample size was determined using Slovin's formula to achieve a confidence level of 95% with a ±5% margin of error.

Setting and Recruitment

The study took place at King Fahad General Hospital, the largest Ministry of Health hospital in Jeddah. The critical care units, comprising a total of 46 beds (34 in the ICU and 12 in the CCU), were the focus of the study. Approval was obtained from the FCMS Internal Review Board and the Jeddah Health Internal Review Board. The participants were provided with a cover page explaining the study's aim, ethical considerations, and a consent and information sheet. Data collection involved distributing hard copy questionnaires to the participants, who were given the option to complete them at the hospital or at home. Reminders were sent after three days, and the questionnaires were collected after seven days.

Research Instrument

The survey questionnaire consisted of two parts. Part I gathered demographic information such as gender, length of experience, educational attainment, and critical care unit assignment. Part II utilized an adapted questionnaire developed by Dorothy Seibert to assess nurses' perception of MRSA prevention. It contained 12 questions divided into five domains: severity, benefit, self-efficacy, susceptibility, and cues to action. A 5-point Likert scale was used for responses, ranging from "Strongly disagree" to "Strongly agree." The questionnaire demonstrated good internal consistency with a Cronbach's alpha value of 0.788.

Ethical Consideration

The study received ethical approval from the Research Ethics Committee of the FCMS, approval number (222/IRB/2021) and written informed consent was obtained from the participants. Confidentiality and data protection principles were strictly adhered to, ensuring anonymity and privacy.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS, version 24). Descriptive statistics, including frequencies, percentages, weighted means, and standard deviations, were employed to analyze demographic characteristics and nurses' perception of MRSA prevention. The t-test was used to examine the differences between demographic characteristics and perception. A significance level of $p < 0.05$ was considered statistically significant.

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Scope and Limitations of the Study

The study's findings are limited by the single setting, limited duration, small and homogenous sample size, lack of previous research in the area, and the researcher's limited experience. Generalizability may be limited due to the specific characteristics of the participants and setting.

RESULTS

Table 1 summarizes the demographic characteristics of the participating nurses in the study on MRSA prevention in a critical care unit. Out of the total sample size of 112 nurses, 84.8% were female, while 15.2% were male. The majority of nurses fell within the age group of 26-35 years (56.3%), followed by 36-45 years (33.9%), with a smaller representation of nurses aged 18-25 years (7.1%) and 46-55 years (2.7%).

Regarding nationality, 44.6% of the nurses were Saudi, while the remaining 55.4% were non-Saudi. In terms of unit assignments, 75.9% of the nurses worked in the intensive care unit (ICU), while 24.1% were assigned to the coronary care unit (CCU).

Regarding length of experience, the distribution among the nurses was as follows: 10.7% had 1-2 years of experience, 20.5% had 3-5 years, 25.9% had 5-10 years, and the largest proportion, 42.9%, had more than 10 years of experience.

The results presented in **table 2** highlight the nurses' perception of MRSA prevention in the ICU and CCU. In the ICU, nurses demonstrated a high level of compliance in the severity category, with a mean score of 4.20 (SD=0.79). They also recognized the benefits of MRSA prevention, reporting a mean score of 4.64 (SD=0.59). However, their self-efficacy and susceptibility scores were slightly lower, with mean scores of 4.08 (SD=1.24) and 3.76 (SD=1.23) respectively. The cues to action category received a mean score of 3.88 (SD=0.97), indicating moderate compliance. In the CCU, nurses' perception of MRSA prevention showed similar patterns, with slightly lower scores across all categories compared to the ICU. Overall, both units demonstrated a favorable perception towards MRSA prevention, with benefits being the highest complied category and cues to action being the lowest complied. These findings provide valuable insights into the nurses' perception of MRSA prevention measures in critical care units and can contribute to the development of targeted interventions to improve compliance and prevent MRSA infections.

Table 3 summarizes nurses' perception of MRSA prevention based on their length of experience. The findings indicate that nurses with different lengths of experience show consistent trends in their perception. Overall, the category of benefits received the highest mean scores, indicating strong compliance, while cues to action had the lowest mean scores, indicating potential areas for improvement. These results suggest that nurses' length of experience does not significantly impact their perception of MRSA prevention. The findings highlight the importance of emphasizing the benefits of prevention measures

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and addressing any barriers related to cues for action to enhance compliance and reduce the risk of MRSA transmission.

DISCUSSIONS

The aim of this study was to assess nurses' perception of MRSA prevention in the critical care unit of King Fahad Hospital. The findings revealed that nurses' perception towards MRSA prevention was primarily focused on the benefits, while susceptibility and cues to action were considered less important. Interestingly, the study also found that there was no significant difference in nurses' perception of MRSA prevention based on their length of experience.

These findings align with previous research conducted by Dahesihdewi et al. (2018), which documented poor MRSA awareness and understanding among healthcare personnel in critical care units, including physicians and nurses [17]. Based on their study, the authors recommended the implementation of additional teaching programs and interventions to enhance MRSA knowledge among all healthcare personnel. However, in the present study, MRSA awareness was not found to be associated with age, years of service, years in critical care, or work position. Most participants were under 55 years old, had an education background higher than a diploma degree, and had received training on WHO hand hygiene recommendations within the last three years [17].

Efforts to control MRSA transmission in healthcare settings have involved the implementation of policies such as antibiotic usage restrictions and the use of antiseptic or disinfectant hand solutions. However, effectively controlling MRSA and preventing its spread in healthcare settings remains a challenge that requires a strong understanding of MRSA infection and the importance of hand hygiene among healthcare workers [18, 19].

A study by Al-Shdaifat et al. (2017) assessed nurses' knowledge, perception, and practice related to MRSA prevention. The findings showed that while 100% of nurses correctly answered questions about gloving and gowning precautions, there were variations in their knowledge and perception levels regarding different aspects of MRSA, such as the ways of spreading and effective methods of killing MRSA [19]. However, a high percentage of nurses demonstrated compliance with practical measures to prevent MRSA transmission, such as hand hygiene, gloving, and gowning. Other healthcare staff also showed a high level of compliance with these practices.

Regarding cues to action, including effective information about MRSA, media influence, and attitudes toward MRSA patients, the study found that nurses had lower perceptions in these areas. Moreover, the study revealed that around two-thirds of the nurses believed that being short-staffed increased susceptibility to MRSA. Overall, the level of perception among nurses regarding MRSA transmission ranged from moderate to high. Most nurses agreed that MRSA is a problem at the hospital and national levels. The study also indicated positive correlations between knowledge and other variables, suggesting that higher levels of knowledge are associated with higher adherence to MRSA

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transmission prevention practices. Several studies have highlighted the importance of education and training in improving compliance with hand hygiene and infection control practices. However, it is also recognized that compliance with hand hygiene is influenced by various factors, and the effects of training may only result in short-term compliance [20]. In terms of organizational environments and patient safety culture, the engagement of healthcare workers with infection prevention and control procedures is crucial. Understanding how IPC innovations are presented, implemented, and engaged with by healthcare workers is essential for driving improvements in healthcare and clinical practice [21]. In conclusion, this study emphasizes the need for enhanced MRSA awareness and education among critical care nurses. Additional teaching programs and interventions can help improve their perception and compliance with MRSA prevention protocols.

CONCLUSION

The study highlights the importance of providing regular and accurate MRSA information to nurses, particularly those in frequent contact with MRSA patients. While nurses generally have sufficient perception of MRSA, consistency across all domains and adoption of preventive measures need improvement. Additional research is needed to explore factors influencing nurses' behavior.

Conflict of interest

The authors declare no conflicts of interest in conducting this study and reporting its findings.

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The authors confirm that the research was carried out independently and without any financial influence or support from external sources.

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Table 1: Demographic characteristics of nurses in the study

Category	Frequency	Percentage
Gender		
Male	17	15.2
Female	95	84.8
Total	112	100.0
Age		
18-25 years old	8	7.1
26-35 years old	63	56.3
36-45 years old	38	33.9
46-55 years old	3	2.7
Total	112	100.0
Nationality		
Saudi	50	44.6
Non-Saudi	62	55.4
Total	112	100.0
Units		
ICU	85	75.9
CCU	27	24.1
Total	112	100.0
Length of Experience		
1-2 years	12	10.7
3-5 years	23	20.5
5-10 years	29	25.9
More than 10 years	48	42.9
Total	112	100.0

Table 2: Nurses' perception of MRSA prevention in the ICU and CCU

Unit	MRSA Prevention Category	Mean	Standard Deviation
ICU	Severity	4.20	0.79
	Benefits	4.64	0.59
	Self-efficacy	4.08	1.24
	Susceptibility	3.76	1.23
	Cues	3.88	0.97
CCU	Severity	3.88	1.01
	Benefits	4.42	0.75
	Self-efficacy	4.06	1.08
	Susceptibility	3.81	0.90
	Cues	3.56	1.06
Total	Severity	4.12	0.86
	Benefits	4.58	0.65
	Self-efficacy	4.07	1.08
	Susceptibility	3.86	1.05
	Cues	3.80	1.00

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Table 3: Nurses' perception to MRSA prevention according to length of experience

Length of Experience	MRSA Prevention Category									
	Severity		Benefits		Self-efficacy		Susceptibility		Cues	
	Mean	***SD***	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***
1-2 years	4.04	1.02	4.42	0.92	3.81	1.38	3.81	1.31	3.58	1.29
3-5 years	4.11	0.86	4.74	0.45	4.29	0.95	4.29	1.07	3.86	1.05
5-10 years	4.21	0.80	4.48	0.69	4.15	0.98	4.15	1.02	3.87	0.99
More than 10 years	4.13	0.86	4.59	0.66	4.08	1.08	4.08	1.16	3.81	1.00
Total	**4.12**	**0.86**	**4.58**	**0.65**	**4.07**	**1.08**	**3.86**	**1.05**	**3.80**	**1.00**