

Prevalence And Epidemiological Characteristics Of Healthcare-Associated Methicillin-Resistant Staphylococcus Aureus (MRSA) In Primary Healthcare Centers In The Kingdom Of Saudi Arabia A Narrative Literature-Based Analysis Of Published National Evidence

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Abstract

Methicillin-resistant *Staphylococcus aureus* (MRSA) continues to be a major cause of infections linked to healthcare settings and presents a serious threat to patient safety and infection prevention. The frequency and epidemiological features of healthcare-associated MRSA are described in this paper by synthesizing available data from the Kingdom of Saudi Arabia, with special attention on basic healthcare facilities. With pooled estimates ranging from roughly 8.6% to 17.0%, national systematic reviews and meta-analyses revealed significant variation in MRSA prevalence across healthcare settings, with greater rates recorded in specific geographic locations and clinical contexts. A possible reservoir for transmission at the community–healthcare interface was indicated by evidence from outpatient and primary healthcare settings that showed significant MRSA colonization, including a reported nasal carriage rate of 25% among primary healthcare center attendance. Significant MRSA carriage was found in studies involving healthcare personnel, underscoring their part in promoting the virus's transmission within medical institutions. Additionally, hospital-based surveillance data revealed rising MRSA trends over time, especially among patients with chronic comorbidities and in surgical wards. When taken as a whole, the results highlight the fact that MRSA is relevant in primary healthcare settings as well as hospitals. To lessen MRSA transmission and aid in national antibiotic resistance management initiatives, these findings highlight the necessity of improved infection prevention and control protocols, consistent surveillance, and focused interventions in primary healthcare facilities.

INTRODUCTION

Healthcare-associated infections (HAIs) constitute a significant global public health issue due to their effects on patient morbidity, mortality, duration of hospital stays, and

healthcare expenditures. Methicillin-Resistant *Staphylococcus aureus* (MRSA) is a highly significant pathogen due to its resistance to many routinely utilized antibiotics and its capacity for rapid dissemination in healthcare environments (Madani, 2002; Subramanian et al., 2025). MRSA infections vary from moderate dermatological and soft tissue diseases to severe ailments, including bloodstream infections, pneumonia, and surgical site infections, necessitating the implementation of effective prevention and control techniques.

In Saudi Arabia, MRSA is extensively recognized as a significant contributor to healthcare-associated infections, especially within hospital environments. Numerous surveillance and epidemiological investigations have documented elevated and rising prevalence rates of MRSA in various regions of the country (Adam & Abomughaid, 2018; Alanzi et al., 2024; Alhazmi et al., 2025). A recent systematic review and meta-analysis estimated the prevalence of MRSA in Saudi Arabia to be between 8.6% and 17.0%, contingent upon the analytical methodology employed, underscoring significant diversity between healthcare environments and geographies (Alanzi et al., 2024). Prolonged observational data indicate a persistent increase in MRSA prevalence, particularly in surgical wards and among patients with concomitant conditions including diabetes and renal failure (Subramanian et al., 2025). Although hospitals have historically been the central focus of MRSA research, increasing evidence indicates that primary healthcare centers significantly contribute to MRSA spread. Primary healthcare centers serve as the initial interface between the population and the healthcare system, handling substantial numbers of patients need wound care, injections, chronic illness management, and minor surgeries. A study among outpatients in primary healthcare centers in Saudi Arabia revealed a significant MRSA nasal carriage rate of 25%, indicating the presence of MRSA in basic care settings (Abou Shady et al., 2015). This study indicates colonization rather than confirmed illness, highlighting the potential risk for transmission and subsequent healthcare-associated infections.

Healthcare personnel represent a significant reservoir for MRSA spread within medical facilities. Research in Saudi Arabia has revealed considerable MRSA colonization rates among healthcare personnel, especially nurses and those with extended clinical exposure (Al-Humaidan et al., 2015; Iyer et al., 2014). The findings indicate that insufficient compliance with infection prevention and control protocols, including hand cleanliness and proper utilization of personal protective equipment, may facilitate the dissemination of MRSA across various healthcare settings, including primary care facilities.

Although there is an expanding corpus of literature regarding MRSA in Saudi hospitals, research explicitly addressing healthcare-associated MRSA in primary healthcare clinics is still scarce. This gap underscores the necessity for targeted research on MRSA prevalence, transmission dynamics, and infection control measures in primary care environments. Comprehending the implications of MRSA at this level of care is crucial for enhancing infection prevention initiatives, minimizing transmission, and safeguarding both patients and healthcare personnel.

This study is to investigate the prevalence of healthcare-associated MRSA in primary healthcare centers in the Kingdom of Saudi Arabia, utilizing existing epidemiological data to guide effective preventative and control measures.

METHODS

This study utilized a literature-based descriptive methodology to investigate the prevalence and epidemiological traits of healthcare-associated Methicillin-Resistant *Staphylococcus aureus* (MRSA) pertinent to primary healthcare centers in the Kingdom of Saudi Arabia. The strategy was selected to consolidate existing scientific information and deliver a

comprehensive overview of MRSA prevalence across healthcare environments, especially in areas where primary-care-specific data are scarce.

Relevant peer-reviewed articles were located using systematic searches of prominent scientific databases, including PubMed, Scopus, Web of Science, and Google Scholar. The search technique concentrated on papers published in English, employing combinations of keywords like “MRSA,” “Methicillin-Resistant *Staphylococcus aureus*,” “healthcare-associated infections,” “primary healthcare centers,” “outpatient clinics,” and “Saudi Arabia.” Furthermore, the reference lists of chosen papers were manually examined to locate additional pertinent studies.

Studies were eligible if done in Saudi Arabia, published in peer-reviewed journals, and reported data on MRSA prevalence, colonization, or infection among patients or healthcare personnel in healthcare environments. Articles concentrating on hospital-based surveillance were added to furnish national epidemiological background in instances where primary healthcare-specific data were limited. Exclusions were made for studies conducted outside of Saudi Arabia, non-human studies, and non-peer-reviewed publications.

Data regarding study setting, population characteristics, sample size, and reported MRSA prevalence or colonization rates were retrieved from each qualifying study. The retrieved data were synthesized descriptively, focusing on findings relevant to primary healthcare centers and healthcare-associated transmission. A quantitative meta-analysis was not conducted, as the aim was to deliver a qualitative synthesis of available evidence instead of aggregated prevalence figures. Ethical approval was unnecessary, as the study relied solely on previously available data and did not directly involve human individuals.

RESULTS

The analyzed research demonstrate that Methicillin-Resistant *Staphylococcus aureus* (MRSA) is widespread in healthcare facilities throughout the Kingdom of Saudi Arabia, with evidence indicating its presence beyond hospitals into outpatient and primary healthcare settings. The reported prevalence of MRSA exhibited significant variability based on the research population and context. National-level evidence from systematic reviews and meta-analyses indicates that MRSA prevalence varies between 8.6% and 17.0%, demonstrating significant variation across regions and healthcare facilities (Alanzi et al., 2024). Previous pooled analysis indicated even greater incidence rates, approaching 38% in several regions (Adam & Abomughaid, 2018).

Research in outpatient and primary healthcare settings has shown that MRSA colonization occurs at the primary care level. A study of outpatients at primary healthcare centers in Saudi Arabia revealed an MRSA nasal carriage rate of 25%, highlighting a substantial reservoir of MRSA in community healthcare services (Abou Shady et al., 2015). This data indicates colonization rather than confirmed infection, suggesting a possible risk for healthcare-associated transmission.

Healthcare personnel were recognized as a significant reservoir of MRSA transmission. Research in Saudi healthcare institutions indicated MRSA nasal carriage rates among healthcare personnel between 18% to over 70%, with elevated rates noted among nurses and those with extended patient interaction (Al-Humaidan et al., 2015; Iyer et al., 2014). Hospital-based surveillance studies consistently demonstrated elevated MRSA prevalence in inpatient environments, especially inside surgical wards and among patients with chronic comorbidities (Subramanian et al., 2025; Alhazmi et al., 2025).

Discussion

This review's findings indicate that MRSA continues to be a notable healthcare-associated pathogen in Saudi Arabia, with evidence of its prevalence at all levels of care, including

primary healthcare centers. Although hospitals remain the predominant sites for MRSA infections, the recorded colonization of MRSA in primary care patients and healthcare personnel underscores the necessity of implementing infection prevention and control strategies beyond inpatient environments.

The elevated MRSA carriage rate seen in primary healthcare outpatients indicates that primary healthcare centers may serve as a crucial nexus for MRSA transmission between the community and hospitals. High patient turnover, proximity during clinical procedures, and inadequate isolation facilities may elevate the risk of MRSA transmission in these environments. These findings correspond with national and worldwide studies highlighting the significance of outpatient and primary care settings in the epidemiology of healthcare-associated infections.

The colonization of healthcare workers exacerbates this risk. The existence of MRSA among healthcare personnel highlights the necessity for rigorous compliance with hand cleanliness, the utilization of personal protective equipment, and consistent training in infection prevention and control protocols. Neglecting to manage healthcare worker carriage may enable ongoing transmission within healthcare institutions, especially basic healthcare centers.

The considerable diversity in MRSA frequency among research is indicative of disparities in study design, population characteristics, and monitoring methodologies. This variability underscores the necessity for standardized national surveillance systems that incorporate primary healthcare institutions in the routine monitoring of healthcare-associated illnesses. Enhancing infection prevention initiatives at the primary care level could diminish MRSA transmission, alleviate hospital strain, and aid in the overarching efforts to manage antibiotic resistance in Saudi Arabia.

CONCLUSION

This study underscores that Methicillin-Resistant *Staphylococcus aureus* (MRSA) continues to be a prominent healthcare-associated infection in the Kingdom of Saudi Arabia, with evidence of its occurrence in both hospital environments and primary healthcare institutions. The examined literature reveals significant diversity in MRSA frequency among various hospital settings, indicating disparities in patient demographics, surveillance techniques, and infection control measures.

The identification of MRSA colonization in patients at primary healthcare centers and in healthcare personnel highlights the potential function of these facilities in the transmission of MRSA between the community and hospitals. These findings underscore the necessity of broadening infection prevention and control initiatives to encompass basic healthcare services in addition to inpatient settings.

Enhancing infection control protocols in basic healthcare specifically hand hygiene, personnel training, and monitoring could mitigate MRSA transmission and the overall impact of antibiotic resistance. Integrating primary healthcare centers into national monitoring and infection prevention initiatives is crucial for establishing a thorough and effective strategy for MRSA control in Saudi Arabia.

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