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Prevalence of and Risk Factors Associated with Methicillin-Resistant *Staphylococcus aureus* (MRSA) Carriage Among Cutting Specialties at the *Ospital ng Maynila* Medical Center

Michael Robert Q. Monteverde, MD
Ramon Carmelo V. Alcira, MD

Department of Otorhinolaryngology
Head and Neck Surgery
Ospital ng Maynila Medical Center

ABSTRACT

Objective: To determine the point prevalence of, and risk factors associated with MRSA carriage among resident physicians of surgical departments at the *Ospital ng Maynila* Medical Center.

Methods:

Design: Cross-Sectional Study
Setting: Tertiary Government Training Hospital
Participants: 51 resident physicians from different surgical departments (general surgery, obstetrics and gynecology, ophthalmology, otorhinolaryngology – head and neck surgery and dermatology) underwent nasal and pharyngeal swabs with microbial culture and sensitivity testing to identify MRSA carriers. Fisher Exact Test and logistic regression were utilized to determine associations between MRSA carriage and various risk factors including frequency of hand washing and departmental affiliation.

Results: Overall prevalence rate of MRSA carriage was 9.8%. Otorhinolaryngology residents had the highest combined prevalence of MRSA of 42.9%, significantly higher compared to other departments and were used as a reference in logistic regression analyses. Notably, handwashing only once daily was associated with a 20-fold increase in the risk of MRSA carriage (OR 20.5, 95% CI: 1.82 to 230, p = .014). Other departments did not demonstrate statistically significant differences in MRSA carriage rates.

Conclusion: Otorhinolaryngology resident physicians had the highest combined prevalence of MRSA and nasal MRSA was found only in otorhinolaryngology residents. The surgical subspecialty and frequency of handwashing of the healthcare worker were identified as important risk factors to develop MRSA carriage. Targeted interventions (including enhanced infection control protocols and regular screening) are needed especially in high-risk departments.

Keywords: *MRSA; surgical site infections; nasal MRSA; pharyngeal MRSA*

Correspondence: Dr. Ramon Carmelo V. Alcira
Department of Otorhinolaryngology
Head and Neck Surgery
Ospital ng Maynila Medical Center
719 Quirino Ave. cor. Roxas Blvd., Malate, Manila 1004
Philippines
Phone: +63 919 328 8470
Email: mon.alcira2012@yahoo.com.ph

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Methicillin-Resistant *Staphylococcus aureus* (MRSA) are strains of *S. aureus* that are resistant to multiple antibiotics. Studies have identified MRSA as the cause of surgical site infections (SSIs) in 20% of patients undergoing elective surgeries.[1] In academic and community hospitals worldwide, MRSA is identified as the main pathogen causing SSIs accounting for 27.96% of *S. aureus* isolates.[1,2,3] In the Philippines, the same trend was observed. Genomic surveillance of MRSA rates published in 2021 have shown an increasing trend beginning in 2004 which remained well above 50% since 2010.[4] In one tertiary hospital in Metro Manila, more than half of the patients (63.7%) with *S. aureus* SSIs were found to be methicillin resistant; specifically, 80.1% were community acquired-MRSA while 19.9% were hospital acquired-MRSA.[5] MRSA are found to be associated with higher mortality rates, longer length of admission, and higher hospital cost.[6,7] Furthermore, MRSA is associated with poor quality of life, prolonged antibiotic treatment and rehabilitation and lost work and productivity.[8]

MRSA present in healthcare workers especially among physicians and nurses were found to cause SSIs in patients.[9,10] Recent studies on hospital-acquired infections focus on reservoir hosts such as surgeons.[11] Several studies have proven the presence of MRSA in different anatomic sites of predilection such as the nares, pharynx, axilla, groin and perineum.[6,12] The highest colony count was found in the nasal vestibule with extranasal carriage found to be of lesser importance. However, the presence of MRSA in extranasal sites is likely to be associated with nasal MRSA colonization.[13]

In this study, we aimed to determine the point prevalence of MRSA among residents of the different cutting specialties at the *Ospital ng Maynila* Medical Center and determine the risk factors associated with its carriage to formulate recommendations aimed to reduce or eliminate this largely preventable problem.

METHODS

Study Design and Population

This cross-sectional study was conducted in September 2023 at the *Ospital ng Maynila* Medical Center, a tertiary hospital in Metro Manila, as approved by San Juan de Dios Educational Foundation, Inc. Institutional Review Board (SJIRB-2023-0049/E-SRG). Using purposive sampling, resident physicians belonging to the different cutting specialties (i.e., General Surgery, Obstetrics and Gynecology, Ophthalmology, Otorhinolaryngology – Head and Neck Surgery and Dermatology) from the total pool of resident physicians were recruited voluntarily. All participants gave their written informed consent and accomplished a self-administered questionnaire that contained their basic demographic and professional information, and questions addressing risk factors for MRSA colonization. Participants who were unavailable or outside the study site during the sampling period, had an ongoing active/symptomatic illness, infection or had any antibiotic therapy within 6 weeks prior to specimen collection were excluded.

Sample Collection and Processing

The first dry sterile cotton swab was inserted 1 cm into each nasal vestibule and rotated five (5) complete revolutions while in contact with the nasal membrane, and placed immediately in a sterile swab container. The second dry sterile cotton swab was used to sample the anterior tonsillar pillars of each participant. Samples were inoculated on Mannitol salt agar plate and aerobically incubated at 37°C for 24 hours. Incubation was continued for another 24 hours in the absence of growth. Samples were interpreted as no growth in the absence of bacterial colonies after 48 hours. The isolated colonies suggestive of *S. aureus* were subjected to further identification by colony morphology, Gram staining, catalase test and tube coagulase test.

For MRSA detection, colonies taken from the pure culture were subjected to antibiotic susceptibility testing via Kirby Bauer method on Mueller-Hinton agar interpreted after 24 hours of incubation at 35°C with strict accordance with the guidelines provided by the Clinical and Laboratory Standards Institute (CLSI).[14] A cefoxitin disc diffusion method using a 30µg disc acted as a surrogate agent for oxacillin. All *S. aureus* strains were screened for MRSA by detection of resistance to cefoxitin disc (≤21mm zone of inhibition) following the CLSI guidelines. Results were compared with *S. aureus* ATCC 25923 and MRSA ATCC 43300 controls strains.

The collected samples were de-identified. Bacterial identification and antibiotic susceptibility data were linked to the personal and professional information with a unique study participant code. A separate password-protected file containing the participants' names and their corresponding code numbers was stored securely.

Data Analysis

Data were analyzed using MedCalc Statistical Software version 22.006 (MedCalc Software Ltd., Ostend, Belgium). Quantitative variables were expressed as means ± standard deviation. The difference between MRSA carriage and different departments was done using Fisher exact test. Python version 3.12.0 (Python Software Foundation, Beaverton, OR, USA) and STATA v13 (StataCorp, LLC, College Station, TX, USA) were employed for logistic regression analysis to explore the associations between multiple risk factors and MRSA carriage. This approach allowed us to report odds ratios with 95% confidence intervals, providing a more robust understanding of the factors significantly associated with MRSA prevalence. A *p*-value of <.05 was considered statistically significant.

RESULTS

A total of 64 resident physicians belonging to the different surgical departments were initially recruited for this study. Thirteen (13) resident physicians were subsequently excluded due to unavailability during the sampling period. Of the 51 resident physicians remaining, the average age was around 30±2 years old and majority were female (66.7%). Their average height was 160.6±7.6 cm while their mean weight was 64.3±14.5 kg. Five departments were represented, namely, General Surgery (17.6%), Obstetrics and Gynecology (25.5%), Ophthalmology (17.6%), Otorhinolaryngology-Head and Neck Surgery (13.7%) and Dermatology (25.5%). Their average years of service was 2.1 ± 1.1 years. Overall, majority (90.2%) had no comorbidities. Among the cohort, 5.8% were reported to have bronchial asthma, and 1.2% had either atopic dermatitis or Still disease. Due to the low number of participants with MRSA, statistical analysis such as odds ratios and confidence intervals could not be computed and were therefore not reported. The average puffs per day of the smokers was around 136.3 ± 90.1 while the average duration of smoking was 4.2 ± 3.3 years. Smoking did not significantly impact MRSA risk, with an OR of 4.44 (95% CI: 0.6 to 32.3, $p = .200$).

A total of five (5) samples yielded MRSA (overall prevalence rate of 9.8%). Of the five, two were obtained from the nasal vestibule (overall prevalence of 3.9%), and three from the anterior tonsillar pillar (overall prevalence of 5.9%). Broken down by specialty, the two (2) samples from the nasal vestibule were obtained from otorhinolaryngology residents (28.6%); of the three (3) pharyngeal samples, one came from otorhinolaryngology (14.3%), one from general surgery (11.1%), and one from dermatology (7.7%). However, these figures were not statistically significant. *(Table 1)*

Table 1. Prevalence of MRSA in nasal vestibule and pharynx of resident physicians belonging to the different surgical departments

Department (Number of Residents)	Prevalence of MRSA – Nasal N, (%)	*p* value	Prevalence of MRSA – Pharynx N, (%)	*p* value	Prevalence of MRSA – N, (%)	*p* value
Dermatology (13)	0, (0%)	1.000	1, (7.7%)	.889	1, (7.7%)	.1000
General Surgery (9)	0, (0%)	1.000	1, (11.1%)	.825	1, (11.1%)	.4091
Obstetrics and Gynecology (13)	0, (0%)	-	0, (0%)	-	0, (0%)	-
Ophthalmology (9)	0, (0%)	1.000	0, (0%)	1.000	0, (0%)	1.000
Otorhinolaryngology (7)	2, (28.6%)	.1105	1, (14.3%)	0.35	3, (42.9%)	.0307*

Note: p values provided for nasal, pharyngeal, and combined MRSA prevalence are calculated using Fisher's Exact test, comparing each department against the OB-GYN department, which is serves as the reference group due to its zero MRSA prevalence. A p-value <0.05 is considered statistically significant.

Otorhinolaryngology residents exhibited the highest combined prevalence of MRSA at 42.9%, significantly distinguishing them from other departments. They were used as the reference group in our analysis, with general surgery and dermatology showing non-significant odds ratios of 0.1667 (95% CI: 0.01 to 2.16, p = .170) and 0.1111 (95% CI: 0.01 to 1.40, p = .089), respectively. This underlines the markedly elevated risk in the Otorhinolaryngology department, highlighting a crucial area for targeted interventions and preventive measures. Logistic regression analysis identified the frequency of handwashing as a significant predictor of MRSA carriage among the resident physicians, with departmental affiliation showing varied influence but not reaching statistical significance except for the Otorhinolaryngology department, which served as a reference for comparison. In assessing the risk factors associated with MRSA carriage, some categories shown in *Table 2* are marked with a dash (-) in the odds rate column. This indicates that the odds ratio was not applicable/indeterminate or could not be calculated due to the absence of events in one or more of the categorical variables. The frequency of handwashing emerged as a crucial factor; washing hands once daily was associated with a significantly increased risk of MRSA carriage, showing an odds ratio of 20.5 (95% CI: 1.82 to 230, p=.014). Department-specific risk varied, with Otorhinolaryngology serving as the reference category for logistic regression analysis.

In addition to the significant risk factors identified, several other potential risk factors were analyzed for their association with MRSA carriage among resident physicians. These included demographic variables such as age and sex, lifestyle choice like smoking and various personal hygiene practices. Despite their theoretical relevance to MRSA transmission or colonization, these variables did not reach statistical significance. Specifically, factors like age, sex, duration of service, presence of comorbidities, and types of smoking devices showed no significant impact on MRSA risk (p > .05 for all). These results are presented in *Table 2* which details both significant and non-significant associations.

DISCUSSION

Several studies have already identified physicians, one of which specified surgeons, as sources of MRSA outbreaks causing hospital-acquired infections including SSIs.[9,10,11] However, none of these compared and identified a specific subspecialty among surgeons that was most likely associated with MRSA carriage. Only one study has mentioned the MRSA nasal carriage being associated with surgical wards and outpatient Otorhinolaryngology and Dentistry care.[15] However, it only included these two departments and a comparison of virulence factors not explaining the reasons for the predilection of MRSA in these surgical specialties.

Our study may be one of the first to compare the prevalence among different surgical departments. The analysis underscores the importance of department-specific exposure and hygiene practices

Table 2. Risk factors associated with presence of MRSA in nasal vestibule and pharynx of 51 resident physicians

Risk factors	Total (n=51) (%)	With MRSA n=5, (10%)	Without MRSA N, n=46, (90%)	*Crude OR*	*95% CI*	*p* value
Age, years, mean	29.5 ± 2	29.4 ± 2.3	29.5 ± 2	0.96	0.6 to 1.5	.879
Male sex	17 (33.3)	2 (40)	15 (32.6)	1.38	0.2 to 9.1	.740
Female sex	34 (66.7)	3 (60)	31 (67.4)		Reference	
Department*						
General Surgery	9 (17.6)	1 (20.0)	8 (17.4)	0.166	0.01 to 2.16	.170
OB-GYN	13 (25.5)	0 (0.0)	13 (28.3)	-	-	-
Ophthalmology	9 (17.6)	0 (0.0)	9 (19.6)	-	-	-
ORL-HNS	7 (13.7)	3 (60.0)	4 (8.7)	-	Reference	-
Dermatology	13 (25.5)	1 (20.0)	12 (26.1)	0.111	0.01 to 1.40	.089
Duration of service, years, mean	2.1 ± 1	1.8 ± 0	2.2 ± 1.1	0.72	0.3 to 1.9	.498
Comorbidities						
None	46 (90.2)	5 (100)	41 (89.1)		Reference	
With comorbidities	5 (9.8)	0 (0)	5 (10.9)	-	-	-
Bronchial asthma	3 (5.9)	0 (0)	3 (6.5)	-	-	-
Atopic dermatitis	1 (2.0)	0 (0)	1 (2.2)	-	-	-
Still disease	1 (2.0)	0 (0)	1 (2.2)	-	-	-
Presence of smoking history	8 (15.7)	2 (40)	6 (13)	4.44	0.6 to 32.3	.200
Type of smoking device						
Vape	5 (9.8)	1 (20)	4 (8.7)	5.53	0.1 to 17.2	.286
Cigarette	1 (2.0)	1 (20)	0 (0)	-	-	-
E-cigarette	3 (5.9)	1 (20)	2 (4.3)	9.96	0.1 to 13.9	.187
Puffs/day	136 ± 90	60 ± 56.6	161.7 ± 87.3	0.96	0.9 to 1.0	.265
Duration of smoking, years, mean	4.18 ± 3.1	6.5 ± 4.9	3.4 ± 2.7	1.39	0.8 to 2.4	.256
Treated/been exposed to a suspected or known case of MRSA [Yes]	1 (2.0)	0 (0)	1 (2.2)	-	-	-
Do you have exposure to known or suspected MRSA infection in the household within the past 3 months [Yes]	1 (2.0)	0 (0)	1 (2.2)	-	-	-
Do you clean your nostrils [Yes]	24 (47.1)	4 (80)	20 (43.5)	5.2	0.5 to 50.2	.154
How do you clean						
Finger	17 (33.3)	3 (75)	14 (70)	0.12	0.03 to 0.56	1.000
Cotton bud	3 (5.9)	1 (25)	2 (10)	0.52	0.04 to 5.96	0.470
Tissue	7 (13.7)	1 (25)	6 (30)	0.14	0.02 to 1.28	1.000
How many days	1.46 ± 1.3	1.3 ± 0.5	1.5 ± 1.4	1.22	0.7 to 2.3	.527
Do you habitually pick your nose [Yes]	20 (39.2)	1 (20)	19 (41.3)	0.36	0.0 to 3.4	.371
Do you clean hands afterwards [Yes]	14 (27.5)	1 (100)	13 (68.4)	-	-	.512
How often do you brush your teeth in one day						
Once a day	5 (9.8)	0 (0)	5 (10.9)		Reference	
Twice a day	39 (76.5)	5 (100)	34 (73.9)	-	-	-
Thrice a day or more	7 (13.7)	0 (0)	7 (15.2)	-	-	-
I do not brush my teeth	0 (0)	0 (0)	0 (0)	-	-	-
When do you do your brushing						
Morning before meal	7 (13.7)	0 (0)	7 (15.2)		Reference	
Morning after meal	3 (5.9)	0 (0)	3 (6.5)	-	-	-
Morning before meal and night before bedtime	34 (66.7)	5 (100)	29 (63)	-	-	-
Every after meal	7 (13.7)	0 (0)	7 (15.2)	-	-	-
How often do you change your toothbrush						
Once in 2 months	12 (23.5)	1 (10)	11 (23.9)	0.64	0.1 to 8.0	.725
Once in 3 months	23 (45.1)	2 (20)	21 (45.7)	0.67	0.1 to 5.3	.701
Once in 6 months	15 (29.4)	2 (20)	13 (28.3)		Reference	
Never	1 (2.0)	0 (0)	1 (2.2)			
Do you floss your teeth						
Yes	30 (58.8)	3 (60)	27 (58.7)	1.06	0.2 to 6.9	.955
No	21 (41.2)	2 (40)	19 (41.3)			
When was your last dental checkup?						
<6 months ago	7 (13.7)	2 (40)	5 (10.9)	5	0.6 to 44.3	.148
Within 6 to 12 months	17 (13.3)	1 (20)	16 (34.8)	0.78	0.1 to 9.3	.845
Between 1 and 2 years	19 (37.3)	2 (40)	17 (37.0)		Reference	
>2 years	8 (15.7)	0 (0.0)	8 (17.4)			
How often do you wash your hands daily*						
Once	4 (7.8)	2 (40)	2 (4.3)	20.5	1.82 to 230	.014
Twice	4 (7.8)	1 (20)	3 (6.5)	6.83	0.47 to 98.8	.158
Three or more	43 (84.3)	2 (40)	41 (89.1)		Reference	

Risk factors	Total (n=51) (%)	With MRSA n=5, (10%)	Without MRSA N, n=46, (90%)	*Crude OR*	*95% CI*	*p* value
Which one do you use often to wash your hands with						
Plain water only	2 (3.9)	0 (0)	2 (4.4)		Reference	
Plain soap and water	44 (86.3)	5 (100)	39 (86.7)	-	-	-
Antiseptic solution	4 (7.8)	0 (0)	4 (8.9)	-	-	-
I rarely wash my hands	0 (0)	0 (0)	0 (0.0)	-	-	-
Duration of your hand washing with soap and water Before examining the patient						
I don't wash	12 (23.5)	2 (40)	10 (21.7)		Reference	
Wash 5 to 10 seconds	32 (62.7)	3 (60)	29 (63)	0.517	0.08 to 3.56	.503
Wash for >15 seconds	7 (13.7)	0 (0)	7 (15.2)	-	-	-
After examining the patient						
I don't wash	5 (9.8)	1 (20)	4 (8.7)		Reference	
Wash 5 to 10 seconds	35 (68.6)	4 (80)	31 (67.4)	1.32	0.1 to 13.3	1.000
Wash for >15 seconds	11 (21.6)	0 (0)	11 (23.9)	-	-	-
How often do you use gloves in examining a patient						
Always	27 (52.9)	3 (60)	24 (52.2)		Reference	
Sometimes	22 (43.1)	2 (40)	20 (43.5)			
Almost never	1 (2.0)	0 (0)	1 (2.2)	0.73	0.1 to 4.8	.740
Never	1 (2.0)	0 (0)	1 (2.2)			
Type of mask generally use						
Cloth/reusable mask	1 (2.0)	0 (0)	1 (2.2)	-	-	-
Surgical mask	29 (56.9)	2 (40)	27 (58.7)	0.444	0.07 to 2.93	.399
N95 mask	21 (41.2)	3 (60)	18 (39.1)		Reference	
How often do you change your mask						
Once a day	39 (76.5)	4 (80)	35 (76.1)		Reference	
Once every 2 days	4 (7.8)	0 (0)	4 (8.7)			
Once every 3 days	0 (0)	0 (0)	0 (0)	0.795	0.08 to 7.88	.845
Once a week	0 (0)	0 (0)	0 (0)			
More than once a day	8 (15.7)	1 (20)	7 (15.2)			

Note: Values under the category with asterisk (*) are significantly different at p < .05

in the risk of MRSA carriage. Notably, otorhinolaryngology residents, likely due to their high exposure to the nasal and pharyngeal areas had a markedly increased risk of MRSA carriage. This finding is consistent with existing literature that identifies surgical specialties with frequent exposures to high-risk anatomical sites as having elevated risks of MRSA.[9-11]

On the other hand, our study showed no significant differences in the prevalence of pharyngeal MRSA across the different surgical departments. Hence, the pharyngeal MRSA isolated from the resident physicians in our study may be considered negligible. As previously mentioned, extranasal carriage is infrequent.[13] A study has also shown that the most frequent MRSA positive cultures were isolated from a nasal swab followed by a throat swab further supporting the findings of our study.[16]

Other variables such as age, sex, duration of service and comorbidities were explored. Although these factors did not show a statistically significant association with MRSA carriage, their analysis helps paint a comprehensive picture of the health status and habits of the resident physicians that could influence infection risks. For instance, although comorbidities did not significantly affect MRSA risk in our study, they are generally considered potential risk factors in the literature,[17] suggesting that our sample size might have been too small to detect a significant effect or that these factors may interact with other unmeasured variables.

The absence of statistically significant associations for several risk factors such as smoking and comorbid conditions may seem counterintuitive, given their documented influence on immune function and susceptibility to infections in existing literature.[18,19] This discrepancy could be due to the forms of smoking (e-cigarettes and vapes) predominating in our study population, which may have different impacts on nasal carriage of MRSA compared to traditional cigarette smoking. Also, the non-significance could be attributed to our relatively small population size, which might have been insufficient to detect small effects. Furthermore, specific population characteristics of our study population and the controlled environment of a hospital setting may have minimized variations typically seen in broader demographic groups.

Moreover, the lack of significant findings for personal hygiene practices other than handwashing such as toothbrushing frequency and methods of nasal cleaning, suggests that these factors might not independently influence MRSA carriage among healthcare professionals and that individual behaviors may exert less influence on MRSA carriage than systemic, or procedural factors. This may prove

vital for infection control strategies, emphasizing the need for hospital/departmental-wide policies and rigorous adherence to established protocols rather than targeting individual behavior modifications.

Among the various risk factors considered, we identified the department or surgical specialty, and frequency of hand washing as the two that were significantly related with presence of MRSA. As to hand hygiene, the hands of healthcare workers are usually colonized by different microorganisms one of which is MRSA.[17] This microorganism may also be found in the environment touched by a hand with MRSA and contaminated by shed skin. Subsequently, the hands can touch the usual body regions that MRSA are likely to colonize (i.e., nares, axilla, groin, perineum).[12,21] Moreover, the use of face masks and other personal protective equipment are mandated during doctor - patient interactions but not during interactions among peers outside the confines of the clinical area. Lastly, surgeons are expected to work a lot using their hands. Therefore, our study highlights the critical role of regular hand washing in mitigating MRSA transmission, reinforcing the need for strict adherence to established infection control practices.

Our study has several other limitations. First, it was conducted in a single institution which meant that our findings might not necessarily apply to other settings. However, while our study sample size was small, we attempted to recruit the entire resident population belonging to the different cutting specialties with the exception of 13 who were unavailable. Second, as a single center cross-sectional study, our findings can only suggest the association of certain risk factors and the prevalence of MRSA carriage and cannot establish any causal relationship. Third, our study questionnaire was modified to meet our local standards and be relevant to our institutional setting and available resources based on established sources,[22,23,24] and it was not formally validated nor was its reliability established. Although the questionnaire was designed to capture comprehensive and relevant information regarding MRSA risk factors and hygiene practices, the possible lack of validity and reliability of the instrument (and consequently our study results), have to be acknowledged. Our questionnaire relied on self-reported data for numerous associated risk factors and hygiene practice, and memory factors as well as bias in self-reporting may have resulted in over- or under- reporting of their hygiene behaviors. Future studies should establish the validity and reliability of their instrument beforehand. Fourth, MRSA prevalence underestimation is a possibility since only the anterior nares and throat were sampled. Although an MRSA carriage detection rate study found axilla and perineum carriage to be 1.2 and 1.8%, respectively. The anterior nares maintain the most frequent carriage site at 81.5% by direct culture.[22] The highest detection sensitivity was obtained when anterior nares was combined with throat at 92.3% by direct culture.[22] We believe that significant underestimation of MRSA point prevalence in our study is unlikely, and the inclusion of the axilla and perineum as culture sites may negatively affect the acceptability of the study to the participants.

It is important to disclose that the approved protocol for this study did not include any intervention for individuals identified positive for MRSA carriage. We did allow access for the participants as far as their personal culture results were concerned but only if they asked for their results. When the researchers began encountering MRSA positive residents, intervention in the form of decolonization was considered, however, the study was concluded per approved protocol without any intervention done. The matter was referred to the department research committee and it was decided that identified MRSA positive residents should undergo decolonization even if it meant deviating from the approved protocol. As of this writing, all residents who had MRSA positive results have been duly informed and have undergone self-decolonization. Further surveillance will include a repeat swab of all residents who previously turned out positive.

The overall prevalence of MRSA in our present study is lower than what appears in the literature.[1,3-5,8,9,11,15] Furthermore, although many studies have already identified various other risk factors associated with MRSA carriage,[2,5,7,11] only the department/specialty and hand hygiene (particularly the frequency of hand washing), were identified in our investigation. It is recommended that further studies with a larger sample size or a multicenter population be done in order to validate these findings. Since individuals specializing in otorhinolaryngology have the greatest exposure to MRSA nasal carriage, stricter hand hygiene and gloving protocols should be implemented. Periodic screening and surveillance should be conducted for the residents at risk. Routine preoperative decolonization should be performed for all patients scheduled for elective surgery. Future studies investigating microbial colonization, carriage, and transmission on any population should include provisions for interventions, particularly decolonization and education, as part of their study protocol.

In conclusion, otorhinolaryngology resident physicians had the highest combined prevalence of MRSA and nasal MRSA was found only among otorhinolaryngology resident physicians. The type of surgical specialty and frequency of handwashing emerges as a crucial preventive measure against MRSA carriage. Our findings advocate for targeted interventions including enhanced infection control protocols and regular screening especially in high-risk departments. Future studies should explore the implementation and efficacy of specific hygiene interventions to further reduce the risk of MRSA carriage in hospital settings.

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