

# Prevalence of Methicillin - Resistant Staphylococcus Aureus in students of higher education

FRANCISCO RODRIGUES<sup>1</sup> , PATRICIA COELHO<sup>1</sup>, SÓNIA MATEUS<sup>2</sup>

<sup>1</sup>Qualidade de Vida no Mundo Rural (QRural), Sport, Health & Exercise Unit (SHERU), Instituto Politécnico de Castelo Branco, Portugal

<sup>2</sup>Hospital Espírito Santos de Évora, Sport, Health & Exercise Unit (SHERU), Instituto Politécnico de Castelo Branco, Portugal

## ABSTRACT

Introduction: S aureus is a bacterium that is part of the normal flora of many Human Beings, and in its most aggressive variant (MRSA) it can constitute a potential risk for the bearer and the People of their relationship. Objective: To evaluate the prevalence rate of S aureus and MRSA; assess the main risk factors; evaluate the students' knowledge about the bacterium. Methods: Nasal zaragotoa harvest, with posterior laboratory analysis for bacterial identification and questionnaire. Results: In our study we had 35.23% positive cases for S aureus. In the MRSA prevalence analysis we have 5.7% of positive cases. We found a higher prevalence in the men, with 41.7% positive cases, compared with the women (30.8%). Concerning the MRSA incidence, this is higher in women (5.8%) than in men (5.6%). We can also see that the traineeship has an important role in the contamination. Conclusion: We concluded a high percentage of S aureus carriers and an expected percentage of MRSA carriers. **Keywords:** S. aureus; MRSA; Nasal carrier.

---

 **Corresponding author.** Escola Superior de Saúde Dr Lopes Dias, Portugal.

E-mail: [franciscobrodrigues@ipcb.pt](mailto:franciscobrodrigues@ipcb.pt)

Supplementary Issue: Spring Conferences of Sports Science. International Seminar of Physical Education, Leisure and Health, 17-19 June 2019. Castelo Branco, Portugal.

JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

© Faculty of Education. University of Alicante.

doi:10.14198/jhse.2019.14.Proc4.82

## **INTRODUCTION**

*Staphylococcus aureus* (*S.aureus*) is a gram positive coccus, facultative aerobic, catalase and coagulase positive (Larkin et al. 2009). *S. aureus* is a major responsible for nosocomial infections (Freeman-Cook and Freeman-Cook, 2006). Can cause numerous diseases in humans: grows and damages the tissue at the site of infection but also release toxins into the bloodstream that can cause diseases in all of the body (Lencastre et al. 2007). Before the introduction of penicillin in the treatment of infections with *S. aureus*, the mortality rate was 80%. However, shortly after starting treatment with this antibiotic, in the early forties, appeared the first strains resistant to penicillin. In 1960 about 80% of *S. aureus* were resistant to penicillin. In 1961 came the first strains resistant to these antibiotics due to the acquisition of the *mecA* gene (Lencastre et al. 2007). Currently it is estimated that every year in the US, approximately 400,000 hospital patients are infected by *S. aureus*, (100,000 die from complications) (Gomes and Westh 2006). With this study we attempted to measure the percentage of people with nasal carriage of *S. aureus* in the student population of Higher Education of Health (these people are within a few years to provide care for hospitalized patients). We intend not only to know the percentage of nasal carriers but also see if the contact with hospital (through training) or specific formation on the proper way to wash hands or on the bacteria in question can contribute to the prevention of infection (DeLeo and Chambers, 2009).

## **MATERIAL AND METHODS**

The nasal samples were collected with sterile cotton swabs. These samples have been preserved at ambient temperature until the inoculation in the culture medium. The culture medium used in this study was the Mannitol Salt Agar. After collecting the swab, it was readily inoculated in the culture medium, which was at room temperature and was placed in the oven at 37 ° C for 24h. After 24 hours we looked for characteristic colonies of *S. aureus* in the MSA. To confirm we made the catalase (ID Color Catalase, BioMerieux) and coagulase (Slidex Staph Plus, BioMerieux) tests. Colonies that prove to be positive for *S. aureus* were then transferred to the chromID MRSA medium (BioMerieux). The cases presented positive in the chromID MRSA were then sent to the department of clinical pathology of a Hospital, to confirm the results through automated antibiogram (Vitek ® 2). Knowledge about *S. aureus* infections and the theoretical formation on Hand Washing Protocols: Each student responded to an anonymous survey with which it was intended to examine three things: history and recent contact with the hospital environment, theoretical knowledge of the *S. aureus* infections and knowledge and application washing hands protocols.

### ***Participants***

For this study 88 students were randomly chosen from the Institution of Higher Education in the Health Area. Of these students 52 were female and 36 were male.

### ***Analysis***

Use the Statistical Package software for the Social Sciences (IBMSPSS v22). A descriptive analysis of all variables was performed. Non-parametric Chi-Square tests and Mann-Whitney test were used to relate.

## **RESULTS**

In our study we had 35.23% positive cases and 64.77% negative cases. In the MRSA prevalence analysis we have 5.7% of positive cases. The other 94.3% were negative for MRSA nasal carriage. We found a higher prevalence in the men, with 41.7% positive cases, compared with the women 30.8%. Concerning the MRSA incidence, this is higher in women (5.8%) than in men (5.6%). We can also see that the traineeship has an

important role as the students that had have a traineeship in the past six months present a higher rate of *S. aureus* and MRSA against the students that haven't had traineeship. The same thing can be observer in the rows concerning the knowledge about infections caused by *S. aureus*, where the incidence is higher in the students that had no knowledge in about this kind of infections. About the rows that concern the students that had have theoretical formation about Hand Washing Protocols, we have an higher incidence in the students with knowledge about this kind of protocols.

## **DISCUSSION**

The results obtained from our study are within the expected values. We can see a greater focus on students who have had contact with the hospital, most likely due to the high percentage of existing carriers on these sites. According to a study (Mulqueen and Cafferty, 2007), a prevalence of 7.7% for MRSA was found in General Practitioners in Ireland. This proves that there is a high risk of infection in hospitals, not only in patients but also healthcare providers. In other article (Thompson, 2004), in which he studied the prevalence of MRSA in an intensive care unit we can see that the 1242 patients admitted to this unit, 68 of them have acquired MRSA during the time of internment, which just goes to show that this exist in hospitals, especially in a unit that should be as aseptic as possible. In the study (Lietzau and Sturmer, 2004) in which it sought to verify the percentage of patients who came to consult with GPs, found a prevalence of *S. aureus* by 24.3% and 0.7% for MRSA. This shows that not only contact with the hospitals that can make students acquire *S. aureus* but also in contact with patients. But not all students had contact with the hospital and therefore the results presented are due to *S. aureus* in community acquired. In other study (Miller and Cook, 2009), which were tested inhabitants of northern Manhattan randomly chosen, the results for *S. aureus* and 25% of MRSA from 0.4%. This demonstrates that this bacterium does not exist only in hospitals but also in the community. We can also see with our study that students with theoretical training in bacterial infections related to *S. aureus* are less susceptible to contamination by these bacteria. As for students who have specific training on the proper way to wash their hands, that this training had a higher prevalence, perhaps due to failure to apply this knowledge.

## **CONCLUSIONS**

We can conclude that there is a high percentage of nasal carriers of *S. aureus* in this Institution. We could also verify that the internship at a hospital is a risk factor with regards to contamination. We cannot say that this is the only factor, since there are others who may be influential and weren't studied.

## **REFERENCES**

- DeLeo, F. R. and H. F. Chambers (2009). "Reemergence of antibiotic-resistant *Staphylococcus aureus* in the genomics era." *J Clin Invest* 119(9): 2464-74. <https://doi.org/10.1172/jci38226>
- Deurenberg, R. H. and E. E. Stobberingh (2009). "The molecular evolution of hospital- and community-associated methicillin-resistant *Staphylococcus aureus*." *Curr Mol Med* 9(2): 100-15. <https://doi.org/10.2174/156652409787581637>
- Gomes, A. R., H. Westh, et al. (2006). "Origins and evolution of methicillin-resistant *Staphylococcus aureus* clonal lineages." *Antimicrob Agents Chemother* 50(10): 3237-44. <https://doi.org/10.1128/aac.00521-06>
- Freeman-Cook, K. Freeman-Cook, Deadly (2006) *Diseases and Epidemics - Staphylococcus aureus Infections*, Chelsea House Publishers, Philadelphia.

- Larkin, E. A., R. J. Carman, (2009). "Staphylococcus aureus: the toxic presence of a pathogen extraordinaire." *Curr Med Chem* 16(30): 4003-19. <https://doi.org/10.2174/092986709789352321>
- Lencastre, H., D. Oliveira, et al. (2007). "Antibiotic resistant Staphylococcus aureus: a paradigm of adaptive power." *Curr Opin Microbiol* 10(5): 428-35.
- Lietzau, S., T. Sturmer (2004). "Prevalence and determinants of nasal colonization with antibiotic-resistant Staphylococcus aureus among unselected patients attending general practitioners in Germany." *Epidemiol Infect* 132(4): 655-62. <https://doi.org/10.1017/sh0950268804002341>
- Miller, M., H. A. Cook (2009). "Staphylococcus aureus in the community: colonization versus infection." *PLoS One* 4(8): e6708.
- Mulqueen, J., F. Cafferty, (2007). "Nasal carriage of methicillin-resistant Staphylococcus aureus in GPs in the West of Ireland." *Br J Gen Pract* 57(543).
- Thompson, D. S. (2004). "Methicillin-resistant Staphylococcus aureus in a general intensive care unit." *J R Soc Med* 97(11): 521-6. <https://doi.org/10.1258/jrsm.97.11.521>

