OPEN ACCESS

Scientific Letters

II TOXRUN
International Congress 2023
27-28 April, 2023 | Porto, Portugal

Poster 14

Nasal colonization by *Staphylococcus aureus* in Health Sciences students and analysis of risk factors under a One Health perspective

L. M. Gomes-Sampaio [1,*], A. Cláudia-Ferreira [1], J. C. Prata [1,2], R. M. S. Azevedo [1], P. Pacheco [1], C. Campos [3,4], C. Novais [5,6], L. Peixe [5,6], R. J. Dinis-Oliveira [1,7,8], C. Coelho [9], C. Miranda [1,10], S. Quinteira [1,11,12] and A. R. Freitas [1,5,6]

[1] TOXRUN, Toxicology Research Unit, University Institute of Health Sciences, CESPU, CRL, 4585-116 Gandra, Portugal.
[2] Food Microbiology and Technology Laboratory, Department of Aquatic Production, Instituto de Ciências Biomédicas Abel Salazar (ICBAS), University of Porto, R. Jorge de Viterbo Ferreira 228, 4050-313 Porto, Portugal
[3] Instituto Português de Oncologia do Porto Francisco Gentil, 4200-072, Porto, Portugal
[4] Escola Superior de Saúde, Instituto Politécnico do Porto, 4200-072, Porto, Portugal
[5] UCIBIO/REQUIMTE, Applied Molecular Biosciences Unit, Department of Biological Sciences, Laboratory of Microbiology, Faculty of Pharmacy, University of Porto, R. Jorge de Viterbo Ferreira 228, 4050-313 Porto, Portugal
[6] Associate Laboratory i4HB, Institute for Health and Bioeconomy, Faculty of Pharmacy, University of Porto, Portugal
[7] UCIBIO-REQUIMTE, Laboratory of Toxicology, Department of Biological Sciences, Faculty of Pharmacy, University of Porto, R. Jorge de Viterbo Ferreira 228, 4050-313 Porto, Portugal
[8] Department of Public Health and Forensic Sciences, and Medical Education, Faculty of Medicine, University of Porto, Porto, Portugal
[9] UNIPRO, Oral Pathology and Rehabilitation Research Unit, University Institute of Health Sciences, CESPU, CRL, 4585-116 Gandra, Portugal.
[10] Associated Laboratory for Green Chemistry (LAQV-REQUIMTE), University NOVA of Lisbon, Caparica, Portugal
[11] BIOPOLIS/CIBIO-InBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Rua Padre Armando Quintas, nº 7, 4485-661, Vairão, Portugal
[12] Departamento de Biologia, Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre, Porto, Portugal

* Correspondence: a29747@iucs.cespu.pt

Abstract

Background: *Staphylococcus aureus* is the leading bacterial cause of death globally [1]. Nasal carriage of *S. aureus* increases the risk of invasive infections, including by methicillin-resistant *S. aureus* (MRSA) strains, but studies including Portuguese university students (PUS) are scarce. **Objective:** To analyse the prevalence of methicillin-susceptible *S. aureus* (MSSA) and MRSA among PUS enrolled in different courses/years (1st-4th) at IUCS-CESPU, characterize their antibiotic resistance profiles, and assess the potential risk factors. **Methods:** Swabs collected during March-December 2022 from anterior nares of 156 volunteers (median 22-years) were processed in mannitol-salt agar and, in parallel, enriched in brain-heart broth with NaCl 6.5% further plated onto ChromID® MRSA SMART. Typical colonies were stored for species identification (MALDITOF-MS) and antibiotic susceptibility testing (disk diffusion; EUCAST/CLSI guidelines). Each student completed a questionnaire comprising demographic/clinical/social parameters. Statistical analysis was conducted in IBM-SPSS Statistics 26 using binary logistic regression applying a backward stepwise (likelihood ratio) method, with α=0.05, selecting variables using Chi-square tests and Mann-Whitney U tests for which $p \leq 0.20$, >10 occurrences, not biologically correlated [2]. **Results:** Prevalence of MSSA and MRSA (cefoxitin screening) were 28.8% and 1.9%, respectively. From the 45 positive samples, 9% were multidrug-resistant, 38% were resistant to penicillin, 40% to erythromycin, 40% to clindamycin (inducible), 7% to cefoxitin, 2% to tetracycline, and 2% to rifampicin. Self-reported frequent contact with animals (OR=3.44, CI 95%: 1.10–10.66) were positively associated with *S. aureus*, while regular sports participation presented a negative association (OR=0.36, CI 95%: 0.17–0.77). Sports participation was not correlated with self-reported excellent health (χ^2=0.680, p=0.409). **Conclusions:** This is one of the first studies assessing MSSA/MRSA rates in PUS after the COVID-19 pandemics imposing higher self-protection/hygienization. While PUS-MSSA rates are similar to that previously observed, PUS-MRSA rates are slightly higher. Additional samples are being processed to explore future trends and other potential One Health factors influencing MSSA/MRSA colonization.

Keywords: *Staphylococcus aureus*; MRSA; university students; One Health

Acknowledgments

Research was partly funded by FCT/MCTES (Fundação para a Ciência e Tecnologia and Ministério da Ciência, Tecnologia e Ensino Superior) for the national funds received through the projects UIDP/04378/2020 and UIDB/04378/2020 of the Research Unit on Applied Molecular Biosciences, project LA/P/0140/2020 of the Associate Laboratory, Institute for Health and Bioeconomy (i4HB).

References

1. GBD 2019 Antimicrobial Resistance Collaborators. Global mortality associated with 33 bacterial pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet 2022, 400(10369), 2221-2248.
2. Ranganathan, P.; Pramesh, C.S.; Aggarwal, R. Common pitfalls in statistical analysis: Logistic regression. Perspect Clin Res 2017, 8(3), 148-151.