Research Article

BACTERIAL CONTAMINATION ON MEDICAL FEMALE STUDENTS' WHITE COATS AT AZADI TEACHING HOSPITAL IN DUHOK, IRAQ

Alaa' Turki Monawer*

Department of Microbiology, College of Nursing, University of Duhok, Kurdistan Region, Iraq

A R T I C L E   I N F O

A B S T R A C T

Background: Laboratory coats are known to act as vectors in the transport of multidrug-resistant microorganisms. This study was carried out to investigate the site, and microbial antibiotic susceptibility that exist on of health care professionals white coats engaged in doing endodontic treatment to assess the risk of pathogenic microorganisms transmission.
Aim: The study was done to detect Bacterial contamination on white coats for medical students at Azadi Teaching Hospital /Duhok.
Materials and Method: A total of 50 lab coats of Medical female Students were included in the study. Sample was collected from mouth pockets of white coat. Moisten sterile swabs with normal saline were used, then inoculated into nutrient broth at 37°C/24hr, after that sub-cultured on agar media like: Nutrient agar, MacConkey agar, Mannitol salt agar, and Blood base agar. Bacterial identification were done depending on colonies features, Gram stain, followed by biochemical tests.
Results: Fifty Lab coats were examined for the presence of bacteria, which owned and used by medical female students. All of the examined Lab coats (100%) were contaminated microorganisms. Four bacterial isolates were found, including: (56%) Coagulase negative Staphylococci (CoNS), Staphylococcus aureus (40%), Bacillus spp., (30 %), and (10 %) E. coli.
Conclusion: White coats are a potential source of cross-infection that contain bacterial agents and can play a large role in the transmission of bacterial infection among medical students.

INTRODUCTION

Health-care Associated Infections (HAIs) are one of the main public health problems both in both developed and developing countries (Mwamungule *et al,* 2015). The World Health Organization (WHO) defines HAI as an infection in a patient. This includes, but not limited to, acquired in the hospital (Uneke *et al,* 2010; Naik *et al,* 2016).

A white coat, apron or the laboratory coat is a knee-length coat or a robe worn by health workers or those who participate in laboratory work to protect their street clothes (Naik *et al,* 2016). It is one of the personal protection equipments (PPE) to prevent contamination of skin and clothing of a health care professional from direct contact with infected saliva, blood, aerosols etc. which are un avoidable in hospital environment (Priya *et al,* 2009).White clinical coats have a very long history of being a symbol of hope and healing for health professionals. However, there is concern that white coats can play a major role in the transmission of infection inside and outside hospitals (Qaday *et al,* 2015). The wearing of white coats by a medical specialist is considered accepted practice, but when, where and how we wear and clean them, they vary between people and even between different institutions (Qaday *et al,* 2015). It is Very often to see the health workers and students who wear white robes outside the clinical areas, such as a dining room, supermarkets, a library and even chapels (Muhadi, *et al,* 2007).

Also, very often people who hang white coats in cars and offices, and transfer them out-of-hospital areas, which increases the chances of trafficking in both pathogenic and non-pathogenic bacteria (Qaday *et al,* 2015), some of these bacterial strains may be resistant strains, such as Methicillin Resistance Staphylococcus aureus (MRSA), which can spread from the hospital to the community and vice versa (Loveday *et al,* 2007). The aim of present study to detect Bacterial contamination on Medical Students' white coats at Azadi Teaching Hospital /Duhok.

MATERIAL AND METHOD

Settings: Fifty samples were collected from Medical Female Students white lab coats at Azadi Teaching Hospital/Duhok, during the period from March to August, 2018.

Corresponding author: **Alaa' Turki Monawer**
Dep. of Microbiology, College of Nursing, University of Duhok, Kurdistan Region, Iraq

Sample Collection: Swabs were taken from the lab coat – pocket. Wet swab was rubbed against the coat–pocket, and inoculated into nutrient broth (37°C for 24hr) as shown in figure (1).

Fig. 1 Techniques for swabbing white coats

Sample culturing: by using solid media such as: nutrient agar medium, blood base agar medium (for growth of fastidious bacteria), MacConky agar (for coliforms), and Mannitol salt agar (for Staphylococci), the bacterial samples were sub-cultured and then incubated at 35°C for 48 hours.

Identification of microorganisms: the identification of microorganisms was done depending on colonies features, Gram stain, followed by standard biochemical identifications.

Statistical analysis: The data was collected, entered into a computer, and statistical analysis was carried out with a statistical software package SPSS using square tests. The P value of less than 0.05 was considered statistically significant.

RESULTS

A total of 50 Lab coats were examined for the presence of bacteria, which owned and used by medical female students. All of the examined Lab coats (100%) were contaminated microorganisms. Four bacterial isolates were found, including: (56%) Coagulase negative *Staphylococci* (CoNS), *Staphylococcus aureus* (40%)*, Bacillus spp*., (30 %), and (10 %) *E. coli*, as shown in Table (1). There was significant difference between the bacterial growth and Medical Female Students' white coats.

Table 1 bacterial isolates from Medical Female Students' white coats

bacterial isolates	No. (n=50)	%
Coagulase negative Staphylococci	28	56
Staphylococcus aureus	20	40
Bacillus spp	15	30
E. coli	3	10
P value	0.03	

DISCUSSION

White coats traditionally represent dignity tomedical professionals as well as hope and healing to patients (Qaday *et al*, 2015). However, these attires might carry serious pathogens which might lead to morbidity and mortality for both medical professionals and patients (Munoz-Price *et al*, 2012).

S. aureus is part of the human microbial normal flora, and it is found in the throat, gastrointestinal tract and skin, and it is considered as one of the most important pathogenic bacteria, that causing series of infections (Camargo *et al*, 2013).

In the current study, (100 %) of examined white lab coats samples from medical female students contaminated by bacterial agents, and *Coagulase negative Staphylococci* (56%) was the most bacterial isolates obtained.

In our study the results obtained were so similar to the Thaore *et al*, 2016 study in which a total of 20 lab coats of clinicians swabbed from 3 different sites of the lab coat – collar, pocket and cuff, their results showed the pocket was more contaminated than the chest and cuff, and also the most common isolate was Coagulase negative *Staphylococci* followed by *Staphylococcus aureus* and then Gram negative bacteria.

The data from Zambia study reported that out of 107 screened white coats, 94 (88 %) were contaminated with bacteria (Mwamungule *et al,* 2015).

A study done by Naik *et al,* 2016. In India showed that Out of 96 white coats screened, 61 (63.54%) were found to be contaminated and maximum isolates were Coagulase negative *Staphylococci* 32 (52.45%).

The results obtained from studies conducted by Moravvej *et al*., (2013), and Pydi *et al*., (2015) showed that the Coagulase negative *Staphylococci* were the most commonly bacterial isolated.

CONCLUSION

The current study highlights the fact that the white lab coats may act as a vector for transmission of infection, or act as a harbor a bacterial agent; therefore I suggest that the white coats must be washed twice a week to decrease bacterial contamination.

References

Camargo RA, Schimim SC, Alves FBT, Chibinski ACR. (2013). Microbiological evaluation of the effectiveness of an antibacterial brush: an in vivo study. *Rev OdontolUNESP* 42: 54–58.
http://dx.doi.org/10.1155/2015/507890.

Loveday HP, Wilson JA, Hoffman PN, and Pratt RJ. (2007). Public perception and the social and microbiological significance of uniforms in the prevention and control of healthcareassociated infections: an evidence review. *British Journal of Infection Control*, vol. 8, no. 4, pp. 10–21,

Moravvej Z, Fakhar Y, Nasab M, and Askari E. (2013). Study on bacteria associated with White Coats of healthcare workers in two tertiary hospitals, Mashhad, Iran. *J. Med. Bacteriol.,* 2(3, 4): 17-25.

Muhadi SA, Aznamshah NA, S. Jahanfar S. (2007). A cross sectional study on the microbial contamination of the medical student's white coats. *Malaysian Journal of Microbiology,* vol. 3, no.1, pp. 35–38.

Munoz-Price LS, Arheart KL, Mills JP. (2012). Associations between bacterial contamination of health care workers' hands and contamination ofwhite coats and scrubs. *American Journal of Infection Control*, vol. 40, no. 9, pp. e245–e248.

Mwamungule S, Chimana HM, Malama S, Mainda G, Kwenda G and Muma JB. (2015): Contamination of health care workers' coats at the University Teaching Hospital in Lusaka, Zambia: the nosocomial risk. *Journal of Occupational Medicine and Toxicology* 10:34. DOI 10.1186/s12995-015-0077-2.

Naik TB, Upadhya A, Mane V, and Biradar A. (2016). Microbial Flora on Medical Students' White Coat and an Analysis of its Associated Factors: A Cross Sectional Study. *Int.J.Curr.Microbiol.App.Sci 5*(7): 353-363.

Priya H, Acharya S, Bhat M, and Ballal M. (2009). Microbial contamination of the White Coats of Dental staff in the clinical setting. *JODDD*, 3(4): 136-140.

Pydi S, Pachava S, and Sanikommu S. (2015). Microbial contamination of the white coats among preclinical and clinical dental students: A comparative cross-sectional study. *J. Indian Assoc. Public Health Dent.,* 13: 193-6.

Qaday J, Sariko M, Mwakyoma A, Kifaro M, Mosha D, Tarimo R, Nyombi B, and Elichilia Shao E. (2016). Bacterial Contamination of Medical Doctors and Students White Coats at Kilimanjaro Christian Medical Centre, Moshi, Tanzania. *International Journal of Bacteriology.* Article ID 507890, 5 pages

Thaore S, Desai N, Srinidhi SR, Surwade P. (2016). Microbial contamination of Lab Coats while performing Endodontic Treatment. *IIOABJ* | Vol. 7 | 6| 1–6

Uneke CJ, and Ljeoma PA. (2010). The potential for nosocomial infection transmission by White Coats used by physicians in Nigeria: implications for improved patient-safety initiatives. *World Health and Population*, 11(3): 40-54.

****