



Bacterial contamination on Medical Doctors' and Medical Students' white coats at Kilimanjaro Christian Medical Centre in Moshi Tanzania

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Outline

- Background
- Problem
- Justification
- Objectives
- Methodology
- Results
- Discussion
- Conclusion and recommendations
- Limitations
- Acknowledgement

Background

- Transmission of nosocomial infections have been linked to colonization of bacteria on PPE for health care workers.
- *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* among others can be transmitted through direct contact.
- Contamination of health care workers' clothing; including white coats may play a big role toward infection transmission.

(Wong et al, 1991, Gosling et al, 2003, Treacle et al, 2009, Catano et al, 2012:)

Background information cont.....

- White coats can carry strains of bacteria and being potential source of disease transmission .
- The prevalence of hospital acquired infection (HAI) in developed countries varies between 3.5% and 12% .
- Low-and middle income countries varies between 5.7% and 19.1%.

(Loh et al,2000,WHO, 2002 ,Jroundi et al,2007, Sepideh et al,2011).

Statement of the problem

- The burden of HAI is more critical in developing countries.
- Overcrowding of patients in health facilities.
- Understaffing which result in inadequate infection control practices.
- lack of implementation of infection control policies.

(United et al,2004,Sepideh et al,2011)

Study objectives:

- To determine the type of bacterial contaminant present on the white coats of medical doctors and medical students at KCMC.
- To determine factors associated with bacterial contamination on medical doctors and students white coats.

METHODOLOGY

- Cross sectional study
- Specimen was collected from mouth pockets of white coat.
- Study was conducted at KCMC Moshi Tanzania.
- **Study population:** Medical doctors and medical students.
- Moisten sterile swabs with normal saline were used.
- Swabs sent to the Laboratory in a transport media.
- BA and MCA were used to cultivate microorganisms overnight at 37°C
- Isolated microorganisms undergone different biochemical tests and what type of category i.e. gram or gram negative.

Results

- 180 participants were enrolled into the study.
- Out of 180 participants involved 118 (65.6%) were men.
- 120 (66.67%) Participants were medical students.
- Participants from non-surgical departments were 100 (55.56%).
- 150 (83.83%) participants were working in the ward departments.
- A total of 132 bacterial isolates were detected.
- *Staphylococcus aureus* 61/132 (46.20%) was the most common isolate, followed by coagulase negative Staphylococci 52/132 (39.4%), mixed growth 12/132 (9.1%), *Pseudomonas aeruginosa* 5/132 (3.8%) and *E. coli* 2/132 (1.5%).

Organisms isolated white coats

Table 1

| S/No | Organism(s) | Number of isolates | Percentage of isolates |
|------|--|--------------------|------------------------|
| 1 | Staphylococcus aureus | 61 | 46.2% |
| 2 | Coagulase negative staphylococci | 52 | 39.4% |
| 3 | Staphylococcus aureus +Coagulase negative staphylococci | 6 | 4.5% |
| 4 | Pseudomonas aeruginosa | 5 | 3.8% |
| 5 | P. aeruginosa +Coagulase negative staphylococci +Staphylococcus aureus | 3 | 2.3% |
| 6 | Escherichia Coli | 2 | 1.5% |
| 7 | Staphylococcus aureus + Pseudomonas aeruginosa | 1 | 0.8% |
| 8 | Coagulase negative Staphylococci + Pseudomonas | 2 | 1.5% |

Table 2: Social demographic characteristics of participants (N=180)

| Variable | N (%) |
|--|-------------|
| Sex | |
| Male | 118 (65.6) |
| Female | 62 (34.4) |
| Staff position | |
| Medical doctors | 60(33.33) |
| Medical students | 120 (66.67) |
| Department | |
| Surgical | 80 (44.44) |
| No surgical | 100 (55.56) |
| Duty station | |
| Inpatients | 150 (83.33) |
| Outpatients | 30 (16.67) |
| White coats storage after working hours | |
| Hospital | 28 (15.56) |
| Home/Hostel | 152 (84.44) |
| Wearing coats outside clinical area | |
| Yes | 8 (4.44) |
| No | 172 (95.56) |

Table 3 :Factors associated with the detection of pathogens in clinical coats among study participants at KCMC Moshi Tanzania 2014.

| Variables | Pathogens detected | | Crude OR (95% CI) | P | Adjusted OR ^a (95%CI) | P ^μ |
|---|--------------------|-------------|----------------------|---------|-------------------------------------|----------------|
| | Yes n (%) | No n (%) | | | | |
| Gender | | | | | | |
| Female | 44 (31.4) | 18 (45.0) | 1.8 (0.9 – 3.7) | 0.114 | 1.4 (0.7 – 3.10) | 0.354 |
| Male | 96 (68.6) | 22 (55.0) | | | | |
| Position(level) | | | | | | |
| Medical student | 94 (67.1) | 26 (65.0) | 0.9 (0.4 – 1.9) | 0.800 | 1.3 (0.6 – 2.8) | 0.576 |
| Medical doctor | 46 (32.9) | 14 (35.0) | | | | |
| Area of residence | | | | | | |
| Off-campus | 114 (81.4) | 30 (75.0) | 0.7 (0.3 – 1.6) | 0.372 | 1.1 (0.4 – 2.7) | 0.903 |
| In-campus | 26 (18.6) | 10 (25.0) | | | | |
| Working specialty | | | | | | |
| Surgical | 74 (52.9) | 6 (15.0) | 0.2 (0.1 – 0.4) | < 0.001 | 0.2 (0.1 – 0.5) | < 0.001 |
| Non-surgical | 66 (47.1) | 34 (85.0) | | | | |
| Duty station | | | | | | |
| In-patients | 112 (80.0) | 38 (95.0) | 4.8 (1.1 – 20.9) | 0.039 | 3.2 (0.7 – 14.9) | 0.132 |
| Out-patient | 28 (20.0) | 2 (5.0) | | | | |
| Days to worn coat since last washing | | | | | | |
| < 3 days | 94 (67.2) | 26 (65.0) | 0.7 (0.3 – 1.5) | 0.376 | 0.6 (0.2 – 1.3) | 0.205 |
| 3 – 7 days | 36 (25.7) | 14 (35.0) | | | | |
| > 7 days | 10 (7.1) | 0 (0.0) | | | | |
| Wearing a white coat outside clinical areas | | | | | | |
| Yes | 6 (4.3) | 2 (5.0) | 1.2 (0.2 – 6.1) | 0.847 | 1.3 (0.2 – 7.3) | 0.802 |
| No | 134 (95.7) | 38 (95.0) | | | | |
| Location for coat storage | | | | | | |
| Hospital area | 22 (15.7) | 6 (15.0) | 0.9 (0.4 – 2.5) | 0.912 | 0.6 (0.2 – 1.8) | 0.412 |
| Home/Hostel | 118 (84.3) | 34 (85.0) | | | | |

RR= Relative Risk; CI = Confidence Interval

^μEstimated from the logistic regression model with Wald type P-value.

^a Adjusted for gender, working specialty and duty station.

Days since last wash of clinical coat (N=180)

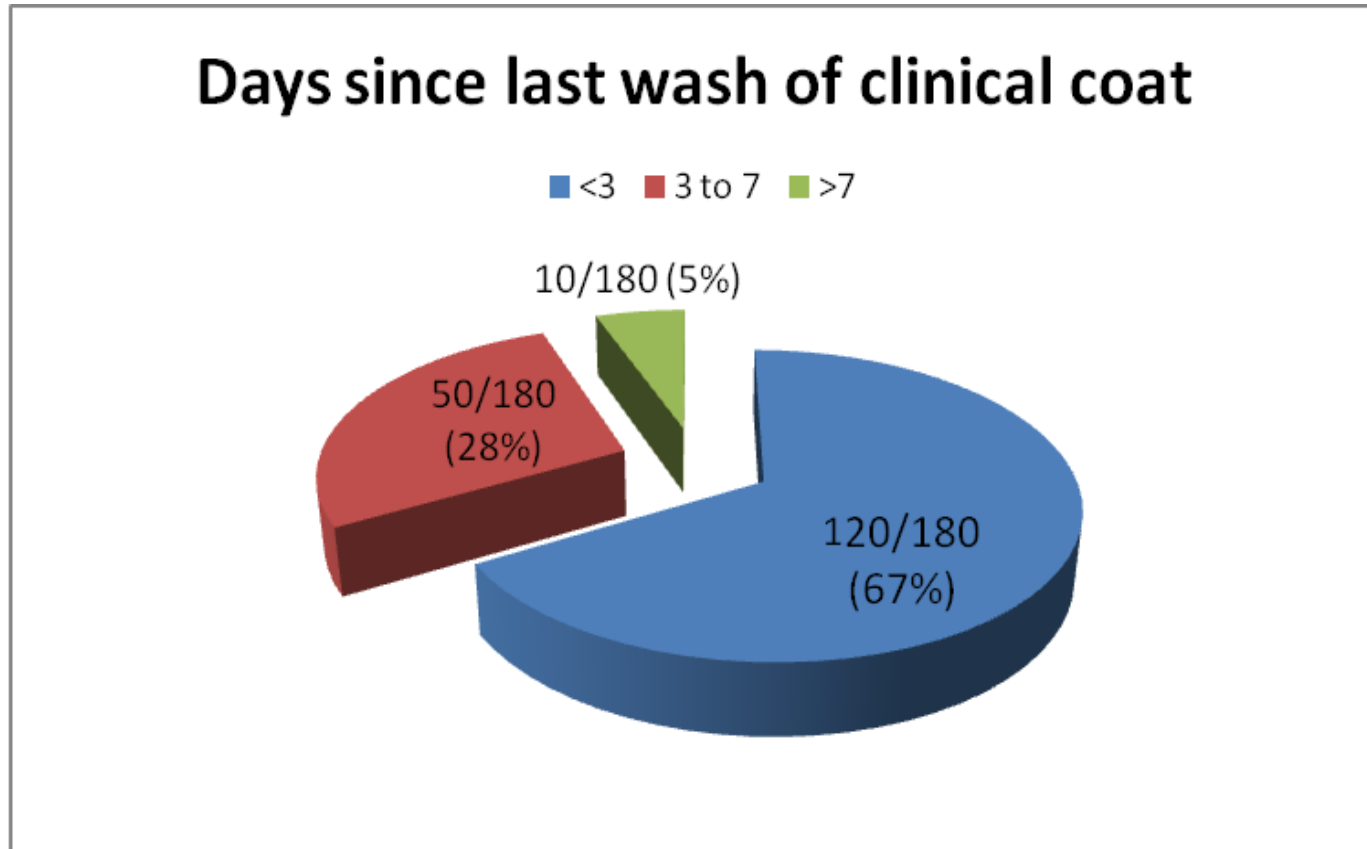


Figure 1

DISCUSSION:

- Most of the white coats were used less than 3 days before another round of washing but 132/180 (73.33%) harbored bacterial contamination.
- The level of bacterial contamination in the current study was similar with a study in Nigeria by Uneke which showed 91.3% of white coats had bacterial contamination, diptheroids followed by *Staphylococcus aureus*.
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- The *Staphylococci* species are the most organisms isolated by every researcher especially *Staphylococcus aureus*.
- It seems that *Staphylococcus aureus* was the common organism found in each study even in KCMC hospital Moshi Tanzania whereby the current study confirmed the previous findings

(Banu et al,2012,Muhadi et al,2007,Treacle et al,2009,Uneke et al,2010)

Conclusion and recommendations:

- White coats are potential source of cross infection which harbor a bacterial agent.
- We suggest white coats to be washed twice a week.
- White coats should not be brought to non-clinical areas.
- IPC protocol is very important aspect to be insisted especially on white coats.

Limitations

- Biased respondent from participants
- Study was conducted at one facility

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