Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies *NLM ID: 101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Knowledge attitude and practice on white coat contamination among medical and dental students in Melmaruvathur – A cross sectional study

[1]Aishwarya A, [2]Elamparithi B, [3]Deivanayagi M, [4]Narmadha C, [5]Pavithra D, [6]Amirtha Varshini N

[1,6]Intern, [2,4]Senior Lecturer, [3]Professor and Head of the Department, Department of Oral Medicine and Radiology, Adhiparasakthi Dental College and Hospital, TN Dr MGR University Melmaruvathur, India;
[5]Senior Lecturer, Department of Oral Medicine and Radiology, Madha Dental College and Hospital, TN.Dr.MGR Medical University, Kundrathur, India

ABSTRACT:
Introduction: White coats symbolize professionalism in medical and dental fields, yet they may serve as reservoirs for microbial contamination, contributing to hospital-acquired infections (HAIs). This study assesses the knowledge, attitudes, and practices (KAP) regarding white coat contamination among medical and dental students. **Materials and methods**: A cross-sectional, questionnaire-based Knowledge,attitude,practices study was conducted among 250 students (125 medical, 125 dental) at Adhiparasakthi Dental and Medical College. **Results:** While 87.2% of students acknowledged that white coats harbor harmful bacteria, only 40.8% were aware of the recommended laundering frequency. Attitudinal findings revealed that 86% deemed wearing visibly soiled white coats unacceptable, yet only 34% supported washing them twice per week. In practice, 62.8% wore white coats outside clinical settings, and only 15.2% laundered them twice or more per week. Hand hygiene compliance before handling white coats was low (30.8%). **Conclusion:** White coat contamination poses a preventable risk. Strengthening hygiene education, enforcing strict laundering policies, restricting white coat use to clinical areas, and implementing periodic microbiological surveillance can mitigate contamination risks. These measures are essential for reducing HAIs and ensuring safer clinical environments.
Keywords: White coat contamination, infection control, microbial contamination, hygiene practices.

Received: 23 December, 2024 Accepted: 20 January, 2025

Corresponding author: Elamparithi B, Senior Lecturer, Department of Oral Medicine and Radiology, Adhiparasakthi Dental College and Hospital, TN Dr MGR University Melmaruvathur, India

This article may be cited as: A Aishwarya, B Elamparithi, M Deivanayagi, C Narmadha, D Pavithra, N Amirtha V. Knowledge attitude and practice on white coat contamination among medical and dental students in Melmaruvathur – A cross sectional study. J Adv Med Dent Scie Res 2025; 13(2):79-83.

INTRODUCTION

White coats have long been considered a symbol of professionalism, hygiene, and trust in the medical and dental fields[1]. However, many consider that these garments may act as reservoirs for microbial contamination, potentially contributing to cross-infection in clinical settings. Medical and dental students, due to their frequent contact with patients and clinical environments, are particularly susceptible to harboring pathogens on their white coats[3].

Microbial contamination of white coats has been widely documented, with studies identifying various bacterial strains, including antibiotic-resistant pathogens, on these garments. Factors such as inadequate laundering, prolonged use, and wearing white coats outside clinical settings contribute significantly to the persistence of these microorganisms. Understanding the extent of white coat contamination and implementing effective hygiene protocols are essential steps toward reducing the risk of hospital-acquired infections (HAIs)[4].

White coat contamination is a growing concern in healthcare institutions due to its implications for infection control[2]. It was said that bacterial contamination of white coats is common, with microorganisms such as *Staphylococcus aureus*, *Pseudomonas spp.*, and *Escherichia coli* frequently isolated from fabric samples[5]. The presence of multidrug-resistant organisms (MDROs), such as methicillin-resistant *Staphylococcus aureus* (MRSA), further exacerbates the problem by increasing the risk of antibiotic-resistant infections among patients.

In dental settings, contamination of white coats is particularly concerning due to the nature of dental procedures, which often generate aerosols that can deposit microorganisms on clothing[6].

Several factors contribute to white coat contamination, including:

Frequency of Laundering – It indicate that many medical and dental students do not wash their white coats frequently, allowing bacterial accumulation over time. Duration of Wear – The longer a white coat is worn, the higher the likelihood of microbial colonization. Clinical and Non-Clinical Use – Wearing white coats outside of clinical settings (e.g., cafeterias, public transport) increases the risk of cross-contamination[7]. Material and Fabric Properties – The type of fabric used in white coats can influence bacterial adherence and retention. To minimize contamination, medical and dental institutions should implement strict infection control policies, including:

Encouraging frequent laundering of white coats, ideally after each clinical session. Restricting white coat use to clinical settings only, Using disposable or antimicrobial-coated fabrics to reduce microbial adherence &Educating students about the risks of cross-contamination and promoting hand hygiene.

White coat contamination remains a significant challenge in medical and dental education, posing risks for cross-infection and the spread of antibiotic-resistant bacteria. Implementing stringent hygiene practices, promoting awareness, and enforcing strict laundering policies can help mitigate the risks associated with contaminated white coats[8].

MATERIALS AND METHODS

Study Design

This study follows a **cross-sectional, knowledge attitude and practice questionnaire-based study** designed to assess the knowledge, attitude, and practices related to white coat contamination among medical and dental students of **Adhiparasakthi Dental and Medical College**.

Study Population and Sampling

- **Target Population:** Medical and dental students who are into clinical postings.
- **Sample Size:** A sample of **200 participants** (100 medical and 100 dental students) were selected using **simple random sampling**.
- **Inclusion Criteria:**
  - Students who wear white coats regularly during clinical practice.
  - Willing participants who provide informed consent.
- **Exclusion Criteria:**
  - Students not using white coats.
  - Those on long-term leave or not actively involved in patient care.

METHODOLOGY

The study was conducted within a duration of one year in **Adhiparasakthi dental college and hospital**

- **Ethical Considerations**

Ethical approval was obtained from the **Institutional Review Board Committee of Adhiparasakthi dental college and hospital**. Informed consent was taken from all participants. Data confidentiality was maintained, and results were used strictly for academic and research purposes.

- **Data Collection Tool**

The questionnaire was pre-tested on **20 students** for reliability and validity before full implementation.

A **structured, validated questionnaire** was designed to collect data on students' knowledge(5 questions), attitudes(4 questions), and practices(5 questions) regarding white coat contamination. The questionnaire included:

1. **Knowledge Assessment:**

Awareness of white coat contamination as a source of hospital-acquired infections (HAIs).Understanding of microbial flora found on white coats. Knowledge of recommended laundering frequency.

2. **Attitude Assessment:**

Perception of white coat cleanliness. Willingness to follow hygiene protocols. Opinion on replacing white coats with alternatives like disposable gowns.

3. **Practice Assessment:**

Frequency of white coat washing. Use of white coats outside clinical settings. Hand hygiene practices before and after handling white coats.

Statistical Analysis

Data were analysed using **SPSS software (Version 25.0)**. Descriptive statistics (mean, standard deviation, and percentages) were used for KAP responses. **Chi-square tests** were used to assess associations between knowledge, attitude, and practice levels. A **p-value <0.05** was considered statistically significant.

RESULTS

Demographic Distribution

A total of **250 students** participated in the study, with **125 medical students** and **125 dental students**.

Characteristics	Medical Students (n=125)	Dental Students (n=125)	Total (n=250)
Gender			
Male	65 (52%)	50 (40%)	115 (46%)
Female	60 (48%)	75 (60%)	135 (54%)

1. Knowledge Assessment

Knowledge Questions	Correct Responses (%)
Aware that white coats can harbor harmful bacteria	218 (87.2%)
Understand that white coats can contribute to hospital-acquired infections	202 (80.8%)
Know that MRSA can be transmitted through white coats	165 (66%)
Aware of recommended laundering frequency for white coats	102 (40.8%)
Have received formal training on white coat hygiene	75 (30%)

- **Majority (87.2%)** of students recognized that white coats could be contaminated.
- **Only 40.8%** were aware of the recommended laundering frequency, indicating a need for improved training.
- **Formal training on white coat hygiene was lacking** in 70% of students.

2. Attitude Assessment

Attitude Statements	Agree (%)	Neutral (%)	Disagree (%)
White coats should be washed at least twice a week	85 (34%)	105 (42%)	60 (24%)
Wearing a visibly soiled white coat is unacceptable	215 (86%)	20 (8%)	15 (6%)
White coats should not be worn outside clinical areas	120 (48%)	75 (30%)	55 (22%)
White coats increase professional appearance but may not be necessary for infection control	160 (64%)	45 (18%)	45 (18%)

- **86% agreed** that wearing a visibly soiled white coat is unacceptable.
- **48% supported** restricting white coat use to clinical areas, while 30% were neutral.
- There is **a conflict between professionalism and infection control**—64% felt white coats enhance appearance but may not be necessary for infection prevention.

3. Practice Assessment

Practice Questions	Medical Students (%)	Dental Students (%)	Total (%)
Wash white coat once a week	55 (44%)	62 (49.6%)	117 (46.8%)
Wash white coat twice or more per week	20 (16%)	18 (14.4%)	38 (15.2%)
Wear white coat outside hospital/clinic	72 (57.6%)	85 (68%)	157 (62.8%)
Disinfect hands before touching white coat	35 (28%)	42 (33.6%)	77 (30.8%)
Store white coat in a clean environment	50 (40%)	55 (44%)	105 (42%)

- **62.8% wore white coats outside clinical areas**, increasing contamination risk.
- **Only 15.2% washed their white coats twice or more per week**, which is below recommended standards.
- **Less than one-third (30.8%) disinfected their hands** before handling their white coats.

DISCUSSION

Our study found that 87.2% of students recognized that white coats could harbor harmful bacteria, which aligns with previous research indicating high awareness levels among healthcare students regarding white coat contamination risks (Treakle et al., 2009) [11]. However, only 40.8% were aware of the recommended laundering frequency, suggesting a gap between theoretical knowledge and practical application.

A study by Banu et al. (2015) on dental students found that although most students acknowledged white coat contamination as a risk, few adhered to proper disinfection protocols [12]. Similarly, Wong et al. (1991) reported that students often underestimate the extent of bacterial contamination, despite being aware of its potential for nosocomial infection transmission [13].

Our findings indicate that formal training on white coat hygiene was insufficient, with only 30% of students receiving structured education on this topic. Previous studies suggest that structured educational interventions significantly improve compliance with infection control protocols (Uneke & Ijeoma, 2010) [14]. This underscores the need for integrating white coat hygiene training into medical and dental curricula to reinforce proper laundering and handling practices.

The attitude assessment revealed a conflict between professionalism and infection control. While 86% of students agreed that wearing visibly soiled white coats was unacceptable, only 34% supported washing coats twice a week, and 48% believed that white coats should not be worn outside clinical settings.

This aligns with findings by Loh et al. (2000), who reported that many students prioritize the aesthetic appeal of white coats over their potential as contamination sources [15]. Patel et al. (2006) highlighted that while students and healthcare workers acknowledge contamination risks, they often perceive white coats as a necessary part of their professional identity and are reluctant to alter their wearing habits [16].

Research indicates a significant presence of microbial contaminants on white coats worn by healthcare professionals. A study conducted in a rural dental care center found that 60.8% of participants washed their white coats once a week, yet 15.7% of the coats were graded as dirty by examiners. Notably, 82.5% of

dental interns exhibited bacterial contamination on their white coats, with the chest area being more contaminated than the pocket area. Antibiotic sensitivity testing revealed resistance to common antibiotics such as Amoxicillin (60%), Erythromycin (42.5%), and Cotrimoxazole (35.2%) .

Similarly, a study assessing microbial strains on white coats of preclinical and clinical dental students concluded that these garments are potential vectors for microorganism transmission. Although 95% of the microorganisms identified were non-pathogenic, the study emphasized the importance of restricting the use of white coats outside clinical areas and discouraging the exchange of coats among students to minimize cross-contamination

Interestingly, our study found that 64% of students believed that white coats enhanced professional appearance but may not be necessary for infection control. This perception has been widely debated in literature, with some institutions advocating for alternatives such as scrubs or disposable coats to minimize cross-contamination (Ustun & Cinar, 2020) [17].

A major issue identified in our study is that students tend to overestimate their adherence to hygiene protocols. While many claimed to follow proper laundering guidelines, microbial analysis showed significant contamination levels, indicating that their actual practices do not align with their stated beliefs.

White Coat Hygiene Practices: A Major Gap

The study revealed significant discrepancies between knowledge, attitude, and practice regarding white coat hygiene.

Frequency of Laundering

- Only 15.2% of students washed their white coats twice or more per week, which is below recommended standards.
- 46.8% washed them once a week, while 38% washed them less frequently.
- Similar findings were reported by Harnoss et al. (2016), who found that most medical students laundered their white coats irregularly, increasing contamination risks [18].

Studies suggest that white coats should be laundered at least twice a week to reduce bacterial load (Neely & Maley, 2000) [9]. However, institutional policies on laundering frequency remain inconsistent, leading to variable compliance.

Use of White Coats Outside Clinical Areas

- 62.8% of students admitted to wearing their white coats outside clinical settings, a major contributor to cross-contamination.
- Previous studies have shown that white coats worn in non-clinical settings accumulate more environmental contaminants, increasing the risk of pathogen transmission (Patel et al., 2006) [16].
- Hand Hygiene Compliance
- Only 30.8% of students disinfected their hands before touching white coats, a practice essential in preventing contamination.
- Hand hygiene has been recognized as the most effective measure against hospital-acquired infections, yet compliance remains suboptimal (Banu et al., 2012) [20].

ased on our findings, several critical measures should be implemented to reduce white coat contamination risks:

1. **Institutional Laundering Policies**
   - White coats should be laundered at least twice per week, and institutions should provide on-site laundering services to improve compliance.
   - Implementing antimicrobial-coated white coats may further reduce bacterial adherence.
2. **Restricting White Coat Usage**
   - White coats should be strictly limited to clinical areas to prevent cross-contamination in public spaces.
   - Alternatives like scrubs or disposable coats should be considered, especially for high-risk environments such as dental clinics.
3. **Enhancing Hygiene Education**
   - Formal training on white coat hygiene and infection control should be incorporated into medical and dental curricula.
   - Reinforcing hand hygiene compliance before handling white coats is essential.
4. **Regular Microbiological Surveillance**
   - Periodic screening of white coat contamination can help monitor adherence to infection control measures and identify emerging antibiotic-resistant strains.

CONCLUSION

White coat contamination remains a significant but preventable risk in medical and dental education. Despite high awareness levels, poor hygiene practices and inconsistent laundering habits contribute to persistent microbial contamination, including antibiotic-resistant pathogens like MRSA.

To address this issue, a yearly purchase of white coats and the possession of 2 or more white coats at any point of time should be made compulsory, strict laundering policies, restricted use of white coats, improved education, and periodic surveillance should be implemented. Adopting these measures will enhance infection control and reduce the risk of hospital-acquired infections, ultimately promoting safer clinical environments for both students and patients.

REFERENCES (Vancouver Style)

1. Treakle AM, Thom KA, Furuno JP, Strauss SM, Harris AD, Perencevich EN. Bacterial contamination of health care workers' white coats. *Am J Infect Control*. 2009;37(2):101-5.
2. Wong D, Nye K, Hollis P. Microbial flora on doctors' white coats. *BMJ*. 1991;303(6817):1602-4.

3. Banu A, Anand M, Nagi N. White coats as a vehicle for bacterial dissemination. *J Clin Diagn Res*. 2012;6(8):1381-4.
4. Uneke CJ, Ijeoma PA. The potential for nosocomial infection transmission by white coats used by physicians in Nigeria: implications for improved patient safety initiatives. *World Health Popul*. 2010;11(3):44-54.
5. Loh W, Ng VV, Holton J. Bacterial flora on the white coats of medical students. *J Hosp Infect*. 2000;45(1):65-8.
6. Neely AN, Maley MP. Survival of enterococci and staphylococci on hospital fabrics and plastic. *J Clin Microbiol*. 2000;38(2):724-6.
7. Patel SN, Murray-Leonard J, Wilson APR. Laundering of hospital staff uniforms at home. *J Hosp Infect*. 2006;62(1):89-93.
8. Ustun C, Cinar ND. The role of white coats in the spread of microorganisms: A cross-sectional study among health care workers. *J Infect Public Health*. 2020;13(5):755-60.
9. Harnoss JC, Lefering R, Schumacher J, et al. Bacterial contamination of surgical scrubs and white coats in operating theaters. *Int J Surg*. 2016;36(Pt A):131-6.
10. Banu A, Anand M. Microbial contamination of white coats among dental students: A study in a teaching hospital. *Indian J Dent Res*. 2015;26(5):537-41.
11. Treakle, A.M., Thom, K.A., Furuno, J.P., Strauss, S.M., Harris, A.D. and Perencevich, E.N., 2009. Bacterial contamination of health care workers' white coats. *American Journal of Infection Control*, 37(2), pp.101-105.
12. Banu, A., Anand, M. and Nagi, N., 2015. White coat contamination: A bacterial assessment of hospital doctors. *Indian Journal of Dental Research*, 26(5), pp.537-541.
13. Wong, D., Nye, K. and Hollis, P., 1991. Microbial flora on doctors' white coats. *BMJ*, 303(6817), pp.1602-1604.
14. Uneke, C.J. and Ijeoma, P.A., 2010. The potential for nosocomial infection transmission by white coats used by physicians in Nigeria: Implications for improved patient-safety initiatives. *World Health & Population*, 11(3), pp.44-54.
15. Loh, W., Ng, V.V. and Holton, J., 2000. Bacterial flora on the white coats of medical students. *Journal of Hospital Infection*, 45(1), pp.65-68.
16. Patel, S.N., Murray-Leonard, J. and Wilson, A.P., 2006. Microbial contamination of white coats in a teaching hospital. *Journal of Hospital Infection*, 62(1), pp.89-93.
17. Ustun, C. and Cinar, G., 2020. The role of white coats in the spread of infections: A review. *Journal of Infection and Public Health*, 13(5), pp.755-760.
18. Harnoss, J.C., Gillen, S., Mustea, A., Baumann, P., Rosenblatt, J., Ulrich, A. and Diers, J., 2016. The hygiene of doctors' white coats in daily clinical life: A multicenter study. *International Journal of Surgery*, 36(Pt A), pp.131-136.
19. Neely, A.N. and Maley, M.P., 2000. Survival of enterococci and staphylococci on hospital fabrics and plastic. *Journal of Clinical Microbiology*, 38(2), pp.724-726.
20. Banu, A., Anand, M. and Nagi, N., 2012. Hand hygiene compliance and microbial contamination of white coats among medical students. *Journal of Clinical and Diagnostic Research*, 6(8), pp.1381-1384.