

Microbial Flora on Aprons of Dental Healthcare Professionals

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Abstract:

Objective : To determine the microbial flora present on aprons of dental healthcare professionals in a dental college & hospital. **Materials and methods:** Total 100 aprons of dental healthcare professionals were included in the study. An informed consent and questionnaire was taken. A cross sectional survey was designed with bacterial contamination of aprons in three predetermined areas (chest, pocket, sleeves). **Result:** It was observed that 66% of dental healthcare professionals used to wash their aprons once in a week with self grading by the participants, 92% of aprons were moderately clean. 71% of dental health care professionals used to wear their aprons while eating and at nonclinical areas. 88% of chest, 84% of pocket and 71% of sleeves of aprons showed growth of microorganisms. Staphylococcus aureus was the most predominant isolate followed by Bacillus species and other all isolates were either environmental microorganisms or skin commensals. Methicillin Resistant Staphylococcus aureus (MRSA) was also found, which was a matter of concern. **Conclusions:** Aprons are a potential source of cross infection even in dental settings. It is recommended that guidelines should be there for handling and washing procedures of aprons.

Key words: Aprons, Staphylococcus aureus, Bacillus species, MRSA

Introduction:

Apron is a protective coat of Dental as well as Medical healthcare professionals to protect their regular clothes from contamination. It is the standard of professionalism and respected dress of doctors or healthcare professionals.¹ Aprons are known to be contaminated with pathogenic bacteria. There has always been a concern about the risk of transmitting pathogenic bacteria in hospitals.² Conclusion of many studies, stated that white coats of doctors', nurses' uniform and other hospital garments, may play a part in transmission of pathogenic bacteria in hospital settings.³⁻⁸ Many articles on clothing and equipment such as stethoscope, otoscope, thermometer and doctors' white coat have been noted to carry potential pathogen.¹ Students are having habit of wearing their aprons while eating their meals at canteen, library and also at nonclinical and non practical areas. Healthcare professionals also sometimes left their aprons on chairs or tables.² In case of dental healthcare professionals aprons are contaminated with splashes of blood, saliva and aerosols while doing the dental care which may be the important risk factor for infection with various organisms.^{1,9} The aim of the present study is to determine the microbial flora on dental healthcare professional's aprons in order to know the pathogenic microorganisms.

Materials and methods:

The cross sectional study was conducted in Sinhgad Dental College & Hospital, Pune, Maharashtra, India. All the participants were informed about the study and necessary informed consent along with a questionnaire was taken. Total 100 aprons of dental healthcare professionals (interns, PG students, UG students along with dental faculties) were

included in the study. All the aprons were half sleeved and made up of cotton material. A questionnaire was given to the participants which include, frequency of washing, practice of exchanging, cleanliness and spillage and handling.

Samples from aprons were taken by using sterile saline-moistened cotton swabs from the three predetermined areas i.e. chest area, upper part of pocket and sleeves of aprons. After collection, swabs were cultured on blood agar and MacConkeys' agar. The agar plates were then incubated at 37°C for 24 hours. The culture plates were examined for growth on next day and were identified by standard laboratory methods.¹⁰ Methicillin resistance in Staphylococcus species were tested with the help of cefoxitin disc and oxacillin disk (Hi-Media Ltd, Mumbai, India) on Mueller Hinton agar by using CLSI guidelines.¹¹

Statistical analysis: Number and percentage of the participants, factors related to cleanliness of apron and presence of different microorganisms was calculated. Cross tabulation was done to analyze the association between presence of microorganisms and the factors related to cleanliness of apron. The comparison was done using Chi-square test and Fisher exact test. P-value of < 0.01 was considered as statistically significant.

Result:

Out of total participants of the study 36% and 64% were male and female respectively. From all participants 82% participants were students and 18% were faculty. Majority of participants washed their aprons once in a week (66%) and 71% of participants were having practice using their aprons while eating. The habit of exchanging the aprons was seen only among 7% of participants. With self grading the cleanliness of aprons was observed as moderately clean by 92% of the participants. 51% participants were stated spillage by wax, aerosols, splashes of blood, saliva and chemicals. 49% of dental healthcare professionals used to keep their aprons on chairs, while 36% of them used to keep aprons in

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Table 1: Frequency distribution of the participants' response according to the study variables

Variables		n(%)
Participants	Faculty	18(18)
	Students	82(82)
Gender	Male	36(36)
	Female	64(64)
Frequency of washing	Weekly once	66(66)
	Weekly twice	27(27)
	Weekly thrice	7(7)
Practice of exchange	Yes	7(7)
	No	93(93)
Cleanliness	Moderately clean	92(92)
	Dirty	4(4)
	Clean	4(4)
Spillage	Yes	51(51)
	No	49(49)
Usage of apron while eating	Yes	71(71)
	No	29(29)
Place of keeping apron	Table	8(8)
	Chair	49(49)
	Cupboard	36(36)

cupboard and only 8% of them used to keep aprons on table.

Association between presence of microorganisms and the factors related to cleanliness of apron was compared using Chi-square test and Fisher's exact test. No statistically significant association between overall presence of microbial flora was observed when compared with different gender, spillage, frequency of washings, practice of exchanging, place of keeping aprons.

Table 2: Frequency distribution of aprons showing Growth of microorganisms

Organisms	No & % of aprons having microorganisms			
	Chest	Pocket	Sleeves	Apron*
Methicillin resistant Staphylococcus aureus (MRSA)	5(5)	2(2)	4(4)	10(10)
Staphylococcus aureus	50(50)	55(55)	37(37.4)	86(86)
Coagulase negative Staphylococci	33(33)	25(25)	22(22)	62(62)
Diphtheroides	5(5)	7(7)	1(1)	12(12)
Bacillus species	16(16)	12(12)	10(10)	33(33)
Pseudomonas stutzeri	13(13)	19(19)	6(6)	30(30)
Serratia	0(0)	4(4)	3(3)	6(6)
Total organisms present	88(88)	84(84)	71(71)	90 (90)

*Calculated by counting the presence of microorganisms in any of the three sites (chest, sleeves or pocket) from each apron.

Table 2 shows frequency distribution of aprons showing Growth of microorganisms. As per Table 2, 88% of chest of aprons, 84% of pockets of aprons and 71% of sleeves of

aprons showed growth of different organisms. Gram positive organisms were the most predominant organisms found on aprons. Small percentages of Gram negative organisms were also isolated from some aprons.

Discussion :

This study was done to determine microbial flora on aprons of dental health care professionals in a dental college and hospital. Staphylococcus aureus was the most common type of organisms in 86% of aprons. These findings are similar to study conducted by SA Mohadi et al.² The second most common organism was Bacillus species (Table 2). Gram negative bacilli and other forms of microbes are considered as environmental microorganisms with no clinical significance and skin commensals such as coagulase negative Staphylococci and diphtheroid species, which is consistent with previous studies.^{1,2,3,12,13} Of the S. aureus isolated 10% were Methicillin-resistant S. aureus (MRSA). The MRSA has emerged as significant bacteria in hospital acquired infection. According to the Centers for Disease Control and Prevention, MRSA is the cause of more than 60% of all hospital infections in United States.^{14,15,16} Because of frequent dermal contact, dental health care professionals' aprons can harbor these resistant bacteria.¹⁴

Conclusions: Aprons are potential source of cross infection even in dental settings. Hence to reduce bacterial contamination carried by dental healthcare professionals' aprons, there should be a ban on wearing of aprons in nonclinical areas such as canteen, classroom and library. It is recommended that guidelines should be there for handling and washing procedures of aprons.

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