

## Study Of Microbiota Inside The Automobile Cars.

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**Abstract:** Introduction :The bacteria are transmitted through contact, inhalation, ingestion, inoculation etc . The health care professionals are aware of preventive measures but unaware of most widely used cars as an inanimate/fomite in spite of all preventive measures, the respiratory and skin infections are prevalent in health care professionals , the present study is concerned with the isolation of pathogenic microbiota inside the cars. Material Method : Total 30 cars are include in the study. The samples were collected by swab method in Department of General Pathology & Microbiology, Sinhgad Dental College and Hospital Pune. Result :The study revealed that the pathogenic microbiota were found in the cars especially Methicillin resistant Staphylococcus aureus. Discussion :These microbes are documented as the potential source of respiratory , skin , soft tissue, urinary tract infection. To conclude the cars needs to be cleaned frequently with disinfectants. [Saxena R et al NJIRM 2013; 4(1) : 34-37]

**Key Words:** Infection, transmission, cars, inanimate/fomite, Methicillin resistant Staphylococcus aureus, disinfectant

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**Introduction:** Cars are the most widely used mode of transportation. People spend lot of time travelling in cars. Due to fast paced lives it has become a necessity to travel in cars. The amount of time spent in cars has increased compared to what it was before which makes it the safest haven where ever you wanted to go. But unfortunately people are not particular about keeping their cars as clean as their homes. Eating food, drinks, air pollution, sock passengers, etc are all factors that result in an unhygienic environment within the car.<sup>1,2,3</sup>

A dirty car due to spillages may become the breeding ground for microorganisms responsible for various health problems. Wet carpet kept for natural drying becomes conducive to multiply and propagate harmful microbes that can cause various illnesses like skin infection, severe nausea and diarrhea.

Microorganisms without difficulty obtain place to remain viable in various inanimate objects like automobile cars. The microbes present in the soil and dust may enter into the vehicle through animals or the foot wares of passengers.<sup>4,5,6</sup> Maintaining good hygiene within the cars is extremely crucial, especially for people travelling with small kids. The dash board, the steering wheel and the gear are the most

commonly touched areas within the car, and it is very important that they are kept clean. Recent studies have revealed that eating in cars is just as bad as eating within the toilet.<sup>7,8,9</sup>

Very few studies have been conducted on the pathogens within the cars. It has not been given due importance. People suffering from car sickness, dizziness, nausea etc while driving is widely common issue in worldwide. A common man is not aware of the possible risk of disease due to pathogens in cars. Dr. Anthony Hilton stated that though many species of microorganism are harmless but some can cause unpleasant health illnesses.<sup>10</sup>

The aim of the present study was to find out contamination by various pathogens in automobile cars used by the private cars driven by health professionals and different sects of users from the general public.

**Materials and Methods:** The present study was conducted in Department of General Pathology & Microbiology, Sinhgad Dental College and Hospital Pune. The study was approved by the institutional research board and a necessary informed consent was taken from the participants. The study period was between June 2011 to December 2011.

Total 30 cars were included in the present study from dental professionals and commercial persons which were equally divided. The samples were collected by swab method. The sterile swab dipped in sterile normal saline from following areas from each car-

1. Air blower
2. Dashboard
3. Gear stick
4. Door handle
5. Steering wheel
6. Driver's seat

After collection the swabs were plated onto the blood agar, MacConkey agar plates and incubated overnight at 37°C for 48 hours. After 48 hour incubation plates were observed for the presence of growth. Identification of the isolates were identified by colony morphology, Gram stain and standard biochemical tests.

The isolates were further subjected to antibiotic sensitivity testing by Kirby Bauer disc diffusion method on Muller Hinton agar plates. The antibiotics used were ampicillin, penicillin, cefotaxime, imipenem, gentamycin. Staphylococcus aureus were tested for methicillin resistance by cefoxitin disc. All the discs used were procured from Hi-Media.

**Results:** All cars showed the presence of growth of microorganisms. Table 1 shows that the number of pathogens from the non doctor's cars were more than the doctor's cars.

**Table 1: Total of isolates as per the car users**

Profession	Number of Isolates (n=15x6=90)
Doctors	80
Non-Doctors	174

The distribution of isolates from various sites within the cars is shown in table 2. The most common isolates found were Bacillus species followed by Serratia marcescens, unidentifiable Gram negative rods, Acinetobacter spp, Methicillin Sensitive Staphylococcus aureus (MSSA), Methicillin Resistant Staphylococcus aureus (MRSA), Enterococcus and Escherichia coli. This suggests the wide distribution of microorganism within the cars. All six sites from where the maximum number of isolates were isolated. Table no. 3 shows the antibiotic sensitivity of the isolates isolated from various sites within the car.

**Table 2: Distribution of isolates from various sites in the car**

Bacteria	Air blower	Dashboard	Gear Stick	Door Handle	Steering Wheel	Driver's Seat	Total
MRSA	2	2	2	3	1	6	16
MSSA	4	3	8	3	4	5	27
Escherichia coli	0	1	0	0	0	0	1
Serratia marcescens	5	5	6	7	7	9	39
Acinetobacter spp.	4	7	3	4	2	4	24
Enterococcus spp.			1		2		3
Bacillus spp.	21	23	17	19	16	13	109
Unidentifiable Gram Negative rods	6	8	3	4	5	8	34
Klebsiella pneumoniae	0	0	0	0	0	1	1
Total	40	49	40	40	37	46	254

**Table 3: Antibiotic sensitivity pattern of isolates**

Isolates	Total number of Isolates	Resistance to antibiotics (%)					
		CX	AMC	MP	G	CF	PG
MRSA	16	16 (100)	16 (100)	16 (100)	16 (100)	16 (100)	16 (100)
MSSA	27		1 (3.7)				
Escherichia coli	1		1 (100)			1 (100)	1 (100)
Serratia marcescens	39		1 (2.5)		1 (2.5)		1 (100)
Acinetobacter	24		3 (12.5)				3 (12.5)
Enterococcus	3		2 (66.6)				2 (66.6)
Bacillus	109		3 (2.7)				
Unidentifiable Gram negative rods	34		15 (44.1)				15 (44.1)
Klebsiella pneumoniae	1		1(100)				1 (100)

CX – Cefoxitin, AMC – Ampicillin, MP – Meropenem, G- Gentamycin, CF – Cefotaxime, PG – Penicillin

Distribution of isolates as per the car users is depicted in table no. 4.

**Table 4: Distribution of isolates as per car users**

Pathogens	Doctors n=15x6	Non-Doctors n=15x6
MRSA	1	15
MSSA	20	7
Escherichia coli	1	0
Serratia marcescens	0	39
Acinetobacter spp.	2	22
Enterococcus spp.	3	0
Bacillus spp.	37	72
Unidentifiable Gram negative rods	16	18
Klebsiella spp.	0	1
Total	80	174

**Discussion:** To our knowledge no study has been conducted in India to know the presence of pathogenic microorganisms in automobile cars to date. This was first study which has been

conducted to know the presence of different microbiota within the car

which might pose a threat to the drivers or passengers sitting in such cars. This study also reveals that the interior of cars may get contaminated by pathogens like Methicillin Resistant Staphylococcus aureus, Klebsiella pneumoniae etc which causes various infections and these pathogens can spread into the environment. The organisms like Acinetobacter spp which is one of the major cause in nosocomial infections while Klebsiella pneumoniae is involved in urinary tract infections, wound infections.

Table no. 1 showed that the number of isolates were quite high in numbers in commercial cars than the doctor's cars. This is may be due to the fact that the commercial vehicles are used by number of people which is responsible for more contamination. This also suggests that the number of users increase the contamination of cars with different micro organisms.

In the present study MRSA were isolated in high numbers from the commercial vehicles than the doctor's vehicles which suggests the possible

contamination because of the passengers. In the study conducted by Carle's Gerba<sup>4</sup> also found the MRSA in the automobile cars. These microbes may pose the threat to the person sitting in such cars which contaminated with MRSA.

Although most strains were harmless but there are some which are dangerous and are of potential risk to the person who is driving such cars. The present study also did the antibiotic sensitivity for the isolates and found that there are strains like E. coli, K. pneumoniae which showed 100 % resistant to ampicillin. Fortunately no strain was resistant to meropenem.

The present study concludes that the cars can become potential hazard to the person who is driving for long time and not taking any care to clean within. The study recommends to clean the cars from within thoroughly at least once a week with known disinfectants. Further research is needed to know the effect of disinfectants on these microbiota isolated from within the cars used by health care professionals or commercial person.

**Constraints In The Present Study:** The study has been conducted on a small numbers of cars. There are no references found as such stating the isolates isolated from within the cars which makes difficult to compare. More studies are needed to know the common microbiota found within the cars.

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