

## Methicillin and Vancomycin Resistant *Staphylococci* from Cell Phones-An Emerging Threat

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**Abstract:** Transfer of infectious diseases through contaminated surfaces is confirmed in many epidemiological studies. Present investigation aimed at investigating the role of cell phones in the transfer of multiple drug resistant *staphylococci* from different population groups. The sampling was carried out at different intervals of time, plating was done on selective and general isolation media. Characterization of isolates was carried out following the standard methods. Antibiotic sensitivity profile of 4 staphylococcal isolates revealed them as resistant for all the antibacterial antibiotics tested especially Methicillin and Vancomycin. These results clearly indicated the emergence of cell phones as carrier of multiple drug resistant *staphylococci* and posing a threat as cell phones become carriers of antibiotic resistant bacterial pathogens.

**Key words:** Methicillin • Vancomycin • Resistant *Staphylococci* from Cell phones

### INTRODUCTION

Today cell phones have becoming one of the indispensable accessories of professional and social life. 85% of Tele communication users in India depends on the cell phones and these cell phones have been identified as one of the media by which bacterial pathogens specially resistant *S. aureus* can be transmitted [1, 2]. These pathogens pass from contaminated hands and skin of the users through which there is exchange of pathogens between the users. Cell phones are found to be more problematic compared to other fomites and are difficult to disinfect.

The present investigation aimed at screening bacterial pathogens and their antibiotic resistance from cell phones used by different groups of populations like students, faculty members of college, doctors, nurses, patients from hospitals and recharge centers.

### MATERIALS AND METHODS

**Sampling:** Twenty Samples were collected randomly from different population groups of different environments where handling of cell phones would be more frequent and chances of transfer of pathogens would be fairly high. Collection of samples from cell phones was carried out by swabbing the cell phone surfaces on back and

front by swabs immersed in sterile saline tubes [3]. Samples were processed immediately after collection for isolation of bacterial pathogens.

**Isolation of Bacterial Pathogens:** The swabbed samples were serially diluted up to  $10^{-9}$  and plated by pour plate technique on selective media like Salmonella Shigella agar, EMB agar and MacConkey's agar and Nutrient agar. The produced colonies were picked and identified by the cultural and biochemical characteristics. All the test isolates were inoculated on blood agar medium and incubated at 37°C for 24 hours. Alpha, beta and gamma hemolysis was observed [4-8].

**Screening for Antibiotic Resistance:** Kirby-Bauer antibiotic sensitivity assay [9] was followed for testing the antibiotic susceptibility of the selected isolates based on their characterization studies. Different antibiotics like Methicillin, Vancomycin, Chloramphenicol, Erythromycin, Ampicillin and Penicillin (at 10 micro gram concentrations) were used [10, 19] since all these were found to be effective antimicrobial antibiotics [12]. Broth cultures of test bacterial isolates were swabbed on solidified nutrient agar media with sterile swabs. The antibiotic discs were placed at equidistance on the agar surface and plates were incubated at 37°C for 24 hours. The sensitivity or resistance was assed by measuring the zone of inhibition in mm.

Table 1: Screening for antibiotic resistance

SI No.		Isolates Number					
		VM	M	P	EM	A	SM
1	SRG1	RESISTANT	RESISTANT	RESISTANT	12mm	16mm	14mm
2	SRG2	RESISTANT	RESISTANT	RESISTANT	14mm	RESISTANT	10mm
3	SRG3	RESISTANT	RESISTANT	RESISTANT	RESISTANT	RESISTANT	10mm
4	SRG4	RESISTANT	RESISTANT	RESISTANT	RESISTANT	RESISTANT	10mm

### RESULTS

**Sampling:** Totally 26 isolates were recovered including 4 isolates belonging to the genus *staphylococci* with beta hemolysis on blood agar.

**Screening for Antibiotic Resistance:** Kirby-Bauer disc diffusion for all the 4 isolates revealed them

as resistant to all the Methicillin, Vancomycin, Erythromycin, Ampicillin and Penicillin tested except for Streptomycin, where 10mm zone of inhibition was observed. The results of antibiotic sensitivity tests clearly indicated these isolates as multiple drug resistant isolates even resistant to Methicillin and Vancomycin (Table 1 and Fig. 1).

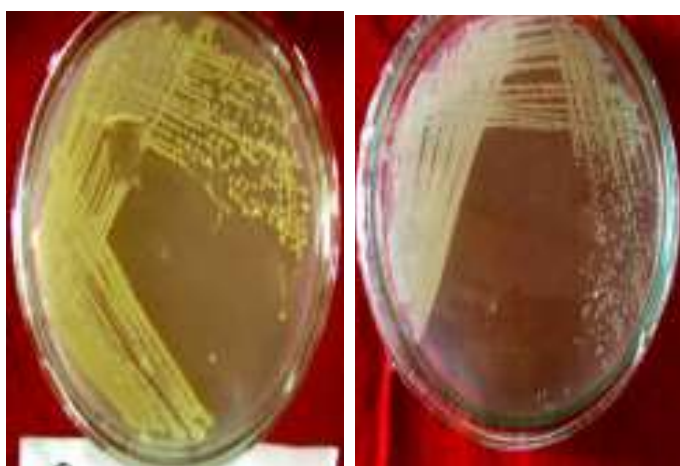


Fig. 1: Isolated *Staphylococci* Colonies

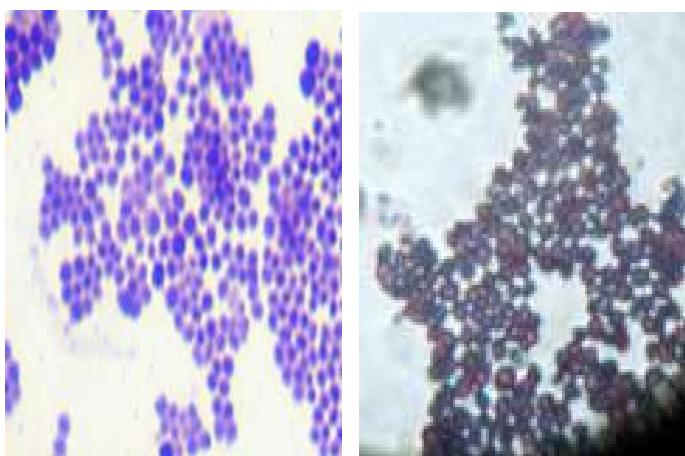


Fig. 2: Microscopic View (2000X)

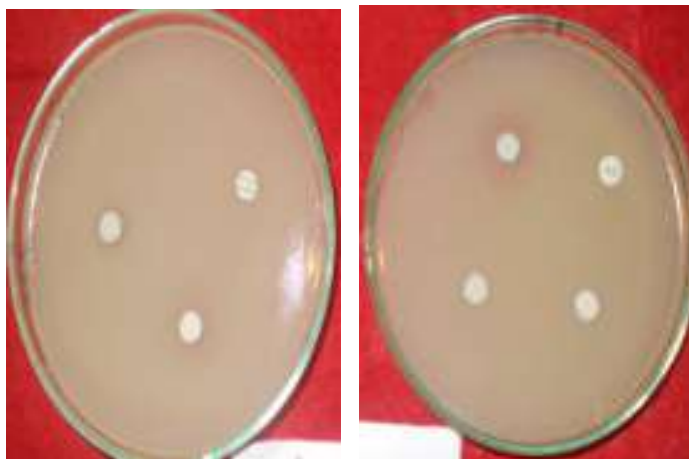


Fig. 3: Vancomycin and Methicillin Resistant Staphylococci Colonies

### DISCUSSION

Antibiotic resistance and its transfer is becoming an emerging trend in countries like India. Hospitals sewage plays an important role in transferring drug resistant flora [11] but the present study revealed the active role of cell phones also as carriers in transmitting the antibiotic resistant bacteria.

In the past few years occurrence of drug resistant bacteria in hospital source is increasing in an alarming rate causing problems in antimicrobial therapy [16]. Emergence of Methicillin resistant *S. aureus* (MRSA) [19] bacteria has increased the risk of hospital acquired infections [18].

In the present study concentrating the collection of samples from public places like mobile recharge centers revealed the presence of *staphylococci* and these isolates were resistant to almost all the tested antibacterial antibiotics [20]. Although the cell phones are usually stored in bags or pockets, they are handled frequently and held close to the face.

The use of cell phones often occurs in hospitals, by patients, visitors and health care workers and this is one environment where hospital-associated infection is most prevalent. Also, travelers who go to low-income countries where potable water and good sanitation are limited are exposed to the risk of contracting infections because these individuals carry phones and the potential of such accessories in the spread of bacterial infection is not yet clear. In the present work, 26 bacterial colonies were isolated as follows; 19 Gram positive cocci, 7 Gram negative bacilli and 4 Gram positive bacilli. Four out of 19 Gram positive cocci were showing drug resistance to Methicillin, Vancomycin and Chloramphenicol in the concentration of 10mg.

*Staphylococci* were found to be the prominent bacteria, recovered from cell phones along with Gram negative bacterial isolates. It was found to be resistant for highly selective drugs for Gram positive bacteria like Methicillin and Vancomycin.

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