



MOBILE PHONES : THE PATHOGENS WHICH WE ARE CARRYING IN OUR POCKETS ?

Aakanksha Sharma

Assistant Professor, Department Of Microbiology, Shri Shankaracharya Institute Of Medical Sciences

Smita Bawankar*

Professor, Department Of Microbiology, Shri Shankaracharya Institute Of Medical Sciences *Corresponding Author

ABSTRACT **INTRODUCTION** : Nosocomial infections are on the rise worldwide and are a major but often neglected health problem. Mobile phones being used by healthcare providers are emerging as fomites capable of transmitting infections. Studies have shown presence of potentially pathogenic bacterial and fungal contamination of cell phones.

METHODOLOGY : This study was carried out with the aim of analysing the microbial contamination of mobile phones carried by health professionals. 250 mobiles phones were sampled with the swabs and analysed for the presence of microbial growth according to conventional microbiological techniques.

RESULTS : Microbial contamination was found to be present in 71.2% of the mobile phones with gram positive cocci forming the most commonly isolated group of organisms. Pathogenic microbes comprised of 20% of the isolates.

CONCLUSION : The isolation of MRSA and other pathogenic microbes shows that mobile phones can act as possible fomites in the spread of nosocomial infection. Thus, compliance with strict hand hygiene practices and disinfection policies is strictly recommended.

KEYWORDS : Nosocomial Infections, Mobile Phones, Drug Resistance, Mrsa Colonisation

INTRODUCTION

Nosocomial infections are on the rise worldwide and are a major but often neglected health problem. Most attention for nosocomial infection prevention is given to high-risk invasive diagnostic and therapeutic healthcare tools while the importance of less critical tools tends to be underestimated.¹ Although microorganisms are most commonly transmitted by the hands of healthcare personnel, materials and articles used in the hospitals could also carry microorganisms.² It is known that accessories used by physicians can be a potential source of infection in hospital setting.

The hospital environment serves as a reservoir for myriad of microorganisms (bacteria, fungi and viruses). Although contamination of inanimate environment by microorganisms has long been recognized, its significance remains unclear. Despite the various hospital infection control measures, scientific evidence suggests that environmental contamination plays an important role in the spread of Gram positive bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin resistant *Enterococcus* sp (VRE) and *Streptococcus pyogenes* which survive for a varying degrees of time on dry surfaces, and many Gram negative bacilli. Gram negative species, such as *Acinetobacter* sp, *Escherichia coli*, *Klebsiella* sp, *Pseudomonas aeruginosa*, *Serratia marcescens* and *Shigella* sp are able to survive for months on hospital surfaces.^{3,4}

Environmental contamination may play a role in the acquisition and transmission of health care associated infectious pathogens, when health care workers contaminate their hands or gloves by touching contaminated surfaces, or when patients come into direct contact with contaminated surfaces. Nosocomial infections create a major problem for health care workers because it continues to hinder effective management of health care delivery in hospitals all over the world.^{5,6}

Control of infection and basic sanitation should be at the heart of good hospital management. Emergence of new pathogens and multidrug-resistant bacterial strains compel us to review our current practices and focus on educating the healthcare workers about the importance of basics of hospital hygiene and infection prevention.

MATERIALS AND METHODS

A total of 250 swabs were collected from mobile phones of medical students and doctors posted in various medical specialties in our teaching hospital for microbial culture. Each sample was collected by swabbing the surface of the mobile phone with a sterile cotton swab moistened with saline. The swabs were inoculated on Blood agar, MacConkey agar and Sabouraud's Dextrose Agar (SDA) plates. The plates were incubated at 37°C for 24–48 h and examined for microbial growth. The microorganisms were identified using standard methods.⁷ Antibiotic susceptibility was tested according to CLSI 2019 guidelines

on Mueller Hinton Agar plates, by Kirby Bauer disc diffusion method using various antibiotic discs procured from HiMedia, Mumbai.

RESULT

Of the total 250 samples tested, 178 (71.2%) were positive for the presence of aerobic microorganisms. The frequency of isolation of various microorganisms is depicted in the table below.

Name of organism	Number
Coagulase Negative Staphylococci	96
<i>Staphylococcus aureus</i>	34
Bacillus spp.	28
Micrococcus	16
<i>Candida albicans</i>	2
<i>Escherichia coli</i>	2

The most commonly isolated organisms were gram positive cocci including Coagulase negative Staphylococci, *Staphylococcus aureus* followed by Micrococcus. Of the 34 *Staphylococcus aureus* isolated, 9 were Methicillin resistant *Staphylococcus aureus*. Most of the isolates were sensitive to the commonly used first line antibiotics recommended by CLSI.

DISCUSSION

Fomites play an important role in spread of hospital-acquired infections. A variety of surfaces, equipments and devices have been found to harbour pathogenic microorganisms, including drug resistant ones like MRSA and VRE, in hospital settings.⁸ Microbes can be transferred from person-to-person or from inanimate objects commonly used in hospitals (stethoscopes, pens, charts, fixed and mobile phones) to hands and vice versa. Clean hands can become colonized after contact with contaminated surface or fomite while caring for patients and organisms can cause infection if they come in contact with susceptible hosts. Hand-to-mouth transfer of microbes after handling contaminated fomites during casual activities has also been documented.⁹

The contamination rate of cell phones in our study was found to be 71.2%. Pathogenic bacteria like *Staphylococcus aureus*, *Escherichia coli* and *Candida* comprised of only 20% of the isolates. This is much lower than other studies.⁸⁻¹¹ However the isolation of potential pathogenic bacteria such as *Staphylococcus aureus*, *Escherichia coli* and *Candida* spp is a worrisome finding as these can easily lead to spread of nosocomial infections in the hospital. Thus, strict implementation of hand hygiene and disinfection policies are the need of the hour to prevent the increasing morbidity due to nosocomial infections

CONCLUSION

In conclusion, this study highlights the high rates of contamination of

mobile phones used by Health Care providers in a hospital setting. Mobile phones contamination with potential human pathogens was common in HCPs working at various areas of the hospital including sensitive areas like OTs and ICUs. Carriage rates of resistant organisms (MRSA) were low in our study. However these organisms can still act as reservoirs for dissemination of nosocomial infection. These findings stress the need for awareness of mobile phones as fomites, need for strict monitoring of hand hygiene and guidelines for routine decontamination of mobile phones in hospitals.

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