ISSN: 0975-766X
CODEN: IJPTFI
Available Online through
Research Article
www.ijptonline.com

A CORRELATION BETWEEN BACTERIAL PROFILE OF MOBILE PHONES OF NURSING STAFFS AND SAMPLES FROM PATIENTS

Sachin Sharma[*1], Varsha A. Singh[1], Nitin Goel Insan[1], Sunil Shekher[1]
[*1]Department of Microbiology, M M Institute of Medical Sciences and Research, Mullana, Ambala, Haryana, India.
Email: sachin0044@hotmail.com

Received on 07-03-2015 *Accepted on 30-03-2015*

Abstract

Mobile phones used by nurses provide a reservoir of potential pathogens known to cause nosocomial infections. Because of the achievements and benefits of the mobile phone, it is easy to overlook its hazard to health. This study was conducted to investigate the bacterial contaminants of mobile phones and its correlation with the nosocomial infection. Total 200 samples (100 from mobile phones of nursing staff & 100 from patients) were included in this study. Most frequently isolated organism was E.coli followed by Staphylococcus aureus. Cefepime (71.42%) and Vancomycin (100%) were most effective antibiotics against E.coli and Staphylococcus aureus respectively.

Key words

Mobile phones, E.coli, Staphylococcus aureus, Klebsiella pneumonia.

Introduction

Fomites are increasingly being recognizing as a source of hospital acquired infection. Non medical devices used by doctors and nurses can harbour various potential pathogens and can become exogenous sources of infection. Improper cleaning of equipment, Patient rooms and medical devices used an many patients are well described means of transmission but little attention has been paid to non-medical devices such as pens, Mobiles etc.

Mobiles used by doctors and nurses can harbour various potential pathogens and can serve as vectors of various infectious agents to patients and their family members. Although microorganisms are most commonly transmitted by the hands of healthcare personnel, but material and articles used by them could also carry microorganism.[1,2]

1/3 of hospital infections are caused by the microorganisms that are found around the hospital. With surveillance studies,

it was shown that contaminated surveys and medical devices can act as the source of hospital infections.[3]

The global system for mobile telecommunication (GSM) was established in 1982 in Europe with a view of providing and improving communication network. Today mobile phones are increasingly becoming one of the indispensable accessories of professional and social life. With all the achievements and benefits of the mobile phone, it is easy to over look the health hazard it might pose to its many users. The constant handling of the mobile phones by users (in hospitals, by patients, visitors and health care workers, etc.) makes it open breeding place for transmission of microorganisms, as well as Hospital-Associated Infection (HAIs). However one aspect that has not been covered is the bacterial contamination of mobile phones. They are particularly susceptibility to this as they are in close contact with mouth, nose, ears, hands and various clinical environments.[4]

Mobile phones are continuously used all day long but never cleaned. further there are no guidelines for proper disinfection and mobile phone are being used in all aspects of preferred and most used routes of communication and decontamination of mobile phones thus mobile phones acts as reservoirs of infection which may proliferate from patient to patient in hospital. [5]

Hand washing may not usually be performed often enough and many people may use personal mobile phone in the course of a working day. The potential act of mobile phone as a source of microbial transmission is considerable.[6]

Material and Method

A total of 200 samples were included in the study, comprising of the swab samples from the mobile phones of nursing staffs and samples from the suspected patients developing nosocomial infection in intensive care unit. Samples were collected with the help of cotton swabs moistened with normal saline.

The swab was rubbed over the surface of all sides of mobile phone and was streaked on blood agar and MacConkey agar plates. Then culture plates were incubated aerobically at 37ºC for 24 hours. Relevant samples from patients developing nosocomial infections were taken and processed by standard operating procedures.

Identification of microorganisms and Antibiotic sensitivity testing were done as per CLSI guidelines. [7]

Result

Total 200 samples (100 from mobile phones of nursing staff & 100 from patients) were included in this study, Out of which 19% were sterile, 20% had non pathogenic organism and 61% had pathogenic organism.

Table-I: Microbiological analysis of mobile phone of nursing staffs and patients sample.

Individuals	Culture Report			
	Sterile	Non Pathogenic Organism	Pathogenic Organism	Total
Mobile phone of nursing staffs	26(26%)	10(10%)	64(64%)	100
Patients	12(12%)	30(30%)	58(58%)	100
Grand Total	38(19%)	40(20%)	122(61%)	200

Table -II: Microbiological analysis of pathogens.

Individuals	Mixed Growth	Pure Growth	Total
Mobile Phone Of Nursing Staffs	4(6.25%)	60(93.75%)	64(52.45%)
Patients Sample	2(3.45%)	56(96.55%)	58(47.54%)
Grand Total	6(4.91%)	116(95.08%)	122

Total 122 pathogenic organisms were isolated, out of which 37 (30%) and 85 (70%) were Gram positive and Gram negative bacteria respectively.

Chart I: Distribution of total pathogenic organisms in samples from patients and Mobile phones of nursing staffs.

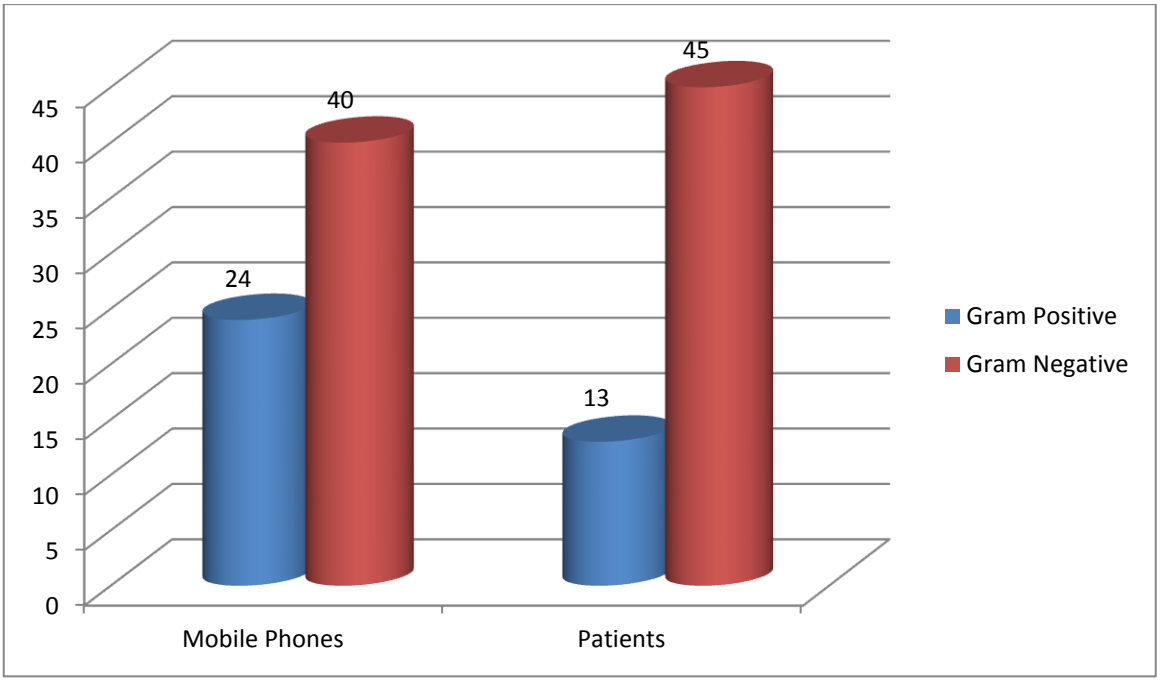

Table-III: Distribution of gram positive pathogens on mobile phones of nursing staff and in patients.

Individuals	Staphylococcus aureus	Candida	Total
Mobile Phone Of Nursing Staffs	24(100%)	0(0.0%)	24
Patients	11(84.61%)	2(15.38%)	13

Table-IV: Distribution of gram negative pathogenic organisms on mobile phones of nursing staff and in patients.

Individuals	Klebsiella pneumoniae	E.coli	Pseudomonas aeruginosa	Total
Mobile Phone of Nursing Staffs	12(30%)	28(70%)	0(0.0%)	40
Patients	12(26.6%)	32(71.1%)	1(2.2%)	45

Table-V: Distribution of pathogens isolated from different ICUs

Ward	Organisms	Patients (%)	M.P Of Nursing Staffs (%)	Total (%)
MICU	E.coli	26(54.16)	22(45.83)	48 (39.34)
	K. pneumoniae	10(62.5)	6(37.5)	16 (13.11)
	Staph.aureus	4(20)	16(80)	20 (16.39)
	Candida	2(100)	0(0.0)	2(1.63)
SICU	E.coli	4(50)	4(50)	8(6.55)
	K. pneumoniae	2(33.33)	4(66.66)	6(4.91)
	Staph.aureus	7(63.63)	4(36.36)	11(9.01)
	Ps. aeruginosa	1(100)	0(0.0)	1(0.81)
PICU	E.coli	2(33.33)	2(66.66)	4(3.27)
	K. pneumoniae	0(0.0)	2(100)	2(1.63)
	Staph.aureus	0(0.0)	4(80)	4(3.27)
Total		58(47.54)	64(52.45)	122

Antibiotic sensitivity pattern of E.coli showed highest sensitivity to Cefepime (71.42%) followed by Cefaxime (67.85%) and Ciprofloxacin (64.28%). Klebsiella pneumoniae showed highest sensitivity to Amikacin (75%) followed by Ciprofloxacin (66.66%). While in gram positive organism, Staphylococcus aureus showed (100%) sensitivity to Vancomycin followed by Gentamycin (70.83%) and Ampicillin 62.5%.

Discussion

Nowadays, the usage of mobile phone in health care services is being increased. Innovations in mobile communication have led to better patient control but increased use of mobile phone is seen against a background rise in nosocomial infection rates reported by ecological findings.

Similar study by Bhat *et al* showed that 99% of the mobile phone were contaminated with different microorganisms.[8] In the study of Tambekar, 95% of the doctors mobile phones demonstrated evidence of bacterial contamination.[9] Goel *el al* in their study on mobile phone of dental workers revealed that 94.5% mobile phones were harboring microorganism.[5] In the present study, 64% of mobile phone of nursing staffs were harboring pathogenic organisms.

In present study, 58% of patients were infected with pathogenic organism. Similar study by Richards *et al* revealed that 68% of patients were infected with pathogenic organisms in major site of ICUs.[10] Akhtar et *al* isolated pathogenic organisms from 60.2% of patient.[11]

In present study, Gram negative and Gram positive organism were isolated 77.5% and 22.4% respectively. Merchant *et al* showed 78% and 22% organisms, isolated from patients in ICUs, were Gram negative and Gram positive respectively.[12] Lakhshmi *et al* isolated 46.5% Gram positive and 53.6% Gram negative organism from patients.[13]

In this study, Gram positive and Gram negative organism isolated from mobile phones of nursing staff were 37.5% and 62% respectively. A similar study by Arora *et al* showed 58.07% Gram positive and 45.04% Gram negative pathogens in their study.[14] Tembekar *el at* isolated 39% Gram positive and 61% Gram negative organisms from Mobile phones.[9] Tagaoe et al revealed 48% Gram negative and 52% Gram positive pathogens from mobile phone of health care workers.[4]

In present study Staphylococcus aureus was predominant in Gram positive organism isolated from mobile phone of

nursing staffs. A similar study by Khivsara *et al* reported high level 40% of contamination of phone by Staphylococcus aureus in hospital at Manglore.[15] Gunasekara *et al* conducted a study on bacterial contamination of anesthetists hands, personnel mobile phones and wrist watch used during theater sessions, Staphylococci were predominantly isolated from mobile phone.[16]

In present study, E.coli (70%) was found predominantly in Gram negative pathogen in mobile phone of nursing staffs followed by Klebseilla spp. (30%). Arora *et al* reported that E.coli was mainly isolates on mobile phone of health care personnel followed by Klesiella species.[14]

In present study, E.coli and klebsiella were sensitive to Azithrimicin, Ciprofloxacin and Amikacin in the range of 70-85%. In Gram positive organism, all isolates (100%) were highly sensitive to Vancomycin. similar result were shown by the study of Trivedi *et al* who reported that all Gram positive organism were sensitive to Vancomycin and sensitivity to Ciprofloxacin, Erythromycin and Tetracycline was in the range of 85-90%. the sensitivity of Gram negative bacilli towards Ciprofloxacin, Erythromycin, Tetracycline and Gentamycin was in the range of 75-85%.[17]

Conclusion

The mobile phone of nursing staffs showed more pathogenic organism 64% as compare to patients samples 58%. Indicate that the mobile phone can act as a potential reservoir of nosocomial infection. We can not restrict using Mobile phones while working so we must follow some simple measures like hand washing, regular cleaning of mobiles with disinfectant etc.

References

1. Gill PK, Arora U, Devi P, Arora S. Writing pens- a potential source of nosocomial infection. BHJ. 2011; 53: 16-19.
2. Wong D, Nye K. Microbial flora on doctors white coats. BMJ 1991; 303: 1602-4.
3. Guinto CH, Bottone EJ, Raffalli JT, Montecalvo MA, Wormser GP. Evaluation of dedicated stethoscopes as a potential source of nosocomial pathogens. AJIC Brief Rep. 2002; 30: 499-502.
4. Tagoe DN, Gyande VK, Ansah EO. Bacterial contamination of mobile phones: when your mobile phone could transmit more than just a call. Webmed Central Microbiology 2011; 2: 1-9.
5. Goel M, Goel A. Beware! Your phone is 'bugged' Mobile phones of dental professionals a potential source of

bacterial contamination-A bacteriological study. Indian J Dent Res. 2009; 1: 42-47.

6. Schultz M., Gill J, Zubairi S, Huber R, Gordin F. Bacterial contamination of computer keyboards in a teaching hospital. Infect. Control Hosp Epidemiol. 2003; 24: 302-03.
7. NCCLS. Performance standards of antimicrobial susceptibility. NCCLS approved standard M100-59 National Committee for Clinical Laboratory Standard, Wayne, PA.. 2006; 28;1:11.
8. Bhat SS, Hegde SK, Salian S. Potential of mobile phones to serve as a reservoir in spread of nosocomial pathogens. Online J Health Allied Scs. 2011; 10: 14-65.
9. Tambekar DH, Gulhane PB, Dahikar SG, Dudhane MN. Nosocomial hazard of doctor's mobile phone in hopitals. J Med Sci. 2008; 8: 73-76.
10. Richards MJ, Edwards JR, Culver DH, Gaynes RP. Nosocomial infections in combined medical-surgical intensive care units in the United States. Infect Con Hosp Epidemiol. 2000; 2: 510-15.
11. Akter N. Hospital acquired infections in a medical intensive care unit. J Coll Physicians Surg Pak. 2010; 20: 386-90.
12. Merchant M, Karnad DR, Kanbur AA. Incidence of nosocomial pneumonia in a medical intensive care unit and general medical ward patients in a public hospital in Bombay, India. J Hosp Infect. 1998; 39: 143-8.
13. Lakshmi KS, Jayshree, Singh S, Ray P. Study of nosocomial primary bloodstream infection in a Pediatric intensive care unit. J Trop Pediatr. 2001; 57: 357-62.
14. Arora U, Pushpa Devi P, Aarti Chadha A, Malhotra S. Cellphones a modern stayhouse for bacterial pathogens. JK Science. 2009; 11: 127-29.
15. Khivsara A, Sushma TV, Dhanashree B Typing of Staphylococcus aureus from mobile phones and clinical samples. Curr Sci. 2006; 90: 910-12.
16. Gunasekara TDCP, Kudavidanage BP, Peelawattage MK, Meedin F, Gurugel LD Nanayakkara G, Nanayakkara M, Fernando SSN. Bacterial contamination of anaesthetists hands, personal mobile phones and wrist watches used during theatre sessions. Sri J Anaesthes. 2009; 17: 1-15.

Corresponding Author:
Sachin Sharma*,
Email: *sachin0044@hotmail.com*