BACTERIOLOGICAL PROFILE OF CELL PHONES OF HEALTHCARE WORKERS AT TERTIARY CARE HOSPITAL.

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ABSTRACT: BACKGROUND AND OBJECTIVES: Cell phones are increasingly used by healthcare workers. They can harbour potential bacterial pathogens and can become an exogenous source of nosocomial infections. Aim of this study was to identify microbial colonisation and their antimicrobial sensitivity; from cell phones used by healthcare workers.

MATERIALS AND METHODS: A total of 100 samples were collected from cell phones of clinical and para-clinical staff and non-medical personnel. Specimens were collected and subjected to culture and sensitivity as per the standard guidelines.

RESULTS: Bacterial species were isolated from 65 (65%) out of total 100 samples. Coagulase Negative *Staphylococcus* (42) was the most commonly isolated organism. Isolates included Methicillin resistant *Staphylococcus aureus* (10), Methicillin sensitive *Staphylococcus aureus* (3), *Bacillus* spp (15), *Pseudomonas* spp (4), *Moraxella* spp (2), *E. coli* (1), *Klebsiella* spp (1) and *Acinetobacter* spp (1).

CONCLUSION: The carriage rate of bacterial isolates was higher in the clinical staff (92%) in comparison to para-clinical staff (56%) and non-medical personnel (20%). Cell phones may serve as potential source of nosocomial infections.

KEYWORDS: Bacterial pathogens, Multidrug resistance, Healthcare workers, Nosocomial infections

INTRODUCTION: The global system for mobile telecommunication (GSM) was established in 1982 in Europe with a view of providing and improving communication network. Cell phones have become one of the most indispensable accessories of professional and social life.¹ Today, India has 500 million Cell phone users. Cell phones increase the speed of communication and contact within health care institutions, making health care delivery more efficient; hence, Cell phones are increasingly used by healthcare workers.² Cell phones are frequently used in hospital wards, casualty, laboratories, ICUs and operation theatres.³ However, Cell phones which are seldom cleaned and often touched during or after the examination of patients without hand washing, can harbour various potential pathogens and become an exogenous source of nosocomial infections for hospitalized patients.⁴ Nosocomial infections are important problem in all hospitals. These infections are increasing day-by-day and can affect rate of mortality and morbidity. In this study, Cell phones of non-medical personnel were also included as it represents an environment of community. Therefore bacterial isolates from Cell

phones of HCWs may vary in numbers and antibiotic sensitivity, to that found on Cell phones of non-medical personnel.⁵

MATERIALS AND METHODS: The study was conducted at the Department of Microbiology, C. U. Shah Medical College and Hospital, Surendranagar, Gujarat from August 2011 to March 2012.

1) COLLECTION OF SAMPLES: Total of 100 Cell phones of healthcare workers of clinical and para-clinical staff and non-medical personnel were randomly selected for the study. Sterile swabs moistened with peptone water were used to collect specimens from the front, sides and back of the Cell phones.

2) PROCESSING OF SAMPLES: Swabs taken from Cell phones were inoculated on nutrient agar, blood agar and MacConkey agar. The culture plates were incubated at 37°C for 24 hours. Isolation and identification of bacterial species were done as per standard guidelines. Antimicrobial susceptibility testing, including detection of Methicillin Resistant *Staphylococcus aureus* (MRSA) and Extended Spectrum β -Lactamase (ESBL) was performed for potential pathogenic isolates by disc diffusion method as per the Clinical and Laboratory Standards Institute (CLSI) guidelines.⁶

RESULTS: Out of 100 Cell phones, bacterial growth was obtained in 65 (65%) Cell phones; which includes 46 from clinical staff, 14 from para-clinical staff and 5 from non-medical personnel; as shown in Chart-1. The carriage rate was 92% in clinical staff, 56% in para-clinical staff and 20% from non-medical personnel.

Out of 65 Cell phones which yielded bacterial growth, 51 (78.46%) had single bacterial isolate and 14 (21.54%) had two bacterial isolates making total of 79 isolates.

Out of total 79 isolates, 42 were Coagulase Negative *Staphylococci* (CONS), 15 were *Bacillus* spp, 13 were *S. aureus* and 4 were *Pseudomonas* spp. Various organisms isolated from clinical, para-clinical and non-medical personnel are shown in Table-1.

Out of 13 *S. aureus*, 10 and 42 CONS, 21 were Methicillin resistant, as shown in Chart-2. *E. coli* (1), *Klebsiella* spp (1), *Pseudomonas* spp (4) and *Acinetobacter* spp (1) isolates were multidrug resistant as shown in Table - 2.

Chart - 1 Growth obtained from Cell phones.

Table – 1 Distribution of bacterial isolates

Organism	Clinical	Para - clinical	Non medical	Total
CONS	29 (69.04%)	11 (26.19%)	2 (4.76%)	42
Bacillus sp.	10 (66.67%)	1 (6.66%)	4 (26.67%)	15
S. aureus	10 (76.92%)	3 (23.08%)	0	13
Pseudomonas sp.	4 (100%)	0	0	4
Moraxella sp.	2 (100%)	0	0	2
Acinetobacter sp.	1 (100%)	0	0	1
Klebsiella sp.	1 (100%)	0	0	1
E. coli	1 (100%)	0	0	1
Total	58 (73.42%)	15 (18.99%)	6 (7.59%)	79

Chart – 2 Methicillin resistance among Staphylococcus species

Table - 2 Percentage incidence of antibiotic sensitivity of bacterial isolates

Organism	Total	AS	BA	CH	RC	TE	GM	CX	CF
CONS	42	38 (90.48%)	23 (54.76%)	33 (78.57%)	28 (66.67%)	30 (71.42%)	32 (76.19%)	21 (50%)	16 (38.09%)
S. aureus	13	11 (84.62%)	5 (38.46%)	5 (38.46%)	7 (53.85%)	7 (53.85%)	9 (69.23%)	3 (23.08%)	3 (23.08%)
Pseudomonas spp	4	2 (50%)	1 (25%)	1 (25%)	1 (25%)	-	3 (75%)	1 (25%)	-
Moraxella spp	2	1 (50%)	1 (50%)	1 (50%)	1 (50%)	-	1 (50%)	-	-
Klebsiella spp	1	1 (100%)	-	1 (100%)	1 (100%)	-	1 (100%)	-	-
E. coli	1	1 (100%)	1 (100%)	1 (100%)	1 (100%)	-	1 (100%)	-	-
Acinetobacter spp	1	1 (100%)	-	-	1 (100%)	1 (100%)	1 (100%)	-	-

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AS – Ampicillin/ Sulbactam, CH – Chloramphenicol, TE – Tetracycline, CX – Cefoxitin, BA – Cotrimoxazole, RC – Ciprofloxacin, GM – Gentamycin, CF - Ceftiaxone

DISCUSSION: The study shows that bacterial pathogens are present on cell phones. The carriage rate of bacterial isolates was 65 %, which was higher in clinical (92%) staff than in para-clinical (56%) staff and non- medical personnels (20%). Similar pattern was observed by Arora U. et al ². Table-3 shows carriage rates of bacterial isolates on cell phones reported by various authors. Bacterial isolates from cell phones of HCWs were varying in their numbers and antibiotic sensitivity, to that found on cell phones of non-medical personnels.

Coagulase Negative Staphylococci (CONS) were found to be the most common colonizing organisms in the present study. Similar pattern have been reported by different authors as shown in Table-4.

Many bacterial pathogens isolated from cell phones of healthcare workers were also multidrug resistant. 21 (50%) Coagulase Negative Staphylococci and 10 (76.92%) *S. aureus* were methicillin resistant. All *E. coli*, *Klebsiella* spp, *Pseudomonas* spp and *Acinetobacter* spp were also multidrug resistant.

Table –3 Comparison of carriage rate with other studies

Study	Organisms isolated	Clinical	Para - clinical	Non- medical
Kabir O. et al – 2009 ⁽¹⁾	62.00%	15.30%	-	66.45%
Arora U. et al - 2009 ⁽²⁾	40.62%	44.78%	37.77%	-
Jayachandra T. et al - 2011 ⁽³⁾	84.30%	-	-	-
Jayalakshmi J. et al - 2008 ⁽⁷⁾	91.67%	90.40%	93.30%	-
Bhat S.- 2011 ⁽⁸⁾	98.50%	-	-	-
Datta P. – 2009 ⁽⁹⁾	59.60%	-	-	10.00%
Present study	65.00%	92.00%	56.00%	20.00%

Table – 4 Comparison of CONS carriage rate with other studies

Study	CONS
Kabir O. et al – 2009 ⁽¹⁾	42.70%
Arora U. et al – 2009 ⁽²⁾	27.55%
Jayalakshmi J. et al-2008 ⁽⁷⁾	47.16%
Bhat S. et al-2011 ⁽⁸⁾	21.78%
Fatma U. et al – 2009 ⁽¹⁰⁾	58.96%
Present study	53.16%

CONCLUSION: The overall carriage rate of Cell phones was found to be 65% in the present study. It was higher in the clinical staff (92%) as compared to para-clinical staff (56%) and non-medical personnel 20 (20%). Cell phones harboured potential pathogens, which included multidrug resistant strains.

Restriction of Cell phones seems impractical, prevention of nosocomial pathogens is important, use of antibacterial agents to clean Cell phones and strict adherence to infection control measures like hand washing and good hygienic practice can reduce the risk of spread of nosocomial pathogens.^{3,9}

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