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Original Research Article

Aerobic bacterial isolates from mobiles of health care workers in a tertiary care hospital of North Kerala, India

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ABSTRACT

Background: Mobile phones have gained so much importance in day today life that we don't want to stay apart from them at any time, so is the condition with the health care workers who tend to carry them and attend to calls while doing procedures and in other patient care activities many studies have shown that mobile phones can carry dangerous pathogens on them which can be a risk to the patients in order to highlight this fact we carried out this study in our hospital setup.
Methods: A six months study was undertaken in our institute after obtaining permission from the institutional ethical committee. Mobile phones were swabbed over the screen, keypad, sides and external cover with sterile cotton swabs moistened with normal saline. And immediately inoculated on the culture media and processed as per the standard protocol.
Results: out of the 100 mobiles phones that were screened for aerobic bacterial colonization 88 (88%) showed bacterial isolates. Among the 93 isolates from the mobile phones the highest number of isolate were from pseudomonas species 42 (45.16%) followed by coagulase negative *Staphylococcus* (CONS) 19 (63.3%) , profession wise mobile phones of technicians showed the highest isolates 41 (44.08%) followed by Doctors 30 isolates (32.25%).
Conclusions: Our study showed that mobile phones can act as vehicles of transmission for bacterial pathogens as also proved by various studies so it is important to maintain the mobile phones in a hygienic way so they don't play a role in transmission of pathogens as these instruments cannot be totally avoided and their importance in health care is immense.

Keywords: Aerobic bacterial isolates, Health care workers, Mobile phones

INTRODUCTION

Mobile phone is now a common tool in the hands of health care workers which has gained importance in recent years as mass communication device[1,2], helping the health care workers to get the information about their patients and pass on the orders immediately for treatment of the patient until their arrival in emergency cases so it is like a boon for the health care workers but if not maintained properly it can even act as a vehicle for transmission of dangerous pathogens to the patients and hamper the treatment.[1-5] The capacity of existing systems to respond to the increased demand associated with HCAI, such as length of stay, cost, effective antimicrobial therapy and anxiety it causes to the patient, relatives and treating physician is not up to mark. It is proved in many studies world over that mobile phones of

health care workers may act as harbour to many harmful pathogens which can serve as a huge reservoir for health care associated infections.[6,7] In this study we investigated the rate of aerobic bacterial contamination of mobile phones of HCWs in our tertiary healthcare teaching hospital, in north Kerala so that we can implement strong infection control practices in our hospital.

METHODS

A total of 100 mobile phones of health care workers were included in the study during a period from October 2013, to January 2014 after obtaining permission from the institutional ethical committee. Mobile phones were swabbed over the screen, keypad, sides and external cover with sterile cotton swabs moistened with normal saline. Each swab was transported immediately to microbiology lab and inoculated onto the 5% Sheep Blood agar (SBA) and MacConkey's agar the plates were incubated aerobically at 370C for 24 hours and were later observed for bacterial growth as per the standard protocols. The bacteria were identified based on the colony characteristics, Gram's staining and biochemical reactions.

RESULTS

Among the 100 mobiles phones that were screened for bacterial colonization 88 (88%) mobile phones were positive, in them some mobile phones showed more than one isolate. Table 1 gives a clear picture showing that mores isolates were got from the mobile phones of the technician.

Table 1: Total number mobile phones tested and distribution of aerobic bacterial isolates sex-wise and profession wise.

	Mobile phones tested	Isolates
Total	100	93
Males	59	52
Females	41	41
Doctors	33	30
Nurses	38	22
Technicians	29	41

Among 93 isolates from the mobile phones the highest number of isolate were from pseudomonas species 42 (45.16%) followed by coagulase negative *Staphylococcus* (CONS) 30 (32.25%) *Flavobacterium species* 8 (8.60%), Acinetobacter species 5 (5.37%) methicillin sensitive *Staphylococcus aureus* 4 (4.30%), methicillin resistant *Staphylococcus aureus* (MRSA) 2 (2.15%) and Bacillus species 2 (2.15%) as shown in Figure 1.

Sex wise there was preponderance of isolates from mobile phones of males pseudomonas species 23 (54.7%) followed by coagulase negative Staphylococcus (CONS) 19 (63.3%) *Flavobacterium* species 3 (37.5%), Acinetobacter species 4 (80%) Methicillin sensitive *Staphylococcus aureus* 2 (50%), Methicillin resistant *Staphylococcus aureus* (MRSA) 1 (50%) as shown in Figure 2.

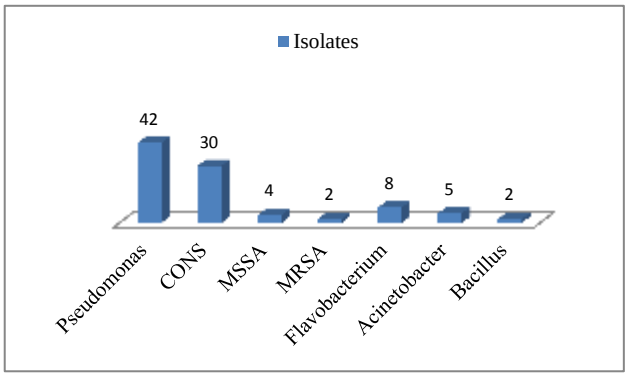

Figure 1: Aerobic bacterial isolates from mobile phones.

In females pseudomonas species 19 (45.16%) followed by coagulase negative Staphylococcus (CONS) 11 (36.6%) *Flavobacterium species* 5 (62.5%), *Acinetobacter species* 1(20%) *Staphylococcus aureus* 2 (50%), Methicillin resistant *Staphylococcus aureus* (MRSA) 1 (50%) *Bacillus species* 2 (100%) as shown in Figure 2.

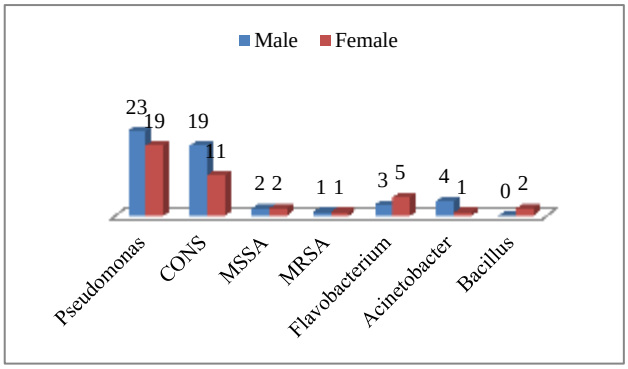

Figure 2: Sex-wise distribution of aerobic bacterial isolates from mobile phones.

From mobile phones of doctors 30 isolates (32.25%) pseudomonas species 13 (30.95%) followed by coagulase negative *Staphylococcus (CONS)* 7 (23.3%) *Flavobacterium* species 5 (862.5%), Methicillin sensitive Staphylococcus aureus 2 (50%), Methicillin resistant Staphylococcus aureus (MRSA) 2 (100%) *Bacillus* species 1 (50%) as shown in Figure 3.

From mobile phones of nurses 22 isolates (23.65%) pseudomonas species 9 (21.4%) followed by coagulase negative *Staphylococcus (CONS)* 8 (26.6%) *Flavobacterium* species 3 (37.5%), *Acinetobacter* species 1 (20%) Methicillin sensitive *Staphylococcus aureus* 1 (25%), as shown in Figure 3

From mobile phones of technicians 41 isolates (44.08%) pseudomonas species 20 (47.6%) followed by coagulase negative Staphylococcus (CONS) 15 (50%) Acinetobacter species 4 (80%) Methicillin sensitive *Staphylococcus aureus* 1 (25%), Bacillus species 1 (50%) as shown in Figure 3.

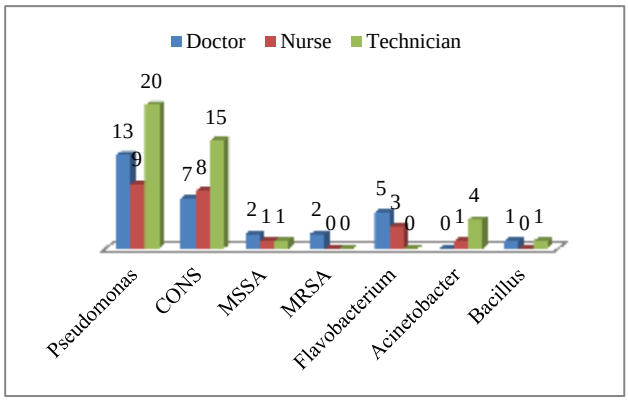

Figure 3: Profession wise distribution of aerobic bacterial isolates from mobile phones.

DISCUSSION

In this era of technology, communication and connectivity play an important role in order to communicate and get connected mobile phones role is immense and every individual likes to keep the mobile phone closer to him and never thinks of parting it where ever he goes whether he is a medical or non-medical person. In this situation it is important to find the negative effects of having these devices everywhere especially in a health care setup medical as a tool in spread of hospital acquired infections , as very often we do perform hand hygiene before touching the patient but we don't take any measures to clean our phone, consciously or unconsciously we start using or touching the phone without releasing that it can contain harmful pathogens that can spread to the patients in order to prove it this study has been undertaken in our settings.

In our study the colonization rate of mobile phones was 88% it was higher than that reported by Trivedi HR et al 46.6% and Sridhar G et al 70% Tambe NN 82.5%[9] less than that reported by Bhat SS et al[1] 99% and heba syed Salim HS et al [10] in our case the environment is humid which may have provided a conducive environment for the colonization of bacteria on the mobile phones as stated by Donald fry in the text book of surgical site infections (2013 page 66) that higher temperature and humidity together increases the bacterial density another reason may be maximum isolates are from technicians mobile phones 41 isolates from 21 mobile phones tested this may be because of some technicians working in microbiology whose phones showed more than one isolate.[1,9,10]

Among 93 isolates from the mobile phones the highest number of isolate were from *pseudomonas species* 42 (45.16%) less than that reported by Bhat SS et al 27 (30.6%)[1] and also it is a common hospital nosocomaial pathogen as also stated by Fazeli, Hossein et al followed by *coagulase negative Staphylococcus (CONS)* 30 (32.25%) less than that reported by Selim HS et al 20 (50%),[10] Sridhar G et al (8%), Trivedi HR et al 60(40%) more than Bhat SS et al 23 (26.1%), Flavobacterium species 8 (8.60%), Acinetobacter species 5 (5.37%) more than that reported by Salim HS et al 1 (2.5%), Trivedi HR et al 1(0.66%), Sridhar G et al (2%) less than that reported by Bhat SS et al 6 (6.8%), *Methicillin sensitive Staphylococcus aureus* 4 (4.30%), less than that reported by Bhat SS et al 17 (19.31%) *Methicillin resistant Staphylococcus aureus (MRSA)* 2 (2.15%) less than that reported by Selim HS et al 21 (52.5%), Bhat SS et al 4 (4.54%) More than that reported by Julian T et al 0.8% Bacillus species 2 (2.15%) Selim HS et al 17 (42.5%) Harish more than that reported by Trivedi R et al 2(1.33%).[1,9-13]

Sex wise the rate of isolation was higher in females 41 (100%) isolates compared to males 52 (88.8%) but these results are contrasting as many studies have shown that hand hygiene is better practised by females when compared to males.

Sex wise there was preponderance of isolates from mobile phones of males showing the *pseudomonas species* 23 (54.7%) followed by *coagulase negative Staphylococcus (CONS)* 19 (63.3%) In females *pseudomonas species* 19 (45.16%) followed by *coagulase negative Staphylococcus (CONS)* 11 (36.6%) so there was not much difference in isolate wise among the sexes

Isolate wise mobile phones of doctors 30 isolates (32.25%) less than that reported by Sridhar G et al (49%), Tambe NN et al (73.33%), Tankhiwale N et al (65%) mobile phones of nurses 22 isolates (23.6%) less than that reported by Sridhar G et al (27%), Tambe NN et al (80%). From mobile phones of technicians 41 (44.08%) more than that reported by Sridhar G et al (6%) less than that reported by Tambe NN et al (90%).[7,9,11]

CONCLUSION

The present study showed that mobile phones can act as vehicles of transmission for bacterial pathogens as also proved by various studies so it is important to maintain the mobile phones in a hygienic way so they don't play a role in transmission of pathogens as these instruments cannot be totally avoided and their importance in health care is immense.

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