Microbial Contamination of Cell Phones in Surgery Ward of a Tertiary Care Hospital in South India

Sir,

Hospital-acquired infections by the superbugs or antibiotic-resistant organisms are on the rise in today's world.[1] This risk depends on the ability of pathogens to remain viable on a surface and the rate at which contaminated surfaces are touched by patients and health-care workers.[1,2]

Cell phones have become essential in the medical setting of today to improve communication and as a means for constant information update. However, the extensive use of cell phones by medical professionals can act as a means for transmission of nosocomial agents through their fingers and hands while dealing with patients.[1,2] The purpose of the study is to bring about awareness among health-care professionals regarding this and possible means of prevention.

This cross-sectional study was conducted over a period of 2 months in a tertiary care hospital in South India. The participants were divided into two groups: the test group included professionals who have worked in the surgery ward of the hospital under study, for a minimum period of 3 months, and the control group included nonhealth-care professionals such as rickshaw drivers and shopkeepers. Purposive sampling technique was used. With 95% confidence level and 80% power, $P = 60\%$ with reference to a past study, the sample size came to be 66 in each group.[2] We included only those who used their mobile phones for a minimum period of 3 months. The institutional ethics committee clearance was obtained, informed consent of the participants was taken, and they were made to answer a questionnaire.

Sterile cotton-tipped swabs were dipped in 1 ml sterile saline, swabbed over the sides of the cell phones, rolled over blood agar and MacConkey agar plates, and incubated overnight at 37°C. The colonies obtained were identified using standard techniques.[3] Antibiotic sensitivity testing was done using Kirby–Bauer disc diffusion method.[4]

Double-disc approximation test was for extended-spectrum beta-lactamase determination for the *Klebsiella* spp. and *Escherichia coli* isolates.[4] Cefoxitin 30 µg disc was used to determine methicillin-resistant *Staphylococcus aureus* (MRSA).[4] *D*-test was used to determine the inducible clindamycin resistance in *S. aureus*.[4] Chi-square test was used for the comparison across the groups, and $P < 0.05$ was considered as statistically significant.

Of the 66 forming the test group, 27 (41%) yielded no growth and 39 (59%) yielded scanty bacterial growth. Among the 66 forming the control group, 16 (24.2%) yielded no growth and 50 (75.8%) yielded bacterial growth. Most of the mobile phones yielded coagulase-negative *Staphylococcus* (CONS). Only three mobile phones yielded MRSA. All the three belonged to the participants of the test group [Figure 1]. One of the MRSA isolates was *D*-test positive showing inducible clindamycin resistance. The other two isolates were clindamycin and erythromycin resistant but vancomycin and teicoplanin sensitive. Our results are consistent with the studies conducted in the past.[2,5]

We did not get a statistically relevant correlation when positive answers to all the questions asked through questionnaire were compared with the growth or no growth yielded by their mobile phones [Table 1]. However the mobile phone of most of the participants who practiced hand hygiene before and after mobile phone use, yielded no growth ($P = 0.054$).

There was more awareness among participants of the test group that the mobile phones can become sources of hospital-acquired infection and most of them ensure hand hygiene before using cell phones ($P < 0.001$). Of the three mobile phones that yielded MRSA, all three owners were aware that mobile phones can become a source of infection and only one of these used hand hygiene before and after mobile phone use.

Mobile phones of participants of the control group yielded other than CONS, *Klebsiella* spp., and nonfermenting Gram-negative bacilli. Of the six mobile phones of participants of the control group that yielded heavy growth of *Klebsiella* spp., two of the owners were aware that mobile phones can be the source of infection and none of them followed hand hygiene. A past study showed a reduction in the number of bacteria when the cell phones were disinfected with isopropyl alcohol.[6] However, cleaning the mobile phone is not practically possible. Most of the test candidates of our study used hand hygiene either alcoholic hand sanitizer or soap and water.

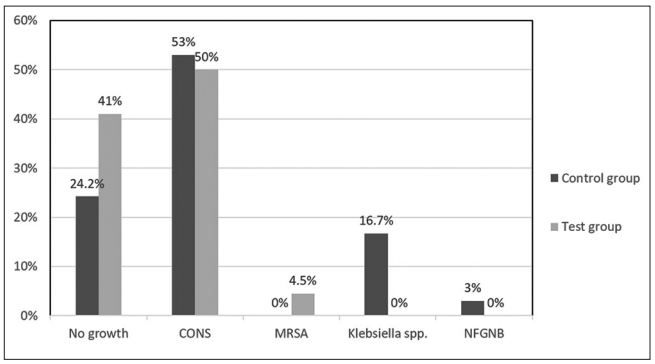

Figure 1: Different organisms isolated from the mobile phones of participants of test and control groups

Table 1: Positive answers for the questionnaire by the participants compared with the growth (*n*=89) or no growth (*n*=43) yielded by their mobile phones

Questions number	Questions	Growth, *n* (%)	No growth, *n* (%)	*P*
Q1	Are you in contact with patients on a daily basis?*	36 (92.3)	24 (88.9)	0.63
Q2	Do you have duty in the OT?*	26 (66.7)	17 (62.9)	0.76
Q3	Are you involved in performing surgeries?*	11 (28.2)	4 (14.8)	0.2
Q4	Do you frequently receive/attend calls on your cell phone during patient hours?*	18 (46.1)	13 (48.1)	0.87
Q5	Do you possess a smart/touch phone?	74 (83.1)	36 (83.7)	0.934
Q6	Do you possess a cover for your phone?	65 (73)	34 (79)	0.45
Q7	Do you carry your phone at all times?	83 (93.2)	41 (95.3)	0.637
Q8	Do you keep your phone in your coat pocket/dress pocket?*	38 (97.4)	26 (96.3)	0.79
Q9	Do you keep your phone away from the ward premises while seeing patients?*	8 (20.5)	5 (18.5)	0.84
Q10	Does your phone come in contact with patients?*	6 (15.4)	5 (18.5)	0.737
Q11	Does your phone come in contact with hospital surfaces or equipment?*	28 (71.8)	16 (59.3)	0.288
Q12	Do you ensure hand hygiene at every step?	30 (33.7)	22 (51.2)	0.054
Q13	Are you aware that your phone can be a reservoir of infection?	46 (51.7)	22 (51.1)	0.955

*Question numbers 1 to 4 and 8 to 11 are not applicable to the control group, so growth (*n*=39) and no growth (*n*=27). OT: Operation theatre

To conclude, handwashing before and after cell phone use by a medical professional can decrease the rate of hospital-acquired infections. More studies of this type will surely bring about increased awareness among health-care professionals reducing the rate of hospital-associated infections.

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Conflicts of interest

There are no conflicts of interest.

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