

## Evaluation of Cellular Phones for Potential Risk of Nosocomial Infection amongst Dental Operators and Auxiliary Staff

V S Nasim<sup>1</sup>, Ahmed Al-Hakami<sup>2</sup>, Mohammed Nadeem Ahmed Bijle<sup>1</sup>, Sulthan Ahmed Al-Manea<sup>3</sup>, Mohammed Dahman Al-Shehri<sup>3</sup>, Saleh Mohammed Al-Malki<sup>3</sup>

### Contributors:

<sup>1</sup>Assistant Professor, Department of Preventive Dental Sciences, Division of Pedodontics, King Khalid University, College of Dentistry, Abha, Kingdom of Saudi Arabia; <sup>2</sup>Assistant Professor, Department of Microbiology, King Khalid University, College of Medicine, Abha, Kingdom of Saudi Arabia; <sup>3</sup>Intern, King Khalid University, College of Dentistry, Abha, Kingdom of Saudi Arabia.

### Correspondence:

Dr. Nasim VS. Department of Preventive Dental Sciences, Division of Pedodontics, King Khalid University, College of Dentistry, Abha, Kingdom of Saudi Arabia. Phone: +966-(0) 55-2620649. Email: nshakela@kku.edu.sa

### How to cite the article:

Nasim VS, Al-Hakami A, Bijle MN, Al-Manea SA, Al-Shehri MD, Al-Malki SM. Evaluation of cellular phones for potential risk of nosocomial infection amongst dental operators and auxiliary staff. J Int Oral Health 2015;7(4):51-53.

### Abstract:

**Background:** This study evaluates cellular phones for potential risk of nosocomial infection amongst dental operators and auxiliary staff in a dental school.

**Materials and Methods:** Each participant's mobile phone was first cleaned with 70% isopropyl alcohol swab. Following the cleansing protocol, the partakers were asked to make a short phone call. The mobile phones were then washed aseptically by rotating damp cotton swabs with sterile normal saline. Bacterial growth was identified on sheep blood agar and McConkey's agar plates. Sabouraud dextrose agar media was used for fungi species. Descriptive statistics was established with the data statistically explored with SPSS version 17.0.

**Results:** About 50% of dental professionals had shown active bacterial and fungal growth in which 35% ( $n=35$ ) were dental operators and 15% ( $n=15$ ) were dental nurses. 53% Gram-positive organisms, 2% Gram-negative organisms, and 3% fungi were identified growths on cellular phones.

**Conclusion:** Thus, it can be concluded that the cellular phones of dental operators as compared to auxiliaries can act as a potential source of nosocomial infection.

**Key Words:** Dentists, dental auxiliary, infectious disease transmission, nosocomial infection

### Introduction

Science and technology have its worth due to continuous evolution of new concepts or advanced modification of existing knowledge throughout the planet. The worth has its establishment due to the dependency variable of humans that exists in today's era. Majority of people are dependent

on science and technology for integration of their routine activities. One of the branches of technology that has gained maximum popularity in recent times is information technology (IT). The practice of ease to access an individual in the current environment is noteworthy. The installation of such a founding was into place by advent of telecommunications, a branch of IT. Over the period of years, with due progress and evolution the branch has shifted considerably from a stable unit to an ambulatory device. Such a device is carrying the property of being compact, easy to store and use, serving purpose of communication and possessing all properties that a stable unit can have, has made its popularity reach peak. Such a device termed "cellular phones," what we understand is become a part of everyone's life without which there may be chances that a person's daily activity will be hampered.

Among the population, health care professionals (HCPs) have no different role to play. Moreover, their dependency is justifiable due to their noble profession that requires immediate access in cases of emergencies. Within the domains in HCPs, dentistry is accepted as an operative field by what the dental surgeon needs infection control to maximum since routine involvement in procedures. Due to their procedural participation, they act in similarity to surgeons and hence correspond to call as a dental surgeon. The access to cellular phones during the procedures would by that disturb the infection control. In addition, there is available literature that speaks about mobile phones as a source of infection<sup>1,2</sup> and its risk of contamination with infection transmission if protocols are violated.<sup>3</sup> Thus, these phones can be regarded as a habitat for microorganisms to breed since its basis to be a transporter for nosocomial infection amongst other professionals, patients, and community. However, the literature available speaks of hospital based environment and not a climate describing clinical dentistry. Very few studies express its relevance in clinical dental surroundings, especially in dental school by what consideration was given only to dental faculty and trainees, specified as chief operator.<sup>4</sup> However, dental nurses also form a significant group of HCPs in a dental environment, whereby their involvement cannot be a mark of ignore. Thus, dental nurses' mobile phones also need microbiological investigation to evaluate its entanglement with the risk that operative dental professionals carry as notified.

Hence, the current study deals with the evaluation of cellular phones for potential risk of nosocomial infection among dental operators and auxiliary staff in a dental school.

### Materials and Methods

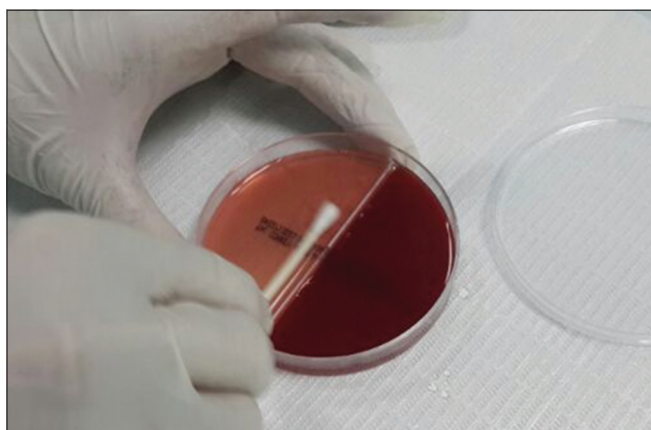
Of the available faculty, students and interns termed as dental operators in comprehension; 50 individuals were randomly selected from the available list. A total of 50 dental auxiliary staff-dental nurses were also selected on randomization as above mentioned.

Each participant's mobile phone was first cleaned with 70% isopropyl alcohol swab. Following the cleansing protocol, the partakers were asked to make a short phone call. The mobile phones were then swabbed aseptically by rotating damp cotton swabs with sterile normal saline over three sites where hands came into contact with the phone being the lateral ends and keypad (Figure 1).

Cultures were done on sheep blood agar and McConkey's agar plates and then incubated at 37°C for 48 h (Figure 2). All plates were examined for visible growth (Figure 3). Based on colonial morphology, Gram-stain, pigmentation and different biochemical reactions, isolates were allocated to appropriate genera. Sabouraud dextrose agar media was used for fungi species.



**Figure 1:** Sterile swab of mobile phones.



**Figure 2:** Swab streaking on agar plates.

The collected data was analyzed using SPSS (Statistical Package for Social Sciences) version 17.0 (IBM Statistics, Chicago, Illinois, USA). Descriptive statistics was established with the data statistically explored.

### Results

A total of 100 specimens were analyzed for bacterial and fungi growth. 50% of dental professionals had shown active bacterial and fungal growth in which 35% ( $n=35$ ) were dental operators and 15% ( $n=15$ ) were dental nurses.

95% Gram-positive organisms, 2% Gram-negative organisms, and 3% fungi were identified growths on cellular phones. Thus, the predominant of all growths was Gram-positive organisms. Among the Gram-positive organism, 22% was *Staphylococcus epidermidis* and 12% was *Staphylococcus aureus*. The traces of *Escherichia coli* and *Aspergillus* species were also noticed (Table 1).

**Table 1: Different bacterial isolates identified from mobile phones of dental professionals.**

Micro-organisms	Percentage
Gram-positive organisms	
<i>S. epidermidis</i>	22
<i>S. aureus</i>	12
MRSA	1
<i>B. subtilis</i>	7
<i>S. pneumoniae</i>	4
<i>S. pyogenes</i>	5
<i>M. luteus</i>	2
Others	42
Total	95
Gram-negative organisms	
<i>E. coli</i>	2
Fungi	
<i>Aspergillus</i> species	3

*S. epidermidis*: *Staphylococcus epidermidis*, *S. aureus*: *Staphylococcus aureus*, MRSA: Methicillin-resistant *Staphylococcus aureus*, *B. subtilis*: *Bacillus subtilis*, *S. pneumoniae*: *Streptococcus pneumoniae*, *S. pyogenes*: *Streptococcus pyogenes*, *M. luteus*: *Micrococcus luteus*, *E. coli*: *Escherichia coli*



**Figure 3:** Media with colony formation.

## Discussion

It was presumed in the study that the mobile phones would carry some bacterial and fungal species and hence was thoroughly decontaminated with an alcohol swab. Also after thorough decontamination, 50% of participants had shown positive growth. This is in differing to the study done by Singh *et al.*<sup>4</sup> whereby following decontamination the bacterial load was significantly reduced to 87%.

Cellular phones of dental operators have shown maximum bacterial and fungal growth in comparison to dental nurses. The effect of notification can be rationalized with the direct involvement of operators when compared to dental nurses in treatment protocol. However, there was positive growth on phones of dental nurses that cannot be ignored.

These growths are potential for development of nosocomial infections with the dental clinics. It has the capacity to the extent even at the community level whereby the patients, professionals and other members of population interact.

Although, *S. epidermis* was found to be a predominant Gram-positive bacteria, but is usually nonpathogenic as compared to *S. aureus* reported second in the investigation which can be both community and hospital acquired with high potential for transmission and infection. However, *S. epidermis* is also a matter of concern in a certain condition where the patient is immune-compromised.<sup>5</sup> *S. aureus* values are in concurrence to the values seen in the study by Singh *S et al.*<sup>4</sup> This study also evaluated the fungal growth that was although in traces, but present with marginal excess when compared to Gram-negative

bacteria. However, the existence of Gram-negative bacteria and fungi seems to be insignificant as compared to the Gram-positive bacterial growth determined.

## Conclusion

Thus, it can be concluded that the cellular phones of dental operators as compared to auxiliaries can act as a potential source of nosocomial infection. The investigators at this moment recommend implementing few standard infection control protocols before and after the procedure to establish infection free area relevant to the cellular phones. The protocols may include the use of disinfection barrier system or regular cleansing with an effective disinfectant. Further randomized control trials are recommended on the subject with multiple institutions and clinical settings to have an effective picture and conclusion over the concern.

## References

1. Badr RI, Badr HI, Ali NM. Mobile phones and nosocomial infections. *Int J Infect Control* 2012;8:5-9.
2. Ulger F, Esen S, Dilek A, Yanik K, Gunaydin M, Leblebicioglu H. Are we aware how contaminated our mobile phones with nosocomial pathogens? *Ann Clin Microbiol Antimicrob* 2009;8:7.
3. Karabay O, Koçoglu E, Tahtaci M. The role of mobile phones in the spread of bacteria associated with nosocomial infections. *J Infect Dev Ctries* 2007;1:72-3.
4. Singh S, Acharya S, Bhat M, Rao SK, Pentapati KC. Mobile phone hygiene: Potential risks posed by use in the clinics of an Indian dental school. *J Dent Educ* 2010;74(10):1153-8.
5. Salyers AA, Whitt DD. *Bacterial Pathogenesis: A Molecular Approach*, 2<sup>nd</sup> ed. Washington, D.C.: ASM Press; 2002.