

Mobile Phones in Dental Clinics: A Possible source Of Infection

Brijesh Ruparelia¹, Nishi Mishra², Tripti Rahangdale³, Nimit Jain⁴, Shivangi Malviya⁵, Syed M Noorani⁶

¹ Professor, Dept of Prosthodontics Crown & Bridge, Mansarovar Dental college, Bhopal.

² Reader, Dept of Oral Medicine & radiology, Mansarovar Dental college, Bhopal

³ Reader, ^{4,6} Senior Lecturer, Dept of Prosthodontics Crown & Bridge, Mansarovar Dental College, Bhopal.

⁵ Senior Lecturer, Dept of Conservative Dentistry & Endodontics, Mansarovar Dental college, Bhopal.

ARTICLE INFO



Keywords:
mobile, dentist, infection

ABSTRACT

A mobile or cellular telephone is a long-range, portable electronic device for personal telecommunication. The vast majority of mobile phones are hand-held. In less than 20 years, mobile phones have gone from being rare and expensive pieces of equipment used primarily by the business elite, to a common low-cost personal item. In many countries, mobile phones outnumber landline telephones since most adults and many children now own mobile phones. A mobile phone is a vital tool for communication for any doctor, but research shows that while a great electronic innovation, this personal item is among the most bacteria infested surfaces we come in contact with everyday. Many studies have revealed high rate of contamination of mobile phones handled by dentist. Mobile phones may act as a reservoir of micro-organism that can be transmitted to the patient. Restriction of mobile phones use in clinics and hospitals should be recommended. This review examines previously investigated risk factors for contamination in addition to work on surface decontamination of the device. Recommendations to reduce contamination risks include staff education, strict hand hygiene measures, guidelines on device cleaning and consideration of the restrictions regarding use of mobile phone technology in certain high risk areas.

Introduction

Mobile phones have become one of the most indispensable accessories of professional and social life. Mobile phones are the reservoir of pathogens as they touch face, ears, lips and hands of different users of different health conditions. Keeping the mobile phones in the pockets, handbags and snug pouches increases the possibility of bacterial proliferation.^{1,2} Warmth and ideal temperature conditions, heat generated by cellphones contribute to harbouring bacteria on the device at alarming rate.³ Once deposited on surfaces, many infectious agents can survive for extended periods unless they are

eliminated by disinfection or sterilization procedures.⁴ However, cell phones that are seldom cleaned and often touched during or after the examination of patients without hand-washing can harbor various potential pathogens and become an exogenous source of nosocomial infections among patients.⁵

Transmission Of Pathogen

Mobile phones may serve as vehicles of transmission. The mobile phone use is highly prevalent among dentist playing a significant role in day-today life.⁶ During every phone call the mobile phones come into close contact with strongly contaminated human body

* Corresponding author: Dr. Nishi Mishra, Reader at Dept of Oral Medicine & Radiology, Mansarovar Dental college Bhopal, Email Address: drnishimishra@gmail.com, contact no. +919584007008

areas with hands to hands and hands to other areas mouth, nose, ears.⁷ Pathogens from the hands of dentist can be transmitted to both sick and healthy individuals.⁸ smallest dental examination involves contact with saliva; and gingival fluid, nasal and mouth breath all potential disease producer as all are in close proximity with the mobile phone. Further the aerosol produced by the airoter and scalar are a mixture of saliva and blood which can transmit bacteria over a considerable distance and these bacteria get harboured in nasal and ear cavities and then get transferred to the mobile phone. Due to this aerosol the mere presence of mobile phone in clinic, can lodge bacteria in them and get transferred with the dental professional moving from one clinic to the other

Microorganisms

The microorganisms discovered belong six genera staphylococcus aureus, coagulase negative, Staphylococci (cons), klebsiella pneumoniae salmonella, Escherichia coli, Proteus. Dental professionals are repeatedly exposed to many microorganisms present in the saliva. As a consequence, the incidence of certain infectious disease is higher among dental professionals than observed for general population.⁹ This is a well known fact that organisms like staphylococcus aureus and coagulase negative staphylococcus resist drying and thus can survive and multiply rapidly in the warm environment like cell phones.¹⁰ Cell phones are more problematic compared to other stationary objects (fomites) in that they facilitate inter wards (and possibly inter facility) transmission and are very difficult to rid of pathogens¹¹.

Bacterial Pathogens Isolated From Doctors Mobile Phones¹²

Sl. No.	Pathogens	Males	Females	Total
1	<i>E. coli</i>	03(60%)	02(40%)	05(6.95%)
2	<i>Salmonella typhi</i>	09(90%)	01(10%)	10(13.88%)
3	<i>Pseudomonas</i>	06(85.71%)	01(14.28%)	07(9.72%)
4	<i>Enterobacter</i>	12(80%)	03(20%)	15(20.83%)
5	<i>Staph. aureus</i>	06(85.71%)	01(14.28%)	07(9.72%)
6	<i>Proteus</i>	01(100%)	00	01(1.38%)
7	<i>Micrococcus leutus</i>	05(71.42%)	02(28.57%)	07(9.72%)
8	<i>Kleb. pneumoniae</i>	04(66.66%)	02(33.33%)	06(8.33%)
9	<i>Kleb. planticola</i>	03(42.85%)	04(57.142%)	07(9.72%)
10	<i>Citrobacter diversus</i>	01(100%)	00	01(1.38%)
11	<i>Citrobacter freundii</i>	01(100%)	00	01(1.38%)
12	<i>Citro. amalonaticula</i>	00(00%)	02(100%)	02(2.77%)
13	<i>Kleb. oxytoca</i>	02(100%)	00	02(2.77%)
14	<i>Providancia stuartii</i>	01(100%)	00	01(1.38%)

Disinfection

Handwashing is considered the single most important intervention to prevent transmission of bacteria and viruses from health care workers.¹² A cross-sectional study was conducted in India to determine the level and type of bacterial contamination of the mobile phones of dental personnel involved in direct patient care and to determine the usefulness of cleaning with 70 percent isopropyl alcohol for decontamination. Dental faculty and trainees in an Indian dental school were asked to participate in a study in which a questionnaire was administered concerning patterns of mobile phone use and disinfection. Swabs from mobile phones of the participants were taken using moist sterile swabs and plated on blood agar plates. The bacteria isolated were identified by biochemical tests. Eighteen percent of the participants (n=9) reported using their phones while attending patients. Nearly 64 percent (n=32) used their mobiles for checking time, and 64 percent (n=42) reported never cleaning their phones. In total, 50 mobile phones were cultured for microorganisms: 98 percent (n=49) were culture-positive, and 34 percent (n=17) grew potentially pathogenic bacteria. There was significant reduction in the mean number of colony-forming units

after decontamination with alcohol (p less than 0.001). The bacterial load was reduced by around 87 percent. The results of this study show that mobile phones may act as an important source of nosocomial pathogens in the dental setting. Therefore, it is important for dental school administrators to encourage higher compliance with hand-washing practices and routine surface disinfection through framing of strict protocols to reduce the chances of occurrence of nosocomial infections.¹³ Researchers conducted a pilot study to estimate the prevalence and type of microorganisms isolated from the mobile phones of 80 health care workers at a Thai hospital before and after alcohol cleansing. The surface of the phone's keypad, mouthpiece, and earpiece was swabbed, and the phone was cleaned with a 70 percent alcohol pad. A second culture swab of the keypad, mouthpiece, and earpiece was obtained one minute later. The researchers reported that 38 participants (47.5 percent) had exposure to multidrug-resistant bacteria at enrollment in the study, and there was an average of two cases per house staff with multidrug-resistant bacteria. Three mobile phones (3.8 percent) had cultures positive for *Acinetobacter* spp. before alcohol cleaning. After alcohol cleansing, no microorganisms were detected. Overall hand hygiene compliance was 39 percent before touching a patient, 29.4 percent before a clean/aseptic procedure, and 47.5 percent after touching a patient's surrounding. Although previous reports identified health care workers' mobile phones as a reservoir for various multidrug-resistant bacteria, none had shown that alcohol cleansing can reduce the detection of bacteria on mobile phones.¹⁴ Other methods can be ultrasonic cleaner which clean mobile phones thoroughly and safely.¹

Specialist Wise Doctor's Mobile Phones

Sr. No.	Specialty	Male	Female	Total No. of mobile phones	Total Pathogens
1	Gynecologist	06	02	08	10(13.8%)
2	General	08	04	12	12(16.6%)
3	Ophthalmologist	01	00	01	01(1.3%)
4	ENT Specialist	02	00	02	03(4.16%)
5	Orthopedics	03	00	03	04(5.5%)
6	Dentists	02	01	03	03(4.16%)
7	Radiologist	01	00	01	01(1.3%)
8	Pediatricians	02	01	03	04(5.5%)
9	Ayurvedic	06	05	11	10(13.8%)
10	Homeopaths	05	01	06	06(8.33%)
11	Surgeons	03	01	04	06(8.33%)
12	Dermatologists	04	02	06	08(11.11%)
13	Anesthetists	02	00	02	02(2.77%)
14	Pathologists	01	00	01	01(1.3%)
15	Critical Care	01	00	01	01(1.3%)
	Total	47	17	64	72(100%)

Conclusion

Mobile phones may act as a reservoir of microorganisms associated with that can be transmitted into the operating environment by dentist. Restriction of mobile phone use in clinically sensitive areas is recommended. Moreover, screening of mobile phones inside the clinics should be done. The training of dentist about strict infection control procedure, hand hygiene, environmental disinfection, and eventually, optimum disinfection methods are of great importance. Lack of awareness regarding the possibility of mobile phone contamination occurring in their grooves and keys suggest the need for creating awareness and ensuring hygienic practices in its handling.

REFERENCES

1. Munish Goel, Asha Goel. BeWare your phone is bugged mobile phones of dental professionals a potential source of bacterial contamination –A Bacteriological study. Indian journal of Dental Sciences 2009; 1:42-47.
2. Oguz Karabay, Esra Kocoglu, and Mustafa Tahtaci. The role of mobile phones in the spread of bacteria associated with nosocomial infections J Infect Developing Countries 2007; 1(1):72-73.

3. Brady RR, Wasson A, Stirling I, McAllister C, Damani NN. Is your mobile bugged? The incidence of bacteria known to cause nosocomial infection in health care workers mobile phones. *J Hospital Infection* 2006;62:123-125.
4. Neff JH, Rosenthal SL. A possible means of inadvertent transmission of infection to dental patients. *J Dent Res* 1957;36:932-4.
5. Jayalakshmi J, Appalaraju B, Usha S. Cell phones as reservoirs of nosocomial pathogens. *J Assoc Physicians India* 2008;56:388-9.
6. Ramesh J, Carter AO, Campbell MH, et al. Use of mobilephones by medical staff at Queen Elizabeth Hospital, Barbados: evidence for both benefit and harm. *Journal of Hospital Infection* 2008; **70**: 160-165.
7. Fatma Ulger, Saban Esen, Ahmet Dilek, Kerametdin Yanik, Murat Gunaydin and Hakan Leblebicioglu Are we aware how contaminated our mobile phones with nosocomial pathogens? *Annals of Clinical Microbiology and Antimicrobials* 2009, 8:7.
8. Ferroni A., Nguyen L., Pron B., Quesle G., Brusset M.C. and Bercher P.: Outbreak of nosocomial urinary tract infection due to *Pseudomonas aeruginosa* in a pediatric surgical unit associated with tap water contamination. *J. Hosp. Infection*. 1998, 38(4):301-307.
9. Goh KT, Chan YW, Wong LYM, Kong KH, Oon CJ, Guan R. The prevalence of hepatitis B virus markers in dental personnel in Singapore. *Trans R Soc Trop Med Hyg* 1988;82:908-10.
10. Usha Arora, Pushpa Devi, Aarti Chadha, Sita Malhotra Cellphones A Modern Stayhouse For Bacterial Pathogens: 2009, 11(3), July-September 127-129.
11. Famurewa, O., David, O. 2009. Cell phone: A medium of transmission of bacterial pathogens. *World Rural Observations*, 1(2): 69-72.
12. Prakash D. Patil, S.A. Pawar Nosocomial hazards of doctors mobile phones *Journal of theoretical and experimental biology*, 8:115-121, 2012.
13. Larsen EL. APIC guideline for hand-washing and hand antisepsis in health care settings. *Am J Infect Control* 1995;23:251-69.
14. 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 Oct; 74(10):1153-8.
15. Sumritvanicha A, Chintanavilas K and Apisarnthanarak A. Prevalence and Type of Microorganisms Isolated from House Staff's Mobile Phones before and after Alcohol Cleaning. *Infection Control and Hospital Epidemiology*. Vol. 32, No. 6. June 2011.

Source of support: Nil Conflict of Interest: None
Online available at: www.joadms.org