ABSTRACT

Background: The objective of this study was to determine the contamination rate of the healthcare workers’ (HCWs’) mobile phones and hands in operating room and ICU. Bacteria from HCWs’ hands could be transferred to the surfaces of the mobile phones during their use. Total 100 samples were collected from healthcare workers’ (HCWs’) hand and their mobile phones. Mainly five types of gram +ve and gram –ve bacteria were isolated. 95% of the mobile phone was contaminated with bacteria. The prevalence of bacteria in case of HCWs’ hands was E.coli (80%), Klebsiella (65%), Staphylococcus (60%), Streptococcus (35%) and Proteus (28%). The prevalence of bacteria in case of mobile phones was E.coli (70%), Klebsiella (75%), Staphylococcus (65%), Streptococcus (40%) and Proteus (30%). 100 HCWs’ hands and 100 mobile phones samples were cultured.

In total, 95% of phones demonstrated evidence of bacterial contamination with different types of bacteria. The prevalence of bacteria in case of HCWs’ hands was E.coli (80%), Klebsiella (65%), Staphylococcus (60%), Streptococcus (35%) and Proteus (28%). The prevalence of bacteria in case of mobile phones was E.coli (70%), Klebsiella (75%), Staphylococcus (65%), Streptococcus (40%) and Proteus (30%). Distributions of the isolated bacteria from mobile phones were similar to hands isolates. Some mobile phones were contaminated with nosocomial important bacterial pathogens.

Conclusion: These results showed that HCWs’ hands and their mobile phones were contaminated with various types of bacterial pathogens. Mobile phones used by HCWs in daily practice may be a source of nosocomial infections in hospitals.

Keywords: Contamination, Mobile phone contamination.

INTRODUCTION

Nosocomial infection is an important problem in all modern hospitals. As early as 1861 Semmelweis [1] demonstrated that bacteria were transmitted to the patients by the contaminated hands of healthcare workers. Hospital operating rooms (OR) and intensive care units (ICU) are the workplaces that need the highest hygiene standards, also the same requirements for the personnel working there and the equipment used by them. Some epidemiological studies have implicated environmental surfaces in the transmission of bacteria [2–4]. Mobile phones are widely used as nonmedical portable electronic devices and it is in close contact with the body. It is used for communication by healthcare workers in every location including OR and ICU. Studies do not include direct comparisons of transmission rates of bacteria from surfaces to hands. The risk of infection involved in using mobile phones in the OR and ICU has not yet been determined as there no cleaning guidelines available that meet hospital standards. However, the mobile phones are used routinely all day long but not cleaned properly, as healthcare workers hands may do not wash their hands as often as they should. The aim of the present study was to evaluate the role of mobile phones in relation to transmission of bacteria from the mobile phone to the healthcare workers’ hands.

METHODS

The study was conducted in Dr. Puran Chand medical hospital. Total 100 samples were collected from healthcare workers (HCWs’) hand and their mobile phones. A sterile swab moistened with sterile saline were rotated over the surface of both sides of mobile phones; second swab was rubbed over the entire ventral surface of the dominant hand (including ventral surfaces of the thumb and the fingers) of HCWs’. The sampling of the dominant hand and mobile phone swabs (twice for hands and twice for mobile phones) were immediately streaked onto two plates of blood agar supplemented, Nutrient agar and eosin methylene blue agar. Plates were incubated aerobically at 37 °C for 48 h. The isolates obtained were identified on the basis of colony morphology and biochemical reactions.

RESULTS

The rate of bacterial contamination of mobile phones was 95% and 98% in case of healthcare workers (HCWs’) hands. The isolated microorganisms from mobile phones and hands were similar. Some of them are known to cause nosocomial infections. Hand contamination rates of HCWs were more than mobile phones. Total 100 samples were collected from healthcare workers’ (HCWs’) hand and their mobile phones. Mainly five types of gram +ve and gram –ve bacteria were isolated. 95% of the mobile phone was contaminated with bacteria. The prevalence of bacteria in case of HCWs’ hands was E.coli (80%), Klebsiella (65%), Staphylococcus (60%), Streptococcus (35%) and Proteus (28%). The prevalence of bacteria in case of mobile phones was E.coli (70%), Klebsiella (75%), Staphylococcus (65%), Streptococcus (40%) and Proteus (30%). 100 HCWs’ hands samples and 100 mobile phones samples were cultured. In total, 95% of phones demonstrated evidence of bacterial contamination with different types of bacteria. The prevalence of bacteria in case of HCWs’ hands was E.coli (80%), Klebsiella (65%), Staphylococcus (60%), Streptococcus (35%) and Proteus (28%). The prevalence of bacteria in case of mobile phones was E.coli (70%), Klebsiella (75%), Staphylococcus (65%), Streptococcus (40%) and Proteus (30%). Distributions of the isolated bacteria from mobile phones were similar to hands isolates. Some mobile phones were contaminated with nosocomial important bacterial pathogens.

DISCUSSION

The possibility transmissions of nosocomial pathogens by electronic devices such as personal digital assistants, hand held computers, and bedside applications were previously reported and some of them were epidemiologically important drug-resistant pathogens [5–6]. Isaacs et al. [5] showed that the main growth was of coagulase-negative staphylococci from 25 keyboards. Two keyboards grew S. aureus, both of which samples were susceptible to
methicillin/flucloxacillin. Neely et al. [7] also identified nosocomial A. baumannii infection on keyboards as a reservoir in burn units and ICUs. Butz et al. [8] stated that immobile phones might carry pathogens as well; stationary phones in a daycare facility were contaminated with rotavirus Rusin et al. [9] documented that hand-to-mouth transfer of microbes after handling contaminated fomites during casual activities. Singh et al. [10] reported that over 47% of immobile phones were contaminated with pathogenic microbes. These results suggested that close contact objects that were contaminated could serve as reservoirs of bacteria where could be easily transmitted from the mobile phone to the HCWs’ hands. During every phone call the mobile phones come into close contact with strongly contaminated human body areas with hands to hands and hands to other areas (mouth, nose, ears). Here in mobile phones are particularly problematic when compared to immobile devices and it may facilitate transmission of bacterial isolates from patient to patient in wards or hospitals. Some authors [11–12] showed that HCWs' mobile phones were contaminated with nosocomial pathogens. The result of our study demonstrated cross transmission of bacteria between HCWs’ dominant hands and mobile phones. Gram negative bacteria are very important nosocomial pathogens. Our study demonstrated that the isolated microorganisms from hands and phones were similar. It is clear that it is not possible to estimate the level of bacterial contamination with one sampling technique. Borer et al. [11] observed that there were contaminations of hands and mobile phones. The contamination of mobile phones could be risky when carried outside the hospital environment. Limitation or crackdown of these items would be unpractical strategies for preventing nosocomial contamination of mobile phones could be risky when carried outside the hospital environment. Limitation or crackdown of these items would be unpractical strategies for preventing nosocomial infections.

According to these results it is obvious that, the training of healthcare personnel about strict infection control procedure, hand hygiene, environmental disinfection and eventually, optimum disinfection methods are of great importance. Otherwise, the potential benefit of using mobile phones by the personnel for private communication or emergency situations in ICU or OR would change into this means of communication detrimental to hospital hygiene. Therefore, near the hand hygiene, cleaning of these devices should be kept in mind. Prevention of contamination risk of nosocomial pathogens and infections stands out as a problem that must be weighed in mind. Developing active preventive strategies like routine decontamination of mobile phones with alcohol containing disinfectant materials might reduce cross-infection. Another way of reducing bacterial contaminations on mobile phones might be the use of antimicrobial additive materials. We could easily avoid spreading bacterial infections just by using regular cleansing agents and rearranging our environment. In the future mobile phones could be produced by using protective material against the bacterial contamination.

REFERENCES