

## Original Research Article

### Prevalence of Bacterial Contamination on Mobile Phones of Medical Staff in Shendi Hospitals-Sudan

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**Abstract: Back ground:** The goal of this cross-sectional descriptive study was to isolate and identify several bacterial species in mobile phones among hospital staff at Almak Nimer University Hospital and Shendi Teaching Hospital in Shendi town, River Nile State, North of Sudan. Between December 2019 and November 2020, the research was carried out. **Methodology:** One hundred (100) swabs were randomly taken from the phones of male and female medical staff volunteers from Almak Nimer University Hospital and Shendi Teaching Hospital, Blood agar and MacConkey agar were used to grow the specimens. Finally, colonial morphology, gram stain, and biochemical tests were used to identify the isolated bacteria. **Results:** Eighty-seven (87) mobile phones were discovered to be cultured positive in the research (87 %). The isolated organisms were: *S. aureus* (28; 32%), Coagulase gram negative staphylococci (26; 30%), *Bacillus* spp (16; 18%), *P. aeruginosa* (7; 8%), *K. pneumonia* (5; 6%), *E. coli* (4; 4%) and Diptheroid (1; 1%). Laboratory technicians (93%) were the most likely to be contaminated, followed by nurses (88%), physicians (80%), and pharmacists (50%). In terms of gender contamination, females account for 87%, while males account for (86 %). **Conclusion:** The results of this study showed that medical staff's phones might be a source of nosocomial infection.

**Keywords:** Bacteria; Contamination; Shendi; Sudan.

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## INTRODUCTION

Cell phones have become one of the most important items in our social and professional lives, and their usage by healthcare personnel has increased. In health care facilities, mobile phones have enhanced the spread of communication and interaction, resulting in speedier and more effective health care delivery (Reihaneh Hosseini Fard *et al.*, 2018).

In all modern hospitals, hospital-acquired infection, also known as nosocomial illness, is a significant problem. Semmelweis proved that bacteria

were transmitted to patients by contaminated hands of health care personnel as early as 1861(Jeske *et al.*, 2007).

More so, patients, visitors, and health-care staff frequently use cell phones in hospitals. Mobile phones, on the other hand, are frequently handled during or after patient examinations without being cleaned, and can carry a variety of bacteria, making them a potential cause of nosocomial infections among patients and even medical personnel (ReihanehHosseiniFard *et al.*, 2018).

In both human and veterinary medicine, nosocomial infection is a growing source of morbidity and mortality. Concerns about bacteria correlated with mobile phone usage in the hospital setting have been raised in human medicine, with findings demonstrating that 9 - 43 % of human health care worker mobile phones are contaminated with bacteria known to cause hospital acquired infections (Timothy *et al.*, 2012).

Some epidemiological studies have linked research to the spread of bacteria, and a few studies from India and Spain have shown that mobile phones may potentially play a role in the spread of diseases in health-care systems and a potentially life-threatening illness may be caught through a doctor's mobile phone in a hospital, causing everyone to be concerned (Tambekar *et al.*, 2008).

## MATERIAL AND METHODS

A descriptive cross-sectional research was conducted with 100 participants drawn from the medical staff of two major Shendi hospitals: Almak Nimer University Hospital and Shendi Teaching Hospital. Using sterilized cotton swabs; a simple random approach was used to gather specimens from mobile phones. Before swabbing the target phones, the swabs were soaked in sterile normal saline. The swabs were then swiftly placed in their containers and delivered to the laboratory for analysis (Kawo and Musa, 2013). The specimens were inoculated on blood agar and mac Con key plates and aerobically incubated at 37 oC for (18-24) hours. The plates were inspected to see whether there was any substantial bacterial growth. The isolates' growth and colonial morphology were examined on plates. Gram positive cocci were examined for catalase, coagulase development, mannitol utilization, and DNase test, whereas gram

negative bacilli were tested for oxidase, kligler iron test, citrate utilization test, urease test, motility test, and indole test.

## ETHICAL CONSIDERATION

The ethics committee of Shendi University's College of Medical Laboratory Science in Sudan accepted this study. Participants signed an informed consent form. To protect the anonymity of participants' identities, names and personal information were encrypted and stored in codes.

## DATA ANALYSIS

Microsoft Excel 2007 was used to analyze, record, and analyze data. Frequencies and percentages were used to convey proportional statistics.

## RESULTS

A total of one hundred (100) swabs were taken from the phones of medical staff in various departments at assigned hospitals (Physicians, Nursing, Laboratory and pharmacy). Bacterial growth was identified in (87;87%) of the samples, as indicated in table (1).

Different bacterial strains were isolated such as *S. aureus* (28; 32%), Coagulase gram negative staphylococci (26; 30%) *Bacillus* spp (16; 18%), *P. aeruginosa* (7; 8%), *K. pneumoniae* (5; 6%), *E. coli* (4; 5%), and Diptheroid (1; 1%) as shown in table (2).

The following are the estimates of mobile phone contamination among various medical staff: laboratory technician (93%) followed by nursing (88%), physician (80%) and pharmacist (50%), as appeared in table (3), with predominance of female gender (87%) versus male (86%) as demonstrated in table (4).

**Table-1: Frequency of Bacterial growth (n= 100)**

Bacterial Growth	Number	Percentage (%)
Yes	87	87
No	13	13

**Table-2: Frequency of isolated organisms (n = 87)**

Organism	Frequency	Percentage (%)
<i>S.aureus</i>	28	32
Coagulase gram negative staphylococci	26	30
<i>Bacillus</i> spp	16	18
<i>P.aeruginosa</i>	7	8
<i>K.pneumoniae</i>	5	6
<i>E.coli</i>	4	5
Diptheroid	1	1
Total	87	100

**Table-3: Frequency of contamination among different medical specialties (n=100)**

Department	Number of specimen	Frequency of contamination	Percentage of contamination
Laboratory technicians	46	43	93
Nurses	25	22	88
Physicians	25	20	80
Pharmacists	4	2	50

**Table-4: Frequency of mobile phones contamination according to gender No (100)**

Gender	Number of specimen	Frequency of contamination	Percentage of contamination
Male	44	38	86
Female	56	49	87

## DISCUSSION

Medical personnel's cellphones are seldom cleansed and are frequently handled during or after patient examinations and specimen handling without adequate hand cleaning (Usha *et al.*, 2009). Furthermore, mobile phone sharing between health-care employees and non-health-care workers may directly accelerate the transmission of bacteria that are potentially pathogenic (Lavanya *et al.*, 2013).

In this investigation, bacterial growth was found on 87 percent of mobile phones. Similar finding was documented by Bodena *et al.* (2019) (94.2%). However, lower rates of bacterial contamination were also stated by Jagadeesan *et al.* (2013). The variations observed might be due to differences in infection control practices or the frequency with which mobile phones are cleaned during work time, hand washing practices, the pattern or policy of mobile use in the hospital, and health professionals' awareness of the role of a mobile phone in microbial transmission.

*Staphylococcus aureus* was the most prevalent bacterial agent isolated with (32%) of all the mobile phones of the study subjects evaluated, similar to the findings of Famurewa and David (2009) in which *S. aureus* was the most frequently encountered bacterial agent isolated from (32.9%) of the samples.

In line with previous research, the present investigation found that the most common source of contamination was among laboratories (Bodena *et al.* 2019). This might be owing to their close proximity to specimens, as there was no gender disparity in cell phone contamination (Sailo *et al.* 2019; Bodena *et al.* 2019).

## RECOMMENDATION

Medical personnel should clean their phones after each usage, wash their hands after touching patients, and create and follow mobile phone use standards in hospital practice.

## CONCLUSION

The results of this study revealed that medical staff's cellphones might be a source of hospital acquired infection.

## Conflict of interest

The authors declare no conflict of interest with any party pertaining to this research.

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