

Comparative Study

## Evaluation the Role of Mobile Phone in Microbial Transmission to Nurses` Hands in Hospital Critical areas

Authors

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**Abstract**

**Background:** *The use of cell phones often occurs in hospitals, by patients, visitors and health care workers, and this is one environment where hospital-associated infection is most prevalent.*

**Aim:** *this study was carried out to evaluate the role of mobile phone in microbial transmission to nurses` hands in hospital critical areas.*

**Subjects and Method: Research Design:** *A descriptive comparative design was used.*

**Setting:** *Critical areas at Al-Ansar and Ohud hospitals at AL-Madinah Almunawra*

**Subjects:** *The study was conducted on The study comprised a systematic random sample of 120 nurses who use mobile phones and divided to main two groups. The first group:- composed of 60 nurses who worked in Intensive. The second group:- composed of 60 nurses who worked in Emergency Department.*

**Tools of data collection:** *that have been used for collecting the data were structured interviewing questionnaire and swaps analysis from both nurse`s hands and their mobile phone..*

**Results:** *revealed that the age ranged from 26 to 31 years old for two group respectively. 77 % of the two groups respectively were female. That nurses` knowledge regarding the role of mobile in microbial transmission to their hands were 54% of the samples had CoNS. Followed by S. Aureus with 16% at ICU*

**Conclusions:** *majority of nurse's relatives used mobile outside the hospital about smart phone and its role in the transmission of infection among nurses. the majority of nurses didn`t disinfect their mobile phone during the work time less than half of both studied nurses had good knowledge about mobile phone and its role in the transmission of microorganisms and source of information.*

**Recommendations:** *Identifying efficient and effective disinfection methods related to smart phone bacterial transmission may reduce the spread of infection*

**Keywords:** *Smartphone, Nosocomial Infection, Bacterial Contamination.*

**Introduction**

Mobile phone is one of the necessities of life that takes place socially and professionally. However,

it plays role as a perfect substrate for microorganisms and may work as a factor in transmitting microbial infection infections. Its

utilization has increased and it goes viral in the health care system <sup>(1-2)</sup>. Mobile phones have become one of the most indispensable accessories of professional and social life. They are increasingly becoming an important means of communication worldwide being easily accessible, economical and user-friendly. They are widely used by the healthcare workers (HCWs) and non-HCWs equally in every location. With all the achievements and benefits of the mobile phone, it is easy to overlook the health hazard it might pose to its many users <sup>(3)</sup>.

Mobile phones can be the key reasons for many health problems. This risk due to their casualness or lack of knowledge of hand hygiene for instance. For instance, some of the nurses keep touching various surfaces while practicing their health care activities such as, examining the patients, providing nursing care, processing samples etc. Therefore, they are more likely to get contaminated by varieties of organisms, some of which could be pathogenic. <sup>(1,4)</sup> . The constant handling of mobile phones by users in hospitals (by patients, visitors and HCWs, etc.) makes it an open breeding place for transmission of microorganisms, as well as health care-associated infections (HAIs). This is especially so with those associated with the skin due to the moisture and optimum temperature of human body especially our palms <sup>(5)</sup>.

These factors and the heat generated by mobile phones contribute to harboring bacteria on the device at alarming levels. When we consider a phone's daily contact with the face, mouth, ears, and hands, the dire health risks of using germ-infested mobile devices are obvious <sup>(3)</sup>. Contaminated mobile phones are hazardous to patients and may also pose a threat of spreading infections into the community<sup>(6)</sup> In one study, 88% to 89.5% of study participants never cleaned their mobile phones and pagers were often touched during or after the examination of patients without hand washing. Microbial contamination is a risk associated with the infrequent cleaning of phones. <sup>(7)</sup>. So This study was conducted to

determine the potential of mobile phones to harbor microorganisms In ICU environments and Emergency Department and to evaluate its role in their transmission from the mobile phone to HCWs' hands.

### Significance of the study

After the use of a mobile phone, the rate of bacterial contamination of HCWs' hands increased to 30/32 (93.7%). One bacterial species was isolated from 27/30 (90%) of HCW's hands, 3/30 (10%) grew 2 different bacterial species (*Klebsiella pneumoniae* and coagulase negative *Staphylococcus*) while no bacterial growth was detected in 2/32 (6.2%) of HCWs' hands (table I). the rate of mobile phone contamination was again 30/32 (93.7%). One bacterial species was isolated from 28/30 (93.3%) of mobile phones, 2/30 (6.6%) grew 2 different bacterial species (*S. aureus* and *Bacillus anthracoid*) while no bacterial growth was detected in 2/32 (6.2%) of mobile phones <sup>(20-22)</sup>. Microbiological analysis revealed that, same microorganisms were recovered from both mobile phones and HCWs' hands that were carrying the phone with the same antibiograms and same biochemical profiles. Two isolates of *S. aureus* 2/14 (14.3%) were meticillin resistant whereas 10/26 (38.5%) of Gram-negative bacilli were MDr.<sup>(23)</sup>.

### Aim of the study

To evaluate the role of mobile phone in microbial transmission to nurses` hands in hospital critical areas..

### Research Questions:

- Dose the nurses who work in the critical areas aware about the role of mobile phone in microbial transmission?
- What is the most common bacteria that transmitted by the mobile phones to nurses' hands?

### Subjects and methods

#### Research design

A descriptive comparative study was used to

conduct the present study

**Setting:** The study was carried out the study was conducted on nurses in Intensive Care Unit and Emergency Department at Al-Ansar and Ohud hospitals - AL-Madinah Almunawra

**Subjects:** The study comprised a systematic random sample of 120 nurses who use mobile phones and divided to main two groups. The first group:- composed of 60 nurses who worked in Intensive The second group:- composed of 60 nurses who worked in Emergency Department. to Mandala et al.,(2010) <sup>(24)</sup> and OR 5.4 according to Khorana et al., (2006) <sup>(25)</sup> with at least 80% power at Two-sided 95% significance level and ratio of

two groups 
$$n = \left(\frac{r+1}{r}\right) \frac{\sigma^2 (Z_{\beta} + Z_{\alpha/2})^2}{(\text{difference})^2}$$
 They were assigned randomly and alternatively divided into two equal groups, 60 nurses for each groups.. nurses were selected according to the following criteria:

- Smart Phones users.
- Nurses in critical areas.
- Willing to participate in the study.

#### **Tools of data collection:**

The first and second tools were developed by the researcher. and the other part developed by researcher after reviewing the related literature <sup>(20)</sup>

#### **Tool I:**

Structured interview questionnaire about nurses' knowledge about contact mobile and its role in transmission of infection, which includes two parts as the following:-

**Part 1:** Nurses' demographic data such as: name, age, gander, education and work area, contact information, e.g. phone number, email address.

**Part 2:** Questionnaire sheet composed of questions related to the transmission of microbial infection by mobile phones. Each nurse was asked to answer the questionnaire while the microbiological cultures were taken..

**Part 3:** Microbiological cultures result.

#### **Tool II:**

An observational checklist of mobile phones usage.

#### **Field work**

- Data collection extended from the first January, 2016 until December, 2016. Nurses who agreed to participate in the study and fulfilling the inclusion criteria were included in the study.
- A sample was taken of 120 shared mobile phones routinely used by nurses who worked in critical areas. The collection occurred in two units from ICU and Emergency department as well as sixty samples taken from each unit.
- The studied nurses were asked to perform hand hygiene with alcohol-based foam before asking them to make short call.
- Samples from mobile phones were collected using sterile cotton swabs. Each swab was first moistened with sterile peptone water and was rotated over the surface of both sides of the tested mobile phone together with the keypad in non touch screen phones.
- All swabs were immediately streaked (surface spread) over the surface of blood and MacConkey's agar plates. The cotton ends of these swabs were cut off and soaked in 10 ml peptone water.
- Taking swap from nurses' contaminated hands for culture and bacterial recovery then enumeration after using mobile phone .To recover bacteria from the hands, using Blood agar for one day . All inoculated blood and MacConkey's agar plates together with the inoculated peptone water tubes were transferred rapidly to the microbiology laboratory at King Fahd Hospital
- At the end assessment of nurses' knowledge and observation of mobile usage by using tool 1 and 2,. It took about 30- 45 minutes.

#### **Content validity and Reliability:**

All tools were tested for face and content validity by doing jury with academic staff consisted of 5 experts of various departments. 3 experts in the

field of Medical Surgical Nursing, Faculty of Nursing, Menofia and Zagazig University, and 2 experts in the field of microbiology medicine, Faculty of Asuite and cairo University. Modifications were done to ascertain relevance and completeness. All tools were tested using a test retest method and a person correlation coefficient formula was used. The period between each test was two weeks. It was 0.97 for tool one, 0.89 for tool two.

#### **Pilot study:**

The purpose of the pilot study was to ascertain the clarity, the applicability and the time needed to fill in the questionnaire. This study was conducted with a sample of 12 nurses in total from ICU and Emergency Department. It is important to know those who participate in the pilot study were excluded from the main study sample. The feedback was considered and applied to develop the final form of the questionnaire.

#### **Administration and ethical consideration:**

The protocol was approved by the ethical committee .Nurses were approached and informed about the purpose of the study before being asked to participate and an oral consent to participate in the study was obtained from them. The assurance of anonymity will be addressed prior to the request for participation. Anonymity of participants will be provided in two ways: The participants are asked not to write their names on the questionnaire; all this information will be remained confidential. In addition, they will be reassured that their participation in the study is voluntary .Also, they will be informed that they could withdraw from the study at any time if they decided not to participate. Confidentiality and privacy will be maintained by data coding to eliminate identifying data with personal information.

Statistical analysis: Data were revised, coded, tabulated and analysis in a personal computer using SPSS program -version 22. The following statistical techniques were used frequencies and percentages .Data were presented using descriptive statistics in the form of frequencies

and percentages for qualitative variables, and means and standard deviations for quantitative variables.

#### **Result**

**Table (1)** evident that about half of studied nurses worked in Emergency department while the other half worked in ICU with no statically difference. Regarding to gender of studied nurses more than half of studied nurses were female in both area of study with no statically difference. In relation to aged of studied nurses was ranged from 20 to 40 years while the mean and standard deviation was  $22.8 \pm 0.83$ .with no statically difference. Regarding to level of education more than half nurses in Emergency Department had diploma of nursing while about 37%of studied ICU nurses had diploma of in nursing with no statically difference. Regarding to the years of experiences the majority of nurses in both ER and ICU had experiences more than 5 years with no statically difference..

**Table (2):** Demonstrates that about 33% studied nurses in ICU and 40% in of studied nurses in ER wash their hands for 15-20 times during their duties with no statically difference detected among studied groups. As reflected in the table, 30% of the studied nurses who work in ER use the mobile phone 2 to 6 times during their shift. On the other hand, in ICU 60% of the studied nurses use mobile phone only twice with statically significance deference. The results also show that about 20% of the nurses at both units clean their mobiles with antiseptic, 10% of the nurses at ER and 15% at ICU clean their mobile phones at beginning of the shift. Near about two third 73% at ER and 60 % at ICU other individuals outside the hospital use their mobile phone with no statically deference respectively.

**Table (3)** cleared that about majority of the studied nurses at both units were not have knowledge about all of the hazard of mobile phones. And about less than half of studied nurse in Emergency Department and ICU had a good knowledge. The majority of nurses in both units

know that mobile is a significant factor to transmit the microbial infection with statically significance difference detected among studied nurses respectively . For the latest, 33 % from studied nurses in Emergency Department and 38% from studied nurses in ICU, claimed that the source of their knowledge was obtained from their colleague with statically significance difference detected among studied nurses respectively about their knowledge about the source of their information

**Table (4)** Illustrated that the ER department has the highest prevalence of nosocomial infection at Al-Ansar and Ohud hospitals with percentage 30% and 46.7% respectively. The external cover was 40%, followed by keypad which was 33.3%, and the earpiece 23.3% while mouthpiece was 20%. The swab culture of nurse mobiles among Ohud hospital was external cover account 60% followed by 45% from keypad, mouthpiece 43.3% and earpiece 36.7%.

**Figure (1)** showed that the most frequent isolated species of microbial infection bacteria from the mobile phones of the 60 nurses at Emergency Department was *S. Epidermidis* with 50%. The second most occurring species was *hylococcus Saprophyticus*, which was found in 34% of the samples. The figure also demonstrates that *S. Aureus*, *CoNS*, *Streptococcus Gamma Hemolytic*, and *Streptococcus* were the third most prevalent microbial infection bacteria that found in 4% phones.

**Figure 2:** showed that 54% of the samples had *CoNS*. Followed by *S. Aureus* with 16%, *Gamma Hemolytic* with 8%, and *MRSA* with 5%. The figure also shows that some bacteria appear with a very small percentage “3% “ such as *Klebsiella*, *H. Kunzii*, *Leclercia Adecarboxylata*, *Leuconostoc Mesenteroides ssp Cremoris*, and *Staphylococcus Pseudintermedius* bacteria from the mobile phones of the 60 nurses at ICU Department .

**Table (1):** Distribution of the staff nurses according to their Socio Demographic characteristics (N=120):

p-value	t-test	ICU (n=60)		Emergency Department (n=60)		Items	
		%	No	%	No		
n.s	34.7	50 %	60	50 %	60		Work Area
		23 %	14	23 %	14	Male	Gender
n.s		77 %	46	77 %	46	Female	
n.s	0.17	63 %	38	70 %	42	Saudi	Nationality
		37 %	22	30 %	18	Non Saudi	
n.s	0.600	20 %	12	13 %	8	20-25 Years	Age
		37 %	22	53 %	32	26-30 Years	
n.s	3.45	43 %	26	13 %	8	31-35 Years	
		0	0	20 %	12	36-40 Years	
		22.8 ± 0.83				Mean±SD	
		60 %	36	57 %	34	Diploma	Education Level
n. s	0.13	40 %	24	43 %	26	Bachelor	
		20 %	12	27 %	16	>5 Years	Experience
n. s	3.7	80%	88	73%	44	<5Years	

\*\*significance difference , (n. s) no st

**Table (1):** Numbers and percentage distribution of nurses' knowledge about contact with mobile phones.

	p-value	X2-test	ICU (n=60)		Emergency Department		Items	
			%	No	%	No		
n. s	2.5		3 %	2	10 %	6	0-5	How many times did you wash your hand during work time?
			30 %	18	27 %	16	5-10	
			27 %	16	30 %	18	10-15	
			40 %	24	33 %	20	15-20	
**	14.0		60 %	36	27 %	16	0-2	How many hours did you using the mobile phone during work time?
			13 %	8	30 %	18	2-4	
			20 %	12	30 %	18	4-6	
			7 %	4	13 %	8	6-8	
n. s	1.6		80 %	48	20 %	12	Yes	Do you ever clean your mobile phone with antiseptic
			20 %	12	80 %	48	No	
**	2.28		3 %	2	10 %	6	At beginning only	If Yes: How many times did you clean your mobile
			1.6 %	1	3 %	2	At beginning and during	
			1.6%	1	3%	2	At beginning and end	
	24	n. s	73.3%	44	3%	2	At end only	Dose other individuals outside the hospital use your mobile phone?
			40 %	24	73 %	44	Yes	
			60%	36	27 %	16	No	

**Table 2:** Nurses` knowledge regarding to mobile phone and it's relation of infection transmissions.

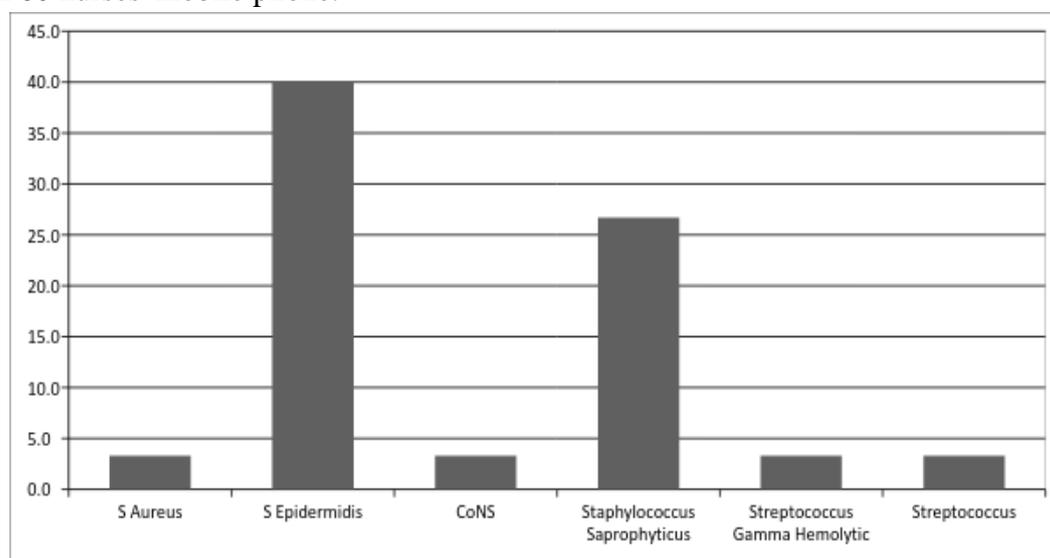
P-value	X2	ICU (n=60)		Emergency Department (n=60)		Items	
		%	No	%	No		
**	10.3	80 %	48	80 %	48	Yes	Do you know hazard of mobile phone as microbial transmission ?
		20 %	12	20 %	12	No	
**	11.2	33 %	20	33 %	20	Poor Knowledge	If yes rink it from 1 to 12:
		43 %	26	40 %	24	Good Knowledge	
		3 %	2	7 %	4	Excellent Knowledge	
		20 %	12	20 %	12	Didn't know	
n.s	0.0	80 %	48	80 %	48	Yes	Do you think the mobile phone can transmit the microbial infection?
		20 %	12	20 %	12	No	
**	13.9	7 %	4	7 %	4	Book and Journal	If yes the sources of your information:
		7 %	4	12 %	7	Social Media	
		12 %	7	8 %	5	TV and Radio	
		17 %	10	20 %	12	Infection control department	
		38 %	23	33 %	20	Colleague	

\*\*significance difference , n. s no statically difference

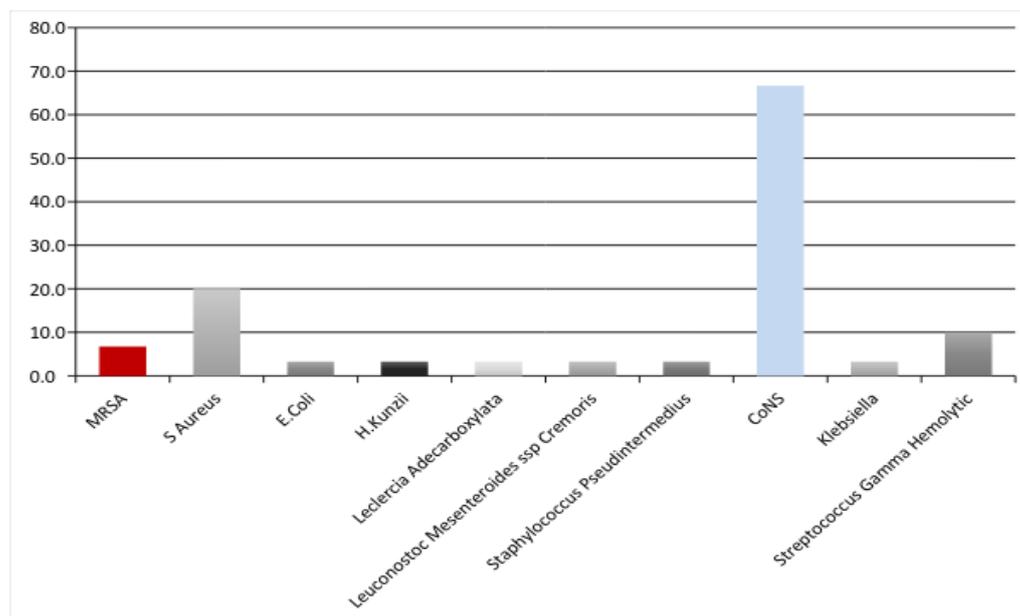
**Table 4:** Distribution patterns of Bacteria from 120 nurse's staff mobile phones in critical area at Al-Ansar and Ohud Hospital.

Ohud hospital (n=60)								Al-Ansar hospital (n=60)				Items	
NICU		PICU		ICU		ER		ICU		ER			
%	No	%	No	%	No	%	No	%	No	%	No		
3.3 %	2	3.3 %	2	6.7 %	4	23.3 %	14	6.7 %	4	16.7 %	10	Positive	Earpiece
23.3 %	14	6.7 %	4	6.7 %	4	26.7 %	16	43.3 %	26	33.3 %	20	Negative	
10.0 %	6	6.7 %	4	3.3 %	2	23.3 %	14	10.0 %	6	10.0 %	6	Positive	Mouthpiee
16.7 %	10	3.3 %	2	10.0 %	6	26.7 %	16	40.0 %	24	40.0 %	24	Negative	
10.0 %	6	10.0 %	6	6.7 %	4	30.0 %	18	10.0 %	6	23.3 %	14	Positive	Keypad
16.7 %	10	0.0	0	6.7 %	4	20.0 %	12	40.0 %	24	26.7 %	16	Negative	
6.7 %	4	10.0 %	6	10.0 %	6	33.3 %	20	16.7 %	10	23.3 %	14	Positive	External Cover
20.0 %	12	0.0	0	3.3 %	2	16.7 %	10	33.3 %	20	26.7 %	16	Negative	

**Figure 1:** The overall percentage distribution of microbial infection bacteria in Emergency Department sampled from 60 nurses' mobile phone.



**Figure 2:** The overall percentage distribution of microbial infection bacteria in ICU sampled from 60 nurses mobile phones.



## Discussion

The mobile phone use is highly prevalent among medical staff playing a significant role in day-to-day life and contributes positively to their ability to communicate concerning hospital affairs.<sup>7</sup> However; this referred only to technical aspects and gives no consideration of their possible role in transmission of infections. Kilic, et al. (2009)<sup>(8)</sup>

Regarding the socio-demographic characteristics of the studied nurses, our study revealed that the majority of sample were from female this finding agree with Meadow, et al. (2014)<sup>(9)</sup> who reported that women and men exhibited significant differences in bacterial communities regardless of whether considering phone because woman appeared have stronger microbiological connection to their phones than men. The researcher in our study revealed that the sample chosen from critical area in the hospital was half from ICU and the other half was from ED, this finding was in line with Ustun, et al. (2102)<sup>(10)</sup> who showed that ICU workers' mobile phones had a significantly higher risk of contamination with ESBL-positive E. Coli than non-ICU workers' mobile phones, perhaps because of the routine patient body care given to ICU patients. In the same line Trivedi, et al.<sup>(11)</sup> reported that the use of mobile phones by HCWs in the operation theatre (OT), ICU and CCU may have serious hygiene consequences as these patients are more vulnerable to hospital acquired infection.

About times of hand washing during work times, the finding revealed that less than half studied nurses in ICU and Emergency DWS2epartment washed their hands from 15-20 times during work time this result supported by the World Health Organization WHO (2012)<sup>(12)</sup> reaffirmed the recommendation to wash hands with soap and water before patient contact, clean your hands before touching a patient when approaching him or her to protect the patient against harmful germs carried on your hands. Before an aseptic task: clean your hands immediately before any aseptic task to protect the patient against harmful germs, including the patient's own germs, from entering

his or her body.

Regarding to the times of using mobile phone during work the finding showed that less than of ICU nurses and more than half of nurses in emergency department nurses respectively used their mobile phone from 4-6 times during work time this result was in consistent with reported that HCWs use mobile phones in hospital halls, laboratories, intensive care units and operating rooms. In the same line, Scott &Cameron. (2015)<sup>(13)</sup> who claimed nearly 80% of nurses acknowledged using their devices for nonprofessional activities while on duty. Reasoned thinking would tell hospital staff to stay away from the phones while they are caring for a patient, but reason doesn't always prevail.

As regard disinfecting mobile phone the finding revealed about the majority of nurses didn't disinfect their mobile phone during the work time this result supported by Basol, et al. (2104)<sup>(14)</sup> who stated that contaminated mobile phones are hazardous to patients and may also pose a threat of spreading infections into the community.

In relation to using the mobile device outside hospital, majority of nurses relatives used mobile outside the hospital this is in line with Badr et al. (2012)<sup>(15)</sup> who stated that. Moreover, the mobile phones are used routinely all day long and the same phones are used both inside and outside the hospital playing a possible role in spreading infections to the outside community.

Regarding nurse's knowledge about mobile phone and relation to transmission of infection, about less than half of both studied nuress had good knowledge about mobile phone and its role in the transmission of microorganisms and source of information. This finding is supported by Tavolacci, et al. (2008)<sup>(16)</sup> who found that the nursing students had a better overall score of knowledge about infection prevention and control than did physiotherapist students, medical students and assistant radiologist students.

In relation to source of information less than both studied nurses in ICU and Emergency Department their source of information was colleague, this

finding is supported by Mitchell , et al.(2014) <sup>(17)</sup> reported that the participants in our study, aged 25 years or younger, were more likely to seek information from senior nurses, compared with those participants who were over 25 years found that compared with more experienced nurses, less experienced ones were reported to more heavily rely on other people for information.

Regarding to microbiological culture results of bacteria, the study revealed that about majority of nurses in ICU and more than half of Emergency Department nurses's mobile had a bacterial contamination . This finding is in line with <sup>(4)</sup> which stated that studies have found high bacterial contamination, including MRSA, on mobile phones, which are likely to have originated from hand contamination. External cover of mobile recorded the most site of bacterial contamination in our study this finding supported by Abdollahi, et al (2010) <sup>(18)</sup> who stated that as has been shown for other mobile devices, an extensive surface contamination

The most frequently isolated species of nosocomial bacteria from the mobile phones of the 60 nurse workers at ICU was *S. Epidermidis* 50%, and *S. Aureus*, CoNS, *Streptococcus Gamma Hemolytic* and *Streptococcus* was the third most prevalent nosocomial bacteria and was found in 4% phones. This finding is on line with <sup>(11)</sup> who mentioned that the present study showed that most common organism isolated was *S. Epidermidis* 40%. Although it is a normal skin flora responsible for a large number of hospitals acquired infections and often proves difficult to treat because of the bacterium's genetic characteristics and growing resistance to high-powered antibiotics.

In our study, isolation of CoNS was maximum in all of sample from the mobile phones of the 60 nurse workers Emergency Department 54%, followed by *S. Aureus* 16%, *Gamma Hemolytic* 8%, the figure also showed that MRSA 5%, *Klebsiella*, *H. Kunzii*, *Leclercia Adecarboxylata*, *Leuconostoc Mesenteroides ssp Cremoris* and *Staphylococcus Pseudintermedius* 3% for each.

This finding is in consistent with Brady,et al. (2011) <sup>(19)</sup> reported that 76.5% of 102 mobile phones sampled in Western General Hospital, Edinburgh were found to harbor CoNS. However, only 12 (11.8%) demonstrated growth of pathogenic bacteria species.

Finally In this study, the use of mobile phones by HCWs working in Emergency Department and ICU not only demonstrated a high contamination rate with bacteria but also more importantly contamination their hands .Some authors Tambekar,et al. (2008-) - Brady, et al (2006) <sup>(20-21)</sup> showed that that the isolated microorganisms from hands and phones were similar this finding agree with the results of cultures obtained in our study it was observed that the more than half culture obtained from nurses' mobile in ICU contained bacteria CoNS. Followed by *S. Aureus* with 16%, *Gamma Hemolytic* with 8%, and MRSA with 5% similar finding of bacteria obtained from nurses' hands in ICU as less than half of bacteria founded in their hands was CoNS. In Emergency department the 50% of sample obtained from nurses' mobile phones contained bacteria *S. Epidermidis* while in this particular study, culture of nurses' contaminated hands in Emergency Department and results revealed the presence of pathogenic bacteria; however, normal skin flora was reported that 20% of the culture was positively staph epidermis. This finding come in same line with <sup>18-19</sup> who mentioned that ,mobile communication devices can act as reservoirs for bacteria associated with health acquired infections (HAIs) and are routinely transported into the operating environment by medical staff.

### Conclusions

Majority of nurses relatives used mobile outside the hospital about smart phone and its role in the transmission of infection among nurses. the majority of nurses didn't disinfect their mobile phone during the work time less than half of both studied nures had good knowledge about mobile phone and its role in the transmission of microorganisms and source of information.. less

than both studied nurses in ICU and Emergency Department their source of information was colleague .Regarding to microbiological culture results of bacteria, the study revealed that about majority of nurses in ICU and more than half of Emergency Department nurses's mobile had a bacterial contamination In our study, isolation of CoNS was maximum in all of sample from the mobile phones of the 60 nurse workers Emergency Department 54%, followed by S. Aureus 16%, Gamma Hemolytic 8%, the figure also showed that MRSA 5%, Klebsiella, H. Kunzii, Leclercia Adecarboxylata, Leuconostoc Mesenteroides ssp Cremoris and Staphylococcus Pseudintermedius 3% for each.

### Recommendations

Nurses need to balance efficient communication with hands-on patient contact to minimize the transfer of bacteria within the hospital environment. Identifying efficient and effective disinfection methods related to smart phone bacterial transmission may reduce the spread of infection. Healthcare facilities should consider disinfecting shared mobile devices with 70% isopropyl alcohol wipes or ethyl alcohol wipes to help prevent the spread of bacteria. Mobile phones go everywhere with staff members on duty and are handled during the course of patient care, staff breaks, and in other venues within the hospital. These studies suggest that cleaning mobile phones may significantly decrease bacterial colonies and the threat of device-related bacterial cross-contamination. Hand washing after contact with infectious material is extremely important for maintaining proper hygiene.

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