

Comparison of Microbial Infection and its Resistance Pattern in Cell Phone of Health-Care Workers with the Administrative Staff at a Teaching Hospital



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Abstract

In recent several decades, despite significant progress in treatment and prevention, microbes also have the power to escape from the clutches of best weapons; Direct contact is the main route of the infection transmission in hospital, so we decided to compare frequency and pattern of microbial contamination and resistance in cell phone of healthcare workers (HCWs) and administrative staffs in Afzalipour Hospital.

In this descriptive & cross-sectional study, 200 samples were collected by using Quota sampling. These samples of cell phone stuff were collected by using sterile swab and cultured in Blood Agar and EMB medium and then were measured sensitivity of bacterial resistance.

In this comparison, HCWs had 61.6% contamination (Staph. Coagulase- 29/7%, MRSA+8/9%, MRSA-17/8%) and administrative staffs had 62.4% contamination (Staph. Coagulase-41/4%, MRSA+3%, MRSA-9/1%) that there wasn't significant difference among two groups (p.v=0/073) but in the HCWs, residents group had most contamination and professors group had low one. Also in HCWs, MRSA cases were three times more than administrative staffs. In addition, in HCWs, three sample gram negative bacteria grew include Neisseria, *E.coli* and Kelebsiela. It was not found in any of the administrative staff and it is important.

In this study, in spite of lack of significant differences between groups of HCWs and administrative staff, finally recommended, cell phones of both groups, every day to be disinfected by standard antiseptic solution.

Keywords: Microbial infection; Cell phone; Stuff; Kerman Afzalipour hospital

Introduction

In recent several decades, despite significant progress in treatment and prevention, infectious disease are considered one of the major causes of death, residual disability, and responsible for the deterioration of the living conditions of millions of people around the world. Infectious disease frequently challenged medical diagnostics skills and should be taken into consideration in differential diagnosis of any syndrome that affects each body systems.

With the introduction of antimicrobial drugs, some medical pioneers convinced that infectious diseases will soon be disappeared and only will be valuable from a historical perspective. Of course, since Second World War have been made hundreds of chemical compositions, majority of them are strong & safety and include drugs which are effective not only on bacteria but also viruses, fungi and parasites. However, today we realize the fact that along with the progress in construction of

new and effective drugs, microbes also have the power to escape from the clutches of best weapons and to engage counterattack by new strategies. Resistance against antibiotics arises from alarming speed among all mammalian pathogens.

Hospital infections are a major problem in all modern hospitals. In early 1861, Semmelweis [1] show that bacteria from contaminated hands of healthcare workers were transferred to patients. Hospital operating rooms and intensive care units are places that have enjoyed the highest standards of hygiene and there are similar conditions for other stuff and used equipment by them. Also, some epidemiological studies show that environmental levels of bacteria are involved in the transfer.

On the other part, the most common way of transmission of nosocomial infections, including resistant bacteria are mainly through the contact. Treatment of these infections is very difficult and they have very high morbidity and mortality as well

as increased health care costs and imposes a huge cost to society, so, we decided to do this study on cell phone of health care staff (HCWs) such as professors, residents, interns and nurses compared with hospital administrative staff; so that we can know a lot of microbes on the status of antimicrobial resistance and using it to do things for reducing hospital infections and morbidity and mortality caused it.

In a study of Dutta et al. [2] in 2009 in India on bacterial contamination of HCWs mobile phone was shown that hospital infections are still a factor for increasing mortality and morbidity of patients and HCWs hands play an important role in the transmission of these infections.

In a similar study carried out by Brady et al. [3] in England and Karabay et al. [4] in Turkey, separation amount of Gram-negative bacilli of mobile phones were 76/4% and 2/7% respectively, and contamination amount of mobile phones with hospital infections in Turkey was 9% and in a study of Brady and et al was %14.

Fatma Ulger et al. [5] in 2009 in Turkey by examining cell phones, reported 94/5% microbial contamination that staph aureus was observed in 52% of separation and gram-negative bacteria's were observed in 3/31% of cases.

Considering that health care staff equipment are at risk of infection with bacterial species and can transfer many infects from outside hospital into it and from inside hospital to outside and even into own it and since this species can change and resist over time, it is necessary to know and better understand them, we prevent from spread of infections in hospital environments. So, in order to better understand it, we compare it with control group (hospital administrative staff) [6].

Materials and Methods

This study was carried out in a descriptive and cross-sectional form in 2014. The studied populations were professors, assistants, interns, nurses and administrative staff of Afzalipour hospital in Kerman and sampling was performed in a form of quota sampling. Finally, were selected 200 people of sample (include: 100 samples of cell phone of health care workers and 100 samples of administrative staff cell phone and from all sections of the hospital such as: administrative, emergency, surgery, pediatrics, infectious diseases, dermatology, gastrointestinal, lung, gynecology, endocrinology, NICU, CCU, ICU. Staff information was acquired using questionnaire. These information included job valuables: (Employee, Professor,

Resident, Intern, nurse), age, gender (male, female), sections of respective hospital (professional, surgery, internal) and type of mobile (key board, Touch). Then, sampling were taken by using a sterile swab from both sides of cell phone, back and forth, in a way that to be done all levels of sampling. Swabs were cultured on culture medium of "Blood Agar", containing %5 of sheep blood and Eosin Methylene Blue Agar (EMB), then, the plates were incubated for 48 hours at 3 °C.

Then, we separated them according to colony growth and morphology and Gram stain and in the next step; we studied bacteria causing hospital infections including bacilli, negative-positive gram in a specific culture medium. Then, using discs impregnated with antibiotics we assess sensitivity and resistance of bacteria and investigate relative-absolute abundance, after analyzing data, using SPSS software. Also, it was used chi-square or fisher test for analytical statistics [7,8].

Results

Table 1: Abundance of jobs and hospital units in the medical staff.

Number			Abundance	Percent
1	Job	Professor	22	22%
2		Resident	21	21%
3		Intern	22	22%
4		Nurse	35	35%
1	Hospital unit	Internal	43	43%
2		Surgery	32	32%
3		ICU	25	25%

Table 2: Comparison of gender abundance in the two study groups.

Number	Gender	Medical Care	
		abundance	percent
1	male	28	%28/3
2	female	72	%71/7

In this study, 200 people of health care workers include 22 professors, 21 assistants, 22 interns, and 35 nurses and abundance of them in the hospital sections was as follow: 43 people in internal unit, 32 people in surgery unit and 25 people in ICU (Table 1). From this number, 28/3% male and 71/7% female were in HCWs group and also, 32/7% male and 67/3% female were in administrative staff group (Table 2).

Table 3: Comparison of abundance of mobile type in the two study groups.

Number	Type of cell	Health care		Administrative		Total		PV
		abundance	percent	abundance	percent	abundance	percent	
1	Keyboard	55	%55/6	43	%43/6	98	49%	0/089
2	Touch	45	%44/4	57	%57/4	102	51%	

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Table 4: Comparison of microbial contamination type abundance, in two study groups.

Number	Type of contamination	Groups under study				Total Administrative		P.V
		Medical care						
		abundance	percent	abundance	percent	abundance	percent	
1	No Growth	39	38/4	37	37/6	76	38	0/073
2	Staph. Coagulase	29	29/7	41	41/4	70	35/5	
3	MRSA	9	9-Aug	3	3	12	6	
4	MSSA	18	17/8	9	1-Sep	37	13/5	
5	Rods	3	3	8	1-Aug	11	5-May	
6	Neisseria	1	1	0	0	1	0/5	
7	Kelebsiela	1	1	0	0	1	0/5	
8	E.coli	1	1	0	0	1	0/5	

Table 5: Comparison of microbial contamination type abundance in two study groups based on job.

Numbers	Type of Contamination	Job								PV
		Professor		Resident		Intern		Nurse		
		abundance	percent	abundance	percent	abundance	percent	A	p	
1	No Growth	13	59/1	5	23/8	10	40/9	11	31/4	0/001
2	Staph. Coagulase	1	5-Apr	11	52/4	2	1-Sep	15	42/9	
3	MRSA	1	5-Apr	1	8-Apr	3	13/6	4	4-Nov	
5	Rods	3	13/6	0	0	0	0	0	0	
6	Neisseria	0	0	0	0	1	5-Apr	0	0	
7	Kelebsiela	0	0	0	0	1	5-Apr	0	0	
8	E.coli	0	0	0	0	0	0	1	9-Feb	

Table 6: Comparison of microbial contamination type abundance in two study groups based on hospital units.

Number	Type of contamination	Type of mobile						PV
		Keyboard		Touch		Total		
		abundance	percent	abundance	percent	abundance	percent	
1	No Growth	35	35/7	41	40/2	76	38	0/291
2	Staph.coagulase	38	38/8	33	32/4	71	35/5	
3	MRSA	3	1-Mar	9	8-Aug	12	6	
4	MSSA	16	16/3	11	8-Oct	27	35/5	
5	Rods	4	1-Apr	7	9-Jun	11	5-May	
6	Neisseria	1	1	0	0	1	0/5	
7	Kelebsiela	0	0	1	1	1	0/5	
8	E.coli	1	1	0	0	1	0/5	

In the part related to mobile type: 55/6% of cell phones of HCWs were from type of Keyboard and 44/6% from type of touch. Also, 42/6% of cell phones of administrative staff were from type of Keyboard and 57/4% were from type of touch (Table 3). In the part of comparison of microbial contamination abundance, in two study groups statistically, there was no significant difference between a group of HCWs and administrative staff (Table 4). In the part of comparison of microbial contamination type abundance, in two study groups there was no significant

difference (P.V-0/001) based on job. The lowest pollution is related to professors group (59/1%, No Growth), the highest pollution is related to assistances group (23/8%, No Growth) (Table 5). In comparison of microbial contamination type abundance in two study groups there was no significant difference (P.V-0/294) based on hospital units (Table 6). Also, in comparison of microbial contamination type abundance in two study groups there was no significant difference (P.V-0/291) based on mobile type (Table 7) [9].

Table 7: Comparison of microbial contamination type abundance in two study groups based on mobile type.

Number	Type of contamination	Type of mobile						PV
		Keyboard		Touch		Total		
		abundance	percent	abundance	percent	abundance	percent	
1	No Growth	35	35/7	41	40/2	76	38	0/291
2	Staph.coagulase	38	38/8	33	32/4	71	35/5	
3	MRSA	3	1-Mar	9	8-Aug	12	6	
4	MSSA	16	16/3	11	8-Oct	27	35/5	
5	Rods	4	1-Apr	7	9-Jun	11	5-May	
6	Neisseria	1	1	0	0	1	0/5	
7	Kelebsiela	0	0	1	1	1	0/5	
8	E.coli	1	1	0	0	1	0/5	

Discussion

Microbial resistance is very important problem that unfortunately, its prevalence is increasing in society. In this study, 100 people of Health care workers participates such as 22 Professor, 21 Resident, 22 Intern, and 35 Nurse. 43 people were in internal unit, 32 people in surgery unit, and 25 people in ICU. Also, 100 people were selected among administrative staff [10]. Obtained information was analyzed by statistical group, after collecting data by registration form and culture and anti-program of mobile phone of staff.

In general, amount of abundance of microbial contamination in health care workers is 61/6% and this amount in administrative staff is 62/4% and there was no significant difference, but, amount of methicillin-resistant *Staphylococcus aureus* (MRSA) in cell phone of health care workers was 9 case and in administrative staff was 9 case that there was 3 doubled difference. Also in health care workers group, three examples of Gram-negative bacilli such as *Neisseria*, *Klebsiella* *E. coli* were grew that did not in the administrative staff. These bacteria were found in introns and nurses and in all studied units. Two sample of these bacteria were grew keyboard-type cell phones and one sample was grew in touch-type cell phone.

In a study that P Datta et al. [2] (2009) were performed in Netherland about bacterial contamination of cell phone of HCWs group, from 200 samples, 144 ones equivalent to 72% were reported microbial contamination that 18% of them were MRSA cases that in a study conducted by us, 6/61 of microbial contamination 9.8 percent of MRSA were found.

In another study performed by Braddy RR et al. [3] in England and Karabay O et al. [4] in Turkey, amount of mobile phone Gram-negative bacilli was respectively 4/76 and 7/2. In our study, this amount was equal to 3% and we see a less percentage [11,12].

Conclusion

In short, results obtained from the study demonstrate that despite significant differences in microbial contamination on Mobile phone of HCWs group, a resident have the highest and

professors had the least pollution, there was no significant difference among microbial contamination in mobile phones of HCWs group and administrative staff. Some of infectious microorganisms such as *Staphylococcus aureus* could be contaminants in both groups; but infection with gram-negative microorganisms were found only in HCWs that shows the effects Clinical Affairs on this issue. Finally, it is advisable that were considered necessity strategies for eliminating infectious agents contaminating from devices of hospital staff and attempt to control it.

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