Vol 3 (2), July 2012; 08-11

Cell Phones: Carrier for Microbes in Women's University

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ABSTRACT

Cell phones are very common portable electronic device which is continuously use for calling , texting and sometimes for educational purposes , it is available at cheap cost so its approach is very easy to common men .It is mostly considered as a carrier for microorganisms which are responsible for pathogenic diseases. Randomly 24 different cell phones from university students were analyzed to check presence of microorganisms and their pathogenecity. Increased percentage of *Pseudomonas aeruginosa* **and** *Staphylococcus aureus* **i.e. 42% which were identified by basic microorganism isolation techniques or by pure culture technique.**

Keywodrs: Cell phones, Pathogenic diseases, Pure culture technique

INTRODUCTION

From Europe in 1982 the mobile telecommunication system was established. (Ekrakene and Igeleke, 2010) Around the world the mobile telecommunications makes life faster and easier and now it is absolutely necessary for social and professional life. (Sciencedaily,2010) Microorganisms are very small and single –celled, some of them are pathogenic and are responsible to cause disease (Tagoe, et al. 2011) Cell phones becomes a common matting place for microbes and their transfer by continuous usage from its user. (Yusha'u, et al.2010) Because of reasonably priced and increased functionality smart phones and cell phones are present on common places. Apart from this, cell phones also generated heat due to which variety of bacteria harbor over it and reached up to level of danger. (Purohit and Singh, 2012) Mobile phones are widely used as non-medical portable electronic devices (Ulger, et al. 2009) between Health care workers (HCWs) and non HCWs and may directly enhance the spread of potentially pathogenic bacteria to the society and there is a vast difference in number ,variety and composition of microbes between health –care and non-health care workers. (Chawla, et al. 2009) Cell phones are is in close contact with the body (Ulger, et al. 2009) and due to moisture and optimum temperature of human body specifically of palm, axillaries and other parts of the body (Tagoe, et al. 2011). It enhances the growth of microbes . Some times some educational projects are supplied with smart phones and there is a common sharing of cell phones .Infection can be reduced by cleaning your mobile phone with antibacterial wipes and washing one's hands after using the toilet.(Skynews,2009) or cleaned with 70% isopropyl. (Ulger, et al. 2009) In different areas of the community the percentage of bacteria is increased because of continuous mobile such as in hospitals, market places and places-of-convenience and play a key role in the spread of bacterial infections with antimicrobial resistance. (Tagoe, et al. 2011).

For this purpose a study was conducted in a women's university to know the bacterial contamination of

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cell phones of educational personals.

MATERIALS AND METHOD

Study Area & Design:
The study was conducted in Jinnah University For Women Nazimabad, Karachi, Pakistan between July'2011 to December'2011.

Sampling:
A total of 24 Mobile phones were randomly sampled from students which were used for at least 1 month. Aseptically swabbing the entire phone using a dry sterile cotton swab. Care was taken to make sure that the keypad and all buttons were swabbed since these areas are most frequently in contact with the tips of fingers.

Inoculation:
The sampled mobile phone swabs were streaked onto Nutrient Agar. The inoculated plates were incubated at 37^{o}C for 24 hours. Plates were observed for growth and colonial morphology of the isolates.

Bacterial isolation & identification:
The different types of colonies were recorded and purified to obtain pure colonies for the identification purposes. Each representative colony was Gram stained and examined for cell morphology and Gram reaction under light microscope and isolates were further Biochemically tested for their confirmation, including catalase, oxidase, IMViC and TSI agar slants .Also streaked on differentiating agar plates including EMB Agar, Mannitol Salt Agar and MacConkey Agar.

RESULT

The results showed highest rate of contamination of bacteria. Out of twenty four samples of mobile phone twenty two samples showed growth and results. The bacterial growth, type and number of organisms found on the cell phones have been summarized in observation tables. Out of twenty five organisms ten were Gram Negative and other Twelve were Gram positive. In case of Gram negative bacteria there were one type of potentially pathogenic bacteria *Pseudomonas aeruginosa* found on the cell phones of students is 42 %. In case of Gram positive bacteria there were three types of potentially pathogenic bacteria isolated that were 42% *Staphylococcus aureus*, 4% *Micrococcus* species and 4% *Bacillus* species. *Staphylococcus* and *Pseudomonas* were frequently encountered pathogenic bacteria found on the surfaces of mobile phones. *Micrococcus* and *Bacillus* species were less frequent. Out of 24 samples, on 2 samples there were no growth of organisms.

DISCUSSION

The main aim of this study is to provide awareness about the cell phone as a carrier for pathogenic microorganism which is responsible for diseases and to minimize the continuous and common use of mobile phones in the university premises as well as to provide guide lines in order to educate the community about mobile phone etiquette, hygiene status of hands, cleaning of cell phones on regular basis and reduce the sharing of cell phones with everyone in order to prevent the transmission of bacteria.

Table.1: Gram Reaction of Isolated Microorganisms

SAMPLE NO.	GRAM REACTION	SHAPE	ARRANGEMET
Sample **1**	Positive	Cocci	Bunches
Sample **2**	Negative	Rods	Single, scattered
Sample **3**	Positive	Cocci	Bunches
Sample **4**	Negative	Rods	Single, scattered
Sample **5**	Negative	Rods	Single, scattered
Sample **6**	Positive	Cocci	Bunches
Sample **7**	Positive	Cocci	Bunches
Sample **8**	Negative	Rods	Single, scattered
Sample **9**	Negative	Rods	Scattered
Sample **10**	Positive	Cocci	Bunches
Sample **11**	-	-	-
Sample **12**	Negative	Rods	Scattered
Sample **13**	Positive	Cocci	Bunches
Sample **14**	Negative	Rods	Single, scattered
Sample **15**	-	-	-
Sample **16**	Negative	Rods	Single, scattered
Sample **17**	Positive	Cocci	Bunches
Sample **18**	Negative	Rods	Single, scattered
Sample **19**	Positive	Cocci	Bunches
Sample **20**	Positive	Rods	Pairs, chains
Sample **21**	Negative	Rods	Single, scattered
Sample **22**	Positive	Cocci	Pairs(Diplococci)
Sample **23**	Positive	Cocci	Bunches
Sample **24**	Positive	Cocci	Bunches

Table.2:Biochemical Characteristics of Gram Negative Bacteria

SAMPLE NO.	CATALASE TEST	OXIDASE TEST	IMVIC TEST				NITRATE	TSI				CONFIRMED PATHOGEN
			I	MR	VP	C		SLANT	BUTT	H_2S	GAS	
Sample **2**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa comfirmed*
Sample **4**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **5**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **8**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **9**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **12**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **14**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **16**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **18**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*
Sample **21**	Positive	Positive	-	-	-	+	Positive	Alk	Alk	-	-	*P.aeruginosa*

Table.3:Biochemical Characteristics of Gram Positive Bacteria

SAMPLE NO.	CATALASE TEST	OXIDASE TEST	SUGARS				CONFIRMED PATHOGENS
			G	L	M	S	
Sample **1**	Positive	Negative			+		*Staphylococcus aureus*
Sample **3**	Positive	Negative			+		*Staphylococcus aureus*
Sample **6**	Positive	Negative			+		*Staphylococcus aureus*
Sample **22**	Positive	Positive	+	-	-		*Micrococcus spp.*
Sample **07**	Positive	Negative			+		*Staphylococcus aureus*
Sample **10**	Positive	Negative			+		*Staphylococcus aureus*
Sample **20**	Positive	Negative	-	-	+		*Bacillus spp.*
Sample **13**	Positive	Negative			+		*Staphylococcus aureus*
Sample **17**	Positive	Negative			+		*Staphylococcus aureus*
Sample **19**	Positive	Negative			+		*Staphylococcus aureus*
Sample **23**	Positive	Negative			+		*Staphylococcus aureus*
Sample **24**	Positive	Negative			+		*Staphylococcus aureus*

Table.4 :Colonial Characteristics of Gram Negative Bacteria

SAMPLE NO.	EMB AGAR	MacConkey Agar	Confirmed PATHOGENS
Sample **2**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **4**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **5**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **8**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **9**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **12**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **14**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **16**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **18**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*
Sample **21**	Non-fermenter	Non-Lactose fermenter	*Pseudomonas aeruginosa*

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