Study of Bacterial Colonization of Mobile Phones and Writing Pens of Doctors and Nurses in Surgical Department

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Research Article

Abstract: Mobile phones and writing pens of health care worker can harbor nosocomial microorganisms. Cross sectional study was done to find out microorganism contamination rate of writing pens & mobile phones of Doctors and Nurses along with their antibiotic sensitivity at Surgery department of Gujarat Medical Education & Research Society Medical College, Sola, Ahmedabad. Doctors and Nurses both should be aware that they may carry pathogenic microorganism on their mobile phones and writing pens.

Key words: Surgery Department, mobile phones, writing pens, microorganism contamination.

Introduction

The objective of this study was to determine the microorganism contamination rate of writing pens & mobile phones of Doctors and Nurses along with their antibiotic sensitivity in surgical department of Gujarat Medical Education & Research Society Medical College, Sola, Ahmedabad. Microorganisms from surgical patients can be transferred to hands of Doctors and Nurses, and from their hands to their mobile phones & writing pens. Mobile phones and writing pens of health care worker can harbor nosocomial microorganisms.[(1)(2)] Doctors and Nurses generally wash their hands but their mobile phones and writing pens can harbor nosocomial microorganisms. These may transmit nosocomial infection to their homes also. Several studies have been done in the different parts of world and they confirm the presence of nosocomial microorganism on healthcare worker's mobile phones & writing pens.[(1)(2)(3)(4)(5)(6)(7)] Most of the Doctors and Nurses of Surgical department are not aware that their mobile phones & writing pens may be contaminated by microorganisms.

Material and Method

Cross sectional study was done at Surgery department of GMERS Medical College, Sola, Ahmedabad in August 2012. Study includes Doctors and Nurses of surgical department like surgical outpatient department, surgical wards, surgical intensive care unit, surgical operation theatre, surgical post operative ward on voluntary basis. Consent was obtained from the Doctors and Nurses before inclusion in the study. Samples from mobile phones and writing pens were taken by sterile wet (sterile distilled water) swab stick. Microbiological cultures of all the samples were done and culture growths were subjected to antibiotic sensitivity.

Result

19 samples from Doctor's mobile phones were collected. A total of 9 were positive for microbiological cultures. 3 (15.8%) showed pathogenic bacteria. Out of these, none had Methicillin-resistant Staphylococcus aureus and candida. 6 (31.6%) had normal flora. 36 samples from Nurse's mobile phones were collected. A total of 15 were positive for microbiological cultures. 10 (27.8%) showed pathogenic bacteria. Out of these, 3 (8.3%) had Methicillin-resistant Staphylococcus aureus, 1 (2.8%) had candida and 4 (11.1%) had normal flora. Doctors had more positive culture on mobile phones (47.4%) compared to Nurses (41.7%) but Nurses had more (27.8%) pathogenic organisms on their mobile phones compared to Doctors (15.8%). 19 samples from Doctor's pens were collected. A total of 1 was positive for microbiological culture. 1 (5.3%) showed pathogenic bacteria. Out of these, none had Methicillin-resistant Staphylococcus aureus, candida or normal flora. 37 samples from Nurse's pens were collected. A total of 6 were positive for microbiological cultures. 2 (5.4%) showed pathogenic bacteria. Out of these, 1 (2.7%) had Methicillin-resistant Staphylococcus aureus, 4 (10.8%) had normal flora and none had candida. Doctors (5.3%) and Nurses (5.4%) both had equal contamination of

pathogenic bacteria to their writing pens. But Nurses had more positive culture on their writing pens (16.2%) than Doctors (5.3%).

Table 1: Result of culture of mobile phones and pens of Doctors and Nurses of Surgical department

Samples from mobile phone			Samples from writing pen		
	Doctor (n=19)	Nurse (n=36)		Doctor (n=19)	Nurse (n=37) *
Total Positive culture	9 (47.4)	15 (41.7)	Total Positive culture	1 (5.3%)	6 (16.2%)
Total Pathogenic bacteria	3 (15.8%)	10 (27.8%)	Total Pathogenic bacteria	1 (5.3%)	2 (5.4%)
Candida	0	1 (2.8%)	Candida	0	0
Normal flora	6 (31.6%)	4 (11.1%)	Normal flora	0	4 (10.8%)

*One nurse did not have mobile phone

Table 2: Microorganism isolated from mobile phones

Microorganism isolated from mobile phones	Doctors (n=19)	Nurses (n=36)	Total (n=55)
Staphylococcus aureus	3 (15.8%)	6 (16.7%)	9 (16.3%)
Methicillin-resistant Staphylococcus aureus	0	3 (8.3%)	3 (5.5%)
Pseudomonas	0	1 (2.8%)	1 (1.8%)
Candida	0	1 (2.8%)	1 (1.8%)
Coagulase negative staphylococci	4 (21%)	1 (2.8%)	5 (9.1%)
Bacillus subtilis	2 (10.5%)	3 (8.3%)	5 (9.1%)
Total	9 (47.4%)	15 (41.7%)	24 (43.6%)

Nurses had contamination of Candida and Methicillin-resistant Staphylococcus aureus on their mobile phones. Doctors had no contamination of Candida and Methicillin-resistant Staphylococcus aureus on their mobile phones.

Table 3: Microorganism isolated from writing pens

Microorganism isolated from writing pens	Doctors (n=19)	Nurses (n=37) *	Total (n=56)
Staphylococcus aureus	0	1 (2.7%)	1 (1.8%)
Methicillin-resistant Staphylococcus aureus	0	1 (2.7%)	1 (1.8%)
Pseudomonas	1 (5.3%)	0	1 (1.8%)
Candida	0	0	0
Coagulase negative staphylococci	0	0	0
Bacillus subtilis	0	4 (10.8%)	4 (7.1%)
Total	1 (5.3%)	6 (16.2%)	7 (12.5%)

*One nurse did not have mobile phone

Nurses had contamination of Methicillin-resistant Staphylococcus aureus on their writing pens. Doctors had no contamination of Methicillin-resistant Staphylococcus aureus on their writing pens. One sample of writing pen of Doctor had contamination to pseudomonas. Nurses had no contamination of pseudomonas on their writing pens. Doctors and Nurses both had more positive culture on mobile phones (43.6%) compared to writing pens (12.5%). Staphylococcus aureus was the predominant pathogenic organism isolated, which was sensitive to penicillin G, amoxycillin+clavulanic acid, cefuroxime, oxacillin, sparfloxacillin, teicoplanin, linezolid, erythromycin, lincomycin and minocycline. Methicillin-resistant Staphylococcus aureus was the second most common pathogenic organism isolated which was sensitive to vancomycin, clindamycin and linezolid. Only one sample had pseudomonas contamination which was sensitive to ceftazidime, piperacillin, piperacillin+tazobactum, cefoperazone, ciprofloxacin, levofloxacin and gentamycin. Coagulase negative staphylococci and Bacillus subtilis of normal flora were isolated. Coagulase negative staphylococci was sensitive to penicillin G, amoxycillin+clavulanic acid, oxacillin, sparfloxacillin, linezolid and erythromycin. Antibiotic sensitivity of bacillus subtilis was not done.

Discussion

In present study, microorganism contamination rate of mobile phones was 43.6%. The predominant pathogenic microorganisms isolated from the mobile phones of Doctors and Nurses of Surgery department were Staphylococcus aureus, followed by Methicillin-resistant Staphylococcus aureus and Pseudomonas. Study done by Fatma Ulger et al. had shown microorganism contamination rate of mobile phones of Health care workers as 94.5% and the predominant microorganisms isolated were Staphylococcus aureus followed by gram negative strains.[2] In present study, microorganism contamination rate of writing pens was 12.5%. The predominant pathogenic microorganisms isolated from the writing pens of Doctors and Nurses of Surgery department were Staphylococcus aureus, Methicillin-resistant Staphylococcus aureus and Pseudomonas. Study done by Prashant Patil et al. had shown microorganism contamination rate of writing pens of Health care workers as 91.66% and the predominant microorganisms isolated were Staphylococcus aureus followed by Escherichia coli, Methicillin-resistant Staphylococcus auresus and klebsiella.[6] Study done by Kiran Chawla et al. and other study done by M. Yusha'u et al. had shown that mobile phones of non health care workers were also contaminated by microorganisms but usually they were not contaminated by pathogenic microorganisms like Methicillin-resistant Staphylococcus aureus and

Pseudomonas.[7][8] In present study, Methicillin-resistant staphylococcus aureus and Pseudomonas both were important nosocomial microorganisms isolated from mobile phones and writing pens of Doctors and Nurses in our surgical department. Despite of proper hand washing, the hands of Doctors and Nurses may re-inoculate with pathogenic microorganisms present over their mobile phones and writing pens. Doctors and Nurses are carrying their mobile phones and writing pens with pathogenic microorganisms to their surgical outpatient department, surgical wards, surgical intensive care unit, surgical operation theatre, surgical post operative ward and also to their homes. Further study may be required to find out whether Mobile phones and writing pens of Doctors and Nurses are involved in transmitting nosocomial infection. Other studies had also shown contamination of White coats of Doctors, Security Swipe Cards and Scanners of Hospital, Stethoscope of Doctors by pathogenic microorganism.[9][10][11] [12] Doctors and Nurses should be aware that their personal objects used in the hospital environment may be contaminated by pathogenic microorganism.

Conclusion

Doctors and Nurses both should be aware that they may carry pathogenic microorganism on their mobile phones and writing pens. Cleaning of writing pens and mobile phones with antiseptic solution along with emphasis on correct hand-washing technique should be given. Use of hands free kit for mobile phones may be useful in preventing direct contact of hands with mobile phones in hospital. Bacterial contamination on mobile phones and wiring pens may be reduced by making them with special material which prevents growth of microorganism which required further research.

Reference

1. Gary French, Diana Rayner, Marie Branson, Margaret Walsh; Contamination of doctors' and nurses' pens with nosocomial pathogens, The Lancet, Volume 351, Issue 9097, Page 213, 17 January 1998.
2. Fatma Ulger, Saban Esen, Ahmet Dilek, Keramettin Yanik, Murat Gunaydin, and Hakan Leblebicioglu; Are we aware how contaminated our mobile phones with nosocomial pathogens?; Annals of Clinical Microbiology and Antimicrobials, v.8; 2009. (Pubmed)
3. Bacterial contamination and resistance to commonly used antimicrobials of healthcare workers' mobile phones in teaching hospitals, Kerman, Iran; Science and technology, American Journal of Applied Sciences 6 (5): 806-810, 2009
4. Dr Ruchi Katiyar, Mr Sachin C Deorukhkar, Dr Santosh Saini; What Does a Pen Carry? Are You Aware?; International Journal of Biomedical Research Vol-2, No 6 (2011) 346-352.
5. R.R.W. Brady, J. Verran, N.N. Damani, A.P. Gibb; Review of mobile communication devices as potential reservoirs of nosocomial pathogens, Journal of Hospital Infection, Volume 71, Issue 4, Pages 295-300, April 2009.
6. Prashant Patil, Sandip Hulke, Avinash Thakre, Manisha Gaikwad; Pen of Health Care Worker as Vector of Infection, Online Journal of Health and Allied Sciences, Vol. 9, Issue 3: (Jul - Sep, 2010).
7. Kiran Chawla, Chiranjay Mukhopadhayay, Bimala Gurung, Priya Bhate, Indira Bairy; Bacterial 'Cell' Phones: Do cell phones carry potential pathogens?; Online Journal of Health and Allied Sciences Volume 8, Issue 1; Jan-Mar 2009
8. M. Yusha'u, M. Bello and H. Sule; Isolation of bacteria and fungi from personal and public mobile cellphones: International Journal of Biomedical and Health Sciences , Vol. 6, No. 1, June 30, 2010.
9. MJ Sultan, A Alm, A Hindmarsh, and RA Greatorex; Security Swipe Cards and Scanners are a Potential Reservoir for Hospital-Acquired Infection, Annals of The Royal College of Surgeons of England, 2009 March; 91(2): 155–158.
10. Wong D, Nye K, Hollis P.; Microbial flora on doctors' white coats. British Medical Journal 1991 December 21; 303(6817): 1602–1604. (Pubmed)
11. Banu A, Anand M, Nagi N; White coats as a vehicle for bacterial dissemination, Journal of Clinical and Diagnostic Research 2012 Oct;6(8):1381-4.
12. Marinella MA, Pierson C, Chenoweth C. The stethoscope: a potential source of nosocomial infection? Arch Intern Med 1997; 157:786-790.(Pubmed)