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NOSOCOMIAL INFECTIONS;
URGENT NEED FOR STRUCTURED AND COHERENT APPROACH TO THE PROBLEM IN PAKISTAN.

DR. BADARUDDIN A. MEMON
Ph.D. Glasgow (U.K)
Department of Microbiology
Shah Abdul Latif University Khairpur
Sindh, Pakistan.

ABSTRACT... doctor_badar@yahoo.com Nosocomial infections are an important cause of preventable morbidity and mortality. This paper highlights some of the serious but avoidable aspects of this largely ignored but vital issue of nosocomial infections in Pakistan. Also this paper aims to alert the health policy makers, medical staff, microbiologists and other experts to consider more clearly the serious threat of nosocomial infections. This is for the Pakistan Ministry of Health to become actively involved in the development of a structured and coherent approach to the problem.

Keywords: Nosocomial infections, Disease transmission, Patient-to-Professional, Professional -to-Patient, Infection control. .

INTRODUCTION

Nosocomial infections or hospital acquired are a serious problem in hospitals of developing countries such as Pakistan where there are no well-defined guidelines for hospital infection control and prevention. Hospitals of both large and small cities of Pakistan are facing multifaceted problems due to rampant nosocomial infections and the emergence of multi-drug-resistant bacteria. If unchecked, these preventable and avoidable infections not only add to the suffering of patients but are also a considerable economic burden. Little literature is available on hospital acquired infections in Pakistan and related issue such as frequent occurrence of multi-resistant-bacteria, and the economic loss and suffering of individuals (who bear the health care costs) while the patients are still in hospital.

In many countries, strict guidelines and policies for control, prevention, and management of nosocomial infections are implemented but even then hospital infections do occur in one form or another. In Pakistan, there is a lack of education in this field but other social, ethical and economic factors also need to be considered in the control of nosocomial infections.

There are numerous of research groups worldwide either sponsored by governments or pharmaceutical companies, which are involved in research on nosocomial infections. These teams have voiced their concerns on nosocomial infections and

identified the prevailing microorganisms and other reasons why they are serious threats to the hospital environment resulting nosocomial infections. According to their findings, nosocomial infections can be drastically reduced if strict guidelines of precautions are followed. Such teams have reported from the UK, USA, Italy, Nether land, France, Greece, Australia, Switzerland, Sweden, Brazil, Germany, Japan, Taiwan, Poland, Norway, Denmark, Barcelona, Belgium and South Africa. All have strongly emphasized the importance of nosocomial infections and their focus has been on the microbiology of the problem. These topics have included: vancomycin-resistant Enterococcus faecium[1], Escherichia coli [2'3] pseudomonas aeruginosa[4'5'6] Salmonella Virchow[7], Klebseilla Pneumoniae[8], Methicillin-resistant Staphylococcus aureus (MRSA)[9'10'11'12'13,14,15,16,] Serratia marcescens[17,18] Enterococci[19,20,] Staphylococci[21,22] Staphylococcus aureus[23], nosocomial infective endocarditis[24], nosocomial fungal infections[25'26], nosocomial and community-acquired infections[27], Nosocomial Bacteraemia[28,] Enterococcus faecium[29], Staphylococcus epidermidis[30], Escherichia coli, Klebseila spp and Enterobacter spp[31,32], respiratory infections in hospitalized patients[33], Bacillus cereus[34], pseudobacteremia[35], intravascular catheter-related sepsis[36] Enterobacter aerogenes[37] etc. as can be seen, there has been a plethora of research papers relating to nosocomial infections.

Apart from identifying microbes and their routes of transmission, other aspects of nosocomial infections have also been addressed. These include preventive practices, guidelines for nosocomial infections[38,39], the role of hospital environment in infection control[40], quality circles in infection control[41], management of hospital-acquired infections[42], the interface between hospital management and microbiology[43], hygiene protocols in hospitals[44], the measurement of the index of microbial air contamination[45].

CONTROLLING NOSOCOMIAL INFECTIONS IN PAKISTAN

A number of factors need to be addressed, highlighted and communicated to the general population and medical staff in particular. These factors include:

BASIC MEDICAL EDUCATION

Basic medical knowledge is vital part of the primary education of every ordinary man and women. This should be developed from the level of primary education until graduation. The knowledge should include the most important human disease, the importance of hospitals in community and their role of controlling diseases and factors involved in transmission of disease46'47. A further aim should be to develop confidence among people that hospitals are safe environments which can reduce the prevalence of disease in the community and cure the ailments for which patients were referred to hospitals.

THE PRESTIGE AND RESPECT OF HOSPITALS

Hospitals must be respected and considered as 'safe places' for patients rather than places where other diseases may be acquired, as many people believe. For this purpose strict, easy to understand, implementable, friendly guidelines[48'49'50] should be formulated and explained to the public in national and local language though newspaper, radio, television, national and local seminars with presentations and talks easily understood by lay people.

HOSPITAL ENVIRONMENTS CLEANING STANDARDS

This is an essential aspect in curbing nosocomial infections if we minimize the risk of acquiring infections from hospitals[51'52'53] Speaking frankly, widespread concerns are raised by the citizens about the contribution of poorly cleaned hospitals to cross infection. High level of dusting results in

spread of microbes in the air of hospitals. The most commonly cited microbes are Staphylococci, Acinetobacter, and Clostridium deficile[54'55'56'57]. These and other microbes spread by dusting can be opportunistic pathogens which cause cross-infection. This is a reason why many European hospitals allocate substantial separate funds under the head cleaning budgets. Hospital policy makers can learn from European countries and experts in Pakistan to formulate effective routines for hospital environment cleaning. Also, imparting knowledge to hospital personnel about reasons for routine cleaning and

decontamination of medical equipment is vitally important in reducing the nosocomial infections. Such a draft guideline should include58'59:

- Management of medical waste
- Good infection in disinfection
- Isolation precautions
- Prevention of catheter infection
- Infection control in intensive care units
- Personal hygiene
- Hand hygiene
- Disinfection and sterilization
- Hospital environmental cleaning
- Accidental blood contact or other clinical specimens
- Prevention of HIV
- Surveillance of hospital infections
- Good use of antibiotics in hospitals

VISITORS

This factor is a common cause of great outbreaks of nosocomial infections60. It has been observed that fora single patient, their complete family as well as friend and other relative will visit the patient. There is currently low awareness of the possible transmission of infections via visitor's shoes, uncovered hands, the need to us© masks, sneezing, coughing (droplets) while talking patients, using same eating utensils (plate, glass, spoon, cup, etc) while visitors are in hospitals. To develop appropriate awareness strict regulation are need to address the physiological and ethical misconceptions of visitors. This can be achieved by educating the general population through the medium of television, radio, and newspaper so that ordinary citizens can understand the guidelines for 'safe visiting' in hospitals.

Guidelines for control of nosocomial infections exist in very few hospitals (both private and state), and many in large and small cities appear to have little awareness of nosocomial infections. Also there are very few 'surveillance studies' or recognition of the Microbiology in hospitals.

CONCLUSIONS

The writer admits that all the aspects of nosocomial infections to medical science could not be discussed i-n this paper because the subject is so vast and varied. Even the most important aspects are not discussed in great detail. However aim to highlight some of the serious but avoidable aspects of this largely ignored but vital issue of nosocomial infections in Pakistan. Misuse of antibiotics has produced antibiotic resistant organism! such as Methicillin-Resistant Staphylococcus Aureus (MRSA) and these increase clinical complications of patients, lengthening their hospital stay and adding to treatment costs. Treatments of such infections is difficult, lengthy and often proves to be extraordinary expensive; this unnecessary additional burden on the health care system costs very difficult to afford. Few research papers are available on this topic. Also, there is no official, national approach and no real managerial support from health authorities for control of nosocomial infections. This paper aims to alert the health policy makers, medical staff, microbiologists and other experts to consider more clearly the serious of threat of nosocomial infections. This is for the Pakistan Ministry of Health to become actively involved in the development of a structured and

coherent approach to the problem. The approach could focus on formation and implementation of a set of objectives, responsibilities, structures, surveillance system, and technical guideline of medical personnel pertaining to nosocomial infections. There is an urgent need for 'active management' of antibiotic usage. This national project should be given high priority and every effort should be made to understand the problem amongst the general population. This could be achieved by popular journalism in the mass-media, by seminars, talks and presentations which highlights this problem. Only in this way can the pubic become directly involved contributing towards a solution to this extremely serious problem.

REFERENCES

1. Kawalce M, Marek G, Maria Z, Tomasz 0, Lech K and Waleria H. Outbreak of vancomycin-resistant Enterococcus faecium of the phenotype van B in a hospital in Warsaw, Poland: Probable transmission of the resistance determinants into an endemic vancomycin-susceptible strain. J Clin Microbiol 2001; 39:1781-1787.

2. Weightman NC and Kirby PJG. Nosocomial Escherichia coli 0157 infection. J Hosp infection 2000,44:107-111.

3. Sotto A, Corinine M, Pascale F, Anne G, Danielle S, and Jacques J. Risk factors for antibiotic-resistant Escherichia coli isolated from hospitalized patients with urinary tract infections: a perspective study. J Clin Microbiol 2001; 39: 438-444. 13.

4. Thomas L, Maillard J, Lambert RJW, and Russel AD. Development of resistance to chlorhexidme diacetate in Pseudomonas aeruginosa and the effect of a 'residual' concentration. J Hosp Infection 2000; 46:297- 303.

5. Schelenz S and French G. An out-break of multi-resistant Pseudomonas aeruginosa infection associated with contamination to bronchoscopes and an endoscope washer-disinfector. J Hosp Infection 2000; 46:23-30.

6. Dubios V, Corinne A, Monique M, Bernard M, Catherine A, Cecile F, et al. Nosocomial outbreak due to a multi resistant strain of Pseudomonas aeruginosa P12: Efficacy of cefepime-amikacin therapy and analysis of beta-lactam resistance. J Ciin Microbiol 2001; 39: 2072-2078.

7. Maguire M, Pharoah P, Walsh B, Davison C, Barrie D, Threlfall EJ et al, Hospital outbreak of Salmonella virchow possibly associated with a foot handler. J Hosp Infection 2000; 45: 76-80.

8. Rogues AM, Boulard G, Allery A, Arpin C and Quesnel C. Thermometers as a vehiclefortransmission extended-spectrum-beta-lactamase producing Klebseilla pneumoniae. J Hosp Infection 2000; 45: 76-80.

9. Wichelhaus TA, Sylvia K, Volker S, and Volker B. Rapid detection of epidemic strains of Mithicillin-resistant Staphylococcus aureus (MRSA). J Clin Microbiol 1999; 37:690-693.

10. O'Brien FG, Pearman JW, Gracey M, Riley TV, and Grubb WB. Community Strain of Methicillin-resistant Staphylococcus aureus (MRSA) involved in hospital outbreak Micribiol 1999; 37: 2858-2862.

11. Hsueh PR, Teng LJ, Yang PC, Pan HJ, Chen YC, Hua L, et al. Dissemination of two Methicillin-resistant Staphylococcus aureus (MRSA) clones exhibiting negative staphylase reactions in intensive care units. J Clin Microbiol 1999; 37: 504-509.

12. Harbarth s, Martin Y, Rohner P, Henry N, Auckenhaler R and Pittet D. Effect of delayed infection control measures on a hospital outbreak of methicillin-resistant Staphylococcus aureus. J Hosp Infection 2000; 43:49.

13. Reischl UDO, Jorg HL, Michaela M, Bright L, and Norbert L. Rapid identification of Methicillin-resistant Staphylococcus and simultaneous species confirmation using real-timefluorescenncePCR.J Clin icrobiol 2000; 38: 2429-2433.

14. Olivier JG, Anne M and Nevine E. Phenotypic and molecular typing of nosocomial Methicillin-resistant Staphylococcus aureus (MRSA) stains susceptible to gentamicin isolated in France from 1995-1997. J Clin Microbiol 2000; 38: 185-190.

15. Shgemi H, Masaya K, Namiko M, shigeyoshi B, Hisako Y, Katsuko 0, et al. Control of a Methicillin-resistant Staphylococcus aureus (MRSA) outbreak in a neonatal intensive care unit by unselective use of nasal mupirocin ointment. J Hosp Infection 2000; 46: 123-129.

16. Hafiz S, Hafiz AN, Ali L, Chugahtai AS, Memon B, Ahmed A, et al. Methicillin-resistant Staphylococcus aureus: a multicenter study. J Pak Med Assoc 2002; 52(7) 312-314.

17. Byrne, AH, Boyle B, Herra CM, Hone R, Keane CT. Serratia Marcescens causing hospital-acquired lower respiratory tract infection. J Hosp Infection 2000; 45: 242-251.

18. Lones, BL, Gorman LJ, Simposon J, Curran ET, Me Namee S, Lucas C, et al. An outbreak of Serratia marcescens in two neonatal intensive care units. J Hosp Infection 2000; 46: 314-319.

19. leven, M, Vercauteren E, Descheemaeker, P, Van LaerF, and Goossenes H. Comparison of direct plating and broth enrichment culture forthe detection of intestinal colonization by glycopeptide resistant Enterococci among hospitalized patients. J Clin Microbiol 1999; 37: 1436-1140.

20. Gottberg A, Nierop W, Adriano D, Marlene K, Kerrigan M, Adrian B.etal. Epidemiology of glycopeptide-resistant Enterococci colonizing high-risk patients in hospitals in Johannesburg, Republic of South Africa. J Clin Microbiol 2000; 38: 905-909.

21. Leski TA, Marek, G, Anna S, Elizbieta S, Krzysztof T, and Waleria H. Outbreak of Mupirocin-resistant I a hospital in Warsaw, Poland, due to plasmid transmission and clonal spread of several strains. J Clin Microbiol 1999; 37:2781-2788.

22. Szewczyk EM, Piotrowaki A, and Rozalska M. Predominant Staphylococci in the intensive care unit of a paediatric hospital. J Hosp Infection 2000; 45:145-154.

23. Fluit AC, Wielders CLC, Verhoef J and Scmitz FJ. Epidemiology and susceptibility of 3,051 Staphylococcus aureus isolates from 25 university hospitals participating in the European sentry study. J Clin Microbiol 2001; 39: 3727-3732.

24. Gilleece A and Fenelon L. Nosocomial infective endocarditis. J Hosp infection 2000; 46: 83-88.

25. Barnes RA, Rogers TR, Pittet D, Burnies J, Haynes KA. Nosocomial Fungal infection: diagnosis and typing. J Hosp Infection 1999; 43 (Supplement): S215-S218.

26. Van Saene HKF, Damjanovic V, Pizer B, Petros AJ. Fungal infection in ICU. J Hosp Infection 1999; 41:337

27. Andeson, BM, Ringertz SH, Petersen GT, Hermansens W, Lelek M, Normal Bl, et al. A three year survey of Nosocomial and community-acquired infections, antibiotic treatment and re-hospita!ization in Norwegian health region. J Hosp Infection 2000; 44: 214-223.

28. Leibovici L, Schonheyder H, Pitlik SD, Samra, Z and. Moller, JK. Bacteraemia caused by hospital-type microorganisms during hospital stay. J Hosp Infection 2000; 44: 31-36.

29. Bertrand X, Thouverez M, Bailly P, Cornette C, Talon D. And members of a Reseau franc-Comtois de lutte contr les infections Nosocomial. Clinical and molecular epidemiology of hospital Enterococcus faecium isolates in eastern France. J Hosp Infection 2000; 45: 125-134.

30. Tammelin A, Domicel P, Hambraeus A, and Stahle E. Dispersal of Methicillin-resistant Staphylococcus epidermidisby staff in an operating suite thoracic and cardiovascular surgery: relation to skin carriage and clothing. J Hosp Infection 2000; 44:119-126.

31. Josef SF, Dieter H, Roland Gl, Patrick F, Christan K, Verhoef J, et al. Increased prevalence of class I intergron in Escherichia coli, Klebsiella species, and Enterobacter species isolates over a 7-year period in a German University Hospital. J Clin Microbiol 2001; 39: 3724-3726.

32. Shah AA, Hasan F and Hameed A. Study on the prevalence of Enterobacteriaceae in hospital acquired and community acquired infections. Pak J Med Res 2002; 41(1) 4-8.

33. Michael C K, Mitchell CA, Griffin M, Spencer RC, and Emmersons AM. Prevalence of lower respiratory

tract infections in hospitalized patients in the United Kingdom and Eire-results from the second national prevalence survey. J Hosp Infection 2000; 46:12-22.

34. Gray J, George RH, Durbin GM, Ewer AK, Hocking MD, and Morgan MEI. An outbreak of Bacillus cereus respiratory tract infections on a neonatal unit due to contaminated ventilator circuits. J Hosp Infection 1999; 41:19-22.

35. Simhon A, Rahav G, Shapiro M, and Block C. Skin disease presenting as an outbreak of pseudo-bacteria in a laboratory worker. J Clin Microbiol 2001; 39: 392-393.

36. Worthington T, Lambert PA and Elliott TSJ. Is hospital-acquired intravascular catheter-related sepsis associated with outbreak strains of coagulase-negative Staphylococci? J Hosp Infection 2000; 46:130-134.

37. Gheldre YD, Struelens MJ, Glupczynski Y, De Mol P, Maaes N, Nonhoff C, et al. National epidemiology surveys of Entrobacter aerogenes in Belgian Hospitals from 1996-1998. J Clin Microbiol 2001; 39: 889-896.

38. Gastemeir P, Daschmer F, Ruden H. Guidelines for infection prevention and control in Germany: Evidence-or expert-based? J Hosp Infection 1999, 43 (Supplement): S310-S305.

39. Fabry J. And Carlet J. Guidelines for infection control: the french situation. J Hosp Infection 1999; 43(supplement):S309-S312.

40. Talon D. The role of the hospital environment in the epidemiology of multi-resistant bacteria. J Hosp Infection 1999; 13-17.

41. Forster DH, Krause G, Gastmeier P, Ebner W, Rath A, Wischnewski N, et al. Can quality circles improve hospital-acquired infection control? J Hosp Infection 2000:45:302-310.

42. Michael CK. The management and control of hospital- acquired infection in acute NHS trusts in England: a report by the comptroller and auditor general - the who, how, and what. J Hosp Infection 2000; 44:157-159.

43. Eastaway AT. The hospital management/microbiology interface-a British view point. J Hosp Infection 2000; 46:182-185.

44. Hirsch J. Compliance with hand hygiene protocol by nurses in a Dutch hospitals. J Hosp Infection 1999; 43: 163-165.

45. Pasquarella C, Pitzurra 0 and Savino A. The index of microbial air contamination. J Hosp Infection 2000; 46: 241-256.

46. Anderson BM, Ringerts SH, Petersen GT, Hermansen W, Lelek M, Norman B, et al. A three year survey of nosocomial and community acquired infections, antibiotic treatment and re-hospitalization in a Norweigian health region. J Hosp Infection 1999; 44: 214-223.

47. Hoffman PN, Bennett, AM and scott GM. Controlling airborne infections. J Hosp Infection 1999; 43: 5203-S210.

48. Gastmeir P, Daschner F, and Ruden, H. Guidelines for infection prevention and control in Germany: evidence based-or expert based? J Hosp Infection 1999; 43:5301-5305.

49. Pearson ML. The Hospital Infection Control Practices Advisory Committee. Guideline for prevention of intra-vascular-device-related infections. Infec Cont Hosp Epid 1996; 17:438-473.

50. Fabry J and Carlet J. Guidelines for inection control: The French situation. J Hos Infection 1999; 43: 5309-5312.

51. Whyte W, Lidwell OM, Lowbury EJL, Blowers R. Suggested bacteriological standards for air in ultra-clean operating rooms. J Hosp Infection 1983; 4: 133-139.

52. Humphrys H. Microbes in the air-when to count (the role of air sampling in hospitals). J Med Microbiol. 1992; 37: 81-82.

53. French MLV, Eitzen HE, Ritter MA, Leland DS. Environmental Control of microbiol contamination in the operating room. In: Hunt TK, Ed. Wound healing and wound infection. New York: Appleton-Century Crofis 1980; 254-261.

54. Talon D. The role of the hospital environment in the epidemiology of multi resistant bacteria. J Hosp Infection 1999; 43: 13-17.

55. Bonilla HF, Zervos MJ, Kauffman Ca. Long-term survival of vancomycin-resistant Enterococcus faecium on a contaminated surfaces. Infec Cont Hospl Epid 1996; 17: 770-771.

56. Oie S, Kamiya A Survival of methicillin-resistant Staphylococcus aureus (MRSA) on naturally contaminated dry mops. J Hosp Infection 1996; 34:145-149.

57. Getchell-white SI, Doowitz LG, Groschel DHM. The inanimate environment of an intensive car unit as a potential source of nosocomial bacteria: evidence for long survival of Acinetobacter calcoaceticus. Infec Cont Hospl Epid 1989; 9: 402-407.

58. Broek PJV. National guidelines for infection control in the Nether Lands. J Hosp Infection 1999; 43: 297-299.

59. Garner JS and The Hospital Infection Control Practices Advisory Committee. Guidelines for isolation precautions in hospitals. Part I. Evolution of isolation practices. Part II. Recommendations for isolation precautions in hospitals. Am J Infection Cont 1996; 24: 24-52.

60. Pelczar MJJr, Chan ECS & Krieg NR. In Microbiology-Concepts and Applications, Published by Me Graw-Hill, Inc. 1993; 590-613.