

A PROSPECTIVE STUDY OF WASTE WATER IN A TEACHING HOSPITAL OF SUB URBAN SETUP

BANDARU NARASINGA RAO¹, D. VIJAYA BHARATHI² & SRINIVAS BUDATI³

¹Professor & Head, Department of Microbiology, Gayatri Vidya Parishad Institute of Health Care & Medical Technology, Marikavalasa, Madhurawada, Visakhapatnam, Andhra Pradesh, India

²Assistant Professor, Department of Microbiology, Gayatri Vidya Parishad Institute of Health Care & Medical Technology, Marikavalasa, Madhurawada, Visakhapatnam, Andhra Pradesh, India

³PhD Scholar, Department of Research, Saveetha University, Thandalam, Chennai, Tamil Nadu, India

ABSTRACT

Background: The term “Wastewater” is referred to any water whose quality has been adversely changed by human or animal activities. It includes liquid waste discharged from domestic homes, hotels, hostels, agricultural, pharmaceutical, chemical, thermal power stations and other commercial sectors including hospitals. The importance of bacterial isolates from waste water environment as a reservoir of antibiotic resistance and a potential source of novel resistance genes to clinical pathogens is underestimated. This present study is framed to isolate and characterize public health important bacteria from waste water in hospital and non- hospital environments and evaluate the distribution of multi drug resistant (MDR) bacteria in this area.

Material and Methods: This was a cross-sectional study conducted from January to March 2015 at 500 bedded Rajiv Gandhi Institute of Medical Sciences (RIMS) Government General Hospital, Srikakulam, Andhra Pradesh, India. Forty samples from various outlets were aseptically collected, transported and processed within two hours using standard test procedures. The microorganisms were isolated using various media and assessed for their antimicrobial resistance pattern using 10 antimicrobial discs by Kirby-Bauer disk diffusion method.

Results: A total of 40 waste water samples were processed for the presence of drug resistant bacteria. From these 40 samples, 149 bacterial strains were recovered. Majority of bacteria 30 (75%) were from hospital environment. Most frequently isolated bacteria from both hospital environment and non-hospital environment was *Klebsiella* spp. 48 (32.21) followed by *Escherichia coli* 37 (24.84), *Staphylococcus aureus* 21 (14.08), Coagulase Negative *Staphylococci* (CoNS) 10 (6.71), *Pseudomonas aeruginosa* 14 (9.39), *Proteus* spp., 10 (6.71) *Enterococcus faecalis* 5 (3.35) in both environments. *Shigella* spp., 3 (2.01) and *Salmonella* spp., 1 (0.67) in the hospital environment, but not from non-hospital environment. Among 21 strains of *Staphylococcus aureus* isolated from both environments, 12 strains were Methicillin Resistant *Staphylococcus aureus* (MRSA) and 1 was vancomycin intermediate resistant *Staphylococcus aureus* (VRSA) and 3 were vancomycin resistant *Staphylococcus aureus* (VISA) with a trend towards superbugs.

Conclusions: In the present study, high percent of multi drug resistant bacteria (MDR) were observed in the hospital environment waste waters which may be transferred to other bacterial pathogens causing fatal infections in the community. It is therefore advised that all concerned in the healthcare sector to formulate the ways on proper liquid waste management practices in healthcare institutions to decrease the risk of disseminating pathogenic and multi drug resistant microorganisms in the community.

KEYWORDS: Hospital environment, Microorganisms, MRSA, Multi Drug Resistant (MDR), Waste water