



## Editorial

### A Hospital-Acquired Infection: A Public Health Problem

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A hospital-acquired infection, also known as nosocomial infection or hospital associated-infection, is defined as any infection that develop within 48 hours after hospitalization. It may develop either from out-patient clinic, indoor hospital setting, nursing homes, diagnostic laboratories or any other clinical settings. It may also occur either in epidemic or endemic form but endemic hospital acquired infections are most common.<sup>1</sup> According to an estimation, more than 1.4 million patients get affected globally by hospital associated infections both in developed and under developed countries. At any times, the prevalence of nosocomial infections differs between 3.5 to 12% in developed countries. However, the prevalence of nosocomial infections in developing countries is 5.7% to 19.1% and the average prevalence is significantly higher in contrast to developed countries.<sup>2</sup> In accordance to a recent multicenter study conducted in Europe, the prevalence of hospital-associated infection is 51% in intensive care unit patients and cumulative incidence is 17 episodes per 1000 patient-days among high-risk adults in developed countries. Though, in the developing countries, the prevalence of nosocomial infections in intensive care unit patients is significantly greater (88.9%) with 42.7 episodes per 1000 patient-days that are nearly three times greater in contrast to high-income countries.<sup>3</sup>

The rate of hospital-acquired infection is also higher in Pakistan. According to recent multicenter study conducted in 13 hospitals of Punjab, out of 1553 hospitalized patients, 130 patients (8.4%) showed symptoms of hospital-acquired infection.<sup>4</sup> A variety of microorganisms such as bacteria, viruses

(Hepatitis B, respiratory syncytial virus, Cytomegalovirus), fungi (candida albicans, Aspergillus, saprophytic) and parasites (Sarcoptes scabies) are the agents of hospital associated-infection. However, the bacteria are the most common nosocomial pathogens and among them commensal bacteria that is found in normal human flora may cause infection if the patient has low immunity. Whereas, pathogenic bacteria may also cause infections either in the form of sporadic or epidemic form irrespective of patient immune status because these bacteria are highly virulent.<sup>5</sup>

The pathogenic bacteria may include anaerobic gram-positive rods (e.g., Clostridium) causes gangrene, gram-positive bacteria (Staphylococcus aureus), beta-hemolytic streptococci, gram-negative bacteria (Escherichia coli, Proteus, Klebsiella, Enterobacter, Serratia marcescens, Pseudomonas species) that causes serious infections such as surgical site, lung, bacteremia, peritoneum infection. Exogenous hospital associated-infections can be acquired via hospital environment, medical procedures and hospital staffs. Whereas, endogenous hospital associated-infections can be originated by organisms that are found as normal flora of the patients.<sup>4,5</sup> These infections spread via direct contact (hands, auto-inoculation, equipment's), indirect contact (contaminated gloves, bedpans, dressings), or can be airborne or exogenous but among this direct contact is the common mode of transmission. The most types of hospital associated-infections observed are surgical site infections, urinary tract infections, nosocomial pneumonia, nosocomial bacteremia, gastroenteritis, skin and soft tissue infections, ulcers and burns.<sup>6</sup> According to the recent multicenter study conducted in Punjab, surgical site

infections showed highest prevalence (40%), followed by blood-stream infections (21.5%) and lower respiratory tract infections (14.6%). The results of this study also revealed that the highest proportion of hospital acquired-infections was found in neonates admitted in intensive care unit (ICU). It has also found that 80% of urinary tract infections were associated with in dwelling catheters and the rate of ventilator-associated pneumonia is 3% per day in patients admitted in intensive care units.<sup>3,4</sup>

Although, the data published by WHO reports keep informing public policy makers and health care workers (HCWs) regarding global prevalence of most important diseases but the nosocomial infections are not part of the list of 136 illnesses assessed. The diagnosis of hospital-associated infections depends upon many laboratory tests rather than single diagnostic procedure. The most likely reason is that the diagnosis of hospital acquired-infections is complex, relying on multiple diagnosis criteria. In order to control hospital acquired-infections, there is need to implement quality assurance measures in all health-care sectors. The risk appraisal will be helpful to classify patients into low, medium, high and highest risk. After risk assessment, infectious patients must be isolated in order to prevent infection in the susceptible patients.<sup>7</sup> The hospital staff suffering from common infectious ailments like diarrhea, skin infections, respiratory tract infections and known carriers of an epidemic strain of bacterium should kept away from work place until completely cured. "Hand hygiene" is the single most effective strategy in order to prevent hospital-associated infections because it has found that hands are the most common carrier for spread of microorganisms among health staff and patients.<sup>6,7</sup>

Hospitals should follow sanitation protocols including proper disinfection through wide variety of disinfectants; sterilization of penetrating body sites medical devices, parenteral fluid medications and reprocessed equipment's. Using face-mask, appropriate bed-spacing, patient load and ventilation may prevent infections caused by droplets. Barrier nursing technique should be implemented in hospitals because it is very effective to protect medical staff against infection especially from patient with highly infectious diseases.<sup>8</sup> Standard precautionary measures should be implemented all the time, irre-

spective of infectious status of patients. Use sterile, clean gloves and gowns during handling of blood or body fluids, contaminated items or any other infective materials of the patients. Use a face mask, eyeglasses or face shield if there are chances of generation of splashes/sprays of blood and body fluids during medical procedures. Confirm that single use objects and sharps are cast-off correctly and decontamination of all potentially contaminated materials. Remove protective clothing's after any procedure and always wash hands.<sup>9</sup>

There should be nosocomial infection surveillance system of health-associated data in order to monitor the nosocomial infection rate and assess the efficiency of infection control activity. Though, a large number of developed countries have national surveillance system, the National Nosocomial Infection Surveillance (NNIS) system that is present in the United States, frequently practice various diagnostic principles and procedures, which made worldwide contrast laborious because of benchmarking difficulties. In low-and middle-income countries, nosocomial infection surveillance systems are occasionally existing. However, in many hospitals, hospital associated-infections seems to be hidden, cross-cutting concern that no organization or healthcare facility can claim to have resolved as up till now.<sup>10</sup>

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