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Editorial

Do Nosocomial Infections Pose a Global Public Health Threat?

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Nosocomial infections, also known as hospital-acquired infections (HAIs), are caused by a variety of pathogens, such as bacteria, fungi and viruses, and continue to pose a substantial global public health menace. These infections usually occur in patients after 48-72 hours of admission to the hospital or health-care centre, and remain a major source of morbidity, mortality, and healthcare expenditure worldwide [1-3]. A number of factors, such as the emergence of multidrug-resistant organisms, inadequate infection control practices, overcrowding in hospitals, and increasing numbers of immunocompromised patients contribute significantly to the upsurge of nosocomial infections in developing as well as developed nations of the world. Nosocomial infections can occur in sporadic as well as in the form of an outbreaks affecting people of both sexes, and all age groups [1,4,5].

Nosocomial infections can be acquired during the course of healthcare delivery in hospitals, clinics, and other medical facilities [6]. These infections include urinary tract infections, surgical site infections, bloodstream infections, hospital-acquired pneumonia, and infections caused by multidrug-resistant organisms. It is important to mention that about 80% of urinary tract infections are attributed due to the use of indwelling urinary catheters [2]. Similarly, indwelling intravenous catheter is responsible to cause septicaemia/bacteraemia in the patients who are admitted in the hospital for treatment [2].

Globally, it is estimated that hundreds of millions of patients are affected with nosocomial infections annually [7]. The burden of nosocomial infections is significantly higher in low- and middle-income countries due to limited resources, inadequate sanitation, lack of trained infection control personnel, and overcrowding [8].

Multiple agents are implicated with nosocomial infections in many regions of the world [1]. Nosocomial infections are mostly caused by bacteria (*Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Clostridioides (Clostridium) difficile, Acinetobacter baumannii, Klebsiella pneumoniae, K. oxytoca, Serratia marcescens, Enterococcus faecalis, E. faecium, Streptococcus pyogenes, Mycobacterium tuberculosis, Burkholderia cepacia*, *Listeria monocytogenes, Salmonella spp., Yersinia spp.*), followed by fungi (*Candida albicans, Aspergillus fumigatus*, *Cryptococcus neoformans, Histoplasma capsulatum, Rhizopus rhizopodiformis*, *Pneumocystis carinii*; *Malassezia pachydermatis*), and viruses (hepatitis B virus, hepatitis C virus, HIV, Norovirus, Lassa virus, SARS-CoV-2, monkeypox virus, Ebola virus, Rota virus, influenza viruses, respiratory syncytial virus) [1,2,4,6,9-18]. In this context, Khan and others [19] have mentioned that *Escherichia coli*, a gram-negative bacterium, is a frequent cause of urinary tract infections and septicaemia in patients. Among fungal pathogens, *Candida* species especially *C. albicans* are an important cause of nosocomial infections, which can be life-threatening in the patients admitted to the hospitals [16].

There are four routes of transmission namely, air, direct contact, oral, and parenteral [2]. It is important to state that hospital staff can transfer the infection to the patients as well as other workers of the hospital [3]. In viral outbreaks, person to person transmission was observed where as in bacterial outbreaks, transmission was largely foodborne [5]. The source of infection includes the patients, hospital employees, and environment [3].

Patients with nosocomial infections usually exhibit a variety of symptoms, such as shortness of breath, productive cough, abdominal pain, palpitations, altered mental status, suprapubic pain, rebound tenderness, costovertebral angle tenderness, polyuria, and dysuria [20].

Microbiological tests can be employed to investigate the source of infection. Several laboratory techniques, such as microbiological, histopathological, immunological and molecular are helpful to establish an unequivocal diagnosis of infection. The isolation of bacteria from various types of clinical specimens should be attempted on blood agar, Mac Conkey agar etc., where fungal isolation can be done on Pal sunflower seed medium, Sabouraud dextrose agar with antibiotic [1,21]. According to the World Health Organization, prompt identification of an outbreak is imperative to check the spread of infection among the patients by health care staff or through contaminated materials [6].

A multidisciplinary approach involving healthcare staff, administrators, policymakers, and public health professionals are imperative for controlling the nosocomial infections in the health care units. A retrospective case-control study conducted to investigate an association between intrahospital transfer and hospital-acquired infection in the elderly patients admitted in a UK hospital indicated that single-patient room can lower the transmission of microbes, and thus decrease the incidence of nosocomial infections [22]. The isolation of critically ill and immunocompromised patient is necessary. The staff are advised to use the face mask, wear disposable gloves, wash hands thoroughly with Dettol or any other good antiseptic solution after contact with infectious materials and after the removal of gloves, maintain all the medical devices in sterile condition, keep adequate ventilation in patient room, care to handle sharps, and to remove biological materials from the ward. In addition, overcrowding in the hospital must be avoided [2,3,5,6,19]. The staff who is suffering with sore throat, skin diseases, common cold, and diarrhoea should not be permitted to work in the hospital till fully cured [3]. It is advised to avoid the overuse and misuse on antibiotics as it can lead to drug resistance.

Despite considerable advancements in medical field, nosocomial infections remain a challenge to the health professionals due to gaps in infection prevention and control programs. There is a need to further develop better practical and feasible strategies, which can be easily implemented by all the hospitals and health care centres to control nosocomial infections. The emphasis is given to impart health education to the staff about the importance of hand hygiene, sterilization of all medical equipment and devices, maintenance of adequate cleanliness in the surgical wards, and prompt collection and proper disposal of hospital wastes. It is hoped that these measures will certainly mitigate the incidence of nosocomial infections, which are life-threatening especially in elderly and the immunocompromised individuals globally.

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