HOSPITAL ACQUIRED INFECTIONS
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ABSTRACT
A hospital is a health care setting that provides care and treatment to patients through trained staff and specialized equipment. Recovery from diseases and attainment of health is crucial for everybody. Therefore, health care professionals gain core position in the treatment of diseases and prevention of other health hazards like Hospital Acquired Infections (HAI). The HAI is one of those hazardous conditions which adversely affect patients thus further contributing to ill health. This term paper defines this scorching issue in depth. It reviews the prevalence of nosocomial infections in relation to the globe and specifically in Pakistan. Furthermore, the paper also explains some of the causes which lead to hospital acquired infections. In addition, the paper also discusses its therapeutic management based on different pharmacological and non-pharmacological interventions. The pharmacological approaches include antibiotics and non-pharmacological include awareness about universal precautions to limit and eliminate hospital acquired infections. Moreover, it provides strategies and recommendations to treat and preclude these infections. It also highlights some of the data gaps needed to be explored in future in order to prevent and alleviate the sufferings from HAI. Hence, implementation of these strategies would not only help in declining the burden of nosocomial infection in our country but also throughout the world.

Hospital is a place where diseases are being treated. The health personnel make their best efforts to transform the state of illness to that of the wellness. Despite the fact, some patients acquire infections even at hospitals during the course of their treatment. These hospital acquired infections (HAI) are defined as infections that occur within 48 hours of admission to health care institution, 3 days after discharge or 30 days following any surgery (Inweregbu, 2005). These infections are the major cause of morbidity and mortality in patients (Petersen, 2010) and are associated with the ill-provision of health facilities, eventually adding to the cost and duration of hospital stay.

HAI are acquired after getting admitted to hospitals. Approximately, 9% of infections occur at a point in time which is equal to 100,000 infections per year. The impact of HAI can vary from discomfort to disability and sometimes to the death of patients. Some HAI are preventable but in old-aged, younger and immune-compromised patients, the prevention of HAI is difficult (Bourn, 2000). According to Hospital Infection Working Group of the Department of Health and Public Health Laboratory Service (1995), 30% of HAI can be prevented with proper application of knowledge and appropriate infection control strategies (Bourn, 2000).

Globally, HAI is rapidly increasing. It affects 2 million patients per year (Kozier, 2004). World Health Organization (2008) claims, that the rate of HAI is 25% to 40% high (Uneke, 2010). Sheikh, (2008) states, that the frequency of nosocomial infection is 29.13%. Both gram positive and gram negative bacteria are responsible for HAI. Begum, (2013) proposed a global data showing more than 30% nosocomial infections to be caused by gram negative bacteria like Acinetobacter Baumannii. According to Khan, Rasheed and Zahra (2014), Methicillin Resistant Staphylococcus Aureus (MRSA), a gram positive bacterium, is also responsible for 53.3% of the infections. Point prevalence survey was conducted from 10 to 26 October, 2012 to ensure the consistency of HAI across all the hospitals in Benin. On the Basis of “Hospitals in Europe Link for Infection Control through Surveillance” (HELICS) project, a pilot study conducted on March, 2012 as cited in Ahoyo et.al, (2014) shows the overall prevalence of person infected from HAI was 31.0%. It also shows that obstetrics and gynecology ward (19.3%) are mostly affected by HAI. In addition, urinary tract infection
(48.2%), surgical site infection (24.7%), lower respiratory tract infection like pneumonia (11.7%) and intravascular catheter infections (27%), followed by blood stream infection (1.5%) result from HAI (Ahoyo, 2014). The point-prevalence survey conducted in Rabat University of Medical Center depicts that both Escherichia coli and Klebsiella Pneumoniae (14.7%) are responsible for HAI (Razine, 2012). In Pakistan, 1,170561 cases report each year for nosocomial infections (Right Diagnosis from Health Grades, 2014). Centre of Disease Prevention (2007) illustrates that HAI is the fourth leading cause of death which kills almost 99000 people each year. Looking at the increased rate of infections in hospital setting, we realized that despite advancement in medical knowledge and technologies; nosocomial infection is anchoring its roots firmly. It not only doubles the burden of diseases on patients but also multiplies the cost of treatment. Although healthcare providers are making enormous efforts for eradicating HAI’s sufferings but they have not made its elimination successfully (Sheng, 2005). Therefore, we chose HAI to identify its possible causes and some compatible strategies to initially lessen, and then gradually eliminate its burden.

Several factors can contribute to the spread of HAI. A study conducted in China in 1999-2007 shows fungi to be the risk factor for gastrointestinal infections, and gram positive bacteria for the blood stream infections (Xi-mao, 2011). These fungi and bacteria are transmitted from patient to patient, from nurse to patient or from environment to patient due to compromised hygiene practices. Pathogens like Candida Albicans, Escherichia Coli, Pseudomonas Aeruginose, Straphylococcus Aureus and Klebsiella Pneumonia also cause HAI through cross contamination (Xi-mao, 2011). Meningoseptica Bacteremiais acquired by prolong mechanical ventilation (Pereira, 2013). Since it is an obligate aerobic bacterium, it grows in presence of oxygen (Johnson, 2011). Therefore, ventilators provide them a medium to grow. Thus, compromised ventilator care aids bacterium to develop and grow over the time causing meningitis and sepsis. Similarly, Anton, (2010) claims organisms like Pseudomonas Aeruginosa, Acinetobacter and Entero-bacteriaeceae result in pneumonia in patients on prolong ventilation with compromised ventilator care. Being resistant to antimicrobials, these organisms survive for longer time periods in hospital environment, and affect the immune-compriended people during their hospital stay (Weinstein, 2005). Moreover, HAI can occur due to indwelling urinary catheterization. This occurs when we insert and remove catheter with unsterile technique, and handle the drainages improperly (Brusch, 2013). Likewise, bloodstream infections are also very prevalent (Custodio, 2014). These infections ensue because of the improper handling of invasive devices and unsterile methods of inserting them. The micro-organisms come in contact with vascular system, spread throughout the body, and cause infections. Hence, prolong use of drip sets and cannulas also promote the spread of infections (Custodio, 2014). Moreover, burns, surgical wounds, and ostomy sites also provide a favorable environment for the development of infections like Zygomycets. Application of unsterile and contaminated dressings on them may expose the person towards infections (Alangaden, 2011). National hospital discharge survey (2003) reports high levels of mortalities in patients who have had transplants under unsterile practices. MRSA usually lives on dead flesh. When a patient gets some injury that ruptures his skin, some part of his flesh dies and provides a feeding ground to MRSA thus increasing the risk of HAI. Additionally, a study conducted in Pakistan claims, lack of hand washing by hospital staff to be the major cause of nosocomial infections (Rao, 2012). Staff non-compliant to hand hygiene practices transmits infection from one patient to another through contaminated hands. Unwashed clothes and soiled shoes carried by staff and visitors are also the source of infection. Hence, lack of hygiene and cleanliness is an important contributing factor to HAI. Moreover, several researches propose that doctor’s white coat can also harbor the risk of nosocomial infection, but its detailed relation has not been found (Uneke, 2010). Similarly, contaminated stethoscopes also carry organisms like Clostridium Difficile (Rose, 2010). If doctors don’t clean their stethoscopes and use them on patients, they are likely to transmit these germs and spread HAI. Likewise, HAI can also attack neonates. This occurs when recurrent cannulation is done without clean
technique. Since, neonates’ veins are very small and fragile; it makes insertion of invasive lines more difficult. Therefore, the chances of mistaken pricks increase which further increases the risk of HAI. Additionally, diseased healthcare provider, unnecessary neonatal handling by multiple people, and overcrowded ward environment are some other contributory factors to HAI (Talaat, 2011).

Once the infection develops, we can also limit its spread with pharmacological and non-pharmacological approach. Many retrospective studies suggest that the combination therapy is found to be effective against HAI. This therapy includes the use of conventional medication like Beta-lectum and Aminoglycosides, with combination of Ciprofloxacin and Ceftazidime. Additionally, Vancomycin, Teicoplanin and Linezolide are considered a drug of choice for MRSA (Jain, 2007).

The non-pharmacological means include promoting hygiene care especially hand hygiene to limit the cross contamination. The infected patient could also be isolated so that he does not become a source of infection for others. According to Kamis, (2013), limiting visitors could also be helpful. This may decrease the chances of transmitting further infections to patient. Since fungal Pneumonia is caused by Aspergillus which is found in dust and ornamental plants. Therefore, it is recommended to remove plants and flowers from patient’s room. Vital signs especially temperature should be monitored as fever indicates infection. Fluid loss often accompanies fever therefore fluid loss should be replaced by increasing water intake. Similarly, balanced diet including high proteins, vitamins, and minerals like zinc and iron should be encouraged which strengthens the immune system. Additionally, complete blood count particularly neutrophils are significant indicators of infection so blood samples should be sent for laboratory tests (Kamis, 2013). Moreover, non-compliance of drug can make organisms resistant and difficult enough to eradicate therefore, educate client to be compliant with medication regimen (Kozier, 2004).

It is rightly said by a philosopher Erasmus that prevention is better than cure. Decreasing the healthcare related contaminations is one of the goals of National Patient Safety 2006 (Kozier, 2004).

In order to prevent HAI, awareness of basic infection control measures, and ways of HAI transmission should be conveyed to the staff through policies (Shuttleworth, 2004). This would help them in controlling the infection spread. For example, if the staff would know how MRSA transmits, they would be able to control its spread and keep the patient on contact precaution. Teaching sessions could be conducted providing knowledge about proper hand washing and personal hygiene which includes trimmed nails, properly tied hair, fairly trimmed beard and moustache, cleaned clothes, unsoiled shoes etc. Gloving is also important to prevent both patient and staff from infections. Use sterile or clean gloves when needed. Mask should be essentially used in areas which are at risk for airborne infections (World Health Organization Department of Communicable Disease, Surveillance and Response, 2002). Furthermore, unnecessary cannulations, and prolong catheterizations should be avoided to decrease the risks. All procedures should be performed with clean or sterile techniques. Additionally, it is also significant to provide clean environment to limit infection transmission. This could be done by avoiding overcrowding in patient’s zone (Durand, 2014) and mopping regularly. Disinfection of the environment and sterilization of equipment should be followed after every procedure. Nurses should also point out other staff on practicing poor infection control; hence advocating for patients and saving them from HAI (Shuttleworth, 2004). Furthermore, nurses should also notify doctors when they encounter early warning signs of infection like rash, and inflammation while providing care. Antibiotics could be used prophylactically before any surgical procedures to alleviate the chances of contamination (Center for Disease Control and Prevention, 2012).

Despite advancement in knowledge, there are still some areas which need to be further researched. As discussed above that various researches show a blurred relation between doctor’s white coat and nosocomial infection transmission; hence, in future this relation could be studied in detail to further decrease the spread of HAI and its sufferings. Likewise, Studies also suggest that monitoring symptoms along with initiating preventive programs
is effective in avoiding HAI. These practices are being followed in Australia (Hospital-acquired infections, n.d.). In future, we can also develop such programs to monitor and prevent the rate and spread of HAI respectively. Dixon (2011) says HAI is considered a minor problem and is often under reported. Therefore, proper monitoring and reporting programs should be initiated in future. For this, outbreak investigations, laboratory tests and epidemiological surveys will be significantly helpful.

CONCLUSION
In conclusion, HAI are contaminations promoted by hospital settings. The rate of HAI is significantly high around the globe. Urinary tract infections, surgical wound infections, bloodstream and respiratory tract infections are some of the common HAI. Lack of personal hygiene which include contaminated hands, soiled clothing, untrimmed nails and hair, non-adherence to infection control practices etc. all contribute to nosocomial spread. Furthermore, lack of sanitary conditions, overcrowded environment and unsterile invasive procedures also lead to HAI. Certain measures must be taken to limit these infections. These include ensuring sterility while performing any procedure, and administering prophylactic antibiotics to patients. Since drug resistance also fastens HAI occurrence therefore, patients must be educated for drug compliance. Moreover, ensuring the refurbishment and application of updated policies must be ensured in order to prevent HAI. Further studies will also help in identifying new causes and inculcating more appropriate interventions for HAI elimination; hence will help staff to provide a high quality care to patients.

REFERENCES