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**CHAPTER ONE**

**IDENTIFICATION AND CHARACTERIZATION OF BACTERIA AND FUNGI ASSOCIATED WITH NOSOCOMIAL INFECTIONS FOUND ON MEDICAL EQUIPMENT IN THE KNUST HOSPITAL**

**BY**

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1. **INTRODUCTION**

**1.1 Background study**

Nosocomial infections (NIs) are a broad term given to all infections acquired by a patient during his or her stay in a hospital. Currently, a new idiom, “healthcare-associated infections” or HAIs are being used to describe precisely, all infections caused by a prolonged hospital stay, and is an impediment to a complete and accurate healthcare delivery service in hospitals (Jayasree & Afzal, 2019). Even more so, nosocomial infections tend to be a major public health risk, leaving hospitalized patients with infectious symptoms forty-eight hours post admission (Garvey, 2023). These infections do not only occur during health care delivery for other diseases in a health care facility, but can occur even after the patient has been discharged (Oni *et al.,* 2023).

Nosocomial infections are the most common events in any healthcare setting that affects patients adversely. They are also the leading cause of morbidity and mortality in hospitals (Sikora & Zahra, 2023). Despite improvements in the knowledge and ability to control these illnesses, they nevertheless pose a serious threat to global public health. Even the best clinical care can be rendered useless if patients contract additional infections while being treated in the healthcare facility (Oni *et al.,* 2023).

For a given nosocomial infection to manifest, two pathophysiological factors must be present. These factors are the impaired host defenses and colonization by pathogenic and non-pathogenic microbes (Jayasree & Afzal, 2019). These microbes are predominantly bacteria, fungi and viruses. Bacteria can arise from either external or endogenous sources as part of the natural flora. Fungal pathogens are typically linked to opportunistic infections in patients who have indwelling devices, such as urinary catheters or central line, or who are immunocompromised. Candida species collectively rank as the fourth most prevalent infection (Weiner *et al.,* 2016).

It has also been reported, within a typical hospital setting, the Intensive Care Units (ICUs) is by far the most threatening in terms of contracting such nosocomial infections. Diseased and accident-stricken patients in the ICU are at an increased risk of contracting device-associated nosocomial infections (DANIs) because of their compromised immune systems (Blot *et al.,* 2022). Over the years, nosocomial infections have become a burden in various healthcare settings, accounting for a substantial number of deaths and increased health costs recorded in hospitals worldwide.

Statistically, out of every hundred patients taken randomly on a worldwide scale for a case study, it can be estimated that seven percent (7%) of them found in developed countries and ten percent (10%) located in developing countries have contracted nosocomial infections (Khan *et al*., 2016). Based on the World Health Organization’s (WHO) general estimation, fifteen percent (15%) of all hospitalized patients were known to be battling with this hospital associated infections in addition to diseases which led them there in the first place.

With the progressing statistical research into the occurrences of nosocomial infections in hospitals worldwide, the infection is increasing annually at a rate of 0.06, with regions in Africa having recorded the highest numbers so far. Ghana as a region estimated a prevalence percentage in hospital acquired infections at 8.2 % (Salu *et al.,2023*). In the 21st century, the impact of nosocomial infections in healthcare delivery services has become more threatening due to the overwhelmingly large numbers of sick people visiting these health centers (Zewdu *et al.,* 2023).

Adequate information is known about nosocomial infections in hospitals nationwide. However, the level of knowledge on hospital acquired infections on the path of healthcare personnel and even the patients have proven to be yet critical in controlling these infections (Ocran & Tagoe, 2014). And through research and the body of existing knowledge so far, it has been found that bacteria and fungi associated with nosocomial infections exists on specific medical equipment and devices such as bronchoscopes, incubators and forceps.

**1.2 PROBLEM STATEMENT**

Little research has been done to investigate the role of medical equipment in the spread of nosocomial infections in some health care setting (Ssekitoleko *et al.,* 2020). However, in Ghana, not much work has been done on nosocomial infections (Duedu *et al.,* 2017). With emphasis on KNUST hospital, there are no concrete investigations on how medical equipment and devices associated with and play a role in the cause, spread or transmission of nosocomial infections. In the KNUST Hospital, the prevalence of nosocomial infections associated with medical equipment poses a considerable challenge to patient safety and quality of care.

**1.3 JUSTIFICATION**

Nosocomial infections are an impediment to a complete and appreciable healthcare delivery service in various hospitals, and the KNUST hospital is not an exception. Ample research already exists on the occurrence of nosocomial infections and statistical analysis has been represented indicating how far nosocomial infections can go in causing nuisances in healthcare facilities. Howbeit, there are few if not a handful of research conducted to linking medical equipment and devices to the harboring and transmission of such infections in the KNUST hospital.

The research also seeks to answer questions as to the specific microbial groups that could be causing these infections. Other than viruses, bacteria and fungi also play important roles in the cause of nosocomial infections. Furthermore, there is a deeper and closer look into the kinds and properties these microorganisms possess that allow them to cause complications.

**1.4 MAIN AIM**

**1.4.1 General objective**

The main objective of this project is to identify and characterize possible bacterial and fungal components found on medical equipment in the KNUST hospital associated with nosocomial infections and to determine their resistance to known antibiotics.

* + 1. **Specific objective**
* Identification of bacteria and fungi associated with nosocomial infections found on medical equipment.
* To conduct antimicrobial resistance and susceptibility tests on microbial loads.

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