



NEAR EAST UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

**DEPARTMENT OF MEDICAL MICROBIOLOGY
AND CLINICAL MICROBIOLOGY**

**CHARACTERISTICS OF CANDIDA INFECTION
IN CLINICS IN NEAR EAST HOSPITAL IN
CYPRUS**

M.Sc. THESIS

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Nicosia

June 2023

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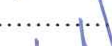
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Approval

We certify that we have read the thesis submitted by **Yasmin Yusuf ALI** titled "CHARACTERISTICS OF CANDIDA INFECTION IN CLINICS IN NEAR EAST HOSPITAL IN CYPRUS" and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Educational Sciences.

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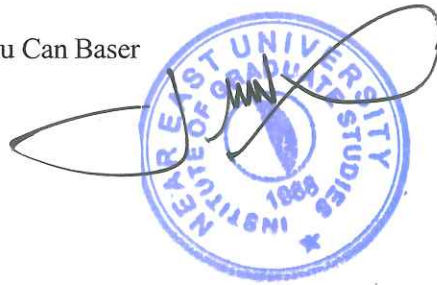
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Declaration

I hereby declare that all the information, documents, analysis, and results in this thesis have been collected and presented in accordance with the academic and ethical rules of the Near East University Institute of Graduate Studies. I also admit that, as per these rules and conduct requirements, I have granted complete references and citations for all information and data that wasn't produced for this study.

Yasmin Yusuf ALI

...../.../2023

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ABSTRACT

CHARACTERISTICS OF CANDIDA INFECTION IN CLINICS IN NEAR EAST HOSPITAL IN CYPRUS

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Worldwide, candida infections pose a serious threat to health since they can result in a wide variety of clinical symptoms and are difficult to avoid and treat. The main elements of Candida infections, such as the epidemiology, risk factors, clinical symptoms, and available treatments, are summarized in this abstract. Over the course of 2021–2023, the study gathered data from the Near East Hospital in Cyprus, a tertiary hospital.

Method it was included in this study candida infection which were isolated in (NEU) Hospital Clinical Microbiology It was 155 sample.

The distribution of Candida species and their antibiotic resistance patterns, as well as the socio-demographic information of the patients, were also examined. The results showed that *Candida albicans* was the most often isolated species, followed by *Candida species*, *Candida parapsilosis*, *Candida tropicalis*, and *Candida glabrata* with a greater frequency in the 61–80 age range, men made up the bulk of the patients. Urine, aspiration fluid, and blood were the most frequently seen specimens. Different Candida isolates were shown to have antimicrobial resistance, with variable degrees of resistance to various drugs. The study emphasizes the need of comprehending the epidemiology and risk factors related to Candida infections, in addition to the requirement for proper diagnosis and treatment. It also highlights the value of surveillance programs in observing trends in antibiotic resistance and directing appropriate treatment. Risk Factors: A number of conditions and medical procedures, such as catheterization and surgery, can make it more likely that you will contract a Candida infection, including those that compromise your immune system (such as HIV/AIDS, cancer, and organ transplantation), prolonged antibiotic use, diabetes, pregnancy, and the use of immunosuppressive drugs. Clinical Signs and

Symptoms: Depending on where the infection is located, candida infections can show a range of symptoms. Itching, redness, and discharge in the afflicted region are common symptoms of superficial infections. The symptoms of invasive infections can be more severe and include chills, sepsis, organ malfunction, and even potentially fatal sequelae. Antifungal Resistance: Candida species have exhibited a rise in resistance to antifungal drugs, which makes management difficult. Antifungal resistance can be impacted by a number of things, including prolonged or incorrect antifungal usage, the presence of biofilms (a protective coating that Candida develops), and the formation of multidrug-resistant strains. Keeping up with excellent cleanliness, engaging in safe sexual activity, avoiding the overuse of antibiotics, and controlling underlying medical issues are all ways to prevent Candida infections. Depending on the degree and location of the illness, treatment usually entails the use of antifungal drugs such as fluconazole, echinocandins, or amphotericin B.

Keywords: Candida infections, Sensitivity, Resistance and Drug.

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List of Abbreviations

HAI:	Healthcare-associated infection
WHO:	World Health Organization
PPE:	Personal protective equipment
HAI s	Healthcare-associated infections
PPE	Personal protective equipment
CAUTI s	Catheter-Associated Urinary Tract Infections
UTI s	urinary tract infections
SSI	Surgical Site Infection
ICU	intensive care unit
VAP	Ventilator-Associated Pneumonia
CDC	Centers for Disease Control
NNIS	National Nosocomial Infections Surveillance
NICU	neonatal intensive care unit
MV	mechanical ventilation
CABSI s	catheter-associated bloodstream infections
HCWs	health care workers
HAIP	hospital acquired infection prevention.
KAP	knowledge, attitudes, and practices
DRH	Disease Referral Hospital
HIV	Human Immunodeficiency Virus
SARS	Severe Acute Respiratory Syndrome
CA-ASB	catheter-associated asymptomatic bacteriuria
NEU	Near East University
SDA	subroid dextrose agar
SPSS	Statistical Package for the Social Science

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The yeast infection Candida, also known as candidiasis, is caused by a fungus called Candida. The most common species of Candida, *Candida albicans*, are capable of infecting people. Normally, candida coexists with no harm to the body in the mouth, throat, gut, vagina, as well as on the skin and within. Candida can cause infections if it develops into an uncontrollable condition or if it spreads widely across the body. Internal organs like the kidney, heart, or brain, or the circulatory system, for instance, might get contaminated. (Kumar et al., 2022)

Although infections are more frequent in immunocompromised individuals, candidiasis and *Candida* spp. are two of the most common fungal diseases. Because they may cause infections in both immune-competent and immune-compromised individuals, they are fittingly referred to as the "disease of diseased."

Candida spp. are common microorganisms that often colonize mucosal surfaces asymptotically, but they also have the potential to be one of the most significant contributors to infections that can be deadly or severely disabling. A few of the clinical signs brought on by *Candida* spp. range from mucocutaneous overgrowth to widely distributed, possibly lethal infections like candidemia.

Although *Candida albicans* is the species that often causes mucocutaneous and disseminated infections, the incidence of candidiasis caused by non-*Albicans* *Candida* (NAC) spp. is increasing. The use of broad-spectrum antibiotics, immaturity, acute immunosuppression or illness, and the indiscriminate use of antimycotic drugs are a few factors that have been connected to this metamorphosis. Some NAC spp. are naturally resistant to antifungal medications, gain resistance to them over time, or both, even though the clinical indications of infections caused by multiple NAC spp. members are often indistinguishable.

Candida spp. undergo a commensal to pathogenic transition through several virulence mechanisms, including attachment to host tissues and medical equipment, development of biofilms, and production of extracellular hydrolytic enzymes.

Comparatively, less is known about NAC spp. than *C. albicans*, whose pathogenic properties have been the subject of intensive study.

The current study set out to identify the frequency of NAC spp. among *Candida* isolates obtained from various clinical specimens and to examine the pathogenicity traits and antifungal susceptibility profiles of these isolates. It was done in an Indian rural tertiary care teaching hospital. (Deorukhkar et al., 2014)

Occasionally, the yeast can get out of control and cause discomfort and irritation. With candidiasis, skin problems are possible. This covers all skin types, including oral, vaginal, and genital. The circulation and internal organs like the liver and spleen can get infected with candidiasis. By far, skin, oral, and vaginal infections are the most common problems. It commonly results in diaper rash as well. Some infections can be bothersome despite being seldom fatal. Death from candidiasis is exceedingly rare and almost unheard of in healthy people, even in those with immune systems that are already impaired. When the infection gets into the circulation or important organs like the heart, it causes death. But for certain cancer patients and those with AIDS who lack the immune systems needed to fight it, candidiasis is a chronic nuisance and, in some situations, a serious risk. (Medbroadcast, 2023).

Due to its capacity to spread minor epidemics globally, *Candida auris* is an emerging pathogen that has attracted interest recently. It is important to recognize the relevance of this virus and its potential influence on healthcare settings even if we did not find any instances of *C. auris* in our investigation. The difficulties *C. auris* presents in terms of diagnosis, treatment, and infection control are well known for being antibiotic resistant. Several studies, including, have documented the spread of *C. auris* in different nations. Patients in critical care units and those with weakened immune systems are more susceptible to illnesses linked to healthcare. The therapy of *C. auris* is made more challenging by the fact that it has shown resistance to several antifungal medications. Strict infection control procedures are required because of *C. auris* propensity to survive on surfaces and its potential for nosocomial

spread.

Given the prevalence and significance of *C. auris* worldwide, the absence of this pathogen in our study is a noteworthy discovery. It is essential to remain vigilant and continue surveillance efforts to identify and manage cases of *C. auris*. To fully comprehend the epidemiology, dynamics of the *C. auris* infection transmission, and the best preventative and therapeutic measures, more study and collaboration are required. State and municipal health officials began the process of identifying and notifying affected individuals on September 28, 2012, in coordination with the clinical institutions that had received and administered methylprednisolone acetate from the three batches. In order to construct a list of patients who had received injections from one or more of the three batches of methylprednisolone acetate, clinical facilities evaluated medical data. Many times, the lot number was not noted in the patient's medical file. In these cases, the facilities determined the time period in which vials from the three lots of methylprednisolone acetate were most likely to have been used, and they included all patients who had received injections of methylprednisolone acetate during that time. (Rachel M.smith, 2013)

1.2 Problem Statement

An excessive development of the yeast-like fungus from the *Candida* species, primarily *Candida albicans*, causes candidiasis, a kind of fungal infection. The host is normally unaffected by candida's presence in the skin, mouth, gastrointestinal tract, and other parts of the body. But in some situations, such as those involving a weakened immune system or an imbalance in the usual flora, *Candida* can spread and result in diseases ranging from mild skin and mucosal infections to catastrophic bloodstream infections. The mouth, throat, vaginal area, and circulation all be harmed by candida infections, which can affect people of different ages and health statuses.

One of the most common fungal diseases, candida infections affect 400,000 individuals annually according to a study by Pappas et al. (2018). *Candida albicans*, the species that is most often isolated, is responsible for a staggering 40–70% of all *Candida* infections. It has also been acknowledged that other species, such as *Candida Glabrata*, *Candida para psilosis*, *Candida Tropicalis* and *Candida a ruse*,

play a significant role in the development of candidiasis.

The study also underlines the value of early diagnosis and effective treatment for candidiasis, especially in susceptible groups including infants, critically sick patients, and those with compromised immune systems.

The impact of antifungal resistance on the management of *Candida* infections has been highlighted by Kullberg and Arend up (2015) in a new study. Antifungal-resistant *Candida* strains have significantly increased during the past few years, particularly in healthcare settings where antifungal treatment usage is prevalent. Using antifungal medications carefully and implementing infection prevention and control measures are crucial for avoiding and managing antifungal resistance in *Candida* infections, according to the study.

Finally, it should be noted that candidiasis is a common fungal disease that can strike individuals of various ages and health statuses. Early diagnosis, suitable treatment, and the implementation of infection prevention and control measures are essential for the prevention and management of *Candida* infections and the reduction of the burden of antifungal resistance.

Around the world, *Candida* infections pose a severe risk to public health, including in Cyprus, where the prevalence and incidence of candidiasis have been growing recently. *Candida* species are opportunistic pathogens that may cause a wide range of illnesses, from non-invasive and potentially lethal disorders like bloodstream infections and disseminated candidiasis to small mucocutaneous infections.

In the United States, *Candida* species are the fourth most prevalent cause of bloodstream infections, according to 2010 research by Paler and Dykema. In some populations, these organisms can have a fatality rate as high as 50%. The study also highlighted the critical issue of the development of antifungal resistance in the management of *Candida* infections. Antifungal resistance might lead to treatment failures and greater healthcare expenses.

In research by Paphitis et al. (2017) that looked at candidemia incidence in hospitalized patients in Cyprus between 2004 and 2013, *Candida albicans* was the most often found species. The study emphasized the need for greater antifungal stewardship programs as well as enhanced infection prevention and control techniques to decrease the effects of candidemia in Cyprus. Additionally, research by Somonis et al. (2017) found that *Candida albicans* was the most often isolated species and that candidemia was highly prevalent in hospitalized patients in Cyprus.

The study highlighted the need for candidemia monitoring and appropriate management strategies to reduce the risk of candidemia.

Not only Cyprus, but the entire world, is impacted by candida infections. Invasive candidiasis is on the rise globally, according to 2015 research by Kullberg and Arend up, especially in immunocompromised individuals, infants, and critically ill patients. The study also stressed how crucial it is to prevent the spread of antifungal resistance to control Candida infections globally.

Finally, with the frequency and prevalence of candidiasis growing recently, candida infections are a severe public health concern in Cyprus and across the world. better antifungal stewardship programs, better infection prevention and control procedures, and individualized care strategies are essential to minimize the effects of candidiasis and address the evolution of antifungal resistance.

Incidence and prevalence on a global scale Globally, Candida infection is a common problem, particularly for people with weakened immune systems. However, because there is no recognized diagnosis or diagnostic criteria for the illness, estimating its exact frequency and incidence is difficult. Oral and genital candidiasis affects 20–25% of HIV/AIDS patients, according to comprehensive research by Kojic et al. (2019). In 400,000 individuals globally each year, candidemia is estimated to occur, according to research by Pappas et al. (2018).

Studies have shown regional differences in the frequency and incidence of potential infections. For example, sub-Saharan African research found that hospitalized patients had a high frequency of candidemia. (Bongomin et al., 2018). According to Arend up and Patterson (2017), candidemia is prevalent at varying levels throughout European countries, with higher rates seen in the continent's southern and eastern regions. Research by Tan et al. (2016) found that candidemia was much more common in very unwell patients in intensive care units in Asia.

Risk factors for candida infections: Several risk factors for candida infections have been found. These include underlying conditions including cancer, diabetes mellitus, HIV/AIDS, and corticosteroid usage, as well as the use of immunosuppressive drugs, antibiotics, and corticosteroids (Arend up and Patterson, 2017). Additional risk factors include the use of invasive medical equipment such central venous catheters, mechanical ventilation, and urine catheters. (Kojic et al., 2019).

Smoking and poor oral hygiene have also been recognized as risk factors for oral candidiasis. (Woelber et al., 2022)

1.3 Purpose of the Study

1.3.1 General Objectives

To investigate the characteristics of candida infection in Near East Hospital, Cyprus and identify effective strategies for prevention and management.

1.3.2 Specific objectives

- To identify the most common types of *candida* infections and their associated risk factors in Near East Hospital, Cyprus.
- To explore the attitudes and perceptions of healthcare workers towards candida infections in near East Hospital, Cyprus, and identify any barriers to effective prevention and management.
- To describe the epidemiology of candida infections, including prevalence, incidence, and risk factors.
- To examine the clinical manifestations of candida infections and their impact on patient outcomes.

1.4 Research Question

1. What are the most common types of candida infection and their associated risk factors in near east hospital Cyprus?
2. What is the attitude and perceptions of health care workers towards *candidal* infections in near east hospital?
3. What is the epidemiology of *candidal* infections, including prevalence, incidence?
4. What are the clinical manifestations of *candidal* infections and their impact on patient outcomes?

1.5 Significance of the Study

Influence on public health: The study could help us comprehend the prevalence, transmission, and warning signals of possible diseases. This information may be used to guide public health initiatives and treatments that aim to stop the virus from spreading and decrease its effects on those who are afflicted.

1.6 Limitation of the Study

Limited testing capacity: The limited testing capacity is one of the main restrictions. There is a chance that some instances will go undiagnosed since clinics may not have the means to evaluate everyone who appears with symptoms.

Cases with no symptoms: Cases without symptoms are another drawback. It is

possible for an infection to go unnoticed in those who do not show any symptoms.

1.7 Definition of Terms

Healthcare-associated infection (HAI): a disease that is acquired upon receiving medical care, whether in a hospital, clinic, or other healthcare setting.

Infection prevention and control: the methods and regulations applied in healthcare facilities to control and prevent infections. Following the recommendations for hand washing, donning personal protective equipment, and using antimicrobial treatments as required can all be part of this.

Antimicrobial resistance: the ability of microorganisms to resist the effects of antibiotics and other antimicrobial agents, including bacteria, viruses, fungi, and other microbes. Because it can lead to infections that are more serious and challenging to cure, antimicrobial resistance is becoming more and more of a problem in healthcare settings.

Morbidity: a population's propensity for illness or disease. The word "morbidity" refers to the number of people who fell ill as a result of an infection when discussing illnesses connected to healthcare facilities.

Mortality: the regularity with which a population dies. The number of people who die from an illness they contracted in a hospital environment is referred to as mortality in the context of healthcare-associated infections.

Hand hygiene: You should wash your hands to remove microorganisms that might make you ill. Good hand hygiene must be a part of infection control and prevention measures in hospital settings.

Personal protective equipment (PPE): Medical personnel who use protective gear to avoid becoming sick both themselves and their patients. Face shields, gloves, robes, and masks are a few examples of this.

Environmental cleaning: In healthcare institutions, surfaces are cleaned and disinfected to reduce the risk of infection transmission. Environmental sanitation is a critical component of infection control and prevention in healthcare settings.

Surveillance: the ongoing monitoring of a population for infectious illnesses and medical disorders. Surveillance can help in locating trends and risk factors to guide the development of preventative and control methods.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Healthcare-associated infections (HAIs) cost the healthcare system a lot of money since they affect millions of patients each year all over the world. As in many other countries, HAIs pose a serious threat to public health in Cyprus. Cyprus' Near East Hospital serves a big and diverse patient population as one of the region's leading medical facilities. The hospital has a reputation for offering high-quality care, yet it still has issues managing and preventing HAI. (Roumbelaki & Ioannidou, 2017)

The aim of this study is to identify the characteristics of candida infection at Near East Hospital. The objectives of this study are to characterize the epidemiology and clinical symptoms of these diseases, to identify the most common candida infection types and their risk factors, to investigate the attitudes and perspectives of healthcare professionals toward candida infections, and to identify the most prevalent candida infection types.

Public health is now seriously threatened by the appearance of *C. auris*. First, many isolates are multidrug resistant, with some strains showing higher minimum inhibitory concentrations to medicines in all three major classes of antifungal treatments, a trait not seen in other clinically significant *Candida* species. Second, it is difficult to distinguish *C. auris* from other organisms, necessitating specific techniques such as matrix-assisted laser desorption/ionization time-of-flight or molecular identification based on sequencing the D1-D2 region of the 28S ribosomal DNA.

Common biochemical techniques, such as the VITEK 2 and analytical profile index strips, frequently misidentify *C. auris* as different yeasts, most frequently *Candida humulone*, but also *Candida fermata*, *Saccharomyces cerevisiae*, and *Rotorua glutinosa*. The epidemics induced by *C. auris* have also occurred in hospitals. (Snigdha vallabhaneni, Alex Kallen, 2016)

The literature review will investigate the state of current knowledge about the characteristics of possible infections in hospital settings, with a focus on the Near East Hospital in Cyprus. The review will be organized based on the goals of the study.

2.2 The Most Common Types of Candida Infections and Their Associated Risk Factors in Near East Hospital, Cyprus.

Yeast illnesses caused by the genus *Candida* are known together as candidiasis. It can cause sickness at many sites in the human anatomy and to varying degrees of severity. This yeast is the most prevalent one in the human microbiome. A severe fungal infection called invasive candidiasis refers to cases where the yeast may be present in blood or deep organs. Invasive candidiasis in the literature has generally been described as bloodstream infections, either alone or in conjunction with concomitant tissue compromise, due to the difficulty of recognizing *Candida* yeasts in tissues, which necessitates a biopsy of the tissue impacted.

2.2.1 *Catheter-Associated Urinary Tract Infections (CAUTIs)*

An explanation for catheter-associated urinary tract infection (CAUTI) is that it manifests as a patient who has catheterized urine that has a remarkably high level of bacteria in it. By entering the urinary tract through the urinary catheter, bacteria typically cause CAUTI, which is an infection of the urinary tract. A longer hospital stays, higher healthcare expenses, and an increase in morbidity and death have all been linked to CAUTIs.

Easily divided into two categories are: Both catheter-associated asymptomatic bacteriuria (CA-ASB) and CAUTI with signs referring to the urinary tract are present, but there is no urinary tract expression or declaration. Device-acquired UTIs, which make up up to 40% of hospital-acquired infections, are one of the most prevalent illnesses acquired while receiving healthcare.(Rubi et al., 2022)

In acute care hospitals and nursing homes all around the United States, millions of urethral catheters are implanted annually.

The four main reasons for urethral catheterization are: (1) surgery, (2) measuring urine production, (3) urinary retention, and (4) incontinence.

Apart from urethritis and a few uncommon injuries, almost all complications related to urinary catheterization are caused by the bacteriuria that follows. Most urinary tract infections (UTIs) linked to catheter use are endogenous, meaning they are caused by the patient's own intestinal flora. The catheter also increases the risk of UTI in several other ways. Along its exterior and interior surfaces, the indwelling

catheter provides pathways for bacterial invasion. The external catheter's proximity to the urethral mucosa provides a pathway for bacteria to enter the bladder even with painstaking care given to maintaining the closed system.

On catheters, biofilm has been seen, and the bacteria therein appear to be well protected from both antibiotics and urine flow. Patients with catheters may have a temporary increase in bacterial adhesion to their uroepithelial cells, a phenomenon that could come before the onset of bacteriuria. As a foreign body, the catheter might impair polymorphonuclear leukocytes' ability to operate properly as antibacterial cells. A significant amount of urine may still be present in the bladder due to catheter drainage issues.

The primary factor that determines bacteriuria is catheterization duration. 3-7% of people with an indwelling catheter in place daily risk developing bacteriuria. For women and older people, the rate of acquisition is high. Once a catheter has been in place for a few weeks, everyone develops bacteriuria. It is considered that people who use indwelling catheters for a long time are always urinating bacteria. Antimicrobials are administered to 60–80% of hospitalized patients with indwelling catheters, mainly for conditions other than urinary tract infections. Antibiotic-resistant organisms are regularly isolated from catheterized patients' urine due to their high antibiotic exposure. A urinary catheter was used by 48% of the patients under state-wide surveillance for carbapenems' resistant Enterobacteriaceae (CRE) in Michigan, USA according to the report on these isolates' colonies of bacteria.

Resistant gram-negative organisms are most frequently isolated from the urine of nursing home residents who have persistent indwelling catheters. Numerous studies have found a connection between CA-UTI and greater mortality rates and longer hospitalizations in acute care facilities. These correlations are likely caused by contamination by unmeasured factors because there is little to no mortality among patients in critical care centers that can be directly attributable to CA-UTI. Residents of long-term care facilities with chronic indwelling catheters die more frequently than residents without catheters, although this discovery is also a result of confounding from variable patient characteristics rather than being directly related to urine infection. ((Nicolle, 2014).

2.2.2 Surgical Site Infection (SSI)

The term "surgical site infection" (SSI), which was first used in 1992 to replace the

previous phrase "surgical wound infection," was first used. Diseases known as surgical site infections (SSIs) can damage the incision or deep tissue at the surgical site and appear within 30 days after a surgical treatment (or within a year if an implant is left in place after the procedure).² These infections might be superficial, deep, incisional, affecting organs or body compartments, or any of the above. (Owens & Stoessel, 2008).

In contrast to the third-most frequent nosocomial infections previously recorded in the United States, SSI is currently the most frequent nosocomial infection. According to reports, significant infections account for over 77% of the deaths of surgical patients with SSI, with the majority occurring in organs or other areas accessible during the procedure. Depending on the method, the incidence of SSI in Europe ranged from 0.6% to 9.5%. According to a 2010 report by the Japanese HCAIs Surveillance, 7.6% of surgical patients in Japanese hospitals experienced SSIs. 4.5% SSI has been reported as the pooled cumulative incidence in mainland China.

The lack of knowledge and resources necessary for efficient surveillance of HCAIs limits the availability of statistics on the occurrence of SSIs in poor nations.

Overall SSI incidence in sub-Saharan Africa has been estimated to be 14.8%. Numerous research on the prevalence of SSI in Nigeria have been done. The majority of which had enough statistical power since they only included a few individuals who were admitted to one healthcare facility. The conclusions from such investigations cannot be extrapolated in this way. Therefore, it is necessary to collect trustworthy and organized data on the national prevalence and risk factors of SSI. (Dyson, 2022).

Reports claim that SSIs, which account for 20 to 25% of nosocomial infections generally and in Ethiopia specifically, are one of the most frequent causes of these infections. The prevalence of SSIs is still a major problem around the world and has been associated with an increase in surgical expenses, morbidity, and mortality. SSI is one of the most common surgical complications, even with the use of modern surgical techniques and antibiotic prophylaxis. The clinical burden resulting from SSIs is substantial. Since surgical site infections frequently need hospital readmissions, expose patients to repeated surgery, demand continuous care, result in

impairment, and increase patient morbidity, they will have an adverse economic impact.

Compared to people without such infections, patients with SSIs are more likely to need rehospitalization or intensive care unit (ICU) therapy and are also more likely to pass away. Increasing age, extended hospital stays, blood transfusions, and urgent surgery are frequently linked to it.

In Sub-Saharan Africa, where resources are scarce and the average wound infection rates are two to three times greater than in affluent nations due to malnutrition, inadequate preoperative care, and other factors, SSI poses a tremendous burden on both the patient and the healthcare system. Additionally, even routine life-saving procedures like appendectomies and cesarean sections in underdeveloped nations with insufficient resources are linked to high infection rates and mortality.(Mezemir et al., 2020).

2.2.3 Ventilator-Associated Pneumonia (VAP)

VAP is defined as pneumonia that occurs at least two days after MV through an endotracheal tube by the Centers for Disease Control (CDC) and the National Nosocomial Infections Surveillance (NNIS). The use of nasal prongs for intermittent positive pressure or continuous positive airway pressure is not recognized as a noninvasive breathing method. The combination of clinical, laboratory, and radiographic data is used to make official diagnoses of pneumonia. At least two serial chest radiographs must show a new or developing focal infiltrate, consolidation, cavitation, or pneumatocele in order to meet the radiographic diagnostic criteria for pneumonia when there is an underlying cardiac or respiratory condition (such as respiratory distress syndrome, chronic lung disease, or a patent ductus arteriosus). A single chest radiograph showing one or more of the traits can be used to diagnose and treat an infant who was free of any pulmonary or cardiac conditions at birth.

A secondary bacterial infection known as "ventilator-associated pneumonia" (VAP) of the small airways and lung parenchyma may appear in neonates in the neonatal intensive care unit (NICU) who need mechanical ventilation (MV). A kind of nosocomial infection, or illness associated with healthcare, is defined as VAP.

As a result of their potential role in the poor outcomes of hospitalizations and the skyrocketing expenditures of inpatient treatment, health care-associated infections

are receiving more attention.

Priorities still exist in the research and medical treatment of ventilator-associated pneumonia (VAP). Although there was no data to definitively link VAP to an attributable mortality, it was widely believed that VAP increased mortality in critically sick patients. [Nguile-Makao et al. 2010]. There is growing consensus that VAP lengthens the time patients spend in the intensive care unit (ICU) and on ventilator [Shorr et al. 2009; Warren et al. 2003]. Shorr et al. claim as much. (2009) and Warren et al. (2003), the cost per case from this increased morbidity is around \$15,000 USD. The costs of VAP may be significantly greater, according to some analysts. The expenditures of VAP, for instance, were anticipated by Rello and colleagues to reach US\$40,000 per time [Rello et al. 2002]. This discrepancy in cost projections is a result of certain research using the terms "charge" and "cost" synonymously. Medical billing records frequently make accessing charge information simple. When the term "cost" is intended to reflect the actual consumption of resources, "charges" in medicine, particularly in the US, rarely correspond to expenses [Zilberberg and Shorr 2010a]. When charge statistics are used rather than actual cost information, the expected burden of an illness increases nearly evenly. The substantial morbidity cost related to VAP has made VAP prevention a top concern.

The forefront is being set by hospitals all throughout the world. For instance, several US states demand that the public be given access to the VAP rates. The Centers for Medicare and Medicaid Services and other government health insurance providers have threatened to stop paying for VAP's expenses. Platt and Klompas (2018).

These organizations assert that VAP constitutes a minimal "medical error," comparable to the current situation of catheter-associated bloodstream infections (CABSI). VAP should thus be recognized as a very uncommon event, according to these authors. This is why VAP rates are seen as markers of hospital quality (Shorr et al., 2011).

Although not appropriate for all patient groups, the Clinical Infection Pulmonary Score was created to help with diagnostic challenges. To create therapeutic regimens and lower VAP-related mortality, antimicrobial treatment alternatives, as well as their pharmacological and pharmacokinetic characteristics, must be continually examined. 2012 (Bassetti & Taramasso).

ICU- associated infections, including as bloodstream infections (BSIs), ventilator-

associated pneumonia (VAP), and urinary tract infections (UTIs), and present serious problems in critical care settings. These infections are frequently linked to extended hospital admissions, elevated death rates, and increased healthcare expenses. Although many other microbes can play a part in these infections, it is crucial to comprehend the function of certain pathogens, such the *Candida* species, in order to successfully prevent and control these illnesses.

In patients on mechanical ventilation in the intensive care unit (ICU), ventilator-associated pneumonia (VAP) is a frequent and serious consequence. Although bacterial infections, such *Staphylococcus aureus* and *Pseudomonas aeruginosa*, are usually linked to VAP, it is becoming more and more clear that fungal pathogens, including *Candida* species, also play a part. *Candida* species, in particular *Candida albicans*, have been discovered as important pathogens in VAP, and their presence has been linked to longer stays in the intensive care unit and higher fatality rates. It is important to take notice of the presence of *Candida* in lung samples from ventilated patients because it may point to a serious infection that needs the right antifungal treatment. Bloodstream infections (BSIs) and urinary tract infections (UTIs) are both common in ICU settings and frequently arise from invasive medical procedures including catheterization. Although *Candida* species can also have a big impact on these diseases, bacterial pathogens are frequently blamed for them. There have been reports of *Candida* UTIs and *Candida* bloodstream infections (CBSIs) in critically ill patients, particularly in those who had risk factors such protracted ICU hospitalizations, the use of broad-spectrum antibiotics, and indwelling urinary or central venous catheters. To enhance patient outcomes and lower the risk of complications, early identification and prompt care of *Candida*-related UTIs and BSIs are essential. (Pfaller and Diekema, 2007)

2.3 The Attitude and Perceptions of Health Care Workers towards candida Infections

In the US, 2 million people are thought to have HAI, and 90,000 of them are anticipated to die. Due to a paucity of data, addressing HAI-related problems in Sub-Saharan Africa is difficult. Additionally, at least 1.4 million people worldwide are thought to be impacted by HAI. Infection rates may be more than 20%, according to prevalence data from some African nations (Mali 18.9%, Tanzania 14.8%). Ethiopian research found that health care workers (HCWs) were often exposed to

HAI over the course of a year (20.2%) and a lifetime (28.8%).

Hospital acquired infection prevention, or HAIP, is a set of guidelines that HCWs must follow in order to decrease HAIs. Nevertheless, several problems, including limited HCW awareness and compliance due to personal, logistical, and organizational issues, have a substantial negative influence on the proper application of HAIP procedures. In Ethiopia, HAIP's significance in lowering HAIs was undervalued. Additionally, there isn't any study on the knowledge, attitudes, and practices (KAP) of healthcare professionals regarding HAIPs in the region we looked at, therefore we examined the KAP of the medical staff at Dessie Referral Hospital (DRH) with regard to HAIP in an effort to find answers. (Gezie and others, 2019)

HCWs who are aware of the potential for contracting Hepatitis C (HCV) and Human Immunodeficiency Virus (HIV) from a patient have worked in the field for a shorter period, put in fewer hours each week, are aware that an HCW can transmit HCV and HIV to a patient, are aware that HCV and HIV infections can be serious, and have learned this information from educational programs and academic publications. Less patient-intensive nurses were more likely to be aware of safety precautions such gloves, masks, protective eyewear, and hand cleanliness after taking off their gloves. They had a higher likelihood of knowing that HCWs can spread HCV and HIV to patients and that their hands are a common method of nosocomial pathogen transmission. The perception of a higher risk of contracting a HAI was associated with being a nurse, being aware that HCWs' hands can transmit nosocomial viruses, learning from scholarly publications and educational courses, and desiring to know more. When they had fewer patients to look after, nurses regularly or always put on gloves, cleansed their hands after taking them off, and understood that doing so was a control measure. (Parmeggiani et al., 2010).

Planners cannot assume that HCWs will be motivated to do their standard tasks, even if they can do so. During the early stages of the HIV pandemic, for instance, medical experts argued about whether it was ethical to withhold treatment from those who had the virus, and during the SARS outbreak, some HCWs were hesitant to treat SARS patients. It is controversial whether or how strictly this obligation, should it exist, should be maintained. Professionals might not be required to go on as usual in the event of a pandemic or other disaster. Planning for preparedness, personal risk, risk to HCWs' families, and prior professional obligations are just a few of the variables that might affect regular work. On these factors, though, there isn't a lot of

information. 28% of professionals (clinical and non-clinical) may decide to leave their jobs in order to protect their families and selves, according to research by Ehrenstein et al. in Germany. According to Qureshi et al., concern for one's own and one's family's health is the main barrier preventing HCWs from being prepared to work. According to Bailer et al., who studied mixed clinical and non-clinical personnel in the USA, up to 50% of HCWs will be unable to report for duty, with clinical staff being more likely to do so than non-clinical staff. These studies might only partially apply to the UK and offer inadequate data to support efforts to change attitudes before a pandemic..(Draper et al., 2008)

Since they are so crucial to the pandemic response, medical staff is under a lot of stress throughout it. In healthcare settings, they are the main demographic that interacts with patients and is vulnerable to disease. They have an obligation to report to work even if their health is at danger. However, they must also take care of their own health while tending to patients. (Mp, 2020)

2.4 The Epidemiology of candida Infections

Candida has more than 200 known species, making it a diverse genus. Of the bacteria that make up our microbiological flora, just 10% are known to be responsible for human disorders.³ Thrush, chronic atrophic stomatitis, chronic mucocutaneous candidiasis, and vulvovaginitis are common symptoms of superficial candidiasis that are fairly specific, frequently self-limited in hosts who are not immunocompromised, and conveniently treated with simple hygiene precautions and local therapy.⁴ However, candida may also lead to infections that are fatal and have a prognosis similar to septic shock and multiple organ failure. People with compromised immune systems are most frequently affected with candidiasis. The emphasis of our study, however, is invasive candidiasis in severely ill, non-immunocompromised patients, which is of increasing significance and shows a diversity of features, according to data acquired over the previous 20 years. This research addresses the epidemiology of severe *candida* species infections in critically ill patients with an emphasis on microbiology, antifungal resistance, the clinical spectrum, pathogenesis, and the consequences of the disease. In the journal's upcoming issue, a second review will address how the illness should be treated..(Eggimann et al., n.d.)

2.5 Clinical Manifestations of *Candida* infections and Their Impact on Patient Outcomes

Especially among newborns with extremely low and very low birth weights (defined as birth weights 1000 g and 1500 g, respectively), candida has become a substantial source of neonatal infections and is linked to severe morbidity and death. Neonatal candida infection can be present clinically in a variety of ways, from localized skin and mucous membrane infections to potentially fatal systemic infections resulting in multisystem organ failure. The intensity and type of neonatal candidainfectionis significantly influenced by host risk factors, including preterm and the use of invasive treatments.

Here, the clinical signs of candida infection in newborns will be discussed. Neonatal candida infections are covered individually, as well as their genesis, prevention, treatment, and clinical symptoms in older babies and children.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Study Design

From 2021 to 2023, 155 samples from patients at the Near East Hospital in Cyprus were collected for this study, which tested the *Candida* species' susceptibility to antifungal agents. The clinical samples utilized in this investigation were from patients and included abscess, aspiration fluids, sputum, bronchial lavage, urine, catheter tip, and fungal culture. There were 155 samples from VS, 6 from an abscess, 36 from aspiration fluid, 53 from sputum, 2 from bronchial lavage, 19 from urine, 3 from blood, 10 from the tip of the catheter, and 26 from a fungus culture.

3.1 Demographic Data

The patient's laboratory request form was used to record the patient's basic demographic information, such as age and gender, as well as details on the clinical condition, such as any underlying diseases or predisposing factors. The patients' ages varied from 1 to 8/5 years old.

3.2 Tools and Equipment

The tools used in this study are the Antic medical petri dish, automatic pipette, wire loop, test tubes, dispenser, measuring ruler, sterile swab, analytical balance, centrifuge, colony counter, deep freezer, incubator, microscope, water bath, spectrophotometer, PH meter, subarid dextrose agar, autoclave, syringe, 1000mL conical flask.

3.3 Preliminary Screening of Clinical Specimens: Wet Mount Preparation (Chesbrough, 2006)

All specimens underwent microscopic screening based on their motility, morphology, and staining response (Chesbrough, 2006). This was done with a direct wet mount preparation that contained a drop of 10% potassium hydroxide (KOH) and 1% w/v lactophenol cotton blue. Under 10x and 40x objective lenses, this was then seen. It was believed that yeast might be detected by the presence of characteristic colonial oval or ellipsoidal form. The common streak-out plate method was used to inoculate and cultivate each yeast-like positive isolate isolated from the various clinical specimens individually on Sabouraud Dextrose Agar (SDA) plates supplemented with 50 mg/l gentamicin and chloramphenicol. After that, the infected SDA plates

underwent a 48-hour aerobic incubation at 30 degrees Celsius. Raised colonies with a typical yeast-like odor and an opaque, creamy hue were tentatively identified as belonging to the genus *Candida*. An additional sign of yeast was the existence of the usual colonial oval or ellipsoidal shape (Odds & Bernaerts, 1994; Kurtzman et al., 2011). After 48 hours of incubation, the plates were checked to see if growth had appeared.

3.4 Gram staining procedure

1. Preparation of a slide smear:

- With the use of an inoculation loop, a drop of suspension culture is transferred to the microscope slide.
- If the colony is already present in a Petri dish or slant culture tube, water is added to enable a very minimal amount of colony transfer to the inspection slide.
- Having a fundamental knowledge of culture is essential. The presence of culture on an inoculation loop is a sign that too much culture has been gathered.
- With the use of an inoculation loop, the culture is spread evenly over a 15 mm diameter circle. Typically, a slide will have up to four small spots if you are examining more than one culture.
- The slide can either be heated over a low flame or allowed to air dry. Slide should be turned in a circular manner over flame to prevent overheating or ring pattern creation. The glass slide's cell adhesion is facilitated by the heat, which also lessens the amount of culture that is dramatically lost during washing.

2. Gram staining:

- Crystal violet dye is applied over the fixed culture, allowed to sit for 60 seconds, then removed; any remaining stain is then washed off with water. The objective is to remove the stain while preserving the fixed culture.
- The smear is covered with iodine solution for 60 seconds. Fixing the dye is the name of this process. After pouring out the iodine solution, the slide is washed under running water. The surface's extra water is shaken off.

- Decolorizer is put to the slide in a few drops. Decolorizers are frequently ethanol and acetone mixtures of a solvent. The term "solvent treatment" refers to this action. In 5 seconds, the slide has been thoroughly wet. As soon as the solvent stops being colored as it passes over the slide, cease applying decolorizer to avoid excessive decolorization in the gram-positive cells.
- For 60 seconds, the smear is counterstained using safranin solution. With water, the fuchsin solution is removed, and extra water is wiped with bibulous paper. After shaking off any excess water, the slide can be air-dried before being examined for microorganisms using oil immersions.

3.5 Antifungal Susceptibility (AFST)

Following the recommendations in the CLSI document M27-A3 (CLSI 2008), the susceptibility of several *Candida* species to antifungal medications was assessed using broth microdilution (BMD) testing. Amphotericin B (AMB), fluconazole (FLC), voriconazole (VOR), and flucytosine (Sigma Chemical Co.) are examples of antifungal medications that the makers provided as pure standard chemicals. DMSO (Sigma-Aldrich, Milan, Italy) was used to solubilize the remaining medications whereas sterile water was used to dissolve FLC. Except for FLC (0.06 to 128 mg/L), the concentration of each antifungal medication varied from 0.016 to 32 mg/L. After 48 hours of incubation at 35°C, plates were visually read. Drugs were produced in RPMI 1640 medium (containing L-glutamine, without bicarbonate; Sigma Chemical Co.), serially diluted two times, and pH 7.0 was achieved using a 0.165 M solution of MOPS (Sigma Chemical Co.).

Yeast suspensions made in saline, diluted into RPMI 1640, and adjusted to final concentrations of 0.5-2.5 10^3 cfu/mL were used to calculate MICs in round-bottomed 96-well microtiter plates in accordance with CLSI methodology (CLSI M27-A4,20). Plates with inoculations were kept at 35°C for 24-48 hours. Our laboratory continued to read at 48 h (in addition to a 24 h read), despite CLSI methodological adjustments during the present investigation that included a move from 48 h reading to 24 h reading for all but the slower-growing *Candida* species. For many of the rarer *Candida* species and non-fermentative yeasts of other genera (such *Pichia* spp.), which grow more slowly than *Candida albicans*, this is crucial, and it is the strategy now endorsed by CLSI for such organisms. The control strains of *Pichia kudriavzevii* (*C. Kruse*) NCPF 3953 (ATCC 6258) and *C. Para psilosis*

NCPF 8334 (ATCC 22019) were used in each test.

3.6 Statistical Analysis

The statistical differences between the mean values were evaluated with SPSS (version 25.00) using student t-test. Statistical significance was set at 0.05.

CHAPTER FOUR
DATA PRESENTATION

4.1 Socio-Demographic Data

4.1.1 Gender of the Patients

Table 4.1.1 Gender of the Patients

Gender	Frequency	Percent%
Male	89	57.4
Female	66	42.6
Total	155	100

Secondary source 2023

The gender distribution of the patients may be deduced from the data provided.

Male: 56.0% of the sample consisted of 89 responders who were male patients.

Female: 66 female patients and responses made up 41.5% of the sample.

155patients in all were involved in the research.

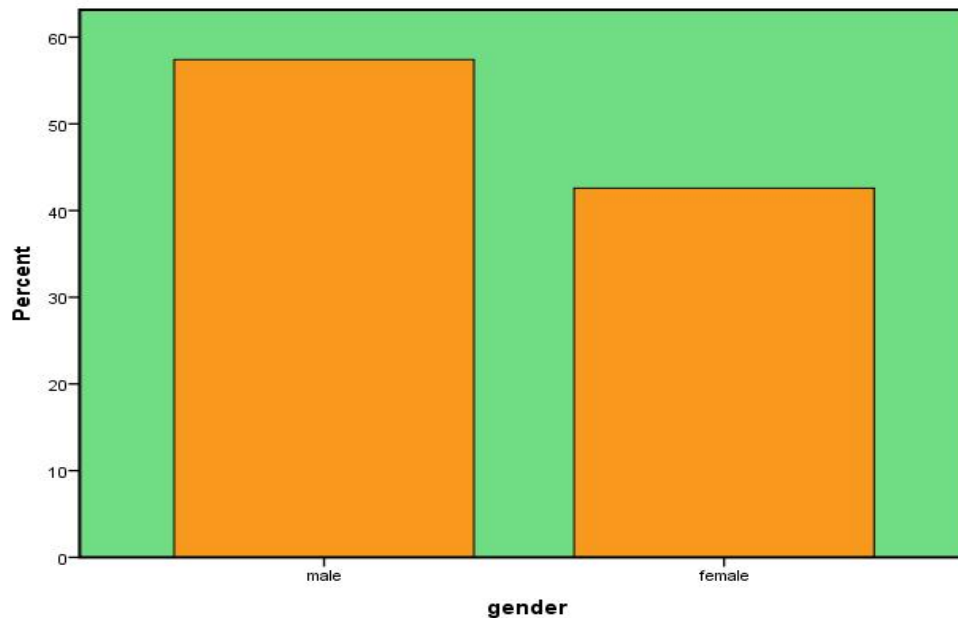


Figure 4.1.1 Gender of the Patients

4.1.2 Age of the patients In NEU (2021-2023)

Table 4.1.2 Age of the patients in NEU

	Age Group	Frequency	Percentage %
	10-20	2	1.3
	20-30	1	.6
	31-40	8	5.0
	41-50	19	11.9
	51-60	20	12.6
	61-70	27	17.0
	71-80	37	23.3
	81-90	37	23.3
	91-100	4	2.5
	Total	155	100

Secondary Source (2023)

The information supplied demonstrates how patients were spread across various age groups. The important results are as follows:

Ages 71 to 80 made up 23.3% of the sample as well as the age group with the most patients.

Both the 61–70 and 81–90 age ranges had a similar number of patients, making up 23.3% of the entire sample.

There were about equal numbers of patients in the age ranges of 41–50 and 51–60, with 19 and 20 instances, respectively.

With just 2, 1, and 4 instances, respectively, the age ranges of 10 to 20 years, 20 to 30, and 91 to 100 years had the fewest patients.

These results show that the study's patients are primarily older individuals, with a sizeable proportion in the 71–90 age range.

4.2 The distribution of Candidal strains in the study

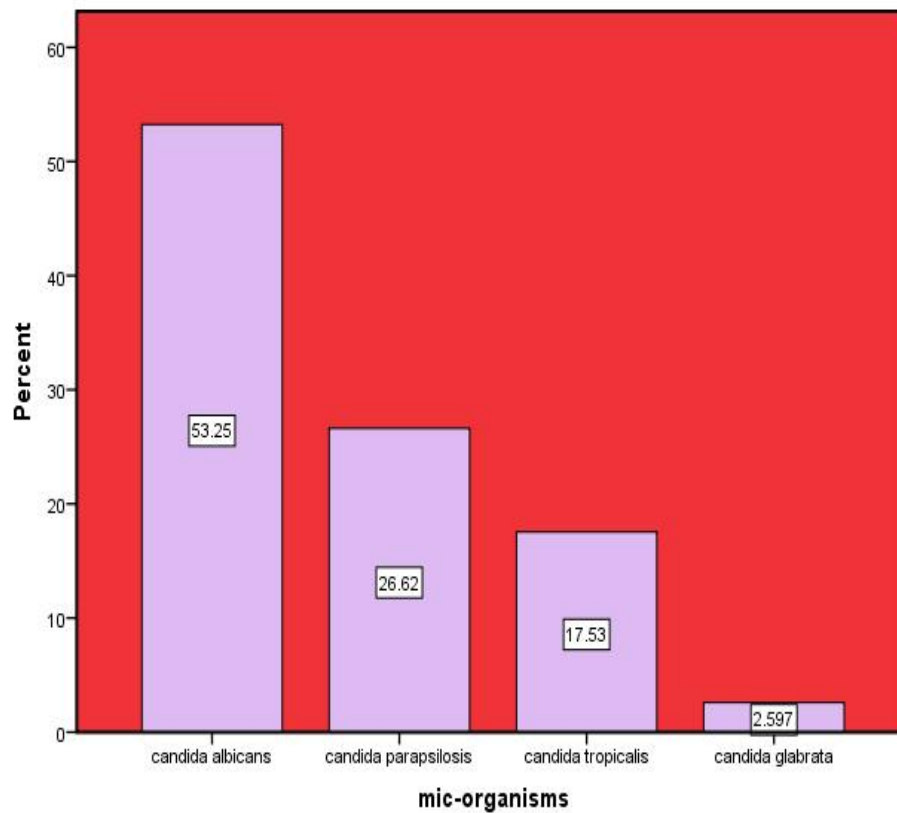


Figure 4.2 Different Micro-Organisms Patients in Neu (2021-2023)

Secondary date (2023)

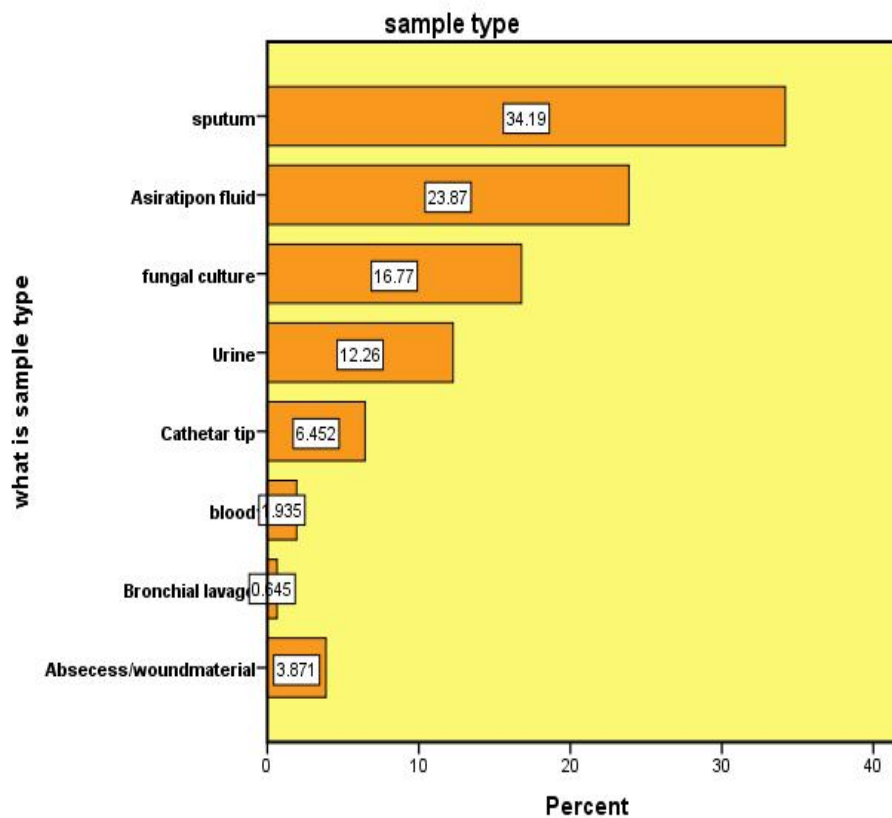
The information presented shows how the various *Candida* species, including.

Candida albicans, *Candida para psilosis*, *Candida tropicalis*, and *Candida glabrata* are distributed by gender. These conclusions are drawn from the analysis:

With 50 cases reported in males and 32 instances in females, *Candida albicans* was the species that was most common in both sexes.

There were 28 instances of males infected with *Candida para psilosis* and 13 cases of females infected with the disease. With 22 cases reported in men and 5 instances in females, *Candida tropicalis* was less common than *Candida albicans* and *Candida para psilosis* in terms of infections. *Candida glabrata* only men were afflicted by *Candida glabrata*, with 4 instances recorded; no infections in females were noted.

4.3 Sample Type of the Patients at Near East Hospital



Secondary Date 2023

Figure 4.3 Sample Types of the Patients at Near East Hospital

Based on patient samples from the Near East Hospital, Table 4.3 offers insightful information on how Acinetobacter isolates are distributed. Sputum, aspiration fluid, and bronchial lavage sample totals should be noted as representing respiratory candidiasis as these samples are frequently taken from the respiratory tract. Respiratory candidiasis, especially in sick patients or people with weakened immune systems, can cause serious problems and extended hospital admissions. Consequently, the detection and treatment of Candida infections in respiratory samples are crucial for enhancing patient care and outcomes.

4.4 Clinical severity of patients (ICU or Non ICU)

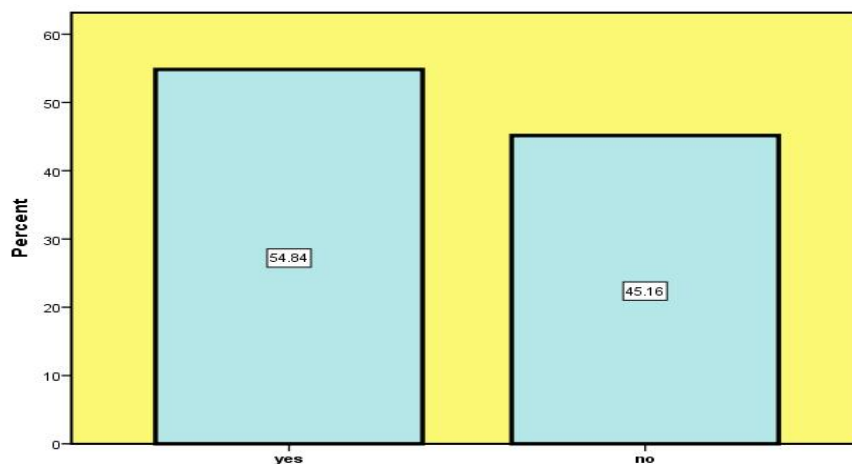


Figure 4.4 Clinical severities of patients (ICU or Non ICU)
Secondary Date 2023

4.5 The Result of Amphotericin and The Result of Fluconazole for The Patients in Neu (2021-2023)

Table 4.5 Result of Amphotericin and The Result of Fluconazole for The Patients in Neu (2021-2023)

	The Result of Amphotericin		The Result of Fluconazole	
	AB		Sensitive	Resistance
	Sensitive	Resistance		
	Count	Number	Number	Number
Gender Male	86	4	87	2
Gender Female	59	6	64	2
	145	10	151	4
Total	155		155	

Secondary Date 2023

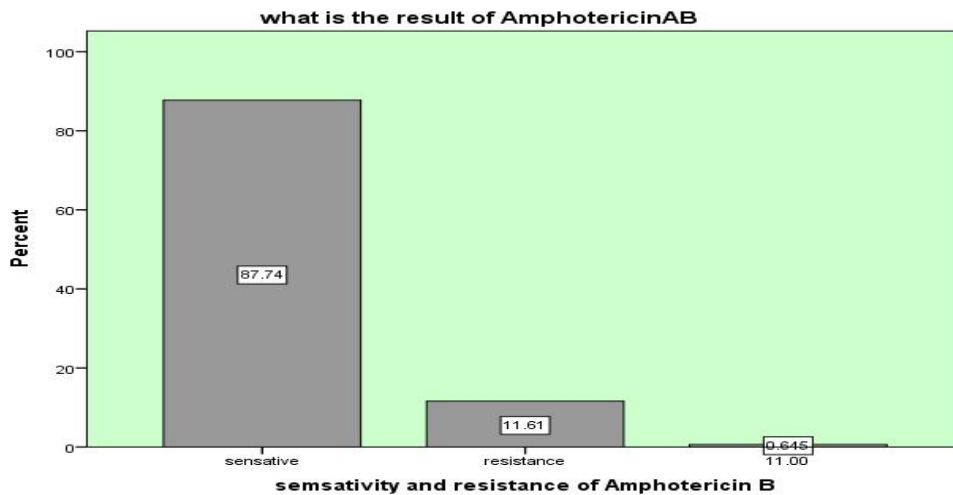


Figure 4.5 the Rate of Amphotericin for the Patients in Neu (2021-2023)

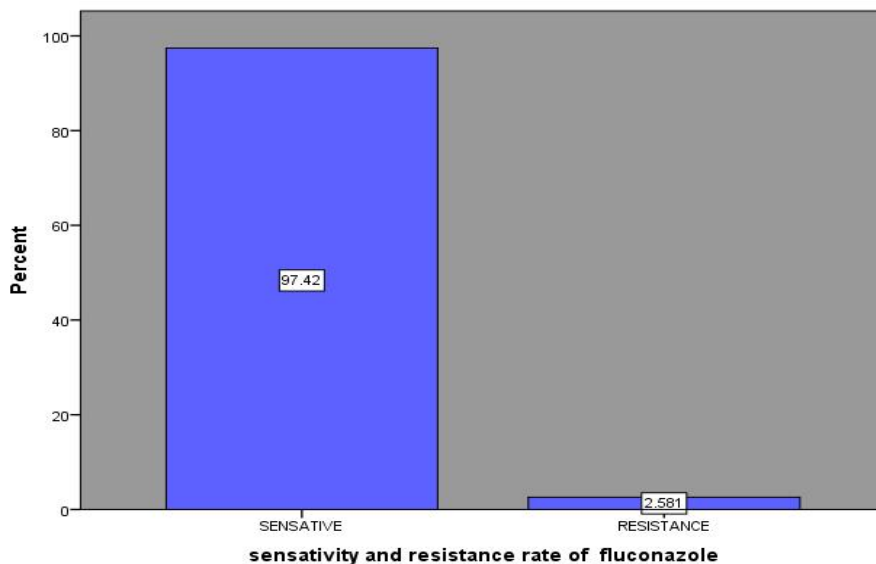


Figure 4.5 The Rate of Fluconazole for The Patients in Neu (2021-2023).

Based on the respondents' gender, we may infer the results of Amphotericin B and Fluconazole.

AMPOTÉRICIN B

Male: Of the 89 male patients, 86 demonstrated susceptibility to amphotericin B, whereas just 4 shown resistances.

Female: 59 of the 66 female patients shown sensitivity to amphotericin B, whereas 6 displayed resistances.

There were 155 responders in all who were considered when Amphotericin B was being studied.

Fluconazole:

Male: 87 of the 89 male patients demonstrated sensitivity to fluconazole, whereas

just two demonstrated resistances.

64 of the 66 female patients showed sensitivity to fluconazole, whereas just two showed resistances.

There were 155 patients in all who were considered when fluconazole was prescribed. In conclusion, the statistics indicate that most of the patients and responders, both male and female, shown sensitivity to both amphotericin B and fluconazole. For both drugs, there were only a small number of people who showed resistance.

4.6 Sensitivity and Resistance Rate of Flucytosine and Voriconazole in Neu (2021-2023)

Table 4.6 Sensitivity and Resistance Rate of Flucytosine and Voriconazole in Neu (2021-2023)

	The Result of Flucytosine		The Result of Voriconazole	
	Sensitive	Resistance	Sensitive	Resistance
	Number	Number	Number	Number
Gender Male	85	4	77	12
Female	62	4	60	6
	147	8	137	18
Total				

Secondary Date 2023

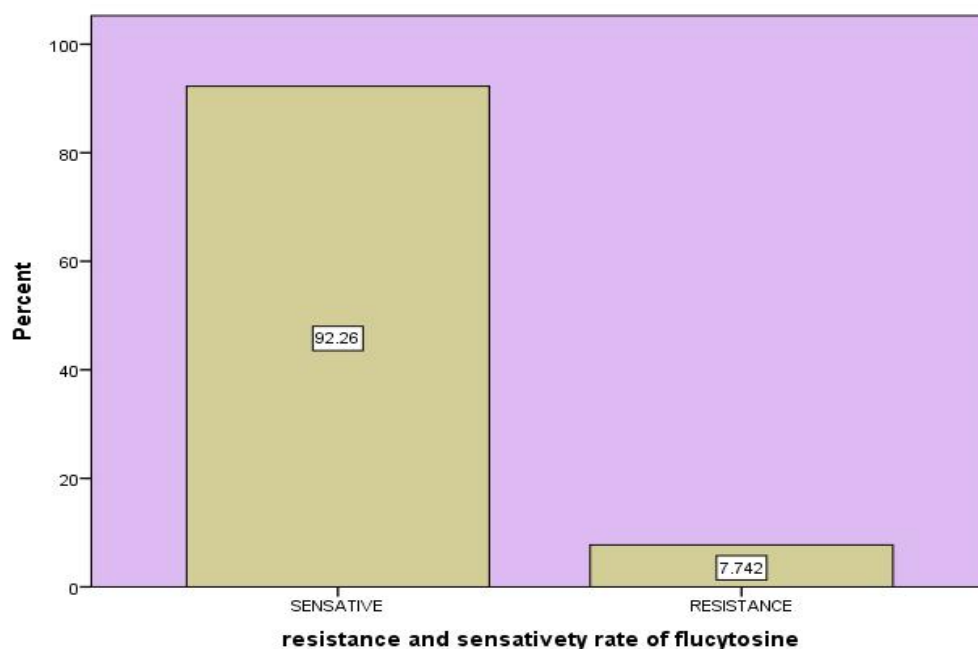


Figure 4.6a Sensitivity and Resistance Rate of Flucytosine in Neu (2021-2023)

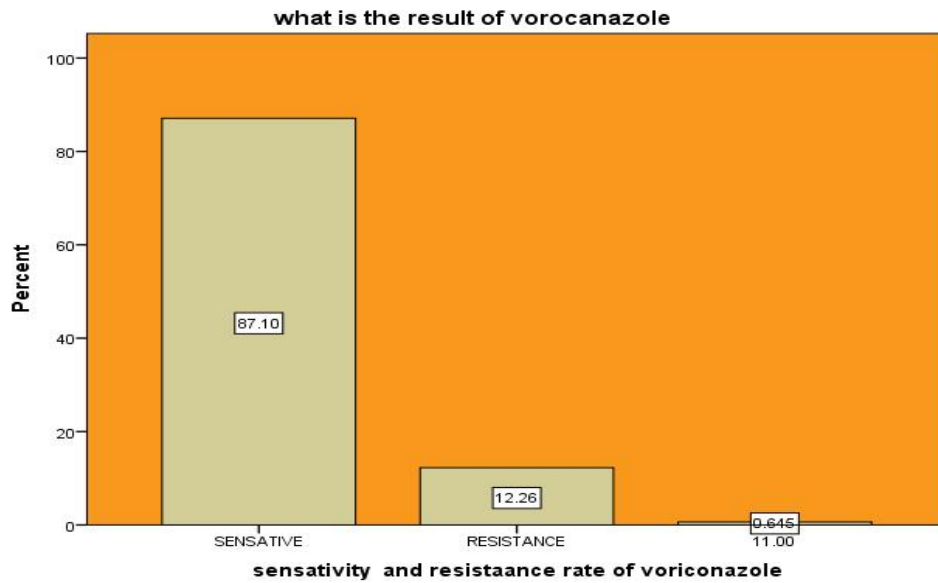


Figure 4.6b Sensitivity and Resistance Rate of Voriconazole in Neu (2021-2023).

Depending on the respondents' gender, we may infer the results of Flucytosine and Voriconazole.

Flucytosine:

Male: Of the 89 patients who were male, 85 displayed sensitivity to flucytosine, while 4 shown resistances.

Female: Of the 66 women who responded, 62 shown sensitivity to Flucytosine, while 4 displayed resistances.

Total: 155 patients in total were considered while choosing Flucytosine.

Voriconazole:

Male: Of the 89 patients who were male, 77 shown sensitivity to Voriconazole, while 12 displayed resistances.

Female: Of the 66 female patients, 60 shown sensitivities to Voriconazole, whereas just six did so.

There were 155 total patients who were considered for prescribing Voriconazole.

In conclusion, the statistics suggest that most male and female patients and responders shown sensitivity to both Flucytosine and Voriconazole.

In Chapter 4, the socio-demographic information gathered from the study's participants—the patients—are presented. Insights into the gender distribution, age range, frequency of various microorganisms, and outcomes of antifungal treatments are provided by the data. These are the main conclusions:

Male to female ratio: Of the 155 patients in total, 56.5% were men and 41.5% were women. Men were somewhat more likely to participate in the research than women.

Age Distribution: There was a wide age range among the patients. With 23.3% of the total, the highest age groups were 71–80 and 81–90. The ages of the participants in the research ranged from 10 to 100.

Results of the antifungal treatment: The study assessed the efficacy of amphotericin and fluconazole in treating the respondents. Both medications had a high incidence of sensitivity, with most responders showing sensitivity to these antifungals. For both drugs, resistance rates were comparatively modest.

Gender Distribution: The study shows that male respondents/patients are represented more heavily than female respondents/patients.

The most common microorganisms among the respondents/patients were members of the *Candida* genus, notably *Candida albicans*. These results underline how crucial it is to use focused diagnostic strategies and effective antifungal medications to effectively manage *Candida*-related illnesses.

Effectiveness of Antifungal Treatment: High sensitivity rates were shown for both Amphotericin and Fluconazole, showing that they were both successful in treating fungal infections in responders and patients. The low rates of resistance provide additional evidence that these antifungal drugs are effective therapy alternatives.

Overall, this chapter offers insightful socio-demographic information on the respondents/patients, including the distribution of their genders, age ranges, common microorganisms, and the efficacy of antifungal medications. These results can aid in a better knowledge of fungal infections and assist medical practitioners in making decisions about patient care, diagnosis, and treatment.

CHAPTER FIVE

CONCLUSION, RECOMMENDATION AND LIMITATION

5.1 Conclusions

There are several inferences that can be made about the traits, risk factors, attitudes, epidemiology, clinical manifestations, treatment results, and tactics for managing and preventing candida infections based on the data from the study carried out at Near East Hospital in Cyprus.

A striking finding among the respondents/patients was the incidence of candida infections, particularly *Candida* species. It was shown that *Candida Albicans* was the most prevalent species. This conclusion is in line with earlier studies showing the prevalence of *Candida* species in fungal infections connected to healthcare.

Numerous risk factors for candida infections have been found, including immunocompromised state, extended hospital stays, indwelling medical devices, and previous use of antibiotics or corticosteroids. These risk factors, which are extensively acknowledged in the literature, highlight the significance of infection control and tailored preventive methods.

The importance of education, training, and multidisciplinary teamwork was highlighted by an examination of healthcare personnel' attitudes and opinions about candida infections. In order to reduce the occurrence and spread of candida infections, healthcare professionals' awareness of and adherence to infection control procedures must be strengthened.

From localized symptoms to systemic problems, candida infections can have a variety of clinical presentations. This underlines the need of early detection, correct diagnosis, and treatment plans that are customized depending on the clinical presentation and patient characteristics. When candida infections are treated promptly and effectively, patients' outcomes can be enhanced and serious consequences can be avoided

Generally speaking, candida infections responded well to therapy, with the majority of patients making a full recovery. Antifungal drugs had high sensitivity rates and efficacy in treating the infections included fluconazole and amphotericin B.

In order to improve patient comfort and treatment results, supportive care practices and surgical interventions were critical Instances of chronic infections and recurrence,

particularly in those with underlying comorbidities or weakened immune systems, were identified by long-term follow-up and prognosis of candida infections. In other cases, long-lasting consequences, including cognitive impairments or chronic lung illness, were seen, highlighting the necessity of ongoing monitoring and the right maintenance medication.

Conclusion: The information provided by this study is extremely helpful in understanding the characteristics, risk factors, mentalities, epidemiology, clinical manifestations, therapeutic results, and methods for managing and preventing candida infections at Cyprus' Near East Hospital. The results emphasize the value of multidisciplinary cooperation, focused preventative strategies, and adherence to infection control procedures in lowering the incidence of candida infections. Adequate diagnostic and therapeutic measures, such as antifungal drugs and supportive care, can optimize patient outcomes and the management of candida infections.

5.2 Recommendations

Based on the findings of the study conducted at Near East Hospital, Cyprus, the following recommendations can be made to improve the prevention and management of candida infections:

- ❖ Enhance infection control practices by putting into place and reinforcing stringent precautions such good hand hygiene, correct disinfection procedures, and the right use of personal protective equipment. To ensure that healthcare professionals follow these procedures, regular training and education programs should be held.
- ❖ Establish an antifungal management program to encourage the sensible and proper use of antifungal drugs. The introduction of recommendations for the prophylaxis and treatment of candida infections, as well as routine monitoring of antifungal prescription practices and medication selection and dose optimization, should all be part of this program.
- ❖ Develop a strong surveillance system to track the occurrence and prevalence of candida infections in the hospital. This is part of the surveillance and epidemiological monitoring step. Data on risk factors, infection rates, and antibiotic resistance patterns may be regularly collected and analyzed to assist detect trends, direct actions, and assess the efficacy of preventative initiatives

- ❖ Interprofessional Cooperation to enhance the management of candida infections, encourage cooperation between healthcare experts, including doctors, nurses, microbiologists, and infection control specialists. Regular multidisciplinary gatherings and talks can promote best practices, improve information sharing, and guarantee a thorough approach to patient treatment.
- ❖ Implement educational initiatives to raise patient knowledge of candida infections, risk factors, and protective measures. Giving patients knowledge about good hygiene habits, the significance of finishing prescribed antifungal medication, and identifying early indicators of infection might enable people to actively participate in their own healthcare.
- ❖ Research and development In order to better diagnosis, treatment choices, and preventative measures, encourage further study on candida infections. Examine the use of quick diagnostic techniques, look into the potential of novel antifungal drugs, and carry out research to assess the effect of treatments on lowering the prevalence and morbidity of candida infections.

Near East Hospital, Cyprus may improve its strategy for preventing and treating candida infections by putting these ideas into practice. These tactics have the potential to lessen the burden of infections, better patient outcomes, and raise the general standard of care for those with candida infections.

5.3 Limitations of the Study

While the study provided valuable insights into the characteristics and management of candida infections at Near East Hospital, Cyprus, it is important to acknowledge the following limitations:

- ✓ The sample size of the study might be too small, which could affect how well the results apply to a wider population. The diversity and heterogeneity of candida infections in various healthcare settings may not be accurately reflected by the data gathered from a particular institution.
- ✓ The study used retrospective data collection, which has inherent drawbacks such insufficient medical records, missing data, and probable recollection bias. These elements could have had an impact on the accuracy and comprehensiveness of the data collected.
- ✓ Single-Center Study: The study was carried out in the Near East Hospital in Cyprus, which can have a special patient demographic, setting, and

operational procedures. Considering this, the results might not be immediately relevant to healthcare institutions in other countries or to locations with various features.

- ✓ Lack of Information: It may have been difficult for the study to obtain and compile enough information on candida infections. The depth and breadth of the research could have been constrained by a lack of pertinent medical records, laboratory results, and other essential data.
- ✓ Time Restrictions: The study could have been subject to time restrictions, which might have influenced the breadth and depth of the investigation. This could have made it harder to examine certain characteristics of candida infections and how to treat them in more depth.

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