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Incidence of *Candida* Species Infections in a Military Hospital in Al-Kharj, Saudi Arabia

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Aim: The present study aims to demonstrate the incidence of *Candida* species associated with infections in a Military hospital in Alkharj.
Methodology: This is a retrospective study that was conducted to assess the prevalence of *Candida* species in a Military hospital in Alkharj – Saudi Arabia. The isolates from various clinical specimens in 2018 and 2019 were studied.
Results: The percentage of candida species in the 2 years was 6.21% of isolates. The *Candida albicans* were 40.87% of the total *Candida* isolates. The majority of *Candida* species cultures were collected from wound/pus/skin or vagina and to lesser extent urine and lower respiratory tract.
Conclusion: *Candida* species are now common pathogens that cause infections specially in the gastrointestinal tract, vagina and at surgical site. It sometimes may lead to high morbidity and mortality rate. It is important to know the resistance rate for the fungi and it is important to start the implementation of antifungal treatment programs.

Keywords: Incidence; candida; fungal; infections.

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1. INTRODUCTION

Over the last decades, *Candida* has emerged as one of the most important microorganisms causing nosocomial bloodstream infection in both adults and children worldwide [1–6]. *Candida* is a part of normal flora, and has more than 200 species, but only 10% of *Candida* species are known to cause human infections [7].

Bloodstream infections that were caused by *Candida* have drawn considerable attention in numerous medical fields over the previous decades because of their increasing incidence and high mortality rates [8-10].

Candidiasis and candidemia are among the most frequent health care infections resulting in high mortality and morbidity rate [11]. Candidiasis is occurring commonly in immunosuppressive patients and its epidemiology has changed over the previous decades [12].

It was reported that the nature of systemic *Candida* infections appeared to be changing continuously. Until recently, most of the infections were caused by *Candida albicans*. Nowadays, *Candida albicans* are becoming less common as other non-albicans *Candida* species begin to proliferate [13].

In the United States, *Candida* species are ranked as the fourth common group of microbes causing nosocomial bloodstream infections and account for 8% of all septicemias [14].

In Saudi Arabia, till now the incidence of candidemia isn't accurately known. Previous studies revealed a low incidence rate in general ranging between 0.2 and 0.76 cases/1000 of hospital discharges [15–18], while more recent studies showed a higher incidence with a median rate of 1.65 per 1,000 of hospital discharges each year with a significant trend towards higher rates over time [19,20].

The present study aimed to demonstrate the incidence of *Candida* species infections in a Military hospital in Alkharj.

2. METHODOLOGY

This was a retrospective study conducted to assess the prevalence of *Candida* species in a military hospital in Alkharj – Saudi Arabia. The isolates from various clinical specimens in 2018 and 2019 were studied.

The study included all of the candida isolates that were collected in 2018 and 2019. All types of specimens were included such as urine cultures, vaginal cultures and other. The cultures before 2018 and after 2019 were excluded.

The cultures results were collected from Clinical Microbiology laboratory. The descriptive data were represented by frequencies of occurrence and percentages.

This study was approved by the IRB committee in the military hospital number 4101728.

3. RESULTS

In 2018, out of 827 total cultures (bacteria and fungi), there were 84 *Candida* cultures (10.16%). The majority of these cultures were collected from wound/pus/skin or vagina. Table 1 shows the types of specimen cultursin 2018.

The majority of the *Candida* cultures were collected from family medicine ward in 2018 (86.90%). The distribution of *Candida* species among different Departments in 2018 is shown in Table 2.

Table 1. Types of specimen culturesin 2018

Types of tests	Number	Percentage
Urine	17	20.24
Wound/pus/skin/vaginal	59	70.24
Lower respiratory tissues	8	9.52

Table 2. The distribution of *Candida* species among different departments in 2018

Department	Number	Percentage
Medical ward	6	7.14
Family ward	73	86.90
Obstetrics	1	1.19
Intensive care unit	2	2.38
Isolation	2	2.38

In 2019, out of 1023 total cultures (bacteria and fungi) there were 31 *Candida* cultures (3.03%). Most of the collected *Candida* species cultures were collected from wound/pus/skin or vaginal (64.52%). Table 3 shows the types of specimen tested in 2019.

Table 3. Types of specimen culturesin 2019

Types of test	Number	Percentage
Urine	11	35.48
Wound/pus/skin /vaginal	20	64.52

Candida cultures in 2019 were mainly collected from Accident and Emergency Department (67.74%). The distribution of *Candida* species among different department in 2019 is shown in Table 4.

Table 4. Distribution of *Candida* species among different departments in 2019

Department	Number	Percentage
Family ward	4	12.90
Obstetric	6	19.35
Accident and Emergency	21	67.74

As a total the percentage of *Candida* species in the 2 years was 6.21% (out of 1850 isolates, there were 115 *Candida* isolates).

4. DISCUSSION

In 2018, *Candida* is the fourth most common isolated microbes in the Military hospital. Previous studies found that in hospitalized patients and especially in the critically ill patients, *Candida* is between the fourth and sixth most common isolated pathogen in bloodstream infections [21–25]. Similarly, these studies reported that *Candida* isolates were common but in contrast of the present study, there isolates were from bloodstream but in the present study the isolates in 2018 were from urine, wound, skin, pus, vaginal or lower respiratory. Moreover, in the present study in 2019, *Candida* was the seventh most common isolated microbes in the Military hospital and the *Candida* isolates were collected from urine, wound, skin, pus or vaginal. Sheevani et al. stated that *Candida albicans* is the sixth cause of most common nosocomial infections [26]. In a university hospital, *Candida* isolates cause 14.13% of the infections specially *Candida albicans* [27].

Unfortunately, in the present study the incidence of different *Candida species* was not found and the collected results were divided to *Candida albicans* and other types of *Candida*. In 2018, 21 out of 84(25.00%)*Candida*species isolated were for *Candida albicans*. But in 2019, 26 out of 31 (83.87%) *Candida* isolates were for *Candida* albicans. Therefore, the *Candida albicans* in the 2 years were 40.87% of the total *Candida* isolates.

It was reported that reported that *Candida tropicalis* was the most common agent, followed by *C. albicans*, *C. parapsilosis*, *C. glabrata*, *C. mesorugosa*, and *C. krusei* [28]. Furthermore, it was reported that Candida *albicans* remains the predominant cause of invasive candidiasis, accounting for over half of all cases followed by *Candida glabrata* which has emerged as the second most common cause of invasive candidiasis in the United States [29].

The nature of systemic *Candida* infections appears to be changing. Until recently, the majority of infections were caused by *Candida albicans*, but nowadays this species is becoming less common and other *Candida s*pecies begin to proliferate, particularly in certain types of patients [13].

The majority of the *Candida* isolates were collected from wounds, skin and vagina. This is rational because *Candida* species commonly lead to infections in vagina and surgical sites. Similarly, it was reported that Vulvovaginal Candidiasis refers to vaginal and vulval symptoms caused by a yeast, most often *Candida albicans*. It affects 75% of women on at least one occasion over a lifetime [30]. Moreover, vaginal candidiasis in the United States is the second most common type of vaginal infection after bacterial vaginal infections [31]. Furthermore, it was reported that an estimated 1.4 million outpatient visits for vaginal candidiasis occur annually in the United States [32]. *Candida species* commonly cause both early and late postoperative infections [33].

Furthermore, there were some isolates collected from urine (24.35%) and lower respiratory tract (6.96%) that may indicate an invasive candidiasis and usually occurred in immune compromised patients. According to CDC, candidiasis occurs commonly in the mouth or throat and in the vagina. CDC reported that invasive candidiasis occurs when *Candida species* enter the bloodstream or affect internal organs like the kidney, heart, or brain [34].

The risk factors for acquisition of *Candida* in the respiratory tract include use of mechanical ventilation, exposure to antibiotics, immune compromised status, hospital or intensive care unit stay and critical illness [35]. Reports by Fisher et al indicated that infection of the urinary tract due to *Candida albicans* is uncommon [36]. Reports by Kauffman indicated that *Candida* species appear to be unique in their ability to both colonize and cause invasive disease in the urinary tract [37].

5. CONCLUSION

Candida species are now common pathogens that cause infections specially in the gastrointestinal tract, vagina and surgical sites. They also cause invasive infections in immune compromised patients and may lead to high morbidity and mortality rates in these patients. The present study shows that *Candida* associated infections were common. In the past, the majority of *Candida* associated infections were caused by *Candida albicans* but nowadays there is an increase in the incidence of infections that are caused by other *Candida species*. It is important to know the resistance rate for *Candida species* and it is important to start the implementation of antifungal treatment programs.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the author.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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