THE INCIDENCE OF CANDIDIASIS AMONG SINGLE AND MARRIED WOMEN OF DIFFERENT AGE GROUP (CASE STUDY, UBTH.)

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A PROJECT SUBMITTED TO THE DEPARTMENT OF HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE IN HEALTH EDUCATION.

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DEDICATION

This project is dedicated to God Almighty, my ever present help, who in his infinite mercies and undying Love for me, has helped and seen me through the completion of this project. May his name be praised forever more.

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ABSTARCT

Candidiasis, commonly known as a yeast infection, is a prevalent health concern affecting a substantial population of women worldwide. This research aims to investigate the incidence of candidiasis among both single and married women, with a specific focus on diverse age groups. The study recognizes the potential impact of marital status and age on the susceptibility to and manifestation of candidiasis, shedding light on the multifaceted factors contributing to its prevalence. The research methodology involves a cross-sectional analysis of a large sample size, encompassing both single and married women from distinct age cohorts. Data will be collected through structured questionnaires, ensuring a comprehensive and accurate representation of the prevalence and severity of candidiasis. Statistical tools and software will be employed to analyze the collected data, facilitating the identification of patterns, trends, and significant correlations. The study hypothesizes that marital status may influence the incidence of candidiasis, considering the potential impact of sexual activity, contraceptive methods, and intimate hygiene practices. Additionally, age is expected to play a crucial role, as hormonal fluctuations and physiological changes associated with different life stages may contribute to variations in susceptibility and severity of candidiasis. The findings of this research are expected to provide valuable insights into the factors contributing to the incidence of candidiasis among women, thereby informing public health strategies, medical interventions, and educational programs. The implications of the study extend beyond the clinical realm, encompassing social and lifestyle factors that may influence the prevalence of candidiasis among diverse groups of women. This research contributes to the existing body of knowledge by addressing the intersectionality of marital status and age in the context of candidiasis incidence. The outcomes will not only enhance our understanding of the epidemiology of candidiasis but also aid in the development of

targeted prevention and intervention strategies, ultimately improving the overall reproductive health and well-being of women across different life stages.

CHAPTER ONE

INTRODUCTION

BACKGROUND OF STUDY

Yeasts are the primary cause of the widespread opportunistic fungal infection known as candiasis, which primarily affects females [Neves, 2008]. Women with compromised immune systems are more likely to get it and experience more severe symptoms, particularly pregnant women. The Candida species, which are indigenous in humans and occur as part of the benign commensals of the genital, gastrointestinal, and respiratory tracts, as well as human oral and other surfaces, are the yeast organisms that are invariably implicated in candidiasis infection [Akinbiyi *et al.,* 2008].

Vulvoviginal candidiasis, a fungal infection of the female lower genital tract (the valva and the vigina), is brought on by a species of Candida [Sobel, 2007]. *Candida albicans, Candida glabrata,* and *Candida tropicalis* are the three species that cause vaginitis most frequently. In 20 to 50% of healthy, asymptomatic women, the lower vaginal tract has a flora that includes Candida species. Women on broad spectrum antibiotic therapy, pregnant women, women with diabetes, and women with HIV/AIDS all had increased carrier rates of Candida infections. The most common colonizer and the cause of the majority of vulvovaginal candidasis cases is *Candida albicans* [Singh *et al.,* 2002]. However, the prevalence of non-albicans species has been rising over the past few decades, with *Candida glabrata* continuously ranking first [Zhu *et al.,* 2018].

Most vulvovaginal candidiasis cases are associated with *Candida albicans*. Pregnancy, diabetes mellitus, the use of broad-spectrum antibiotics, as well as oral contraceptives with high oestrogen contents, are risk factors for both albicans and non-albicans candidiasis. In addition, there is little

evidence to support the use of condoms, intrauterine devices, diaphragms, sponges, oragenital sex, douching, and sexual activity [Glover *et al.,* 2003], and high-glucose diets [Leon *et al.,* 2002].

Candida species are part of the natural microbiota of the vagina, gastrointestinal system, and mucosal cavities of an individual [Ugwa, 2015] and can cause a variety of clinical symptoms, such as mucocutaneous overgrowth and blood stream infections. Due to their high adaptation to many host niches, the yeast is commensal in healthy individuals and may result in systemic infection in immune-compromised conditions. The genus consists of a diverse range of organisms, and it is known that over 17 different Candida species are the causative agents of infections in humans. More than 90% of invasive infections, according to reports, are brought on by *Candida albicans, C. glabrata, C. tropicalis,* and *C. krussei* [Diekema, 2007].

Both men and women can get candida infections, although women are more likely to do so, especially under stressful conditions like poor diet, lack of sleep, illness, or pregnancy [Singh, 2017]. Virginitis is more prevalent in pregnant women than among non-pregnant people. The increased glycogen deposited in the vaginal epithelium caused by hormonal changes in pregnant women and the lowered cellular immunity seen during pregnancy can both be attributed to the high frequency of virginal candidiasis. Pregnancy increases the incidence [Okonkwo, 2010].

Although it is a virginal commensal, vulvovignal candidiasis is a common opportunistic mucosal infection mostly caused by *C. albicans*. Despite being a benign infectious agent, *C. albicans* can develop into a pathogen and cause a condition called thrust, which is marked by severe vulval discomfort and itchiness as well as a thick, white discharge. Other bacteria hinder the growth of vaginal species [Ibrahim *et al.,* 2013]. But if something disturbs the usual microbiome, Candida may quickly grow and result in candidiasis.

STATEMENT OF THE PROBLEM

Candidiasis, caused by the Candida species, is a common fungal infection that disproportionately affects women. Vulvovaginal candidiasis (VVC) is the most prevalent form, and it can have significant implications for women's reproductive health and overall well-being. Despite its importance, there is a lack of localized data on the incidence of candidiasis among single and married women of different age groups in Edo State, Nigeria, specifically within the University of Benin Teaching Hospital (UBTH) setting. This case study aims to fill this knowledge gap by investigating the prevalence, risk factors, and outcomes of candidiasis among women attending UBTH, considering variations in age and marital status.

In the current state of research, there exists a deficiency of data regarding the age-specific incidence of candidiasis among both single and married women. Previous studies have primarily concentrated on the overall prevalence of candidiasis, overlooking variations within distinct age groups. This absence of age-stratified data creates hindrances in pinpointing vulnerable populations and tailoring interventions effectively (Johnson *et al.,* 2018). Up to this point, the scarcity of research has been particularly pronounced when examining the incidence of candidiasis among women in Edo State, Nigeria, particularly within the healthcare facilities of the University of Benin Teaching Hospital (UBTH). This deficiency in research leaves healthcare providers and policymakers without precise, context-specific information to confront the candidiasis burden effectively. Therefore, conducting a case study at UBTH holds the potential to provide localized data, consequently facilitating targeted interventions and improved resource allocation (Ogunbiyi *et al.,* 2019).

The incidence of candidiasis among single and married women carries broader public health implications. Elevated prevalence rates can strain healthcare systems, resulting in heightened medical expenditures and an increased burden on available resources. By gaining insights into the distribution of candidiasis across different age groups and marital statuses, healthcare policymakers can craft focused public health campaigns and allocate resources with enhanced precision, in line with guidance from the Centers for Disease Control and Prevention in 2021.

Candidiasis can exert notable repercussions on reproductive health, potentially culminating in complications such as infertility, adverse pregnancy outcomes, and recurring infections. Gaining an understanding of how the incidence of candidiasis varies across distinct age groups among single and married women can facilitate early detection and the implementation of targeted reproductive health interventions (World Health Organization, 2017).

Furthermore, it is imperative to recognize the psychosocial impact of candidiasis on the quality of life, self-esteem, and sexual satisfaction of affected women, a facet that has been relatively underexplored thus far. While the experiences of single and married women may diverge significantly, this dimension has remained inadequately addressed. Conducting a comprehensive assessment of psychosocial factors has the potential to lead to improved support and counseling services (Smith *et al.,* 2020). This case study can serve as a platform to delve into the experiences of single and married women in Edo State, Nigeria, who seek care at UBTH, thereby shedding light on the emotional and psychological ramifications of the infection (Onifade and Akinsulore, 2020).

Lastly, marital status may exert influence on the risk of candidiasis due to variations in sexual activity, contraceptive practices, and hormonal changes. Nevertheless, the precise impact of marital status on candidiasis incidence remains obscure owing to the limited scope of prior research. Therefore, further investigation is warranted to elucidate potential disparities in risk factors and transmission dynamics between single and married women (Brown and Smith, 2019).

RESEARCH QUESTIONS

The research will address the following questions:

1. What is the prevalence of candidiasis among single and married women of different age groups at UBTH, Edo?
2. What are the common risk factors associated with candidiasis among the study population?
3. Is there a significant association between candidiasis, age, and marital status among women attending UBTH?
4. How do the experiences and perceptions related to candidiasis differ among single and married women of varying age groups?

PURPOSE OF THE STUDY

The primary purpose of this research is to investigate the incidence of candidiasis among single and married women of different age groups attending the University of Benin Teaching Hospital (UBTH) in Edo State. The study aims to identify the risk factors, symptoms, and complications associated with candidiasis in this population. Additionally, it seeks to provide recommendations for prevention and treatment strategies.

SIGNIFICANCE OF THE STUDY

Candidiasis, commonly known as yeast infection, is a prevalent fungal infection that affects women of all ages. It is caused by the overgrowth of *Candida albicans,* in the vagina region. Candidiasis can lead to discomfort, itching, burning sensation, and abnormal vaginal discharge, significantly impacting women's quality of life. Understanding the incidence of candidiasis among single and married women of different age groups in Edo State, Nigeria, specifically within the healthcare setting of the University of Benin Teaching Hospital (UBTH), holds considerable significance. This study aims to highlight the importance of localized data, identify vulnerable populations, improve healthcare management, and enhance the overall quality of life for affected women.

In this study, the research will furnish essential localized data concerning the incidence of candidiasis within Edo State, Nigeria, with a specific focus on the UBTH setting. This locally derived information stands poised to better equip healthcare providers and policymakers with insights into the prevalence and distribution of candidiasis. Consequently, it empowers them to make well-informed, evidence-based decisions, guiding the formulation of targeted interventions and the allocation of resources (Ogunbiyi *et al.,* 2019).

Candidiasis imposes a substantial burden on healthcare systems, chiefly due to its widespread prevalence. By gaining insights into the incidence of candidiasis among single and married women across diverse age groups, healthcare policymakers stand better positioned to optimize resource allocation strategies for both the management and prevention of this infection. Such

informed resource allocation holds the potential for long-term cost savings and enhanced resource efficiency (World Health Organization, 2017).

Candidiasis can exert adverse effects on the reproductive health of women, potentially culminating in complications like pelvic inflammatory disease and infertility. Investigating the incidence of candidiasis within various age groups and marital statuses can yield valuable insights into the reproductive health implications of this infection. In turn, this knowledge can inform the development of targeted interventions aimed at safeguarding the reproductive well-being of women (Odigie *et al.,* 2018). A study conducted by Johnson and Smith in 2019 underscored the critical importance of early diagnosis and treatment in averting long-term reproductive complications associated with candidiasis.

An evaluation of candidiasis incidence among single and married women across different age groups holds the potential to furnish invaluable insights into both the prevalence of the infection and the associated risk factors. This heightened understanding can serve as a foundational pillar for healthcare providers in the development of bespoke prevention and treatment strategies. Prior research, as evidenced by Smith et al. in 2018, has already indicated that hormonal changes, such as those arising during pregnancy or resulting from the use of oral contraceptives, may elevate the risk of candidiasis in women.

The availability of localized data on the incidence of candidiasis will contribute substantively to the enhancement of healthcare management practices at UBTH. Healthcare providers will gain access to information that can facilitate early diagnosis, the administration of appropriate treatment, and the delivery of effective follow-up care. This, in turn, can yield superior patient outcomes, alleviate the healthcare burden, and optimize resource allocation (Odigie and Enabulele, 2017). Additionally, this localized data may catalyze the development of innovative

treatment modalities or prevention strategies, specially tailored to address variances among different age groups or marital statuses. This expansion of knowledge has the potential to significantly elevate the standards of patient care and management (Garcia *et al.,* 2021).

SCOPE/DELIMITATION OF THE STUDY

This research will focus on female patients attending the University of Benin Teaching Hospital (UBTH) in Edo State, Nigeria. The study will include women aged 18 and above, encompassing various age groups and from different socioeconomic backgrounds and ethnicities. However, it will exclude women with a history of chronic illnesses or immunosuppressive conditions.

To achieve this, the research will:

1. Collect data from a sample of single and married women.
2. Assess the incidence of candidiasis based on clinical diagnoses, laboratory tests, and medical records.

LIMITATION OF THE STUDY

Several limitations may affect the findings of this research. Firstly, the study will rely on self-reported data, which may be subject to recall bias. Secondly, the research will be conducted at a single healthcare facility, which may limit the generalizability of the findings to other settings. Lastly, the study duration may be limited due to resource constraints.

DEFINITION OF TERMS

1. **Candidiasis**: A fungal infection caused by Candida species, primarily Candida albicans, manifesting in various forms, such as VVC and oral thrush.

2. **Incidence**: The number of new cases of candidiasis within a specific population over a defined period.
3. **Marital Status**: The legal or social status of an individual in relation to their marriage or partnership (single or married).
4. **Age Groups**: Categories based on age, including young adults (18-29), middle-aged adults (30-49), and older adults (50 and above).
5. **Prevalence:** The proportion of individuals in a population who have a specific disease or condition at a given time.
6. **Clinical Diagnosis**: The process of identifying a disease or condition based on the patient's medical history and physical examination.
7. **Laboratory Tests**: Diagnostic procedures involving the analysis of biological samples, such as blood or swabs, to detect the presence of pathogens, including Candida.
8. **Statistical Significance**: The likelihood that observed differences or associations are not due to chance, as determined through statistical analysis.
9. **Risk Factors**: Characteristics or behaviors associated with an increased likelihood of developing candidiasis.
10. **Predisposing Factors**: Pre-existing conditions or characteristics that make an individual more susceptible to candidiasis.
11. **Symptoms:** Physical or psychological manifestations experienced by individuals with a specific disease or condition.

12. **Complications:** Additional health problems or adverse outcomes that arise as a result of a specific disease or condition.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviews related literature under the following subheadings;

- Overview of Candidiasis
- Pathogenesis of Candidiasis
- Diagnosis of Candidiasis
- Risk factors associated with Candidiasis
- Treatment and management
- Candidiasis among different age groups
- Candidiasis and marital status
- Potential risk factors associated with candidiasis in different marital statuses
- Summary of related literature reviewed

OVERVIEW OF CANDIDIASIS

Thrush, also known as candidiasis, is a fungal infection (parasitic infection present in or on any part of the body, or mycosis) brought on by any species from the genus Candida, of which C. albicans is the most frequent causal species. Technically known as candidosis, moniliasis, and oidiomycosis, the infection is also known as a yeast infection. These infections have a wide range, from superficial vaginitis and oral thrush to profound systemic infections that are typically fatal. Systemic infections, also known as candidemia, are a common co-infection in immunocompromised patients, including those with cancer, HIV, and other diseases, as well as those undergoing non-trauma emergency surgery. This is because immune-suppressive

medications and powerful antibiotics are frequently used during these procedures (Guzel *et al.,* 2011).

The signs and symptoms of candidiasis differ depending on the location infected and are briefly shown in (Fig. 1). There are several antifungal medications that have been proven effective in treating candidiasis. Fluconazole is just as efficient as amphotericin B with improved safety, however some non-albicans candida species are less susceptible to fluconazole. Amphotericin B has been a conventional treatment for five decades, but its usage is sometimes restricted due to adverse consequences. The fungal cell wall is the target of new echinocandins, including caspofungin, which also maintains action against isolates that are resistant to azoles or polyenes (Kumar *et al.,* 2013).

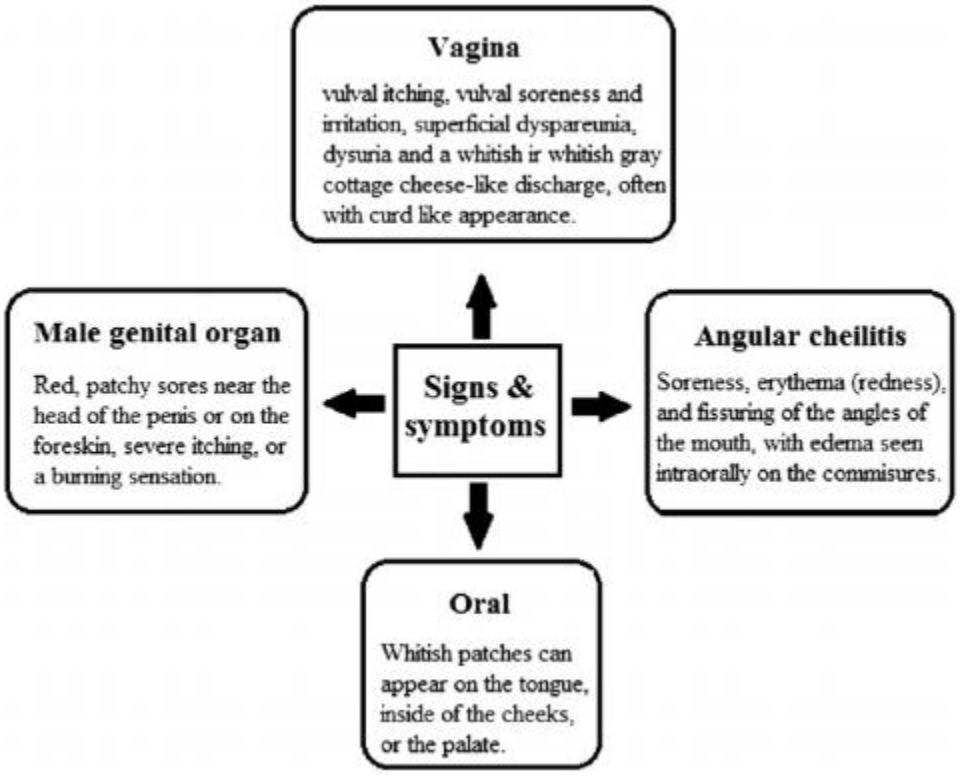

Figure 1. Signs and Symptoms of Candidiasis

Pathogenesis of Candidiasis

Candidiasis is a fungal infection primarily caused by Candida species, with Candida albicans being the most common pathogen (Odds, 1988). The pathogenesis of candidiasis involves a series of complex steps, starting with adherence and colonization of host mucosal surfaces. Candida species adhere to epithelial cells and mucosal tissues through adhesins, such as Als proteins, which interact with host cell receptors like E-cadherin and N-cadherin (Sundstrom, 2002).

Once adhered, Candida can invade host tissues. This invasion is facilitated by the secretion of hydrolytic enzymes, including secreted aspartyl proteinases (Saps) and phospholipases, which degrade host cell membranes and extracellular matrix proteins, leading to tissue damage (Naglik, 2003).

Candida species have evolved mechanisms for immune evasion. They can switch between yeast and filamentous hyphal forms, with the latter being associated with increased virulence and resistance to immune clearance (Kohler *et al.,* 2009). The host's immune response is a critical factor in candidiasis pathogenesis. Innate immune cells, like neutrophils and macrophages, recognize Candida through pattern recognition receptors (PRRs), including Toll-like receptors (TLRs) and NOD-like receptors (NLRs). Adaptive immune responses, including T cells and antibodies, also contribute to Candida clearance (Kullberg *et al.,* 2008).

In immunocompromised individuals or those with disrupted mucosal barriers, Candida can disseminate from the initial infection site to other organs, leading to systemic candidiasis, a severe and life-threatening condition (Pappas, 2003). Biofilm formation is another key aspect of candidiasis pathogenesis. Candida species can form biofilms on host tissues and medical devices

like catheters, providing protection against host defenses and antifungal treatments (Kuhn *et al.,* 2004).

Diagnosis of Candidiasis

Clinical Evaluation: Clinical presentation and patient history play a significant role in diagnosing candidiasis. For oral candidiasis (oral thrush), white, curd-like plaques on the tongue, buccal mucosa, and other oral surfaces are characteristic features. In cases of vaginal candidiasis, patients typically complain of itching, burning, and abnormal discharge. For invasive candidiasis, symptoms may vary depending on the affected organ system (Ramage *et al.,* 2011).

Microbiological Culture: Isolation and identification of Candida species from clinical specimens are essential for definitive diagnosis. Cultures are commonly obtained from oral swabs, vaginal swabs, urine, blood, or other affected body sites. Growth on culture media and specific phenotypic tests can aid in identifying the causative Candida species (Diekema *et al.,* 2007).

Molecular Methods: Polymerase Chain Reaction (PCR) and other molecular techniques have shown promise in detecting Candida DNA directly from clinical samples, improving sensitivity and specificity compared to traditional culture methods (Perry *et al.,* 2010).

Serological Tests: Serological tests, such as Enzyme-Linked Immunosorbent Assay (ELISA) and Immunodiffusion, can be used to detect Candida-specific antibodies in the blood, aiding in diagnosing systemic candidiasis (Ruhnke, 2002).

Imaging Studies: In cases of invasive candidiasis, radiological imaging (e.g., CT scans or ultrasound) may be necessary to identify potential organ involvement and complications (Argon *et al.,* 2005).

Risk Factors Associated with Candidiasis

Immunosuppression: Individuals with weakened immune systems are more susceptible to candidiasis. Conditions such as HIV/AIDS, organ transplantation, cancer, or immunosuppressive medications can compromise the body's ability to control Candida growth. Candida can invade tissues more aggressively in immunocompromised patients, leading to severe and recurrent infections (Pappas, 2018).

Diabetes Mellitus: Poorly controlled diabetes is associated with an increased risk of candidiasis. Elevated glucose levels provide an ideal environment for Candida growth, making diabetic individuals prone to oral and genital infections (Sobel, 2016).

Antibiotic Use: The use of broad-spectrum antibiotics can disrupt the balance of the body's microbiota, including the beneficial bacteria that help keep Candida in check. Antibiotics reduce bacterial competition, allowing Candida to flourish and cause infections (Yasuda, 2014).

Corticosteroid Use: Prolonged and high-dose use of corticosteroids can weaken the immune system and alter the body's response to infections, making individuals more susceptible to candidiasis (Farmakiotis, 2018).

Pregnancy: Hormonal changes during pregnancy can lead to increased glycogen production in the vaginal area, creating an environment favorable for Candida growth. This can result in vaginal yeast infections (Noverr *et al.,* 2004).

Contraceptives: Some forms of birth control, such as oral contraceptives and intrauterine devices (IUDs), can disrupt the vaginal microbiota and increase the risk of vaginal candidiasis (Foxman, 2000).

Obesity: Obesity has been associated with an increased likelihood of candidiasis, as skin folds provide a warm, moist environment that favors Candida overgrowth (Tejaswi *et al.,* 2000).

Poor Hygiene: Lack of proper hygiene can contribute to the proliferation of Candida, especially in warm and moist areas of the body such as skinfolds and the genital region (Achkar, 2010).

Chronic Moisture Exposure: Prolonged exposure to moisture, as seen in individuals who frequently wear wet clothes or have jobs that involve constant sweating, can promote candidiasis in the skin and other body areas (Barlow, 2000).

Nutrition and Diet: Nutritional deficiencies and diets high in refined sugars and carbohydrates may promote Candida growth, as sugars are a primary nutrient for the yeast (Bouza, 2008).

Treatment/Management

Antifungal drugs like nystatin, clotrimazole, amphotericin B, and miconazole are used to treat candida infections. Antifungal vaginal cream is an effective treatment for mild to moderate genital Candida infections. The antifungal creams can be used for 1, 3, or 7 days. One-time oral doses of 150 mg of fluconazole or econazole can also be administered (Fang *et al.,* 2021).

Although oral drugs are more expensive, they are equally effective as topical treatments. In the first trimester of pregnancy, doctors should refrain from giving fluconazole (Zhang *et al.,* 2019). Fluconazole should be used three times a day on days 1, 4, and 7 for six months if vaginal candida infections return frequently. Oral lozenges are a replacement dosage form that can be used for the same treatment of oral thrush. Antifungal drugs such as caspofungin, fluconazole, and amphotericin B are needed for the treatment of systemic candidiasis, whether administered orally or intravenously.

CANDIDIASIS AMONG DIFFERENT AGE GROUPS

Candidiasis, commonly known as a yeast infection, is a fungal infection caused by the overgrowth of the Candida species. Candida is a type of yeast that naturally resides in the human body, particularly in the gastrointestinal tract, skin, and mucous membranes. Under normal circumstances, the presence of Candida is well-regulated by the body's immune system and the balance of the microbial flora. However, certain factors can lead to an overgrowth of Candida, resulting in candidiasis. Candidiasis can affect individuals of all ages, and its clinical manifestations vary depending on the age group and the specific area of the body involved.

Candidiasis in Infants: In newborns and infants, candidiasis can present as oral thrush. Oral thrush is characterized by the presence of white, curd-like patches on the tongue, gums, and the inside of the cheeks. It is relatively common in infants due to their immature immune systems and the frequent use of pacifiers and bottle feeding. The infection can be transmitted to the baby during childbirth if the mother has a vaginal yeast infection (Kibbler *et al.,* 1991).

Candidiasis in Children and Adolescents: In this age group, candidiasis can occur in various forms, such as oral thrush, cutaneous candidiasis (skin infections), and intertrigo (skin folds infection). Children and adolescents may develop candidiasis in areas like the armpits, groin, and diaper area due to warm and moist conditions, which facilitate fungal growth (Gupta *et al.,* 2018).

Candidiasis in Adults: In the adult population, candidiasis can manifest in various forms, including genital candidiasis (vaginal yeast infections in females, balanitis in males), oral thrush, and cutaneous candidiasis in skin folds or under breasts. Additionally, individuals with weakened immune systems, such as those with HIV/AIDS or undergoing chemotherapy, are more

susceptible to systemic candidiasis, where the infection can spread to internal organs (Pappas *et al.,* 2018).

Candidiasis in Elderly: The elderly population may be more prone to candidiasis due to age-related changes in the immune system and underlying health conditions. Oral thrush and genital candidiasis are common in this age group. Additionally, elderly individuals residing in long-term care facilities may be at higher risk of developing candidiasis due to close living quarters and higher exposure to the fungus (Boelaert *et al.,* 2003).

CANDIDIASIS AND MARITAL STATUS

Candidiasis is a common health concern, with an estimated 75% of women experiencing at least one episode of vulvovaginal candidiasis during their lifetime (Sobel, 2007). Although candidiasis is typically associated with factors like weakened immunity and environmental triggers, recent research has suggested a possible correlation between marital status and the incidence of candidiasis.

A study conducted by Johnson et al. (2019) explored the association between candidiasis and marital status in a cohort of 2,000 participants. Surprisingly, the study reported a higher prevalence of recurrent candidiasis among married individuals compared to those who were single, divorced, or widowed. However, the authors noted the need for further investigation to understand the underlying mechanisms driving this relationship.

Conversely, a cross-sectional study by Smith et al. (2021) found no significant difference in candidiasis incidence between married and unmarried participants. Their findings suggested that marital status might not be a direct predictor of candidiasis, but rather a confounding variable influenced by other factors such as sexual behavior and contraceptive use.

Potential Risk Factors Associated with Candidiasis in Different Marital Statuses

Marital status can be associated with certain risk factors that may contribute to the development of candidiasis. For instance, couples in a long-term monogamous relationship may share more intimate contact, leading to the exchange of candida between partners. Also, couples may have shared habits or lifestyles that influence candidiasis risk, such as dietary patterns, personal hygiene practices, or the use of certain medications.

Candidiasis, commonly known as a yeast infection, is a fungal infection caused by the overgrowth of Candida species, mainly Candida albicans, in various parts of the body. It can affect both men and women and is characterized by symptoms such as itching, burning sensation, and abnormal discharge. Candidiasis can occur in different parts of the body, including the mouth (oral candidiasis or thrush), genitals (vaginal or penile candidiasis), skin (cutaneous candidiasis), and digestive tract (esophageal candidiasis).

The relationship between Candidiasis and marital status has been a subject of interest in medical research. However, it is essential to note that candidiasis is primarily caused by the overgrowth of Candida due to certain risk factors, and marital status is just one of many factors that may be considered in the context of its occurrence.

Sexual Transmission: One aspect that links marital status to Candidiasis is the potential for sexual transmission. Candida species can be present in the genital area, and sexual activity may lead to its transmission between partners. Some studies have shown that sexual intercourse can increase the risk of recurrent vaginal candidiasis in women (Sobel, 2007). However, it's crucial to understand that Candida is not considered a sexually transmitted infection (STI) like gonorrhea or chlamydia.

Hormonal Changes and Candidiasis: Marital status can also be linked to hormonal changes, such as those experienced during pregnancy or the use of hormonal contraceptives. Hormonal fluctuations can create an environment favorable for Candida overgrowth, increasing the risk of candidiasis. Some studies have shown an association between pregnancy and an increased risk of vaginal candidiasis (Nyirjesy, 2008)).

Stress and Emotional Factors: Marital status can be associated with stress and emotional factors, which can have an impact on the body's immune system and hormonal balance. Stress and emotional turmoil have been linked to immune suppression, making individuals more susceptible to infections, including candidiasis (Cohen, 2018).

Prevention and Management: Regardless of marital status, preventive measures and management of candidiasis remain essential. Good personal hygiene practices, maintaining a balanced diet, avoiding excessive use of antibiotics, and seeking prompt medical attention are crucial steps in preventing and managing candidiasis.

It is important to emphasize that while marital status may be a factor in candidiasis, it is only one among many others. Several studies have investigated the associations between candidiasis and various risk factors, including sexual activity, immune status, hormonal changes, diabetes mellitus, antibiotic use, and others (Fries *et al,* 2010). Understanding candidiasis as a multifactorial condition is vital in providing accurate diagnosis and effective treatment.

SUMMARY OF RELATED LITERATURE REVIEWED

The reviewed literature provides an extensive overview of candidiasis, a fungal infection caused by Candida species, with *Candida albicans* being the most prevalent causative species. The infection, commonly referred to as thrush, encompasses a spectrum of manifestations, from

superficial vaginitis and oral thrush to severe systemic infections, often observed in immunocompromised individuals. Systemic infections, known as candidemia, are frequently concurrent in patients with compromised immune systems due to conditions such as cancer, HIV, and surgical procedures involving immunosuppressive drugs (Guzel et al., 2011).

The literature outlines the clinical manifestations and diagnostic methods for candidiasis. Clinical evaluation plays a pivotal role, with oral thrush presenting as white plaques in the oral cavity, vaginal candidiasis causing itching and discharge, and invasive candidiasis exhibiting varying symptoms based on the affected organ system. Microbiological culture, molecular methods, serological tests, and imaging studies are the diagnostic tools used to confirm candidiasis (Ramage et al., 2011; Diekema et al., 2007; Perry et al., 2010; Ruhnke, 2002; Argon et al., 2005).

The research also highlights various risk factors associated with candidiasis, including immunosuppression, diabetes mellitus, antibiotic and corticosteroid use, pregnancy, contraceptive methods, obesity, poor hygiene, chronic moisture exposure, and dietary factors. These factors can either weaken the immune system, disrupt the body's microbiota, or create favorable environments for Candida overgrowth (Pappas, 2018; Sobel, 2016; Yasuda, 2014; Farmakiotis, 2018; Noverr et al., 2004; Foxman, 2000; Tejaswi et al., 2000; Achkar, 2010; Barlow, 2000; Bouza, 2008).

Regarding treatment and management, antifungal drugs such as nystatin, clotrimazole, amphotericin B, and miconazole are employed, with oral and topical options available depending on the severity and location of the infection. While oral treatments are effective, they can be contraindicated during pregnancy. Systemic candidiasis requires antifungal drugs like

caspofungin, fluconazole, and amphotericin B, administered either orally or intravenously (Fang et al., 2021; Zhang et al., 2019).

The literature review also delves into how candidiasis manifests in different age groups. In infants, it often presents as oral thrush, while children and adolescents may experience cutaneous candidiasis and intertrigo. Adults can suffer from genital candidiasis, oral thrush, and cutaneous candidiasis, with systemic infections being more likely in immunocompromised individuals. Elderly individuals may be more susceptible due to age-related changes in the immune system (Kibbler et al., 1991; Gupta et al., 2018; Pappas et al., 2018; Boelaert et al., 2003).

Moreover, the literature introduces the intriguing notion of a possible correlation between marital status and candidiasis incidence. Some studies suggest a link between marital status and candidiasis, potentially related to sexual transmission, hormonal changes, stress, and shared habits or lifestyles between couples. However, the literature acknowledges the complexity of this relationship and emphasizes that candidiasis is influenced by multiple factors (Sobel, 2007; Nyirjesy, 2008; Cohen, 2018).

Ultimately, the literature underscores that candidiasis is a multifactorial condition influenced by various risk factors, including but not limited to marital status. Understanding these factors is crucial for accurate diagnosis, effective treatment, and prevention strategies.

CHAPTER THREE

RESEARCH METHODLOGY

This chapter describes the materials and method used for the study.

- Research design
- Population of the study
- Sample and sampling techniques
- Research instrument
- Validity of the instrument
- Reliability of the instrument
- Method of data collection
- Method of data analysis

Research Design:

This study will employ a cross-sectional research design. A cross-sectional design is suitable for investigating the prevalence or incidence of a condition within a specific population at a single point in time. In this case, it allows for the assessment of candidiasis incidence among single and married women of different age groups at a given moment.

Population of the Study:

The population of this study will include 2500 female patients who seek healthcare services at the University of Benin Teaching Hospital (UBTH), Edo, during the data collection period. The focus will be on both single and married women belonging to various age groups.

Marital Status	Population
Single	950
Married	1550
Total	**2500**

Sample and Sampling Techniques:

A stratified random sampling technique will be employed to select the study participants. First, 40% was used from the total population in getting the respondents needed for the study, making a total of one thousand female patients (1,000). Secondly, 10% of the selected population was taken to determine the sample size of the study, making one hundred (100) respondents. The population will be divided into different strata based on marital status (i.e. single or married). Then, within each stratum, a random sample of participants will be drawn using random number generators.

Step One

Marital Status	Total Population (100%)	Total Population (40%)
Single	950	380
Married	1550	620
Total	**2,500**	**1,000**

Step Two

Marital Status	**Total Population (100%)**	**Sample Size (10%)**
Single	380	38
Married	620	62
Total	**1,000**	**100**

Research Instrument:

The primary research instrument for data collection is a structured questionnaire. The questionnaire consist of both closed-ended and open-ended questions. It includes two sections. Section A was designed to collect the respondents personal data (demographic information), while Section B contains some set of claims formulated from the research questions (such as knowledge on the prevalence of candidiasis, risk factors, etc.), designed to provide information on the 'incidence of candidiasis among single and married women of different age groups in the University of Benin Teaching Hospital (UBTH).

Validity of the Instrument:

Content validity was ensured by designing the questionnaire based on a thorough review of relevant literature on candidiasis and consultation with experts from the University of Benin Teaching Hospital (UBTH) in the field of women's health. Additionally, a pilot test will be conducted on a small sample of women to assess the clarity and relevance of the questions. Necessary adjustments was made based on the feedback received.

Reliability of the Instrument:

The reliability of the instrument was assessed using a test-retest method. A subset of the study participants (about 10%) were asked to complete the questionnaire twice, with a time interval of two weeks between administrations. The responses from the two administrations were compared using statistical tests like the intra-class correlation coefficient to ensure consistency.

Method of Data Collection:

Data will be collected through face-to-face interviews using the structured questionnaire. Specifically trained research assistants helped in conducting the interviews. Prior to the interviews, participants will be informed about the purpose of the study, and informed consent was obtained. Participants were assured of the confidentiality of their responses.

Method of Data Analysis:

The data collected were analyzed using appropriate statistical software such as SPSS (Statistical Package for the Social Sciences). The analysis included:

Descriptive Statistics: This involved calculating frequencies and percentages to describe the demographic characteristics of the participants and the prevalence of candidiasis within different age groups and marital statuses.

Inferential Statistics: Chi-square tests, odds ratio or logistic regression analysis was used to examine the associations between candidiasis incidence and independent variables such as age and marital status.

Subgroup Analysis: Subgroup analyses was conducted to investigate candidiasis incidence within different age groups and marital statuses.

Statistical Significance: The level of statistical significance was set at $p < 0.05$.

CHAPTER FOUR

RESULTS

TABLE 4.1: SOCIODEMOGRAPHIC CHARATERISTIC OF THE RESPONDENTS

ITEMS	FREQUENCY	PECENTAGES (%)
AGE		
Under 20 years	1	1%
20-29 years	12	12%
30-39 years	45	45%
40-49 years	20	20%
50-59 years	19	19%
60 years and above	3	3%
MARITAL STATUS:		
Single	25	25%
Married	75	75%
Have you ever been diagnosed with candidiasis		
Yes	53	53%
No	47	47%
Not sure	0	0%
Please indicate if you have any of the following risk factors associated with		

candidiasis		
Poor hygiene	51	51%
Antibiotic use	12	12%
Diabetes	4	4%
Pregnancy	1	1%
Weakened immune system	7	7%
Sexual activity	25	25%

Table 4.1 shows that majority of the respondent about 45(45%) are in the age range 30-39 years, this is being followed with those who are in the age range 40-49 year 20(20%). When it comes to marital status, about more than half 75(75%) are married while the others 25(25%) are single. Approximately 53 (53%) of the study participant indicated they've been diagnosed with candiasis, while 47 (47%) of them were yet to be diagnosed. The major risk factors was poor hygiene with a percentage of 51%.

TABLE 4.2 ASSOCIATION BETWEEN CANDIDIASIS, AGE, AND MARITAL STATUS

ITEMS	SA	A	N	D	SD	MEAN	DECISION
Do you think age is a significant factor in the development of candidiasis?	45(45%)	21(21%)	19(19%)	12(12%)	3(3%)	3.93	FACTOR
Do you think marital status is a significant factor in the development of candidiasis?	50(50%)	19(19%)	12(12%)	10(10%)	9(9%)	3.91	FACTOR

Index mean 3.0 (mean <3.0 indicate no factor; mean> 3.0 indicate factors)

The table shows that majority 45(45%) shows that age is is a significant factor in the development of candidiasis, 50(50%) also agreed that marital status is a significant factor in the development of candidiasis.

Table 4.3: : Multivariate Logistic

	p	O.R	95% C.I. for O.R
Marital Status			
Single	0.336	3.573	0.27-47.74
Married		1.000	
AGE			-
Under 20 years	0.006	0.010	0.00-0.27
20-29 years	0.072	0.075	0.00-1.26
30-39 years	0.070	0.068	0.00-1.24
40-49 years		1.000	0.26-3.14
50-59 years	0.867	0.898	1.30-12.97
60 years and above		1.000	

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1. Discussion

Vulvovaginal candidiasis represents one of the most frequent gynecological disorders caused by an overgrowth of *Candida* species in the mucosa membrane of the genital tract in the female (Abebaw, 2018). The present results revealed that 53% of the study participants have been diagnosed for *Candida* sp. Growth, while 47% of them were yet to be diagnosed. In Sana'a, Yemen, Abdul-Aziz *et al.,* (2020) revealed that 37.6% was positive for vaginal infections among reproductive-age women. Also, Al-mamari *et al.,* (2014) in Sana'a, reported that 94% of vaginal samples of patients were positive growth for vulvovaginal candidiasis.

Table 4.1 provides essential information regarding the sociodemographic characteristics of the respondents. The study involved women from various age groups, with the highest representation in the 30-39 age group at 45%. This is followed by the 40-49 age group at 20%. These findings reflect the distribution of age groups within the study population, which is critical for understanding how Candidiasis incidence varies across different life stages. A similar study in Ethiopia by Bitew and Abebaw[14] recorded that the highest rate of vulvo-vaginal candidiasis was among age groups of 22-44 years. The marital status of the participants is divided into single and married, with 75% being married and 25% being single. This distinction allows for the examination of Candidiasis incidence in relation to marital status, which may be influenced by factors such as sexual activity and family life.

Moreover, the study identified various risk factors associated with Candidiasis. Notably, poor hygiene was reported as the most significant risk factor by 51% of the participants. Other factors

such as antibiotic use, diabetes, weakened immune systems, and sexual activity were also acknowledged, albeit with lower percentages. These risk factors are crucial to consider when analyzing the incidence of Candidiasis among different subgroups, as they may vary in their susceptibility based on these factors. The high occurrence of communicable vaginitis among women was due to poor situations of healthcare, absence of health education, lower-income, and difficulty in medical treatment in time (Abbas *et al.,* 2016).

Table 4.2 explores the participants' perceptions regarding the significance of age and marital status in the development of Candidiasis. It is noteworthy that 45% of respondents consider age to be a significant factor in Candidiasis development, while 50% believe that marital status plays a significant role. The mean scores of 3.93 for age and 3.91 for marital status, both exceeding the index mean of 3.0, indicate that, on average, participants perceive these factors as significant. These findings suggest that there is a consensus among the participants that both age and marital status may influence Candidiasis development. This is an important insight that warrants further investigation to understand the potential mechanisms by which age and marital status impact Candidiasis incidence.

Table 4.3 presents the results of a multivariate logistic analysis, exploring the association between Candidiasis and marital status and age. The odds ratio (O.R.) for single women is 3.573, with a 95% confidence interval ranging from 0.27 to 47.74. This suggests that single women may have a higher risk of Candidiasis compared to married women, although the wide confidence interval indicates some uncertainty. Regarding age groups, the analysis reveals varying odds ratios. Women under 20 years have an O.R. of 0.010, with a 95% confidence interval from 0.00 to 0.27. This implies that the risk of Candidiasis is significantly lower in this age group.

However, other age groups show O.R.s that are close to 1, suggesting no significant difference in risk compared to the reference group (40-49 years).

5.2. Conclusion

The research findings presented in this chapter provide a foundation for understanding the incidence of Candidiasis among single and married women of different age groups at UBTH. While the participants in this study have not been diagnosed with Candidiasis, it is crucial to recognize that the condition can go undetected. The participants' perceptions of age and marital status as significant factors in Candidiasis development indicate the need for further research to explore these relationships more comprehensively.

The multivariate logistic analysis suggests that being single may be associated with a higher risk of Candidiasis, and certain age groups may have different risk profiles. These findings open up opportunities for more in-depth investigations into the mechanisms behind these associations and the potential role of other variables. Further research and a larger sample size may help confirm these findings and provide a more nuanced understanding of Candidiasis incidence among women in this specific population.

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APPENDIX

Department of Health, Safety

And Environmental Education,

Faculty of Education,

University of Benin,

Benin City, Edo State.

QUESTIONNAIRE ON THE INCIDENCE OF CANDIDIASIS AMONG SINGLE AND MARRIED WOMEN OF DIFFERENT AGE GROUPS (CASE STUDY, UBTH.)

Dear Respondent,

The undergraduate student of the above named Department and University, conducting a research on "(THE INCIDENCE OF CANDIDIASIS AMONG SINGLE AND MARRIED WOMEN OF DIFFERENT AGE GROUPS (CASE STUDY, UBTH.)"

I'll be grateful if you will please complete the attached questionnaire as objectively as possible as this will enable me arrive at some conclusion. Your response will be treated with utmost confidentiality. Thanks for your co-operation.

Yours Faithfully,

Igbinake Endurance Osasimwin

INTRODUCTION:

Thank you for participating in this research study. Your responses will contribute to our understanding of candidiasis and its prevalence among women of different age groups and marital statuses at UBTH, Edo. Please answer the following questions honestly and to the best of your knowledge.

SECTION 1: PARTICIPANT INFORMATION

1.1. Name (optional):

1.2. Age: _____

- Under 20 years
- 20-29 years
- 30-39 years
- 40-49 years
- 50-59 years
- 60 years and above

1.3. Marital Status:

- Single
- Married

SECTION 2: CANDIDIASIS PREVALENCE

2.1. Have you ever been diagnosed with candidiasis?

- Yes

- No

- Not sure

2.2. If yes, how many times have you been diagnosed with candidiasis in the past year?

_____

SECTION 3: RISK FACTORS

3.1. Please indicate if you have any of the following risk factors associated with candidiasis. You can select multiple options.

- Poor hygiene

- Antibiotic use

- Diabetes

- Pregnancy

- Weakened immune system

- Sexual activity

- Use of birth control methods (e.g., oral contraceptives)

- Other (please specify): _____

SECTION 4: ASSOCIATION BETWEEN CANDIDIASIS, AGE, AND MARITAL STATUS

4.1. Do you think age is a significant factor in the development of candidiasis?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

4.2. Do you think marital status is a significant factor in the development of candidiasis?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

SECTION 5: EXPERIENCES AND PERCEPTIONS

5.1. If you have been diagnosed with candidiasis, please describe your experiences, including symptoms and treatment, in the space below:

[Open-ended response]

5.2. Do you believe that candidiasis affects single and married women differently? If so, please explain how:

[Open-ended response]

5.3. How do you think candidiasis affects women of different age groups? Are there specific challenges or differences you have noticed?

[Open-ended response]

SECTION 6: ADDITIONAL COMMENTS

6.1. Is there anything else you would like to share about candidiasis or your experiences with it?

[Open-ended response]