

Candida albicans VAGINOSIS AMONG PATIENTS IN
LIKAS HOSPITAL KOTA KINABALU
SABAH

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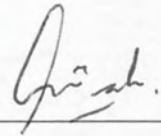
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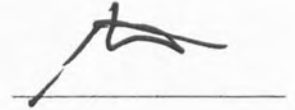


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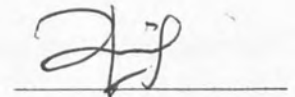
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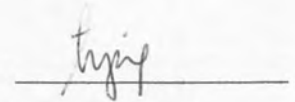
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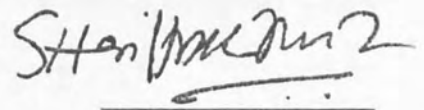
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ABSTRACT

The *Candida albicans* vaginosis is quite common in Sabah, Malaysia. There is a little information on the size of the problem amongst endogenous population. The aim of study was to create awareness, clinical presentation of the *C. albicans* vaginosis in Sabah. This study has also reviewed the pathogenesis, laboratory diagnosis and antibiotic therapy. Over the last 3 months there have been 57 reported cases of *C. albicans* vaginosis in Likas Hospital, Kota Kinabalu. Eighteen (31.6%) Kadazan, 15 (26.3%) were Bajau, 8 (14%) Chinese, 4 (7%) Indonesian, 1 (1.8%) Malay, Indian, Philippines and others 9 (15.8%) respectively were positive to *C. albicans*. The study has not determined any relationship between the *Candida albicans* vaginosis and the predisposing factors like *Diabetes mellitus* and antibiotic therapy. Most of the isolates were sensitive to common antifungal drugs. Further research is needed to determine the true importance of vaginitis in Sabah.



Infeksi *Candida albicans* pada vagina merupakan kes yang biasa ditemui di Sabah, Malaysia. Informasi mengenai permasalahan ini di kalangan populasi tempatan adalah sedikit. Matlamat kajian ini adalah untuk memberikan kesedaran, keadaan klinikal *C. albicans* di Sabah. Kajian ini juga merujuk kepada patogenesis diagnosis makmal dan terapi antibiotik. Dalam tempoh 3 bulan sebanyak 57 kes infeksi *C. albicans* pada vagina yang dilaporkan di Hospital Likas, Kota Kinabalu, Sabah. Seramai 18 (31.6%) adalah Kadazan, 15 (26.3%) adalah Bajau, 8 (14%) adalah Cina, 4 (7%) adalah Indonesia, 1 (1.8%) masing-masing ialah Melayu, India dan Filipina dan 9 (15.8%) lain-lain adalah positif kepada *C. albicans*. Kajian ini tidak menjelaskan sebarang hubungan di antara infeksi *C. albicans* pada vagina dengan faktor-faktor utama seperti *Diabetes mellitus* dan terapi antibiotik. Kebanyakan sampel adalah sensitif kepada ubat anti-kulat. Kajian yang lebih lanjut adalah perlu untuk melihat kepentingan infeksi *C. albicans* pada vagina di Sabah.



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LIST OF ABBREVIATION

AIDS	Acquired Immunodeficiency Syndrome
BiGGY agar	Bismuth Sulphite Glucose Glycine Yeast agar
cfu	colony forming unit
DMSO	Dimethyl Sulphoxide
ECM	Extracelullar Matrix
EPIC	European Prevalence of Infections in Intensive Care
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
MIC	Minimum Inhibitory Concentration
mL	milliliter
NCCLS	National Committee for Clinical Laboratory Standard
O&G	Obstetric and Gyneacology
PAC	Patients Admission Center
5-FC	5 Fluorocytosine
µg	microgram
%	Percent
>	More than
<	Less than
°C	Degree Celsius



CHAPTER 1

INTRODUCTION

1.1 Introduction to *Candida albicans*

Candida albicans a yeast fungus found as the normal flora of the mouth, skin, nail, digestive tract and vagina of perfectly healthy people (Campbell, 1993). It is also known as yeast infection. However, under circumstances and for unknown reason, it may cause severe and fatal infections. It is usually live in a vaginal atmosphere, because pH is acidic here (4.0 - 5.0). *C. albicans* is the most frequent organism that can produce the inflammation in the vaginal region. It is a dimorphic fungus and grows as both pseudomycelium and yeast (Griffin, 1994).

C. albicans has been reported as one of the 28,600 species of ascomycetes, or sac fungi, it has 150 species of *Candida*, and there are 80 known toxic poisons released by *Candida* spp in human body (Micheal *et al.*, 2003). There are three main predisposing factors that may put a woman at risk for *C. albicans* infection; 1) Pregnancy, 2) *Diabetes mellitus* and 3) antibiotic therapy. The infection of *C. albicans* is more common due to the effect of pregnancy hormones on the vaginal environment. If *Candida* infections are left untreated, they can lead to



that are lethal. The pH change in diabetes patient may result the rapid growth of *Candida* (Buffo *et al.*, 1984). Diets high in sugars also help *Candida* flourish. “Friendly Bacteria” (probiotic flora) and *Candida Albicans* compete for space in human body to live. When the “friendly bacteria” was killed off in intestines (antibiotic therapy), *Candida* has an opportunity to take hold and start growing (Lim, 1998).

Taxonomy of *Candida albicans* (Van Rij, 1987)

Phylum: Ascomycota

Order: Saccharomycetales

Family: Saccharomycetaceae

Genus: *Candida*

Species: *Candida albicans*

1.2 *Candida albicans* as a normal microflora

Normal microflora can be defined as the microbial population, which resides in humans, which is both persistent and stable, and does not elicit an acute immune response in normal circumstances. Normal microflora is also the term used to describe the various bacteria and fungi that are permanent residents of certain body sites, especially the skin, oropharynx, colon, and vagina (Ryan *et al.*, 2004). The members of the normal microflora extensively populate many areas of the body. The yeast *C. albicans* is a member of the normal flora but can cause disease when host defenses are impaired. Diabetes, overload of antibiotics, and pregnancy are some of



the predisposing factors (English, 1980). *C. albicans* is frequently present as part of the microflora of the gastrointestinal tract or the oropharynx in the normal human host. Between 10 to 40% of healthy people carry yeasts in throat and gut in low concentration of $3/4 \times 10^3$ cfu/ml of saliva or gram of faeces.

In healthy people, *C. albicans* is unable to multiply rapidly and does not cause problems. It competes with other members of the flora for available nutrients. Without competition, *C. albicans* proliferates and causes inflammation of the vagina, which is characterized by thick discharge with the consistency of cottage cheese (Lim, 1998). The vaginal flora of adult women consists primarily of *Lactobacillus* spp. *Lactobacilli* are especially prominent among the members of normal microflora in maintaining low population of yeast and responsible for producing the acid that keeps the pH of the adult women's vagina low. Before puberty and after menopause, when estrogen levels are low, *Lactobacilli* are rare and the vaginal pH is high (Cowan *et al.*, 2006). *Lactobacilli* appear to prevent the growth of potential pathogens, since their suppression by antibiotics can lead to overgrowth by *C. albicans* (Figure 1.1). Overgrowth of this yeast can result in *Candida* vaginitis.



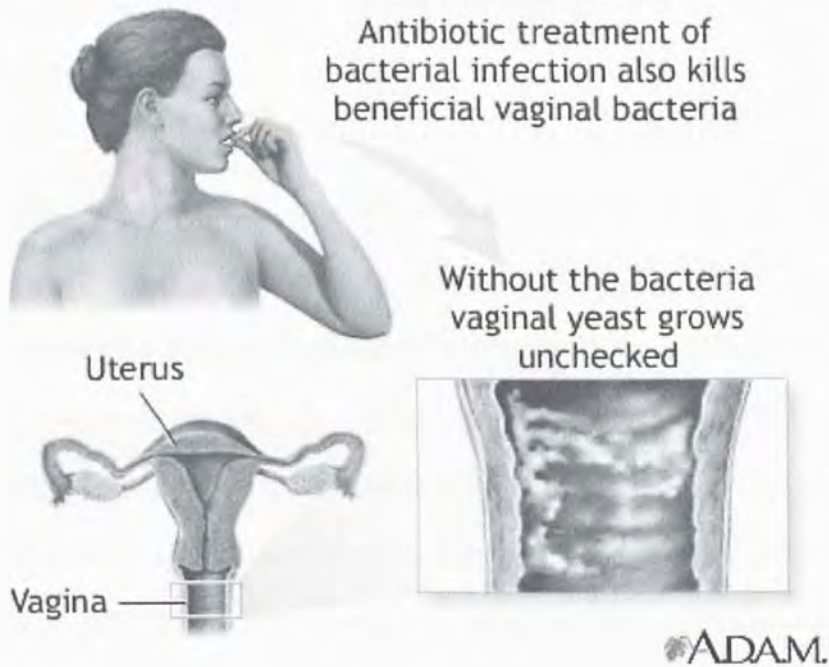


Figure 1.1 Antibiotic therapy as a predisposing factor (Source: Secondary infection image)

1.3 Aim of study

C. albicans infection has been recognized for the last 150 years. There is little information on *C. albicans* vaginosis in Sabah, Malaysia. There is clear need for such study in Sabah. The study is to provide information on prophylactic and treatment methods can be used in the local population.

1.4 Study objectives

There are four objectives in this study;

1.4.1 To study *Candida albicans* Vaginosis amongst patients in Likas Hospital, Kota Kinabalu

Candida albicans vaginitis is not life-threatening, but it can be uncomfortable and frustrating. Yeasts are microscopic fungi consisting of single cells which reproduce by budding. Between 85% and 90% of yeasts isolated from the vagina are strains of *C. albicans*. Hospital Likas, Kota Kinabalu was chosen as the case study. Clinical samples of high vaginal swabs were taken from 155 patients and cultured for diagnosis. A positive culture on media with specific colony appearance considered as a positive to *C. albicans*. Microscopic examination is important as it enables a presumptive diagnosis to be made in the laboratory.

1.4.2 Isolation of *Candida albicans* from the clinical specimens.

Various enrichment and selective culturing methods are available to help isolate clinical specimens that either enhances the growth of some organisms or inhibit the growth of other organisms. Differential media contain various nutrients that allow the investigator to distinguish one organism from another by how they metabolize (Johnson, 1995). *C. albicans* has a strong ability to reduce a bismuthyl hydroxy polysulphite. BiGGY agar containing bismuth-sulphite confers a high degree of selectivity to the medium and most strains of bacteria are inhibited on BiGGY agar (Oxoid, 1982). Selective media contain chemicals that prevent the growth of unwanted bacteria without inhibiting the growth of the desired organism. Sabouraud's

Dextrose agar containing antibiotics is often used to isolate pathogenic fungi such as *C. albicans*.

1.4.3. Antifungal susceptibility pattern of the isolates

The antifungal sensitivity test is to define those minimal amounts of antibiotics which will either inhibit the growth of microorganisms or destroy it in vitro. Four antifungal agents are used in this test to define the most effective antibiotic for treatment of *C. albicans* infection: Nystatin, Amphotericin-B, 5-fluorocytosine (5-FC) and Itraconazole. Nystatin, Amphotericin-B and 5-fluorocytosine (5-FC) are now available in the United States for treatment of serious or systemic mycotic infections in man (Shadomy *et al.*, 1973). The tube dilution method is used for antifungal sensitivity test of the isolates.

1.4.4. To determine the demographic social factors associated with *Candidiasis*.

All patients suspected of *C. albicans* infection have their information recorded in study protocol pertaining to their biodata, clinical features and other details. However, we were focused on age and ethnic only. The study protocol was filled by the medical staff and researcher.



CHAPTER 2

LITERATURE REVIEW

2.1 *Candida albicans* as a pathogen

Candida albicans is oval yeast like fungus causative agent of *Candidiasis*. The fungus producing both blastospores and pseudomycelium in tissue and exudates, and in culture at room temperature and at 37°C. Lagenbeck in 1839, demonstrated in thrush, the presence of a yeastlike, budding fungus, which Robin (1853), named *Oidium albicans*. Berhout established the genus *Candida* in 1923, and now the several species can be identified by standard laboratory methods. *C. albicans* has been considered the only pathogenic member of the genus. However, other species are being isolated with increasing frequency from variety of lesions in man.

In women, a pruitus vulva is a dominant symptom. Vaginal discharge is present in varying degree. Many women have only one or occasional isolated episodes. Recurrent *Candidiasis* (four or more symptomatic episodes annually) occurs in up to 5% of healthy women of reproductive age. *C. albicans* is the most common human fungal pathogen. It is frequently associated with oral *Candidiasis*, in



Human Immunodeficiency Virus (HIV) – infected individuals. Healthy people may acquire superficial infections of the skin and mucous membranes, which is more a nuisance than a dangerous infection. However, in immunocompromised individuals, e.g. patients on chemotherapy, after organ transplantations or patients with Acquired Immunodeficiency Syndrome (AIDS) may acquire fatal systemic infections (Odds, 1988).

The vaginal infection occurs predominantly in reproductive age women. The main symptoms produced by a *Candida* yeast vaginitis are vaginal and/or vulvar itching (pruritus), or even a vulvar burning sensation. There is a cheese-like (caseous) white-to-white yellow discharge. In addition, there can be swelling of the perineum or redness (erythematic). The discharge is not watery and usually not odorous. Symptoms build up over 1-3 days. Vaginal infections caused by the opportunistic yeast *C.albicans* are a significant problem in women of childbearing age. Vaginal yeast infections occur when the normal bacterial flora of the vagina is disturbed. They are characterized by a thick discharge with the consistency of cottage cheese. In malignancies, long-term and high-density colonization has been shown to lead to *Candidemia* (presence of *C. albicans* in the blood stream). International records show the incidence of *Candida* spp, in the vagina to be 35%, in the sputum to be up to 77% and the gut to be 85% (Howard, 1983).

To cause an invasive infection, *Candida* usually penetrates mucosal barriers to enter the bloodstream. Many factors common to Intensive Care Unit (ICU) patients may damage the integrity of the gastrointestinal mucosa. Most systemic infections



with *C. albicans* are caused by translocation of endogenous organisms. However, apparent outbreaks of infection have been reported, raising the possibility of horizontal transmission.

2.2 Pathogenesis and virulence in *Candidiasis*

Candida albicans grows in multiple morphologic forms, most often as yeast with budding by formation of blastoconidia (Ryan *et al.*, 2004). *C. albicans* also able to form hyphae triggered by changes in condition such as temperature, pH, and available proteins. In their initial stages when still attached to the yeast cell, these hyphae look like sprouts and are called germ tubes. Other elongated forms with constrictions at intervals are called pseudohyphae because they lack the parallel walls and septation of the true hyphae.

The *C. albicans* cell wall is made up of a mixture of the polysaccharides mannan, glucan, and chitin alone or in complexes with protein (Ryan *et al.*, 2004). A fibrillar outer layer extending to the surface contains a number of distinct mannoproteins. The exact composition of the cell wall and surface components varies under different growth and morphologic conditions. *C. albicans* is regularly present in mucosal surfaces, disease implies a change in the organism, the host, or both. The change from the yeast to the hyphal form is strongly associated with enhanced pathogenic potential of *C. albicans*. In histological preparations, hyphae are seen only when *Candida* starts to invade, either superficial or in deep tissues. This switch can be controlled in vitro by the manipulation of environmental conditions, but it is not known what triggers the change in human disease. What is known is that the



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