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EVALUATION OF *CANDIDA ALBICANS* AND ITS ASSOCIATED RISK FACTORS AMONG MARRIED WOMEN OF REPRODUCTIVE AGE IN ZAKHO CITY, KURDISTAN REGION, IRAQ

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ABSTRACT

Background: Candida vaginitis is a major fungal infection of the female genital tract ranging from mucosal to systemic infection. *Candida species* has remained a major public health issue affecting women globally.

Objectives: The aim of this study was to evaluate the prevalence of *Candida albicans* and its associated risk factors among married women with signs and symptoms of vaginitis referring to Obstetrics and Gynecological Hospital at Zakho City, Iraq.

Methods: Vaginal samples were collected from 150 symptomatic women aged 18-48 years from October 2021-to April 2022 using two sterile cotton swabs. Wet mount was initially performed from first swab for the presence of budding yeast cells, and pseudo-hyphae of *Candida* infection. The second collected swabs were cultured on Sabouraud dextrose agar and incubated at 35°C for 24-48 hrs. *C. albicans* was then detected using morphologic characteristics of the colony. Candida colonies were finally confirmed by germ tube test.

Results: Overall, 58 (38.67%) *C. albicans* were diagnosed. The highest rate of infection was reported in the age group of 31-40 years (45%) and non-educated people (37%), but statistically not significant (p>0.05). *C. albicans* was also higher in women who used pills as a contraceptive (45.45%) than other types of contraceptives. Women who had low number of births were significantly associated with *C. albicans* (OR; 1.01, 95% CI; 0.94-1.26, p=028). *C. albicans* was also significantly associated among symptomatic patients with vaginal itching (67.19%) (OR; 9.69, 95% CI; 4.52-20.79, p=0.001) and vaginal pH level > 4.5 (OR; 0.39, 95% CI; 0.19-0.82, p=0.001). *C. albicans* was also significantly higher among participants who had whitish vaginal discharges (96.67%) (OR; 8.0, 95%CI, 3.8-16.85, p=0.001), and yellow-green vaginal discharges (58.62%) (OR; 0.12, 95% CI; 0.01-0.93, p=0.007).

Conclusions: *C. albicans* is a relatively common gynaecological problem among married women in our region. *C. albicans* is significantly higher among child bearing age women who had vaginal discharges and itching in our study. These results call for preventive measures to protect women against Candidiasis. Therefore, public health education and campaign should be implemented.

KEYWORDS: *Candida albicans*, Risk Factors, Reproductive Age Women, Zakho City, Iraq.

INTRODUCTION

Vaginal candidiasis is one of the major fungal infections of the mucosa of lower female genital tract at the reproductive age of 20 - 40 years, worldwide (Rasti et al., 2014). It causes inflammation of the vagina (vaginitis), after bacterial vaginosis, which is usually characterized by vaginal itching, a thick white abnormal vaginal discharge, burning, smelly, and inflammation and redness of the vulva (Hainer and Gibson, 2011). It is known that approximately 85 to 95% of yeast strains isolated from the vagina are *C. albicans* strains (Jang et al., 2019). Non- *C. albicans* isolates, particularly *Candida glabrata*, infect approximately 10% to 30% of females in different parts of the world (Sobel et al., 2011). The prevalence of Vulvovaginal candidiasis (VVC) caused by non- *C. albicans* species has been suggested to be increasing (Jang et al., 2019). VVC is highly prevalent among women with diabetes or after using antibiotics for a long period (Abdul-Aziz et al., 2019). Vaginal candidiasis is characterized as uncomplicated or complicated based on the clinical presentations and antifungal response (Hainer and Gibson, 2011). The most common cause of uncomplicated vaginal candidiasis is *C. albicans*, which causes mild to severe symptoms of vaginitis. However, non-albicans Candida species produce complex vaginal candidiasis, which is more common in immunocompromised patients and pregnant women (Kalaiarasan et al., 2017). It is previously reported that about 75% of all women suffer from at least one attack of *C. albicans* during their lifetime and roughly half of them suffer from vaginitis many times (Yuan et al., 2021). Depending on the locality, age, and socioeconomic status; the rate of vaginal yeast isolates among women has been revealed between 5 to 48.4% and *C. albicans* was the dominant isolated species (51.37%) (Anh et al., 2021). Another study conducted in Nigeria reported that the prevalence of *C. albicans* was around 41% (Enweani et al., 2001). Another recent study conducted at Maternity Hospital in Erbil City; Iraq found that the prevalence of vulvovaginal candidiasis using culture was 54.66%. The highest number of positive cases 71 (63.4%) was found among the age group of 30 –34 years (Shekhany, 2021)

The absolute diagnosis of *C. albicans* depends on the clinical manifestations is difficult due to mixed with other infections affecting vaginal, including Bacterial vaginosis, *Neisseria gonorrhoea* and *Trichomonas vaginalis*. Thus, mycological examinations of vaginal discharges are critical for the initial diagnosis of infection and detection of definitive causative agents (Anderson et al., 2004).

It is important to note that *Candida* spp. have fundamental resistance to several antifungal drugs (ElFeky et al., 2016). These

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problems in addition to exerting psychological adverse effects in the treatment of C. albicans in women, can increase the probability of infertility, pelvic abscess, pelvic inflammatory disease, and also during pregnancy they may lead to premature infant birth, abortion, postpartum infections, and systemic inflammation (Hedayati et al., 2015). Several studies have been conducted on the major causes of abortion and miscarriage among pregnant women in our region (Naqid et al., 2020a, Naqid et al., 2020b, Naqid et al., 2019, Haydar and Naqid, 2022) but no study has been done yet on *C. albicans*. Due to the lack of sufficient information in terms of the prevalence rate of different kinds of VVC and the type of causative species especially *C. albicans* in Zakho City, therefore, the aim of this study was to evaluate the prevalence of *C. albicans* and associated risk factors in women with signs and symptoms of vaginitis referring to Obstetrics and Gynaecological Hospital at Zakho City, Iraq.

MATERIALS AND METHODS

2.1 Study design and subjects

The current study was conducted as a cross-sectional study among married women attending Obstetrics and Gynaecological Hospital at Zakho City, Kurdistan Region-Iraq. From October 2021-to April 2022, 150 symptomatic married women with vaginal discharge and itching was collected and analysed for Candidiasis. The participants ages ranged from 18 to 48 years old

2.2 Study tool and sampling technique

Data was collected from each patient using a designed structured questionnaire such as sociodemographic, and clinical characteristics of participants. Demographic characteristics such as age, educational levels, residence, smoking, contraceptives use, past medical history and recurrent infection were recorded. Clinical characteristics of patients including vaginal discharges, and pH of vagina were also reported. Women suffered from vaginal discharge, painful intercourse, vaginal itching or painful urination were regarded as symptomatic.

2.3 Ethics

The study procedure and protocol were approved by the ethical committee of the Shekhan Technical College of Health, Duhok Polytechnic University, Iraq. The study protocol was also approved by the Duhok Governorate's Research Ethical Committee (Reference number: 15092021-9-4). Informed consent was acquired from each participant before the collection of data.

2.4 Criteria

The inclusion criteria were married women who presented with clinical features of the diseases and agreed to participate in this study and the exclusion criteria were unmarried women, not agreed to participate, and older than 48 years old

2.5 Genital swab collection and processing

Aseptically, vaginal discharge swabs were collected by a physician from the cervix and high vaginal swabs (HVS) using two sterile cotton swabs, and a speculum. Firstly, the endocervix was cleaned with a cotton swab to remove mucous and blood. Secondly, another cotton swab was inserted at a distance of 2-3 cm into the endocervix and rotated for 5–10 seconds to allow exudates to be absorbed.

2.6 Diagnosis of *Candida albicans*

Abnormal vaginal discharge and pH of vaginal <4.5 were characteristics of candidiasis. 10% KOH Wet mount was performed from one swab on the clean slide and examined microscopically. The slide was then incubated for 5 to 15 min at 37°C and then microscopically examined for the seen of budding yeast cells, and pseudo-hyphae suggested by *Candida* infection (Emeribe et al., 2015).

For characterisation of colony morphology, the second swab was directly inoculated on the Sabouraud dextrose agar (NEOGEN-USA) by streaking the cotton swab on the plate and then incubated aerobically at 37 °C (24-48 hrs. Suggestive *C. albicans* colonies were further confirmed by the germ tube test (Fajoyomi Bridget et al., 2022). For this purpose, 3 colonies were mixed with 0.5 ml of human serum in a test tube and incubated for 3hrs at 37 °C. Light microscopic (Olympus, Japan) examination was done under oil immersion (100X).

2.7 Statistic

GraphPad Prism version 8 was used for the statistical analysis. The significant association between variables was reported using descriptive information and expressed as number (%). Univariate logistic regression analysis was used to analysis the relationship between Candidiasis and their risk factors according to demographic and clinical characteristics. Odds ratios (ORs) and 95% confidence intervals (CIs) were also assessed. p value < 0.05 is considered significant.

RESULTS

3.1 Patients' characteristics

The demographic characteristic of 150 married women participated in the current study presented in Table 1. The average age of recruited subjects was 32.64 years (±8.01 SD). The majority of the age group of participants was in 31-40 years 60 (40%), followed by 21-30 years old 49 (32.7%) (Table 1). The highest percentage rate of studied participants was uneducated 64 (42.7%) and about 104 (69.3%) of the study subjects lived in the urban area. Nearly 80 (53%) of participants used contraceptives and 70 (46.6%) not used any type of contraceptive. Other characteristics of participant were presented in Table 1.

3.2 Morphology characteristics of *C. albican*

The colony morphology of *C. albicans* on Sabouraud dextrose agar appeared as a creamy, pasty colony, and was smooth after incubation for 24-48 hours at 37°C (Figure 1-A). The results of 10% KOH wet mount preparation showed hyphae with yeast cells, pseudo-hyphae and budding yeast cells (Figure 1-B). In the germ tube test, *C. albican* germ tube observed as a long tube-like projection extending from the yeast cells with no constriction (Figure 2).

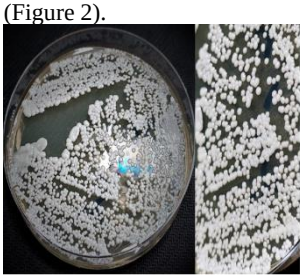

Figure 1-A: Creamy white smooth Colonies of *C. albicans* on Sabouraud dextrose ager

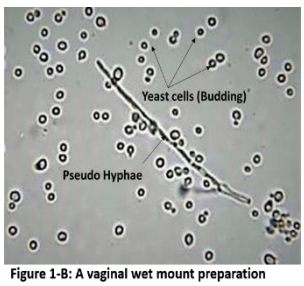

Figure 1-B: A vaginal wet mount preparation shows a positive result of *C. albicans*

Figure 2: Germ tube test shows a positive *C. albicans*. A: Under magnify 40X and B: Under Oil immersion 100X).

Table 1: Demographic characteristics of subjects

Characteristics	Number (n=150)	Percent (%)
Age (Year)		
<20	12	8
21–30	49	32.7
31-40	60	40
>40	29	19.3
Level of education		
Uneducated	64	42.7
Primary and secondary	41	27.3
High school	27	18
Higher education	18	12
Residence		
Urban	104	69.3
Rural	46	30.7
Smoking		
Yes	8	5.3
No	142	94.7
Number of Birth		
0	24	16
1-4	87	58
> 4	39	26
Contraceptive Use		
Yes	80	53.3
No	70	46.7
Contraceptive Types		
Intrauterine Device	9	6
Pills	22	14.7
Condom	16	10.7
Natural	33	22
None	70	46.6
Past medical history		
Yes	95	63.3
No	55	36.7
History recurrent infection		
Yes	37	24.7
No	113	75.3

3.3 Prevalence of *C. albicans* and risk factors

The overall rate of infection among married women was 58/150 (38.67%). Univariate logistic analysis was applied to study the relationship between risk factors and demographic characteristics (Table 2). The highest prevalence of *C. albicans* was found in ages groups of 31-40 years old (40%), but there was no significant difference between different age groups (OR; 1.01, 95%CI ;0.96-1.05, p=0.59) (Table 2). The highest rate of infection was reported among higher education level (59%) followed by uneducated people 24 (37.5%) but not significantly associated (OR; 1.11, 95% CI; 0.81-1.53, p=0.48). The highest prevalence of infection was reported among participants who lived in urban area (39.43%), but the difference was also not significant (OR; 0.91, 95% CI; 0.44-1.84, p=0.77). *C. albicans* was higher among married women who used pills as a contraceptive 10 (45.45%) as compared to other types of contraceptives, but the difference was also not significantly associated (OR; 0.92, 95% CI; 0.72-1.16, p = 0.46) (Table 2). Additionally, past medical history (OR; 0.81, 95% CI; 0.41-1.6, p=0.46) and history of recurrent infection (OR; 2.02, 95% CI; 0.94-4.24, p =0.07) were not significantly associated with *C. albicans* (Table 2). On the other hand, we only found that the women who experienced a low number of births were significantly associated with *C. albicans* (OR; 1.01, 95% CI; 0.94-1.26, p=0.28).

Table 2: Univariate logistic regression analysis used for the evaluation of risk factors associated *C. albicans* among married women

Variable	*Candida albicans n (%)*		Univariate logistic analysis	
	Negative	Positive	OR (95% CI)	*p value*
Age (Year)				
<20	8 (66.67)	4 (33.33)	1.01 (0.96-1.05)	0.59
21–30	33 (67.34)	16 (32.66)		
31-40	33 (55)	27 (45)		
>40	18 (62.07)	11 (37.93)		
Level of education				
Uneducated	40 (62.5)	24 (37.5)	1.11 (0.81-1.53)	0.48
Primary and secondary	26 (63.41)	15 (36.59)		
High school	17 (62.96)	10 (37.04)		
Higher education	9 (50)	9 (50)		
Residence				
Urban	63 (60.57)	41 (39.43)	0.91 (0.44-1.84)	0.77
Rural	29 (63.04)	17 (36.96)		
Smoking				
Yes	5 (62.5)	3 (37.5)	0.94 (0.22-4.13)	0.94
No	87 (61.27)	55 (38.73)		
Number of Birth				
0	11 (45.83)	13 (54.17)	1.01 (0.94-1.26)	0.028
1-4	50 (57.47)	36 (41.38)		
> 4	31 (79.48)	9 (23.08)		

Contraceptive Use				
Yes	52 (65)	28 (35)	0.72 (0.37-1.38)	0.32
No	40 (57.14)	30 (42.86)		
Contraceptive Types				
Intrauterine Device	5 (55.56)	4 (44.44)	0.92 (0.72-1.16)	0.46
Pills	12 (54.54)	10 (45.45)		
Condom	10 (62.5)	6 (37.5)		
Natural	21 (63.63)	12 (36.36)		
Nonusers	44 (62.85)	26 (37.14)		
Past medical history				
Yes	60 (63.16)	35 (36.84)	0.81 (0.41-1.6)	0.54
No	32 (58.18)	23 (41.82)		
History of recurrent infection				
Yes	19 (51.35)	18 (48.65)	2.02 (0.94-4.24)	0.07
No	74 (65.49)	39 (34.51)		

3.4 Relationship between *C. albicans* and clinical characteristics of participants

The relationship between *C. albicans* and clinical characteristics of participant is presented in (Table 3). The prevalence of *C. albicans* was significantly higher among women who had a vaginal itching 43 (67.19%) (OR; 9.69, 95% CI; 4.52-20.79, p=0.001). However, the prevalence of infection among other clinical characteristics was painful urination 21 (42.86%), genital ulcer 19 (39.58%), lower abdomen pain 30 (37.5%), abnormal discharge 27 (36.99%), painful intercourse 37 (34.58%), and bleeding in the urine 9 (32.14%), but without any significant relationship (Table 3). In terms of vaginal discharges, *C. albicans* was not significantly higher among participants who had whitish vaginal discharges 58 (96.67%) (OR; 8.0, 95%CI, 3.8-16.85, p=0.001), colourless 1 (4%) (OR; 0.05, 95%CI, 0.006-0.37, p=0.001), and yellow-green discharge 17 (58.62%) (OR; 0.12, 95% CI; 0.01-0.93, p=0.007) (Table 3). Although vaginal pH levels of more than 4.5 was 14 (25.45%) and statistically significant (OR; 0.39, 95% CI; 0.19-0.82, p=0.001). Other abnormal vaginal discharges of participants had no significant influence as presented in (Table 3).

Table 3: Relationship between *C. albicans* and clinical characteristics of patients using univariate logistic analysis

	Candida albicans n (%)		Univariate logistic analysis	
Variables	Negative	Positive	OR (95% CI)	*p value*
Abnormal discharge				
Yes	46 (63.01)	27 (36.99)	0.87(0.45-1.68)	0.68
No	46 (59.74)	31 (40.26)		
Painful urination				
Yes	28 (57.14)	21 (42.86)	1.29 (0.65 -2.61)	0.46
No	64 (63.37)	37 (36.63)		
Vaginal Itching				
Yes	21 (32.81)	43 (67.19)	9.69 (4.52-20.79)	0.001
No	71 (82.56)	15 (17.44)		
Lower abdomen pain				
Yes	50 (62.5)	30 (37.5)	0.9 (0.46-1.74)	0.75
No	42 (60)	28 (40)		
Genital ulcer				
Yes	29 (60.42)	19 (39.58)	1.06 (0.52-2.14)	0.87
No	63 (61.76)	39 (38.24)		
Painful intercourse				
Yes	70 (65.42)	37 (34.58)	0.55 (0.27-1.13)	0.11
No	22 (51.16)	21 (48.84)		
Bleeding in urine				
Yes	19 (67.86)	9 (32.14)	0.57 (0.23-1.41)	0.21
No	72 (59.02)	50 (40.98)		
Colour of vaginal discharge				

Yellow-Green				
Yes	12 (41.38)	17 (58.62)	0.12 (0.01-0.93)	0.007
No	80 (66.12)	41 (33.88)		
Red/brown				
Yes	10 (100)	0 (0)	2.19 (0.47-10.2)	0.001
No	82 (58.57)	58 (41.43)		
Gray				
Yes	17 (70.83)	7 (19.17)	0.61 (0.23-1.56)	0.28
No	75 (59.52)	51 (40.48)		
Whitish				
Yes	2 (3.33)	58 (96.67)	8.0 (3.8-16.85)	0.001
No	90 (100)	0 (0)		
Colourless				
Yes	24 (96)	1 (4)	0.05 (0.006-0.37)	0.001
No	68 (54.4)	57 (45.6)		
Vaginal pH level				
<4.5	49 (51.58)	46 (48.42)	0.39 (0.19-0.82)	0.01
>4.5	41 (74.55)	14 (25.45)		

OR; Odd ratio, CI; Confidence Interval; P value <0.005 is considered statistically significant

DISCUSSION

Vaginal candidiasis is a common fungal infection of female genital tract caused largely by *C. albicans*, which can influence a large number of healthy women of reproductive age. It is previously reported that roughly three - quarters of all women suffer from at least one episode of this infection during their lifetime and half of them suffer from vaginitis several times during their life (Yuan et al., 2021). The aims of present study were to evaluate the frequency of *C. albicans* and associated risk factors among married women of reproductive age.

Worldwide, there is a variation in the distribution of *Candida spp*. identified from vaginal swabs and depends largely on the location as well as the population studied. The frequency rate of Candidiasis reported by several studies was 16.5%, and 19% (Aring et al., 2013). The prevalence rate of infection in the present study was 38.67% using culture. This relatively higher frequency of *C. albicans* infection among married women could be highly attributed to poor personal hygiene, inadequate knowledge, and abnormal levels of estrogen and corticoids (Fernández Limia et al., 2004). Similar to our study, a study conducted in Iraq reported that the rate of Candidiasis was 38% of the studied groups (Al-Obadi and Al-Abidi, 2000). A very recent study performed among women at Duhok province, Iraq, found a higher infection rate of *C. albicans* (47%) based on PCR detection than our results (Oufi et al., 2022).

The frequency of infection in our study is also higher than the rates reported in Indian (20.4%) (Ahmad and Khan, 2009), and Turkish (16%) (Ozcan et al., 2006). However, another study conducted in North-West Nigeria reported a very high prevalence of vaginal candidiasis (84.5%) (Ugwa, 2015). This difference could be due to the population size of each district, the health status of women, the socioeconomic status of participants, and personal hygiene. This variation may also be due to inaccuracy in the detection of pathogens, sensitivity of diagnostic tests in different laboratories, ethnic groups and cultures, incomplete course of therapy, drug resistance, and inappropriate health habits (Ahmad and Khan, 2009).

Generally, the frequency of *C. albicans* among the women depends on age, level of education, pregnancy status, uses of contraceptive and any other risk factors for its transmission of infection. In the present study, *C. albicans* infection were observed frequently in the age reproductive group 31-40 years (45%) and the least among those less than 20 years (33.33%), however, no age-group was absolutely free of vaginal candidiasis. This high frequency of infection in this age group may be due to an increase sexual activity, physiological and hormonal changes, vaginal flora changes, higher vaginal discharges, poor personal hygiene, the use of drug abuse and contraceptives among this age-group (Arfiputri et al., 2018). Our findings are similar to the study of Alo et al. (2012), who found a higher rate of *C. albicans* (33.33%) within age group of 36-40 years, while the lowest prevalence reported between 20-25 years (20.42%). A study conducted in Iraq found a higher incidence rate of vaginal candidiasis among female age group 16-28 years (Abdulla et al., 2001). Another study conducted in Iran also reported similar results, the highest rate of Candia infection was observed in patients with <40 years old, while patients aged >40 years old had the lowest rate of infection (Kiasat et al., 2019). Several studies explained the factors that are responsible for the low percentage of candidiasis infection in aged women, these may be due to reducing the effect of estrogen hormone, reaching menopause, less or no sexual activity, no contraceptive use, and also good vaginal immunity because they have low estrogen and corticoids (Menza et al., 2013). We also found the highest prevalence of *C. albicans* among higher education qualification (50%) followed by uneducated people (37.5%), but there was no significant difference between different levels of education (p=0.48). Likewise, possible explanations for the difference in infection rates between illiterates and those with a higher level of education include improvements in personal hygiene and economic standing. On the other hand, the obtained results revealed that the high frequency of *C. albicans* was reported among women who had low number of birth and significantly associated with it (p=0.028). This difference would be partially due to the number of samples recruited in the present study. More studies are needed to recruit a larger number of samples to explore this area.

We also found a higher occurrence of infection among married women who used oral contraceptive pills (45.45%), but the difference was also not significantly associated (p = 0.46). The IUCD users reported 44.44% isolation of *C. albicans* in our study. This could be due to local changes and secretions resulting

from foreign subject presence in the vagina. Similarly, a study conducted in Bangladesh found that the highest prevalence of vaginal candidiasis was reported in oral contraceptive pills (OCP) (85.7%) patients (Yusuf et al., 2007). This was followed by injectables (12.2%) and intra-uterine contraceptive device (IUCD) (2.1%), users. There was a clear significant association between the type of contraceptive used and the occurrence of Candida vaginal infections (p=0.002) (Yusuf et al., 2007). Previously, estrogen and progesterone hormones have been suggested to be present in oral contraceptives, which could increase glycogen levels in the vagina and increase lactobacilli activities Candida (Enweani et al., 2001). It is well known that lactobacilli play an important role to convert glycogen into lactic acid thus decreasing vaginal pH. Subsequently, the decreased pH reduces the bacterial biota activities which is favours for the growth of yeast of Candida (Enweani et al., 2001).

In our study, it was also found accounted around 37 % of *C. albicans* do not use contraceptives. This result explored that there may be other causes of the high occurrence of vaginal infections in women rather than contraceptive use. It might also be ascribed to the predisposition to sexual behavioural activity. This is adapted to another study suggesting that natural factors predispose to Candida infections (Yusuf et al., 2007). In our study, the illiteracy and poor practice in personal hygiene may partially explain this high prevalence of candida among women. Additionally, we also reported a higher rate of *C. albicans* among women who had recurrent infection (48.65%), but was not significantly associated (p=0.07) and used antimicrobial therapy for a long time (36.84%). This result was in conformity with the fact that prolonged antibacterial used for recurrent infections usually affects the population of vaginal microflora and biochemical activity, which therefore increases the pH of the vagina as a result of decreased CO_2 production. This characteristic together with hormonal factors could promotes overgrowth of *Candida*, which lead to vaginitis (Bauters et al., 2002). Although overusing antibiotics has been proposed as one of the significant factors contributing to the increasing in the prevalence rate of Candia. Therefore, for efficient preventive control of candidiasis among women, it is recommended first to identify the *Candida* spp. alongside clinical symptoms before starting treatment of this infection.

As the vulva is involved in *C. albicans* infection, this disease is usually accompanied by vaginal itching, burning, and erythema of the vagina and vulva, which are regarded as a major clinical manifestation of Candida vaginitis. In the current study, there was a significant relationship between vaginal itching and the frequency of *C. albicans* (p=0.001). The invasion of epithelial cells in the female reproductive tract by Candida may cause causes widespread inflammation and itching due to the release of enzymes or toxins that are important for the pathogenesis of Candida (Ilkit and Guzel, 2011). However, the rate of infection among other clinical characteristics was not significantly associated (p>0.05). The typical *C. albicans* signs such as whitish discharges, and yellow green discharges, pH>4.5 were significantly related to *C. albicans* infection. A similar study conducted in Iran reported that vaginal itching as the most common symptom in Candida infection (Hedayati et al., 2015). However, same study reported that cheesy discharge and erythema were not significantly associated to Candida Vaginalis (Hedayati et al., 2015). This variation of results may be related to higher sexual activity, hormonal and physiological changes, health habits and vaginal flora changes.

The value of the present study lies in the samples collected from married women who suffered from vaginitis and treated many times without any responses. Our study also found the major risk factors associated with *C. albicans* and this will help physician to manage the case infected with this fungus. Our study has some limitations or weakness which include the lower number of samples recruited in the present study, which may reduce the evaluation of number size and may indirectly influence the statistical analysis of significance. Secondly, the lack of screening for other species of *Candida* in women and the lack of facility of molecular techniques for the detection of candida. Another limitation of study Finally, the lack of using molecular diagnosis by sequencing the ITS region of rDNA or using Candida chromogenic agar to confirm the isolates.

CONCLUSION

The results of our study showed a relatively higher occurrence of *C. albicans* in married women in our area. *C. albicans* is one of the common causes of vaginal discharge and itching among childbearing age women in our study and this could be a problem for health among this age in the area. A high frequency of infection was also reported among women who use oral contraceptive and intrauterine contraceptive device. Findings of this study highlight the importance of the different risk factors that play an essential role in *C. albicans* infection. These results call for preventive measures to protect women against vaginal candidiasis. Further study is required to investigate more about risk factors for *C. albicans* infection in order to improve the health condition of women. Therefore, public health education and campaign should be implemented.

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