

## Effectiveness of Nursing Intervention Protocol on Recurrence of Vulvovaginal Candidiasis Infection Associated Pregnancy

Amira Said Fotouh <sup>1</sup>, Mona Ahmed El sheikh <sup>2</sup> and Somya Ouda Abdelmenam <sup>3</sup>

(1) Clinical Instructor in Technical Nursing Institute, Benha University, Egypt, (2) Professor of Maternity and Gynecological Nursing, Ain Shams University, Egypt and (3) Assistant Prof. of Obstetrics and Gynecological Nursing, Faculty of Nursing, Benha University, Egypt.

### Abstract

**Aim of the study:** The study aimed to evaluate the effectiveness of nursing intervention protocol on recurrence of vulvovaginal Candidiasis infection associated pregnancy. **Setting:** This study was conducted in antenatal outpatient clinic at Benha University Hospital **Design:** Quasi experimental study was utilized to fulfill the aim of the study. **Sample:** A group of 300 pregnant women was included by purposive sampling technique; the study subjects randomly assigned into two equal group (control and study) **Tools:** Two tools were used to collect data, Tool I: Structured Interview Questionnaire Sheet to assess general characteristics of women, obstetrical data, predisposing factor of vulvovaginal candidiasis and daily health practice, Tool II: Follow-up Sheet used to follow-up symptoms and signs of vulvovaginal candidiasis and problems associated recurrent vulvovaginal candidiasis. **Results:** The mean score of symptoms and signs of vulvovaginal candidiasis decrease in study group than control group through pregnancy period. Also, there was highly statistical significant differences ( $p < 0.001^{**}$ ) between both groups through follow-up till term. **Conclusion:** The nursing intervention protocol had a significant effect in improving health practices regarding prevention recurrence of vulvovaginal candidiasis during pregnancy. Also, there was decrease in recurrence and severity of vulvovaginal candidiasis episodes among pregnant women in study group through follow-up till term while increase in control group with highly statistical significant differences between both groups. **Recommendation:** Increase awareness of women about healthy practices to prevent recurrence of vulvovaginal candidiasis during pregnancy. Simple illustrated instructions about vulvovaginal candidiasis and healthy practices toward vaginal health should be available for women in obstetrics and gynecology outpatient clinic

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**Key words:** Nursing intervention protocol, Vulvovaginal candidiasis, Pregnancy

### Introduction:

Vulvovaginal Candidiasis (VVC) is a common clinical problem caused by different species of *Candida*, most often *Candida albicans*. Pregnant women are more vulnerable to VVC than healthy women due to physiological changes occur during pregnancy. These changes include high levels of estrogen and progesterone hormones, lowering of immunity of pregnant women

leads to increase glycogen storage in vaginal cells and alteration in vaginal PH. These changes result in congestion and hypertrophy of vaginal mucosa, which allow more growth of anaerobic bacteria and other pathogenic microorganisms within vagina (Dawood & Omar, 2019).

Incidence of vulvovaginal candidiasis have been attributed to a number of factors

including pregnancy, diabetes mellitus, immunosuppressive therapy (cytotoxic drugs, steroids, etc.), prolonged use of broad spectrum antibiotics, oral contraceptives, immunodeficient conditions (HIV, cancer, chronic illness), tight fitting and nylon undergarments, poor personal hygiene and poor dietary habits, Also heat and moisture increase growth of candida species **(Waikhom et al., 2020)**.

Recurrence of vulvovaginal candidiasis is defined by four or more episodes of infection in a year and an estimated 8-10 % of women. vulvovaginal candidiasis is usually characterized by itching in vagina and vulva, cheesy white vaginal discharge, soreness or pain in vagina or vulva, dysuria, dyspareunia and rashes on perineum and thigh may be seen on physical examination. So that VVC require treatment especially during pregnancy **(Almubarak et al., 2020)**.

Vulvovaginal candidiasis in pregnant women poses a great risk of complications, including abortion, premature rupture of membranes, chorioamnionitis, prematurity, low birth weight, and postpartum endometritis, emotional stress, suppression of immune system and poor pregnancy outcome. Also vertical transmission of VVC inducing microorganisms may lead to severe respiratory problems in new born infants. In addition to untreated vaginal candidiasis can lead to subsequent abortion, congenital infection of the neonate and pelvic inflammatory disease (PID) resulting in infertility in non-pregnant women **(Prasad et al., 2021)**.

Health education is one of key components of primary health care and one of most vital health care requirements for women during pregnancy. Health education should be

instituted at ante-natal clinic to raise knowledge and level of awareness of pregnant women toward seeking prompt and appropriate treatment. Nurse as educator provides pregnant women important health topics as diet, personal hygiene, increasing immunity, and way of administration of medication that limit recurrence of VVC and preventive subsequent complication. Despite several antifungal therapies and personal hygiene practices, VVC has remained an important public health problem affecting millions of women worldwide **(Abdelnaem et al., 2019)**.

#### **Significance of the study:**

Vulvovaginal candidiasis is most common mucosal infection of female genital tract associated with significant morbidity. Actual prevalence of vulvovaginal candidiasis is uncertain because of frequency of self-diagnosed and self-treatment. In Egypt, VVC affects about 50.4 % of women. Annually in United States there are approximately 13 million cases of VVC, resulting in 10 million gynecologic office visits per year and so incidence of VVC in US is about 39%. VVC is estimated that 75% of women will experience at least one episode in their lifetime , approximately 40-50% of women with the first episode of VVC are likely to experience a recurrence and about 5–8% have chronic candida infections at least three or more episodes per year. It has been estimated that up to 30% of pregnant women worldwide may have VVC **(Elnasr et al., 2019)**.

The researcher observed pregnant women are suffer from recurrence of Vulvovaginal candidiasis more frequently, lack of information on health practices and lifestyle behavior toward VVC and most women suffer

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from physical and psychological pain that may require instant attention, which is lacking in most of hospitals and clinics. Hence, women need to provide specific instructions about vaginal health, which can be favorable to avoid recurrence of VVC during pregnancy. Therefore the researcher found the time to be stress on this problem and also this study was the first study conducted to evaluate the effect of nursing intervention protocol on recurrence of vulvovaginal Candidiasis infection associated with pregnancy at obstetrics of women health nursing in faculty of nursing, Benha University.

### **Aim of the study:**

The aim of the current study was to evaluate effectiveness of nursing intervention protocol on recurrence of vulvovaginal Candidiasis infection associated pregnancy.

### **Research hypothesis:**

Application of nursing intervention protocol regarding vulvovaginal Candidiasis during pregnancy will reduce incidence and recurrence of VVC.

### **Subject and Methods**

#### **Subjects**

**A- Research Design:** Quasi experimental study design was used to fulfill the aim of the study.

**B- Research Setting:** The study was conducted at Benha university hospital in obstetrics & gynecology outpatient clinic.

#### **C-Sampling**

##### **Sample type**

Non probability purposive sample was used in collecting the data.

##### **Sample Size:**

Three hundred (300) pregnant women were assigned randomly into two equal groups; study group (150) and control group (150). This sample size was calculated according to the following equation

$$n = \frac{N}{1+N(e)^2}$$

Where: n = sample size, N= total population size, e = margin error (0.05).

### **Sampling criteria**

Pregnant women were recruited in the current study according to the following

#### **Inclusion criteria:**

- 1) Gestational age  $\leq 20$  wks
- 2) Age (20-35) years old
- 3) Pregnant women diagnosed as having vulvovaginal candidiasis infection
- 4) Pregnant women can read & write.
- 5) Free from any medical and obstetrical diseases

#### **Sample Technique:**

The subjects were assigned after fulfilled the previous criteria into two equal groups:-

- 1) **Group I:** (control group): consisted of (150) pregnant women who received medication of VVC only.
- 2) **Group II:** (study group): consisted of (150) pregnant women who received the nursing intervention about VVC in addition to medication.

#### **Tools of Data Collection:**

Two tools will be used in this study:

**First tool: A structured interviewing questionnaire sheet:** It consists of two parts:-  
**Part I:** General characteristics of women (age, level of education, occupation, residence, BMI).

**Part II:** Obstetric data history such as (gestational age, gravidity, parity, and number of abortion).

**Part III:** Predisposing factor of VVC: Previous Candida infection, previous gestational diabetes, Obesity, frequency of sexual intercourse and behavior abuse such as douching

**Part IV:** Daily health practice: (genital hygiene, getting enough rest, avoid stress, keep exercise regularly, eating healthy diet, etc.)

### **Second tool: Follow-up Sheet**

was included questions related to follow-up symptoms and signs of vulvovaginal candidiasis of pregnant women through course of pregnancy and its severity was evaluated through the symptomatologic score of Sobel on a semiquantitative scale: 0 (no VVC), 1 (mild VVC), 2 (moderate VVC), 3 (severe VVC). A total score of  $\geq 4$  will be considered as a case of recurrent vulvovaginal candidiasis; follow up was included three parts:

**Part I:** Symptoms of vulvovaginal candidiasis: like (itching, burning, Cheesy white vaginal discharge, Offensive vaginal discharge, dyspareunia and dysuria)

**Part II:** Signs of vulvovaginal candidiasis: like (redness, swelling, abrasion and fissure).

**Part III:** Effect of VVC symptoms and signs on quality of life: This section was included questions such as: worry, discomfort and uneasiness about women's vulvar symptom, affecting on daily activities and interaction with family & others, loss of desire, sexual intimacy, and dryness or bleeding during sexual activity.

### **Ethical consideration**

- The aim of the study was explained to each woman before applying the tools to gain confidence and trust.

Informed consent was obtained from women's to be included in this study.

- No harm happened for women's

- The data was collected in confidential manner and a result was considered.

- Every woman had the right for refuse at any time without giving reasons.

- Study doesn't contradict with cultural, traditional and religious issues

- Study doesn't touch the dignity of the women.

### **Validity of Tools:**

The validity of the tool were reviewed by a jury of experts in the specialty of maternal nursing and obstetrics to assure the validity and reliability of the questionnaire.

### **Reliability of Tools:**

Reliability was applied by the researcher for testing the internal consistency of the tools. Answers from repeated testing were compared by using Alpha Cronbach reliability.

<b>Tools</b>	<b>Cronbach's alpha value</b>
Obstetric data of studied women ( <b>Tool I</b> )	<b>80.2%</b>
Daily health practice for reducing VVC ( <b>Tool I</b> )	<b>90.1 %</b>
Symptoms and sign of VVC. ( <b>Tool II</b> )	<b>85.6 %</b>
Effect of VVC signs and symptoms on quality of life ( <b>Tool II</b> )	<b>83.4%</b>

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### **Pilot study:**

The pilot study was carried out on 10% of total sample (30 pregnant women) that met the criteria of selection to test the study process clarity, validity and reliability of the tools to find the possible obstacles and problem that might be faced during data collection. Not modifications will be done in the tool to suitable for the subjects and not excluded from main study sample.

### **Field work:**

The field work of the current study was carried out through one year started from the beginning of April 2020 to the end of March 2021. The researcher collected data after obtaining oral permission from director of Benha university hospital. The researcher visited the setting of the study 3days/week (Saturday, Monday and Wednesday) from 9 Am to 12 Pm, until the predetermined data collection time was reached and the subjects with previous characteristics mentioned were collected.

### **The researcher implements the procedure through three phases:**

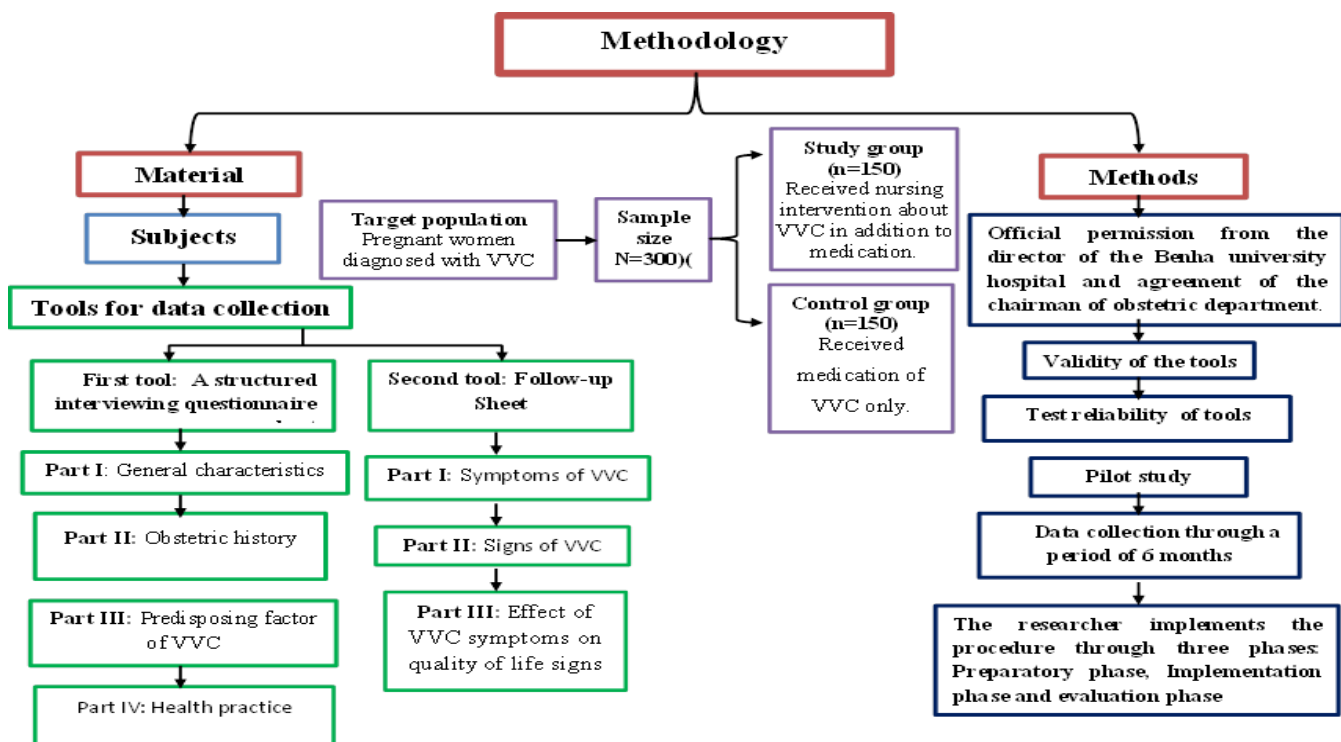
#### **Preparatory phase**

During this phase review of related literature has been done for construction of data collection tools and for designing the teaching brochure. The brochure was designed by the researcher using simple Arabic language and different illustrated pictures in order to facilitate women understand. The researcher interviewed the pregnant women by welcoming and then explained the study aim in simple terms. The initial assessment was done to the participating women in the waiting room of obstetrics & gynecology outpatient clinic. The researcher asked each pregnant woman the

questions in simple Arabic language and filled the checklist. The researcher collected general characteristics of women, obstetric data, predisposing factor, daily health practice, candida sign & symptoms and effect of VVC symptoms on quality of life. The researcher start with control group to avoid contamination of the sample then study group and the time taken to complete the checklist was about 20-30 minutes.

#### **Implementation phase:**

The intervention was implemented to study group through one small session of nursing intervention about general characteristics of normal and abnormal vaginal discharge, knowledge related to vulvovaginal candidiasis as definition, causes, predisposing factors, signs & symptoms, complication, diagnostic measures and how woman can help in treating and preventing recurrence of vulvovaginal candidiasis. Brochure was used as teaching aid to help in clarifying information about vulvovaginal candidiasis. During and after the teaching session the researcher encouraged active participation of the pregnant woman through asking questions and receiving feedback. This session was conducted in the waiting room of the antenatal outpatient clinic immediately after completion of the assessment. The time taken to complete this phase was about 30 minutes. Also, the researcher communicated with women via telephone call for instruction and reinforcement.



**Follow up and evaluation phase**

Assessment of VVC symptoms & signs conducted after 4 weeks from the implementation phase to assess effect of nursing intervention protocol on relieving signs and symptoms of VVC or not. Also, follow-up and evaluation of recurrence of VVC infection carried out every four weeks after first follow-up through course of pregnancy using follow-up questionnaire where the researcher evaluate the effect of nursing intervention protocol on recurrence of vulvovaginal Candidiasis infection through every visit. Researcher asked each pregnant woman about symptoms of VVC (subjective) using follow up questionnaire such as (itching, burning, Cheesy white vaginal discharge, Offensive vaginal discharge, dyspareunia and dysuria) and researcher made external vulval exam (objective evidence) to observe signs of VVC such as (redness, swelling, abrasion and fissure). Also the researcher asked the woman to put pad before visit for observing vaginal discharge. Each pregnant woman was followed up

individually at antenatal outpatient clinic in examination room. Evaluation started first with control group then with a study group to avoid bias.

**Statistical analysis:**

The collected data were coded, organized, analyzed and tabulated using computer. Presentation of tables and graphs were carried out according to types of variables by using the statistical package for social science (SPSS version 22).

**Results:**

**Table (1):** Reveals that, about half of both study & control group (46.0% & 50.0%) were in age of ( $\geq 30$  years) with mean  $\pm$ SD (26.85 $\pm$ 6.58 & 27.62 $\pm$ 6.04), nearly two third of study & control group (67.3% & 58.0%) were live in rural area. According to level of education; nearly half of two groups (48.0% & 41.3%) had Secondary education. About two third of study & control groups (68.7% & 62.0%) were not working. In relation to

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smoking, more than half of both groups (60.0% & 56.0%) had no smoking.

**Table (2):** Displays that; there was no statistically significance difference between both groups regarding obstetric history. As Mean  $\pm$ SD of gestational age of both study and control group was (14.06 $\pm$ 3.60 & 13.73 $\pm$ 2.99). Nearly three quarter (67.4% & 72.0%) of both groups was pregnant in two to four numbers with Mean  $\pm$ SD 3.01 $\pm$ 0.86 & 2.97 $\pm$ 0.74. About half of both group born one to two times with Mean  $\pm$ SD 1.55 $\pm$ 0.34 & 1.61 $\pm$ 0.35.

**Table (3):** Illustrates that, there was no statistical significant difference ( $p > 0.05$ ) regarding follow self-reported healthy practice of the studied women for reducing VVC between both groups at the pre-intervention phase.

**Table (4):** Illustrates that, there was highly statistical significant difference ( $p < 0.001^{**}$ ) regarding total symptoms and signs of VVC during course of pregnancy between both groups. Mean score of symptoms and signs of

vulvovaginal candidiasis decrease in study group than control group through course of pregnancy.

**Table (5):** Illustrates that, there was no statistical significant difference ( $p > 0.05$ ) regarding problems associated recurrence symptoms and signs of VVC between both groups at pre-intervention while there was highly statistical significant difference ( $p < 0.001^{**}$ ) between both groups at post-intervention

**Table (6):** Illustrates that, there was a highly statistical significant correlation ( $p < 0.001^{**}$ ) between recurrence of VVC and previous candida infection on both groups. Also there was statistical significant correlation ( $p < 0.05^{*}$ ) between recurrence of VVC and (gestational diabetes, Obesity, frequency of sexual intercourse & behavior abuse).

**Table (1): Distribution of studied women (study and control group) according characteristics of study groups (n=300).**

Characteristics	Study group (n=150)		Control group (n=150)	
	No	%	No	%
<b>Age (years)</b>				
20-	20	13.3	24	16.0
25-	61	40.7	51	34.0
30-35	69	46.0	75	50.0
<b>Mean±SD</b>	26.85±6.58		27.62±6.04	
<b>Residence</b>				
Rural	101	67.3	87	58.0
Urban	49	32.7	63	42.0
<b>Educational level</b>				
Read & write	24	16.0	30	20.0
Secondary	72	48.0	62	41.3
University	32	21.3	32	21.4
Post graduate	22	14.7	26	17.3
<b>Occupational status</b>				
Not work	103	68.7	93	62.0
Work	47	31.3	57	38.0
<b>Smoking</b>				
Passive smoking	60	40.0	66	44.0
Non smoking	90	60.0	84	56.0

**Table (2): Distribution of studied pregnant women according to obstetric data (n=300).**

Obstetric data	Study group (n=150)		Control group (n=150)		Chi square	P value
	No	%	No	%		
<b>Gestational age(weeks)</b>						
6-	30	20	37	24.7	1.064	>0.05
10-	38	25.3	33	22		
14- 20	82	54.7	80	53.3		
<b>Mean ±SD</b>	14.06±3.60		13.73±2.99			
<b>Gravidity</b>						
1(Primigravida)	29	19.3	29	19.3	1.71	>0.05
2-	101	67.4	108	72.0		
5-	20	13.3	13	8.7		
<b>Mean ±SD</b>	3.01±0.86		2.97±0.74			
<b>Parity</b>						
Nullipara	37	24.7	36	24	2.23	>0.05
1-	80	53.3	78	52		
3-	33	22	36	24		
<b>Mean ±SD</b>	1.55±0.34		1.61±0.35			
<b>No. of abortion (n=121)</b>						
No	105	86.8	110	90.9	1.098	>0.05
1-	12	9.9	8	6.6		
3-	4	3.3	3	2.5		



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**Table (3): Distribution of studied sample women regarding self-reported healthy practice for reducing VVC (pre-intervention phase) (n=300).**

Healthy practice	Study group (n=150)				Control group (n=150)				Chi square	P value
	Not done		Done		Not done		Done			
	No	%	No	%	No	%	No	%		
I- Genital hygiene Keep vagina clean.	64	42.7	86	57.3	54	36.0	96	64.0	1.39	>0.05
Maintain dryness of genital area after toilet and wipe from front to back.	127	84.7	23	15.3	128	85.3	22	14.7	0.026	>0.05
Avoid douches and any kind of perfumed sprays or powders	100	66.7	50	33.3	88	58.7	62	41.3	1.008	>0.05
Choose the right underwear: change of underwear especially wet underwear.	109	72.7	41	27.3	106	70.7	44	29.3	0.148	>0.05
Wearing cotton underwear.	116	77.3	34	22.7	114	76.0	36	24.0	0.075	>0.05
Sleeping without underwear.	108	72.0	42	28.0	105	70.0	45	30.0	0.146	>0.05
Wash underwear carefully with soap and warm water and exposing them to sun rays.	75	50.0	75	50.0	70	46.7	80	53.3	0.334	>0.05
II- Eating healthy diet -Yogurt	98	65.3	52	34.7	94	62.7	56	37.3	0.231	>0.05
-Food low with carbohydrate and sugar	121	80.7	29	19.3	117	78.0	33	22.0	0.325	>0.05
-Food strengthens immunity during pregnancy as olive oil, whale liver oil, garlic.	135	90.0	15	10.0	127	84.7	23	15.3	1.92	>0.05
III- Don't wear tight clothes	100	66.7	50	33.3	110	73.3	40	26.7	1.087	>0.05
IV- Getting enough rest	125	83.3	25	16.7	130	86.7	20	13.3	0.987	>0.05
V- Avoid stress	120	80	30	20	125	83.3	25	16.7	1.023	>0.05
VI- keep exercise regularly	147	98	3	2	148	98.7	2	1.3	1.123	>0.05

**Table (4): Distribution of studied women regarding total symptoms and signs of VVC during pregnancy.**

symptoms & signs of VVC	Study group				Control group				Chi square	P value
	Not suffer		Suffer		Not suffer		Suffer			
	No.	%	No.	%	No.	%	No.	%		
1 <sup>st</sup> 4 weeks follow-up n=300 (150 study &150 control)	131	87.3	19	12.7	103	68.7	47	31.3	9.087	<0.01* *
	Mean ±SD 1.34±0.26				Mean ±SD 2.05±0.37					
2 <sup>nd</sup> 4 weeks follow-up n=298 (150 study &148 control)	135	90	15	10	98	66.2	50	33.8	7.643	<0.01* *
	Mean ±SD 1.14±0.19				Mean ±SD 2.17±0.28					
3 <sup>rd</sup> 4 weeks follow-up n=294 (149 study &145 control)	137	91.9	12	8	92	63.3	53	36.5	7.611	<0.01* *
	Mean ±SD 1.02 ±0.10				Mean ±SD 2.29 ±0.34					
4 <sup>th</sup> 4 weeks follow-up n=291 (148 study &143 control)	138	93.2	10	6.8	88	61.5	55	38.5	10.333	<0.01* *
	Mean ±SD 0.97 ±0.16				Mean ±SD 2.48 ±0.36					
5 <sup>th</sup> 4 weeks follow-up n=282 (144 study &138 control)	139	96.5	5	3.5	78	56.5	60	43.5	9.002	<0.01* *
	Mean ±SD 0.74 ±0.08				Mean ±SD 2.63 ±0.62					
6 <sup>th</sup> 4 weeks follow-up n=270 (139 study &131 control)	139	100	0	0	68	51.9	63	48.1	10.807	<0.01* *
	Mean ±SD -----				Mean ±SD 2.72 ±0.51					

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**Table (5): Distribution of studied women according problems associated recurrence symptoms and signs of VVC at pre & post intervention (n=300).**

Item	Pre-intervention								Post- intervention								Chi square test	P value
	Study group (n=150)				control group (n=150)				Study group (n=150)				Control group (n=150)					
	Not suffer		Suffer		Not suffer		suffer		Not suffer		suffer		Not suffer		suffer			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Worry about VVC symptoms	15	10.0	135	90.0	13	8.7	137	91.3	140	93.3	10	6.7	122	81.3	28	18.7	18.456	<0.01**
Discomfort & uneasiness	19	12.7	131	87.3	23	15.3	127	84.7	142	94.7	8	5.3	125	83.3	25	16.7	17.032	<0.01**
Affecting on interaction with family & others	42	28.0	108	72.0	30	20	120	80	144	96	6	4	130	86.7	20	13.3	19.446	<0.01**
Affecting on daily activities	40	26.7	110	73.3	45	30.0	105	70.0	144	96	6	4	132	88	18	12	16.311	<0.01**
loss of desire	26	17.3	124	82.7	16	10.7	134	89.3	145	96.7	5	3.3	130	86.7	20	13.3	19.002	<0.01**
avoidance of sexual intimacy	20	13.3	130	86.7	14	9.3	136	90.7	145	96.7	5	3.3	132	88	18	12	20.111	<0.01**
Dryness during sexual activity	16	10.7	134	89.3	8	5.3	142	94.7	141	94	9	6	140	93.3	10	6.7	17.064	<0.01**
Bleeding during sexual activity	131	87.3	19	12.7	119	79.3	31	20.7	150	100	0	0	145	96.7	5	3.3	16.900	<0.01**

**Table (6): Correlation between recurrence of VVC and predisposing factor.**

Predisposing factor	Recurrence of Study group	Recurrence of Control group
Previous candida infection	r. 0.654 p <0.002**	r. 0.701 p <0.000**
Previous gestational diabetes	r. 0.467 p <0.016*	r. 0.501 p <0.012*
Obesity	r. 0.390 p <0.023*	r. 0.397 p <0.021*
Frequency of sexual intercourse	r. 0.311 p <0.034*	r. 0.386 p <0.023*
Behavior abuse (Douching, perfumed soaps, bubble baths, powders or vaginal sprays)	r. 0.377 p <0.031*	r. 0.385 p <0.030*

**Discussion:**

Vulvovaginal candidiasis is a universal health problem affecting millions of women

and is a usual fungal infection caused by Candida species, mainly Candida albicans. VVC could cause various vaginal signs and symptoms, including a thick cottage-cheese-

like discharge associated with vaginal and vulvar pruritus, pain, burning, erythema, and edema. External dysuria and dyspareunia may also occur (**Ekpenyong et al., 2021**).

The present study is an intervention study which aimed to evaluate the effect of nursing intervention protocol on recurrence of vulvovaginal Candidiasis infection associated with pregnancy. It was conducted in antenatal outpatient clinic at Benha university hospital. Results of this study supported the following investigated hypothesis.

The present study revealed that about half of both study & control group were in age of ( $\geq 30$  years) with mean (26.85 & 27.62), these finding came agree with **Elnasr et al., (2019)** who detect prevalence of aerobic bacteria vaginosis among chronic IUD users among Egyptian women, and found that the mean of age was (28.86)

The finding of present study revealed that, there was no statistically significance difference regarding obstetric history among both study and control group. More than half of study and control group were in second trimester (14-20w) as Mean of gestational age of both study and control group was (14.06 & 13.73). These finding are in the same line with **Nurat et al., (2015)**, who determine detection and epidemiology of Vulvovaginal Candidiasis among asymptomatic pregnant women attending a tertiary hospital in Ogbomoso, Nigeria, and found that near half of pregnant women in second trimester. These finding are consistent with **Jane, et al., (2019)**, who determine prevalence and antifungal susceptibility patterns of candida isolated on CHROMagar™ candida at a tertiary referral hospital, Eastern Uganda, and showed that about half of studied women were in third trimester.

The results of present study illustrate that, there was a significant effect between daily

health practice of the studied women and reducing VVC. These results agree with **Ekpenyong et al., (2021)**, who determine recurrent vulvovaginal candidiasis among young women in south eastern Nigeria: the role of lifestyle and health-care practices, and show a significant association between certain lifestyle habits and aberrant health-care practices and incident RVVC among young women in south eastern Nigeria.

Daily health practice can have a significant influence on the development of VVC. study showed that wearing cotton underwear was statistically associated with the presence of recurrent VVC. These finding are agree with **D'Antuono et al., (2018)**, who determine Use of Dermasilk briefs in recurrent vulvovaginal candidosis: Safety and effectiveness, and showed that type of underwear (cotton/synthetic) was statistically associated with the presence of recurrent VVC.

The present study revealed that wearing tight underwear, trousers or tight pants was statistically significant for occurrence of VVC. These finding are matched with **Felix et al., (2020)**, who evaluate of vulvovaginitis and hygiene habits of women attended in primary health care units of the family, who found that more than half of the women wearing tight jeans/pants and this was statistically significant for occurrence of infection.. AS clothing can cause alterations in the vaginal microbiota, due to temperature variation, local humidity, and compromised ventilation of the external genitalia, altering the genital ecosystem and causing irritation.

The result of present study showed that, eating food low carbohydrate and sugar decreases recurrence of VVC. These finding agree with **Nyirjesy et al., (2018)**, who evaluating vulvovaginal symptoms and

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Candida colonization in women with type 2 diabetes mellitus treated with canagliflozin, a sodium glucose co-transporter 2 inhibitor, have showed that diabetes mellitus, especially uncontrolled diabetes mellitus, and explored that frequently drinking sweet drinks and frequently eating sweet foods could augment the susceptibility to VVC. This may contribute to the fact that increased glucose concentrations in vaginal secretions could promote the adherence of Candida to epithelial cells and further stimulate its development.

The study showed the effect of doing regular exercise, sedentary life, and daily emotional state on recurrence of VVC. These finding matched with **Zeng et al., 2018**, who explore risk Factors of vulvovaginal candidiasis among women of reproductive age in Xi'an: a cross-sectional study, and revealed that doing regular exercise and positive emotion were protective factor in prevalence VVC. Little is currently known about the correlation between physical exercise and emotional state and prevalence VVC.

Regarding follow up of recurrence of vulvovaginal candidiasis symptoms and signs during course of pregnancy, the results revealed that there was decrease in recurrence and severity of vulvovaginal candidiasis episodes among pregnant women in study group through follow-up till term while increase in control group with highly statistical significant difference between both groups where in first follow up Mean of study group 1.34 (mild VVC) while Mean of control group increase 2.05 (moderate VVC). Six follow up Mean of study group ----- (no VVC) while Mean of control group 2.72 (moderate VVC). This finding was related to study group received nursing intervention

about prevention recurrence of vulvovaginal candidiasis during pregnancy in addition to medication.

These finding are matched with **Ekpenyong et al., 2021**, who studied the recurrent vulvovaginal candidiasis among young women in south eastern Nigeria: the role of lifestyle and health-care practices, and found that a significant association between certain lifestyle habits and aberrant health-care practices and incident recurrent VVC among young women in south eastern Nigeria. This association has underscored the need for the preventive programs aimed at educating about the risk factors that could precipitate recurrent VVC.

The result of present study showed that, symptoms of VVC had effect on sexual relation of women where causing loss of desire and avoidance of sexual intimacy. These finding came in the same line with **Gordon et al., 2016**, who evaluate high prevalence of sexual dysfunction in vulvovaginal specialty clinic, and found that more than half of women with vaginal infections have sexual dysfunction and also effect on sexual desire. Also these findings came agree with **Alahverdi et al., 2020**, who evaluating treatment outcomes of vaginal infections on sexual function, and illustrated that VVC are the most common causes of sexual dysfunction and more than half of womens and sexual dysfunction is twice as common.

Result of present study illustrated that, there was a highly statistical significant correlation between recurrence of VVC and previous candida infection on both study and control group. This result was matched with **Na et al., 2018**, who evaluating risk factor for candida infection of the genital tract in the

tropics, and believed that there was an association between symptomatic episodes of VVC and a history of lower genital tract infection.

The results of present study clarified that, there was statistical significant difference between recurrence of VVC and frequency of sexual intercourse of studied women Study & control group. This finding was agree with **Spinillo et al., 2020**, who determine epidemiologic characteristics of women with idiopathic recurrent vulvovaginal candidiasis, and concluded that a high frequency of sexual intercourse increase the likelihood for colonization, VVC and RVVC.

This is due to frequent sexual intercourse prevents the restoration of the vaginal ecosystem after coital act and, hence, increase the likelihood of VVC infection. This alters the ph of the vagina from between 4.2 and 4.7 to around 4.9 and 5.7, which discourage the growth of normal flora of the vagina.

The results of present study illustrated that, there was statistical significant difference between recurrence of VVC and obesity of studied women Study & control group at post intervention. This is may be due to obesity provides more areas of moisture and warmth (such as skin folds) in which candida can grow. But there was no studies were talking about relation of VVC and obesity.

The results of present study clarifies that, there was statistical significant difference between recurrence of VVC & behavior abuse of studied women Study & control group at post intervention. This finding was in the same line with **Na et al., 2018**, who evaluating risk factor for candida infection of the genital tract in the tropics, and found that there was association between vaginal

douching and recurrence of VVC. This due to vaginal douching destroys not only harmful bacteria, but also the helpful kind that keep yeast under control. Also douche products wash away the natural protective lining of the vagina, leaving women more susceptible to yeast and other vaginal infections, while also introduces substances that may cause allergic reactions and alter the pH balance (acidity) of the vagina.

### **Conclusion**

Nursing intervention had a significant effect in improving health practices regarding prevention recurrence of vulvovaginal candidiasis during course of pregnancy. There was decrease in recurrence and severity of vulvovaginal candidiasis episodes among pregnant women in study group through follow-up till term while increase in control group. There was highly statistical significant effect to VVC symptoms and signs on quality of life between both groups. Also there was a statistical significant correlation between recurrence of VVC and obesity on both groups. Therefore, the study hypothesis was supported and aim of the study was achieved.

### **Recommendations**

- Increase awareness of women about healthy practice to prevent recurrence of vulvovaginal candidiasis during pregnancy.
- Simple illustrated instructions about vulvovaginal candidiasis and healthy practice toward vaginal health should be available for women in obstetrics and gynecology outpatient clinic

### **Further research:**

- Further studies are needed to perform for evaluation effect of nursing intervention

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regarding recurrence of vulvovaginal candidiasis on outcome of pregnancy.

-Further studies should be performed about relation between recurrence of vulvovaginal candidiasis and obesity.

### References:

**Abdelnaem, S.A., Mohasib, S.H. and Mohamed, H.A. (2019).** Effect of self-care guidelines on knowledge and quality of life among faculty of nursing students with vaginal infection. *Obstet Gynecol Int J.* 10(1):15-29.

**Alahverdi, F., Kheirkhah, M. and Janani, L. (2020).** treatment outcomes of vaginal infections on sexual function. *J Med Life.* 13(3): 329-335.

**Almubarak, S.S., Alsofyani, A.H., Almahboob, G.S., Alaswad, F.A., AlThkerallah, F.A., Alkwitem, B.A., Ahmed, A.Z. and Alfayez, M.H. (2020).** Increased vaginal discharge during pregnancy: prevalence, causes, and associated symptoms. *BIBLIOMED.* 4(3): 740-745.

**D'Antuono, A., Baldi, E., Bellavista, S., Banzola, N., Zauli, S. and Patrizi, A. (2018).** Use of Dermasilk briefs in recurrent vulvovaginal candidosis: Safety and effectiveness. *Mycoses.* 55(3): 85-89. Doi: 10.1111/j.1439-0507.

**Dawood, A.S. and Omar, M.K. (2019).** Incidence and types of vaginitis in pregnant women attending routine antenatal care at Tanta University Hospital: a cross-sectional study. *Int J Pregn Chi Birth.* 5(2):87-90.

**Ekpenyong, C.E., Inyang-etoh, E.C., Etebong, E.O., Akpan, U.P., Ibu, J. O. and Daniel, N. E. (2021).** Recurrent vulvovaginal

candidiasis among young women in south eastern Nigeria: the role of lifestyle and health-care practices. *International journal of STD & AIDS.* 23(10):704-9

**Elnasr, B., Ammar, H and Nasef, A (2019).** Prevalence of aerobic bacterial vaginosis among chronic IUD users among Egyptian women's. *MOJ Women's Health.*2019;8(6):317-321.

**Felix, T., Araujo, L., Roder, D. and Pedroso, R. (2020).** Evaluate of Vulvovaginitis and Hygiene Habits of Women Attended in Primary Health Care Units of the Family. *Int J Womens Health.* 12:49–57.

**Gordon, D., Gardella, C., Eschenbach, D. and Mitchell, C.M. (2016).** High prevalence of sexual dysfunction in vulvovaginal specialty clinic. *Journal of lower genital tract disease.* 20(1):80-4.

**Holzer, I., Farr, A., Kiss, H., Hagmann, M. and Petricevic, L. (2017).** The colonization with *Candida* species is more harmful in the second trimester of pregnancy. *Arch Gynecol Obstet.* 295(4):891–895.

**Jane, W., Iramiot, J. & Kalule, J. (2019).** Prevalence and Antifungal Susceptibility patterns of *Candida* Isolated on CHROMagar™ *Candida* at a Tertiary Referral Hospital, Eastern Uganda. *Microbiology Research Journal International* DOI: 10.9734/mrji/2019/v28i630151

**Na, D., Weiping, L., Enfeng, Z., Chan, W., Zhaozhao, X. and Honghui, Z. (2018).** Risk factors for *Candida* infection of the genital tract in the tropics. *African Health Sciences.* 14(4):835–839.

**Nurat, A., Ola, B., Olushola, S., Mikhail, T., & Ayodeji, A (2015).** Detection and Epidemiology of Vulvovaginal Candidiasis among Asymptomatic Pregnant Women Attending a Tertiary Hospital in Ogbomosho, Nigeria, *International Journal of Biomedical Research*. 6(07):518-523

**Nyirjesy, P., Zhao, Y., Ways, K. and Usiskin, K. (2018).** Evaluation of vulvovaginal symptoms and Candida colonization in women with type 2 diabetes mellitus treated with canagliflozin, a sodium glucose co-transporter 2 inhibitor. *Current Medical Research and Opinion*. 28(7): 1173-1178.

**Prasad, D., Parween, S., Kumari, K. and Singh, N. (2021).** Prevalence, Etiology, and Associated Symptoms of Vaginal Discharge During Pregnancy in Women Seen in a Tertiary Care Hospital in Bihar. *Cureus*; 13 (1).

**Spinillo. A., Pizzoli, G., Colonna, L., Nicola, S., de Seta, F. and Guaschino, S. (2020).** Epidemiologic characteristics of women with idiopathic recurrent vulvovaginal candidiasis. *Obstet. Gynecol.* 81:721–727. Doi: 10.1016/0020-7292(94)90096-5.

**Waikhom, S.D., Afeke, I., Kwawu, G.S., Mbroh, H.K., Osei, G.Y. and Louis, B. (2020).** Prevalence of vulvovaginal candidiasis among pregnant women in the Ho municipality, Ghana: species identification and antifungal susceptibility of Candida isolates. *Pregnancy and Childbirth*. 131-140.

**Zeng, X., Zhang, Y., Zhang, T., Xue, Y., Xue, H. and An, R. (2018).** Risk Factors of Vulvovaginal Candidiasis among Women of Reproductive Age in Xi'an: A Cross-Sectional Study. *Biomed Res Int.* 9703754.



## فاعلية بروتوكول الرعاية التمريضية على تكرار الاصابة بعدوى المهبل بالكانديدا اثناء الحمل أميرة سعيد فتوح- منى احمد الشيخ- سميرة عودة عبدالمنعم

التهاب الكانديدا المهبلي هو عدوى مهبليّة ناتجة عن نمو الكانديدا وأكثرها شيوعاً هي الكانديدا البيضاء. يعتبر التهاب الكانديدا المهبلي ثانياً أكثر أنواع العدوى المهبليّة شيوعاً. النساء الحوامل أكثر عرضة للإصابة بالتهاب الكانديدا المهبلي أكثر من النساء الأصحاء بسبب ضعف جهاز المناعة وعدم التوازن الهرموني. لذلك هدفت الدراسة الى تقييم فاعلية بروتوكول الرعاية التمريضية على تكرار الاصابة بعدوى المهبل بالكانديدا اثناء الحمل. تم استخدام تصميم شبه تجريبي لاجراء هذه الدراسة. وقد اجريت هذه الدراسة في عيادة النساء بالعيادة الخارجية في مستشفى بنها الجامعي. حيث اشتملت عينة الدراسة على (300) سيدة حامل وتم تقسيمها الى مجموعتين (الدراسة والتحكم). وكشفت النتائج ان تكرار اعراض وعلامات التهاب الكانديدا المهبلي يقل في مجموعة الدراسة عن مجموعة التحكم اثناء مدة الحمل. هناك علاقة ذات دلالة إحصائية بين كلا المجموعتين تجاه نتائج تكرار التهاب الكانديدا المهبلي اثناء مدة الحمل. تم الاستنتاج ان تطبيق الرعاية التمريضية لها تأثير قوى على تحسين الممارسات الصحية ومنع تكرار التهاب الكانديدا المهبلي أثناء الحمل. هناك تحسن قوى على عدم تكرار التهاب الكانديدا المهبلي بين السيدات الحوامل في مجموعة الدراسة أكثر من مجموعة التحكم. كما اوصت الدراسة بزيادة وعي النساء عن أهمية الممارسات الصحية للوقاية من تكرار التهاب الكانديدا المهبلي أثناء الحمل. تعليمات مصورة بسيطة عن التهاب الكانديدا المهبلي و الممارسات الصحية تجاه المحافظة على صحة المهبل بعيادة النساء والتوليد .