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Assessing Knowledge Regarding Vulvovaginal Candidiasis among Female University Students

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Abstract

Vulvo vaginal candidiasis (VVC) is a common clinical problem facing adolescent females throughout the world and affecting their future health. It is estimated that 75% of females will experience at least one episode in their lifetime and 50% will experience multiple episodes, particularly in hot, subtropical climates. VVC is a leading cause of morbidity and has devastating consequences for females of reproductive age. Exploring knowledge of adolescents about VVC is of significant importance, especially in Arabic countries where addressing issues related to genital tract is jeopardized by social, religious and cultural sensitivities. The study aims to assess the knowledge of female university students about VVC. The study question of this work is: what is the knowledge level of female university students regarding VVC? A descriptive research design was utilized to achieve the aim of current study. The current study was conducted at Cairo University hostel for female students. A simple random sample of 100 female university students was recruited for this study. Two structured tools were developed by the researcher and used to collect data: an interviewing questionnaire and a VVC knowledge assessment interviewing questionnaire. Findings of the current study revealed that mean age of the studied sample was 20.18±1.19 years, and approximately three quarters of them fell in the age group 20-23 years. Regarding the menstrual history of the studied sample, age range at menarche was 11-14 years with a mean of 12.30±1.88 years. Concerning the duration of menstruation, it ranged between 2-6 days with a mean of 4.23±1.25. Mean total score of VVC knowledge of female university student was found to be 18.87±7.83 out of 85, which indicated a low knowledge level. Female university students had poor knowledge of VVC and awareness classes or programs may be needed.

Keywords: Knowledge, Vulvovaginal Candidiasis, Female University Students

Introduction

Infections of the female reproductive tract are considered a significant health problem causing morbidity and sometimes mortality in women of reproductive age. Their incidence is highest during adolescence due to low levels of cervical antibodies, increased sexual activity, and the effect of reproductive hormones[1]. Common problems for which young females consult healthcare centers are vulvar discomfort and abnormal vaginal discharge[2,3]. Vulvovaginal Candidiasis (VVC) has been considered an important public health problem as it is one of the most common causes of vaginal infection worldwide, particularly in hot, subtropical climates. It affects millions of women every year and accounts for more than one third of office visits[4].

Estimates show that approximately 13 million cases of VVC are diagnosed annually in the USA, resulting in 10 million gynecologic office visits with a total annual cost of 1.8 billion dollars[5]. Besides, 75% of females will experience at least one episode in their lifetime, with a projected 50% of all females experiencing multiple episodes, especially those who are older than 17 years. In Egypt, the most common type of vaginal infection reported among women attending gynecology clinics at El Manial university hospital was VVC (41%)[6].

An upset of the balance between Candida vaginal colonization and the host environment can induce VVC. Several factors can predispose a woman to this upset, such as pregnancy, hormone replacement, uncontrolled diabetes, immunosuppression, antibiotics and glucocorticoids use, obesity and genetic predisposition. In addition, behavioral factors such as use of oral contraceptives, intrauterine devices, spermicides and condoms, hygienic habits, clothing and sexual practices[7] may affect this development. Typical symptoms include pruritus and discharge that appear frequently in the premenstrual period. Females experience genital itching or burning dysuria, dyspareunia, vaginal soreness, erythema and irritation. Furthermore, there is a change in the characteristics of vaginal discharge that may be thick, white, cheesy, and odorless with adherent patches that can be localized or coat the entire vagina.

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[1] World Health Organization (2011) *Women's Health: Improve our health – improve the world*. WHO/ FHE/95.8. Geneva.

[2] Brêtas JR, Ohara CV, Jardim DP, Muroya Rde L (2009) Knowledge of STD/Aids among adolescent students. *Revista da Escola de Enfermagem da U S P* 43(3): 551-557.

[3] Mercola (2008) *Fungus causing cancer – A novel approach to the most common form of death*. Retrieved from http://articles.mercola.com/sites/articles/archive-.

[4] Centers for Disease Control & Prevention (CDC) (2014) *Fungal diseases. Frequent asked question*. Retrieved from http://www.cdc.gov/fungal/diseases/candidiasis/genital/risk-prevention.html.

[5] Ibid.

[6] Kamel AD (2011) *Assessment of common types of vaginal infections among women attending gynecology clinics at El-Mainal University Hospital: A proposed plan of action*. Published thesis at third International Arab medical conference at Libya.

[7] Gonçalves B, Ferreira C, Alves CT, Henriques M, Azeredo, J, Silva S (2016) Vulvovaginal candidiasis: Epidemiology, microbiology and risk factors. *Critical Reviews in Microbiology Journal* 42(6).

Bleeding can occur in severe cases in case of removing the patches; vulvar edema and tissue fissuring may also occur[8].

Morbidity associated with VVC may lead to mental distress, pain and discomfort, altered self-esteem, anxiety, impaired work performance and sexual relations[9]. Many complications, such as pelvic inflammatory disease, infertility, ectopic pregnancy, pelvic abscess, spontaneous abortion, temporary or absolute endometritis, premature birth, postpartum infection and menstrual disorders, can occur as a consequence of untreated or recurrent episodes of VVC[10].

Adolescence is one of the most rapid and dynamic phases of human development having marked physical, emotional, intellectual and social changes and experiences. It is considered a period of preparation for adulthood, incorporating both physical and sexual maturation in addition to movement toward social and economic independence. Therefore, having a thorough understanding of adolescent physical and psychosocial growth and development, as well as health needs, is important for healthcare providers[11].

Prevention of VVC could reduce frequent office visits, costs of treatment, uncomfortable vaginal infections and prevent complications for females. Certain measures, which are mainly related to changing lifestyle and personal hygiene practices, in addition to awareness of normal and abnormal vaginal discharge combined with proper estimation of the problem and its consequences can be beneficial. In this perspective, nurses and other healthcare providers often offer advice to adolescent females in an effort to prevent candidiasis and taking into consideration the unique dimensions of this sensitive phase of human development. Nurses play a crucial role in VVC early detection through careful assessment of risk factors, signs and symptoms, as well as comprehensive physical exams. In consequence, increasing females' awareness regarding VVC preventive measures will help to reduce the incidence, limiting recurrences and avoiding the complications of VVC[12].

The need for the current study arose from high VVC incidence causing young women to seek medical care, which the investigator came across in personal clinical experience. In addition, Arab young females in general and Egyptian females in specific usually seek medical advice for reproductive health problems at the later stages of illness when the symptoms are aggravating, particularly those who are unmarried. This behavior can be related

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[8] Rathod SD, Klausner JD, Krupp K, Reingold AL, Madhivanan P (2012) *Epidemiologic Features of Vulvovaginal Candidiasis among Reproductive-Age Women in India. Infectious diseases in obstetrics and gynecology*. Hindawi Publishing Corporation.

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to shyness from revealing the genitalia in addition to considering abnormal vaginal discharge as a simple problem that will be solved spontaneously without medical intervention. Thus, this area of health related issues is not being fully addressed due to social, cultural, and religious sensitivities in addition to under-estimation of its consequences. Additionally, Egyptian nursing studies concerning VVC awareness among female university students are scattered. The current study aimed at assessing level of female students' knowledge regarding VVC to address the need for educational activities regarding its prevention.

Methodology

Aim of the Study

The aim of the current study is to assess the knowledge of female university students about VVC.

Research Design

A descriptive research design was utilized to determine the existing level of knowledge of the female university students regarding VVC.

Setting

The study was conducted at Cairo University Hostel for female students in Giza governorate. The University Hostel houses students from across Egypt, including areas of Upper and Lower Egypt, but principally from Giza and Delta. It accepts students who are studying in Cairo University colleges and residing in areas of more than 60 kilometers distance from Cairo University. It provides low cost services including accommodation, restaurants, a library, a mosque, and security, as well as entertainment. In addition, there is an equipped lecture hall for instruction that fits 50 students. Healthcare services are provided to the students through the Student's Hospital in Giza, which is located 100 meters from the Hostel. The total numbers of female students residing in the Hostel were about 4,000 students (Statistical Department, Cairo University Female Hostel, 2015). The sample was recruited from buildings housing students of non-medical faculties, such as "Dar Elulum, Archaeology, Economics, Political Science and Law and Kindergarten Education Faculties". Each building of the non-medical Faculties contains about 350-400 students.

Sample

The sample size was calculated based on a power analysis, a power of 0.95 (β = 1-0.95 = 0.5) at alpha 0.05 (one-sided) with large effect size (0.5) as a significance level, because these levels have been suggested for use in most

areas of research. Then, a simple random sample of 100 female university students was recruited for this study by selecting the odd hostel floors. From the selected floors, the odd rooms were selected and finally, from the selected rooms, the odd student numbers were selected. Inclusion criteria were student from non-medical colleges, aged between 18 and 24 years, single, not complaining of VVC and willing to participate in the study. Meanwhile, the exclusion criterion was having any educational program on VCC during the past six months.

Tools

Two tools were developed by the investigator after extensive review of the relevant literature and used for data collection. First is a structured interviewing questionnaire that encompasses two sections. Section I contained questions related to personal data, such as code, age, residence, level of university education and faculty. Section II included data related to menstrual history, such as age at menarche, regularity of menses, frequency and duration of menses, and amount of blood loss. Second is a VVC structured knowledge assessment interviewing questionnaire, which consists of eight parts encompassing 85 multiple choice questions with more than one correct option. Part 1 was related to the anatomy of the female reproductive system (14 items); part 2 was related to VVC infection (definition, causative organism, mode of transmission & characteristics of normal vaginal discharge) (13 items); part 3 was related to risk factors of VVC (13 items); part 4 was related to symptoms of VVC (12 items); part 5 was related to diagnosis of VVC (5 items); part 6 was related to treatment of VVC (2 items); part 7 was related to complications of VVC (6 items); and finally, part 8 was related to preventive measures of VVC (20 items).

Scoring System

For knowledge, a score of (0) was given for an incorrect answer and a score of (1) was assigned for each correct answer with a total score out of 100%. The total score was counted then converted to a percentage (out of 85). Levels of knowledge were classified into three categories: a total score of seventy five percent or more was considered a good level, a total score of fifty to seventy four percent was considered a satisfactory level, and a total score of less than fifty percent was considered a poor level.

Validity and Reliability

Content validity of both tools was ensured by juries of five experts in gynecology and maternity nursing. Test reliability of the proposed tools was done using Cronbach's alpha which showed a strong significant positive correlation between the items of tools (0.84).

Pilot Study

A pilot study was carried out on 10 participants (10% of the total sample) who met the inclusion criteria. They were then excluded from the total study sample. The clarity of items and feasibility of the research were thus ensured, and needed refinements and modifications were made.

Protection of Human Rights

The study was conducted after receiving an official approval from the Research Ethics Committee at Faculty of Nursing, Cairo University. In addition, the project obtained official permission from the authoritative personnel in Cairo University and Cairo University Hostel, Giza Governorate. A written informed consent to conduct the study was granted from the Ethics Committee (Institutional Review Board), which is formally designated to approve, monitor and review researches with the aim to protect rights and welfare of the research subjects before the start of the study. Students who met the inclusion criteria were informed about the purpose, procedure, benefits, and nature of the current study by the investigator in order to obtain their acceptance of participation, as well as their written consent. The investigator ensured that participation was voluntary and participants had the right to withdraw from the study at any time without any rationale. Additionally, confidentiality was maintained through data coding. Finally, files of the collected data were kept in a locked cabinet at a research office and could not be accessed by anyone other than the investigator of the study.

Procedure

The investigator interviewed the students individually (15-20 min) to collect personal data and menstrual history. Then knowledge about VVC was assessed. The students were asked in Arabic language, then their responses were documented in the utilized tools by the investigator in English.

Limitation

Although the current study provided some insight into female students' knowledge about VVC, the embarrassment of some students to answer the research questions was a problem faced by the investigator during data collection.

Results

Description of Sample Characteristics

Data shows that the age of the participants ranged between 18-23 years with a mean of 20.18±1.19 years. Approximately three quarters of them fell in the age class 20-23 years, 63% of them were residing in rural areas, 41% of them were studying in Faculty of Dar El-ulum and 39% of them were in the second level (Table 1).

Regarding menstrual history of the participants, age at menarche ranged between 11-14 years with a mean of 12.30±1.88 years, duration of menstruation ranged between 2-6 days with a mean of 4.23±1.25, 66% of them had regular rhythm and 79% had moderate amount (Table 2).

Description of Sample Based on Their Knowledge Scores

Regarding the participants' knowledge about the anatomy of the female reproductive system (Part 1), the total mean score was 5.55±4.02 out of 14. For external genital organs, 47% of the participants recognized the vaginal orifice and 37% of them recognized the clitoris. Meanwhile, only 2% of the participants recognized the urethral meatus, and 5% of them recognized the mons pubis. For internal genital organs, all participants (100%) recognized the cervix, and 70% of them recognized the uterus. While, 37% of them identified the vagina and 41% identified the fallopian tubes (Table 3).

Concerning Part 2, the total mean score was 4.31±1.71 out of 13. For characteristics of normal vaginal discharge, 34% of the participants identified that it is white and clear; 20% of them identified that it is odorless; and 11% of them identified that it is not accompanied by itching or burning sensations. For the time when vaginal discharge increases, 24% of them identified that it is during ovulation; 9% of them identified that it is during sexual arousal; and 8% of them identified that it is during pregnancy. For mode of VVC transmission, no participants identified the correct answer (Table 4).

Table 1. *Distribution of the Participants According to Their Demographic Characteristics*

Item	Freq. (n=100)	%
Age (years)		
<20	28	28.0
20-23	72	72.0
Mean±SD	20.18±1.19	
Residence		
Rural	63	63.0
Urban	37	37.0
Faculties		
Dar El-Ulum	41	41.0
Kinder Garden	20	20.0
Economic and Political Science	14	14.0

Law	12	12.0
Archeology	8	8.0
Commerce	5	5.0
Academic level		
First year	30	30.0
Second year	39	39.0
Third year	25	25.0
Fourth year	6	6.0

Table 2. *Distribution of the Participants According to Their Menstrual History*

Item	Freq. (n=100)	%
Age of menarche (years) Mean±SD	12.30±1.88	
Duration of menstruation 2-4 days 5-6 days	31 69	31.0 69.0
Mean±SD	4.23±1.25	
Rhythm of menstruation Regular Irregular	66 34	66.0 34.0
Amount of menstruation Scanty Moderate Severe	18 79 3	18.0 79.0 3.0

Table 3. *Distribution of the Participants According to Their Knowledge Regarding Anatomy of the Female Reproductive System*

No.	Organ	Freq. of Correct Answer (n=100)	%
External genital organs			
1	Mons pubis	5	5.0
2	Labia minora	4	4.0
3	Labia majora	24	24.0
4	Clitoris	37	37.0
5	Vaginal orifice	47	47.0
6	Bartholin gland	7	7.0
7	Urethral meatus	2	2.0
Internal genital organs			
8	Vagina	37	37.0
9	Cervix	100	100.0
10	Uterus	70	70.0
11	Fallopian tubes	41	41.0
12	Ovaries	55	55.0
Total score		14	

Note: *Total is not exclusive, i.e., every item (n) =100.

Regarding Part 3, the total mean score was 2.8±1.4 out of 13. The most commonly reported risk factors for VVC were wearing tight clothes (21%), improper drying of genital organs (15%) and using perfume antiperspirant

(8%). Meanwhile, no participants reported using corticosteroids and stress as risk factors (Table 5).

Less than one quarter of the study participants correctly identified each of the symptoms associated with VVC. The total mean score of Part 4 was 2.3±3.9 out of 12. The most commonly recognized symptoms were excessive vaginal discharge (23%), change in its color (16%) and itching (11%). On the other hand, viscid vaginal discharge with yeast odor and occasional symptoms associated with backache were not recognized by all study participants (Table 6).

Table 4. *Distribution of the Participants According to Their Knowledge Regarding Definition, Causative Organism, Mode of Transmission of VVC and Characteristic of Normal Vaginal Discharge*

No.	Item	Freq. of Correct Answer (n=100)	%
1	Definition of Vulvovaginal Candidiasis	15	15.0
2	Causative organism of Vulvovaginal Candidiasis	13	13.0
3	Mode of transmission	0	0.00
4	Characteristic of normal vaginal discharge	34	34.0
5	Time of increased vaginal discharge	29	29.0
Total score		**13**	

Note: *Total is not exclusive, i.e., every item (n) =100.

Table 5. *Distribution of the Participants According to Their Knowledge Regarding Risk Factors of VVC*

No.	Risk factors of VVC	Freq. of Correct Answer (n=100)	%
1	Frequent antibiotics use	7	7.0
2	Diabetes mellitus	1	1.0
3	Using corticosteroids	0	0.0
4	Using perfume antiperspirants	8	8.0
5	Wearing tight clothes	21	21.0
6	Improper drying of genital organs	15	15.0
7	Obesity	5	5.0
8	Hot weather with high humidity	3	3.0
9	Unbalanced diet	3	3.0
10	Stress	0	0.0
Total score		**13**	

Note: *Total is not exclusive, i.e., every item (n) =100.

Only 1% of the participants recognized that symptoms of VVC and vaginal examination are diagnostic methods for VVC. Additionally, a PH of less than 4.5 and vaginal swab were not recognized by all participants. The total mean score of part 5 was 0.03±0.2 out of 5 (Table 7).

The total mean score of knowledge regarding treatment of VVC was 0.28±0.45 out of 2, with only one tenth of the participants (13%) recognizing

mixed anti-fungi and anti-inflammatory treatment. Concerning complications of VVC, the transfer of the infection to the fetus was recognized by only 2% of participants. Other complications, such as persistent discomfort, persistent pelvic pain and recurrent infection, were not recognized by all of them. The total mean score was 0.02±0.1 out of 6 (Table 8).

Table 6. *Distribution of the Participants According to Their Knowledge Regarding Symptoms of VVC*

No.	Symptoms of VVC	Freq. of Correct Answer (n=100)	%
1	Excessive vaginal discharge	23	23.0
2	Changed color of vaginal discharge	16	16.0
3	Itching	11	11.0
4	External genital organ inflammation "redness"	1	1.0
5	viscid vaginal discharge with yeast odour	0	0.0
6	Burning sensation during urination	4	4.0
7	Sometime symptoms associated with backache	0	0.0
8	Sometime associated with social isolation depression	1	1.0
9	Lower abdominal pain	3	3.0
10	Insomnia	2	2.0
11	Anxiety	5	5.0
Total score		**12**	

Note: *Total is not exclusive, i.e., every item (n) =100.

Table 7. *Distribution of the Participants According to Their Knowledge Regarding Diagnostic Methods tf VVC*

No.	Diagnostic Methods of VVC	Freq. of Correct Answer (n=100)	%
1	Symptoms of VVC	1	1.0
2	PH<4.5	0	0.0
3	Vaginal examination	1	1.0
4	Vaginal swab	0	0.0
Total score		**5**	

Note: *Total is not exclusive, i.e., every item (n) =100.

Table 8. *Distribution of the Participants According to Their Knowledge Regarding Complications of VVC*

No.	Complications of VVC	Freq. of Correct Answer (n=100)	%
1	Persistent discomfort	0	0.0
2	Persistent pelvic pain	0	0.0
3	Recurrent vaginal candidiasis	0	0.0
4	Skin inflammation around vagina	0	0.0
5	Transfer Candida infection to the fetus	2	2.0
Total mean		**6**	

Note: *Total is not exclusive, i.e., every item (n) =100.

Finally, the total mean score of knowledge regarding preventive measures was 3.8±4.4 out of 20. The most commonly recognized measures were using cotton underwear and avoiding tight underwear clothes (30%) and avoiding high carbohydrate and sugar foods (36%). On the other hand, the least recognized preventive methods were managing stress and following the course of treatment until its end (14%), avoiding unnecessary use of antibiotics and use of hormonal contraceptives in case of recurrent VVC infection (12%), and daily changes of sanitary pads (10%) (Table 9).

Table 10 shows that the mean total score for VVC knowledge of female university students was 18.87±7.83 out of 85, which indicated a poor knowledge level. The highest mean total score was related to the anatomy of the female genital tract. Meanwhile, the lowest mean total scores were related to the diagnosis and prevention of VVC.

Table 9. *Distribution of the Participants According to Their Knowledge Regarding Prevention of VVC*

No.	Prevention of VVC	Freq. of Correct Answer (n=100)	%
1	Keep genital area clean and dry	23	23.0
2	Avoid tight under wear clothes	30	30.0
3	Frequent change of underwear clothes	26	26.0
4	Clean genital area from front to back	21	21.0
5	Avoid irritant soap	15	15.0
6	Avoid unnecessary use of antibiotics	12	12.0
7	Avoid use perfumed towels "pads"	29	29.0
8	Use cotton underwear clothes	36	36.0
9	Keep blood sugar level within normal level	16	16.0
10	Eat fresh vegetables and fruits	22	22.0
11	Avoid food high in carbohydrate and sugar	36	36.0
12	Eat yogurt daily	15	15.0
13	Avoid obesity	15	15.0
14	Manage stress	14	14.0
15	Avoid sexual relation during infection	15	15.0

16	Follow the course of treatment until its end	14	14.0
17	Avoid use of hormonal contraceptives in case of recurrent VVC infection	12	12.0
18	Change sanitary pad daily	10	10.0
Total score		**20**	

Note: *Total is not exclusive, i.e., every item (n) =100.

Table 10. *Distribution of the Participants According to Their Knowledge about VVC*

No.	Part	Total score	Mean±SD
1	Anatomy of the female reproductive system	14	5.55±4.02
2	Definition, causative organism, mode of transmission of VVC and characteristic of normal vaginal discharge	13	4.31±1.71
3	Risk factors of VVC	13	2.8±1.4
4	Symptoms of VVC	12	2.3±3.9
5	Diagnostic methods of VVC	5	0.03±0.2
6	Treatment of VVC	2	0.1±0.2
7	Complications of VVC	6	0.02±0.1
8	Prevention of VVC	20	3.8±4.4
Total mean knowledge score for VVC		**85**	**18.87±7.83**
Level of knowledge in all parts		**Poor level (22.2%)**	

Discussion

The aim of the current study was to assess the knowledge level of female university students regarding VVC. Our findings revealed that the participants had poor knowledge regarding anatomy of reproductive organs. Moreover, less than half of them recognized the characteristics of normal vaginal discharge in relation to color, consistency and odor. This could be attributed to insufficient basic information gained from their academic study, especially because all involved students are enrolled in literary faculties. These findings are in agreement with a survey indicating that the studied women had limited knowledge about the female reproductive system, especially among those who are younger[13]. In the same line, a cross-sectional study indicated that half of the studied women were unaware of normal vaginal discharge[14].

Moreover, the current study participants had a poor knowledge level regarding VVC and its prevention. These findings were in accordance with a previous study conducted in a selected hostel at Mangalore, India where 83.5%

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of the studied adolescents had poor knowledge regarding prevention of VVC[15]. In this perspective, the results of another study assessed the effect of an awareness program about the prevention of VVC among pregnant women, which showed that the majority of the studied sample in Manipal, India had poor knowledge regarding vaginal infections[16]. Additionally, another study assessed the effect of education on knowledge, attitude and practice of patients with vaginitis in Iran indicated that, the level of knowledge regarding prevention of VVC was poor[17]. These results were in agreement with Li et al.[18] who reported that the studied Chinese women had very low levels of knowledge regarding reproductive tract infections. In the same line, Dube and Sharma[19] found that most of the participated Indian girls were unaware with reproductive health. Additionally, Suja & Aruna[20] assured us that more than half of the studied married women in India had inadequate knowledge on reproductive tract infection. All previous findings indicate a strong need for increasing women's awareness in many communities about the reproductive health to improve their practices regarding prevention of reproductive tract infection or minimizing its complications.

Meanwhile, results of a survey assessing women's knowledge, attitude and practice regarding prevention of common genital tract infections in Iran showed that women had high knowledge with a score of 70% for knowledge, 80% for attitude and 80% for practice. The reason for the high knowledge scores here may be related to the fact that nearly half of the studied women had previous genital tract infections and gained some information from healthcare centers[21]. Moreover, the current study findings contradicted with Şatıroğlu et al.[22] who found that majority of the studied group were able to differentiate between normal and abnormal vaginal discharge.

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Conclusions

Based on the findings of the present study, it can be concluded that a majority of female university students were lacking essential knowledge regarding VVC, particularly in relation to diagnosis and prevention.

Recommendations

Based on the results of the current study, the following actions are recommended:

- Providing female university students with continuous educational programs to raise their awareness about VVC and its prevention
- Providing nurses working in community and gynecology clinics with regular training sessions on VVC and its prevention
- Further researches to investigate other common types of vaginal infections
- Replication of the study on larger sample size selected from different university hostels in Egypt to increase data generalizability

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