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# Effect of Educational Program on Vulvitis Prevention Among Nursing Students

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**Abstract:** The aim of this study was to evaluate the effect of educational program on vulvitis prevention among nursing students. Research design: A quasi-experimental design was utilized. Setting: This study was conducted at Faculty of Nursing, Benha University. Sample: convenient sample included two hundred and fifty nursing students female all enrolled in first academic years. Tools of data collection: 1) a structured interviewing sheet to collect data about socio-demographic characteristics, menstrual and gynecological history and knowledge of nursing students regarding vulvitis 2) reported practices assessment 3) modified likert scale for students' attitude regarding vulvitis. Results: there were general improvements regarding students' knowledge, attitude and practice regarding prevention of vulvitis with highly significant ( $P \leq 0.001$ ) difference after educational Program. The mother was the main sources of knowledge to students (60%). There was insignificant relation between students' total knowledge, total attitude and total practice scores with their age. Conclusion: The implementation of educational Program significantly improved students' knowledge, practices and attitude towards prevention of vulvitis. There were positive high statistically significant correlations between students' total knowledge, total practices and total attitude scores after educational Program. Recommendation: Provide students booklets and pamphlet about healthy habits and measures to prevent infection in reproductive system. Replication of the study on a larger sample and in different geographical areas in Egypt is recommended for generalization of findings.

**Keywords:** Educational Program, Vulvitis, Prevention

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## 1. Introduction

The vulva is the first line of defense to protect the genital tract from infection. Contaminants often collect in the vulvar folds, and increased moisture; sweating, menses, and hormonal fluctuations influence vulvar microbial growth and species balance, potentially resulting in odor and vulva infection [1]. Vulva or external genital organs, includes all structures visible externally from the pubis to the perineum. These include the mons pubis, labia majora, labia minora, clitoris, vestibular glands, vaginal vestibule, vaginal orifice, and urethral opening [2]. The vulvar tissue is richly supplied with sweat and sebaceous glands, and some areas contain hair follicles as well; the vulvar region supports a moist environment that contains increased concentrations of skin

bacteria [3].

The goal of vulvar care is to keep the vulva dry and free from irritants, in this way, can prevent the vulva from becoming red, swollen and irritated, because many infections are introduced into the vagina [4]. Inflammation of the vulva is called vulvitis, It is very common and can occur in women of all ages [5]. Infections that may cause vulvitis are candidiasis, genital herpes and warts. Infestations with pubic lice or scabies are possible causes. vulvitis may also occur as result of changes in the vulval skin. These changes tend to affect women after the menopause, although there is no apparent trigger. Inflammation take form of red or white patches thickened or thinned areas. Other possible causes of vulvitis include allergic reactions to hygiene products, excessive vaginal discharge, or urinary incontinence [6].

Vulvitis is more likely caused due to unhygienic practices as the mal-use of soaps or douche, poor menstrual hygiene, and tissue damage, in addition, to the personal unhygienic behaviors such as swimming in polluted water, or using contaminated towels, and using irritating and tight nonabsorbent underwear [7, 8]. Symptoms include vulvar itching and/ or burning: excoriation of vulva, scaly thickened white patches. The diagnosis is based on the patient's symptoms and on inspection of the vulva. Treatment is to discourage tight clothing, urge sitz baths to decrease itching, apply topical estrogen cream and water – based vaginal lubricants [9]. Complications ascending infection (an infection that moves through the vagina to internal structures) is a potential complication of vulvitis and vaginitis. Infection confined to the lower reproductive tract seldom poses a threat to life or fertility [10].

Female students have a high risk of making unhealthy lifestyle choices that could affect their health and wellbeing. This is the result and influence of a variety of popular cultures among this age group, and the typical peer pressure encountered during these years. Uninformed, university and college students could formulate inaccurate and incomplete notions regarding health, lifestyle, physical activity and fitness [11]. Awareness and knowledge regarding the prevention and control of reproductive tract morbidity in order to uncover the asymptomatic infections must be supplemented with reliable and appropriate instructions and guidance for early diagnosis of the wide range of genital tract infections [12].

Education in health is one of the key components of primary health care and one of the most vital health care requirements for female that must be considered much more in the primary health care system, particularly maternal and child health [13]. Health education conducted by nursing personnel helps imparting knowledge regarding prevention of vulva infection among female. The nurse can educate female regarding genital infection, recommended treatment, preventive measures and risky behavior change. This education will help female to understand in depth about genital infection; thereby can adopt healthy life style practices which will prevent further complication [14]. Health teaching should include the prevention of future infections. Teaching girls at an early age to wipe front to back after toileting, Avoiding tight fitting clothes and nylon panties assist in prevention [15].

The Nurse plays an important role in preventing vulvitis through counseling and education. Nurses must give health teaching to student to prevent having vulvitis such as wear loose clothing, choose cotton underwear, hygiene the vulva by soaking for five minutes in lukewarm water to avoid any residue of lotions or other products. Pat dry, and use any prescribed medication or a soothing and substance such as Vaseline or olive oil [16].

### **1.1. Significant of Study**

Vulvitis is the most common gynecological problem among female was found to affect all preparatory, secondary

school and faculties students [17]. In 2013 external genital organs infection rates among 15- to 19-year-old female were considerably higher, at 3043.3 cases per 100,000 [18] 10-20% untreated women, infection spreads up the genital tract to cause Pelvic Inflammatory Disease (PID) and damage to the fallopian tube [19]. also Genital infection can cause the female embarrassment, may lower self- image, and may negatively affect relationships [20]. Egyptian females' University students receive insufficient reproductive health education through the formal Education in Schools & University system [21].

### **1.2. Aim of the Study**

This study was undertaken to evaluate the effect of educational program on vulvitis prevention among nursing students through:

- (1) Assessing nursing students' knowledge regarding vulvitis (pre and post educational program).
- (2) Assessing nursing students' knowledge regarding prevention of vulvitis (pre and post educational program).
- (3) Assessing nursing students' practice regarding prevention of vulvitis (pre and post educational program).
- (4) Assessing nursing students' attitude regarding prevention vulvitis (pre and post educational program).

### **1.3. Research Hypothesis**

Student nurses who received educational program would have improved knowledge, attitude and practices regarding prevention of vulvitis than before educational program.

## **2. Subjects and Method**

### **2.1. Research Design**

A quasi experimental (pre/post test) design was utilized in this study.

### **2.2. Setting**

This study was conducted in Faculty of Nursing at Benha University. This particular setting was chosen because it is has large number of female students.

### **2.3. Subject**

#### **2.3.1. Sample Type**

Convenient sample

#### **2.3.2. Sample Size**

Number 250 female university students (all students female who enrolled in first academic years).

#### **2.3.3. Technique**

All students in the first academic years divided to sub group (10 group) every group consist of 25 student to allow the researchers interactive, demonstration and re-demonstration, discussion with group and collect data.

## 2.4. Tools of Data Collection

Three tools were used for collecting data

### 2.4.1. First Tool

A Structured interview sheet: It was developed by the researchers in Arabic language after reviewing related literature. It involved three main parts:

*Part I:* Socio-demographic characteristics of students such as; age, residence, marital status and mother education.

*Part II:* Menstrual and gynecological history about vulvitis as; age of menarche, frequency of menstruation, duration of menstruation, menstrual disturbance and previous vulvitis.

*Part III:* Students knowledge about vulvitis, it consisted of 6 items (meaning infection, meaning of vulvitis, symptoms, causes, complication, preventive measures of vulvitis) was used pre and post intervention.

*Scoring system:* Each correct answer was assigned a score of '1', and a score of '0' was assigned for wrong answer, the total score was categorized into three levels as follows: Good knowledge score,  $\geq 75\%$ ; average knowledge score,  $50-75\%$ ; and poor knowledge score,  $\leq 50\%$ .

### 2.4.2. Second Tool: Reported Practices Sheet

It was developed by the researchers after reviewing related literature [22, 23, 24], It was used to assess nursing students reported practices, It included 20 items as (student's general hygienic reported practices for prevention of vulvitis 10 items) & (hygienic reported practice during menstruation 10 items) was used pre and post educational program.

*Scoring system:* Each done practice was assigned a score of '1', and a score of '0' was assigned for not done practice. The total score was categorized into two levels as follows: Unsatisfactory practice score  $< 60\%$  of total practice score and Satisfactory  $60\% - 100\%$  of total satisfactory score.

### 2.4.3. Third Tool: Modified Likert Scale

Modified likert scale was used to assess attitude of the students regarding vulvitis and it was adopted from Fakhri [25]. It was composed of (17) items was used pre and post intervention.

*Scoring system:* Each question was assigned a score of '2' for agree, a score of '1' was assigned for Uncertain and a score of '0' was assigned for disagree. The total score was categorized into three levels as follows: Positive attitude score  $> 75\%$  of total attitude score, Uncertain attitude  $60 - 75\%$  of total attitude score and Negative attitude  $< 60\%$  of total attitude score.

## 2.5. Methods

The study was executed according to the following steps:

### 2.5.1. Tools Validity

The tools validity was done by five experts of Faculties Nursing Staff from the (Obstetrics & Gynecology Nursing) and (Community Health Nursing) specialties who reviewed the tool for comprehensiveness, appropriateness, and applicability.

### 2.5.2. Tools Reliability

Reliability was done by using Cronbach's Alpha coefficient test of all items of the tools which revealed that, each of the tools consisted of relatively homogenous items as indicted by the high reliability, knowledge = (0.789), attitude = (0.868), practice = (0.863).

### 2.5.3. Ethical Considerations

Verbal consent was obtained from each nursing students before conducting the interview and after informed about the purpose of the study and its importance. Anonymity and confidentiality were assured through coding the data. The students were informed about their right to withdraw at any time from the study without giving any reasons.

### 2.5.4. Pilot Study

A pilot study was carried out on 10 % of the nursing students (25) to test the feasibility, clarity, applicability of the tools and, determine the time needed to fill the study tools as well as to find out any problem that may interfere with the process of data collection. No modifications were done. The nursing students involved in the pilot study were included in the main study.

### 2.5.5. Field Work

A written official approval to conduct this research was obtained from the Dean of the Faculty of Nursing; Benha University was taken to obtain their agreement to conduct the study after explaining its purpose. The nursing students was divided into 10 groups (each group about 25 students) to receive the session of education. The study was carried out through four phases: Assessment, planning, implementation, and evaluation. These phases were carried out from beginning of October 2017 to the end of April 2018, covering along a period of seven months. The previously mentioned settings were attended by the researchers two days/week (Saturday and Sunday) according to student table from 9.00 a.m. to 3 p.m.

### 2.5.6. Assessment Phase

Upon securing official permissions to conduct the study, the researchers interviewed the student nurses, greeted each nursing students, explained the purpose and procedures of the study, and asked for participation. Upon consent to participate, the nursing students were interviewed to assess general characteristics, knowledge regarding prevention of vulvitis, as well as nurses' practices and attitude toward prevention of vulvitis. The data obtained during this phase constituted the baseline for further comparisons to evaluate the effect of the educational program, Average time for the completion of interviewing schedule 30-45 minutes. The number of group assessed nursing students /week ranged from 2-3group (the phase of assessment take first month)

### 2.5.7. Planning Phase

Based on the needs identified in the assessment phase from the student nurse, and in view of the related literature, the educational program was developed by the researchers in the form of printed Arabic booklet to satisfy the students' deficit

knowledge, practices and attitude regarding vulvitis. Power Point presentation about vulvitis was prepared in simple Arabic language. The general objective of the educational program was to improve students' knowledge, practices and attitude regarding prevention vulvitis.

Specific objectives: By completion of the educational program, each student will be able to:

- (1) Discuss female anatomy external genital organ.
- (2) Define infection.
- (3) Define vulvitis
- (4) Enumerate symptoms of vulvitis.
- (5) List common causes and risk factors for vulvitis.
- (6) Discuss the potential complications of vulvitis.
- (7) Demonstrate diagnosis of vulvitis
- (8) Discuss preventive measures of vulvitis.
- (9) State the steps necessary perineal hygiene
- (10) Demonstrate menstrual hygiene

#### 2.5.8. Implementation Phase

Implementation of the educational program took (24) weeks. The researchers attended the settings two days/week according to student table lecture. The educational program involved (5) scheduled sessions; *first session*: Anatomy of the external genital organ *second & third session*: meaning, symptoms, risk factor, causes, complication, diagnosis and treatment of vulvities. *Four & five session*: Practices and preventive hygienic measures of students regarding vulvitis including perineal hygiene and menstrual hygiene. These sessions were repeated to each group of (25) students. The number of group 2/month repeated until finished all groups. The duration of each session lasted from half an hour to one hour including periods of discussion according to their achievement, progress and feedback. At the beginning of the first session an orientation to the educational program and its aims took place. Feedback was given in the beginning of each session about the previous one. The teaching methods used were discussion, demonstration and re-demonstration, posters and group discussion. Suitable teaching media were used, included an educational booklet that was distributed to all nursing students in the first day of the educational program as well as audio-visual aids, PowerPoint and real objects used for practical sessions regarding perineal care.

#### 2.5.9. Evaluation Phase

The effectiveness of the educational program was evaluated immediately after the implementation of the intervention using the same questionnaire for pretest and post test.

#### 2.5.10. Statistical Analysis

The data were coded for entry and analyzed using SPSS Statistical Package for Social Science, USA (version 20). Data were presented using descriptive statistics in the form of frequencies and percentages, mean and standard deviation. Chi square tests and Pearson correlation coefficient were used to estimate the statistical significant differences. A significant *P*-value was considered when *P*-value was less than 0.05 and it was considered highly significant when *P*-value was less than or equal to 0.001.

### 3. Results

*Table 1* represents socio-demographic characteristics of the nursing students. It was clear that the mean age of students  $18.81 \pm 0.44$ , 79.6 % of them were resident at rural settings and all nursing students are single. Furthermore mother education 32.4% of them had secondary education and 26.0% of them had university education.

*Table 2* shows that menstrual history of the nursing students. It was clear that the mean age of menarche  $13.90 \pm 1.43$ . As regards frequency of menstruation, 87.6% of them occurred every 26-30 days and 67.6% of them duration of menstruation 3-5 days. Also illustrates 28.4% complaining from menstrual disturbance and 81.7% complain from dysmenorrhea.

*Table 3* shows that 24.0% of nursing students' complain from vulvitis, regarding previous vulvitis, 60.0% of them had previous vulvitis twice, 65.0% of them don't go to doctor, all of them added that the rational for not go to doctor was feeling of shyness. Moreover self-care that used for prevention of vulvitis 50.0% using of antiseptic solution for cleaning vulva, the result of this care 65.0% recovered.

*Table 4* represents that, 84.8%, of nursing students' incorrect answer about meaning of infection and 92.4% incorrect answer about meaning of vulvitis before educational program compare to after program with insignificant differences  $p=0.151$  meaning of infection and meaning of vulvitis  $p=0.288$ . Also 41.2% incorrect answer about not change pads during menstruation as causes of vulvitis before educational program compare 98.0% correct answer after educational program with insignificant difference. In addition 62.8% incorrect answer about infertility as complication to vulvitis before educational program compare to 98.0% correct answer after educational program with insignificant difference ( $p=0.082$ ).

Figure 1 illustrates that, all the nursing students had not a good knowledge level before the educational program. However, the good knowledge level improved after program 67.2%.

Figure 2 demonstrates that, 60% of students' sources of information regarding vulvitis mother and 24% from mass media.

Table 5 clarifies that, there were 21.6% of nursing students not done cleanliness vulva after each toilet before educational program compare to 99.2 % done after educational program with statistically insignificant difference ( $P=0.007$ ). Also shows a highly statistically significant difference ( $P \leq 0.000$ ) before and after the educational program regarding their general hygienic practice about vulvitis.

Table 6 displays that, 39.2% of nursing students not done changing pad after each bath before educational program compare to 96.8% done after program with significant difference ( $P=0.021^*$ ). Also demonstrated there were highly statistically significant differences ( $P < 0.001^{**}$ ) before and after educational program in relation to practice about hygienic practice during menstruation.

Figure 3 demonstrates that, 85.2% of students total practice score regarding prevention vulvitis unsatisfactory

practice before educational program compare to satisfactory practice 95.6% after educational program.

Table 7 reflects that, 64.4% agree about careful dryness of genital organ reduce risk of infection before educational program compare 98.4% agree after program with significant difference ( $P= 0.025^*$ ), also shows that there were, highly statistically significant difference regarding attitude about prevention of vulvitis after educational program ( $P \leq 0.001^{**}$ ).

Figure 4 demonstrates that, 77.2% of students had a positive level of total attitude score before the educational program. However, after the educational program, 97.6% of them had got a good level of total attitude score

Table 8 emphasizes that there were a positive statistically significant correlation ( $p \leq 0.05$ ) between nursing students total knowledge, total practices and total attitudes scores before educational program, Furthermore, a positive highly statistically significant correlation ( $p \leq 0.001^{**}$ ) after educational program.

Table 9 shows that, insignificant relation between nursing students total knowledge, total attitude and total practices scores and their age before and after educational program. Also revealed highly significant relation between nursing students 'total knowledge, total attitude and total practices scores and their residence before and after educational program ( $p \leq 0.001^{**}$ )

**Table 1.** Frequency distribution of the students regarding socio-demographic Characteristics (n=250).

Items	No	%
Age in years		
18-	56	22.4
-19	189	75.6
$\geq 20$	5	2
Mean $\pm$ SD	18.81 $\pm$ 0.44	
Residence		
Urban	51	20.4
Rural	199	79.6
Marital status		
Single	250	100
Mother education		
Read and write	25	10
Basic education	79	31.6
Secondary education	81	32.4
University education	65	26

**Table 2.** Frequency distribution of the students regarding menstrual history (n=250).

Items	No	%
Age of menarche (years)		
12-	54	21.6
13-	32	12.8
14-	88	35.2
$\geq 15$	76	30.4
Mean $\pm$ SD	13.90 $\pm$ 1.43	
Frequency of menstruation (days)		
22-	7	2.8
26-	219	87.6
$\geq 30$	24	9.6
Duration of menstruation (days)		
< 3 days	68	27.2
3-5 days	169	67.6
>5 days	13	5.2
Menstrual disturbance		
Yes	71	28.4
No	179	71.6
Type of menstrual disturbance (N=71)		
Dysmenorrhea	58	81.7
Menorrhagia	8	11.3
Hypomenorrhea	5	7

**Table 3.** Frequency Distribution of the students regarding previous history of vulvitis (n=250).

Items	No	%
Complaining of vulvitis		
Yes	60	24.0
No	190	76.0
Previous vulvitis (n=60)		
Once	19	31.7
Twice	36	60.0
Three or more	5	8.3
Go to doctor (n=60)		
Yes	21	35.0
No	39	65.0
Causes of not going to doctor (n=39)		
Feeling of shyness	39	100.0
Self-care that used for prevention of vulvitis (n=60)		
Using warm water	20	33.3
Using of antiseptic solution for cleaning vulva	30	50.0
Avoiding worry and psychological stress	3	5.0
Using of alternatives that prescribed	7	11.7
Prognosis of this care (n=60)		
Recovered	39	65.0
Go to doctor	21	35

**Table 4.** Frequency distribution of the students regarding their general knowledge about vulvitis pre and post educational program (n=250).

Items	Pre educational program				Post educational program				Chi square test	p value
	Correct		Incorrect		Correct		incorrect			
	No	%	No	%	No	%	No	%		
Meaning of infection	38	15.2	212	84.8	239	95.6	11	4.4	2.062	0.151
Meaning of vulvitis	19	7.6	231	92.4	237	94.8	13	5.2	1.128	0.288
Symptoms of vulvitis										
Severe itching	188	75.2	62	24.8	228	91.2	22	8.8	73.147	0.000**
Redness and swelling in the vulva	117	46.8	133	53.2	241	96.4	9	3.6	8.213	0.004*
Whitish patches on the vulva	120	48.0	130	52.0	228	91.2	22	8.8	22.267	0.000**
Vaginal discharge	198	79.2	52	20.8	244	97.6	6	2.4	23.408	0.000**
Causes of vulvitis										
Using soap or toilet paper increase sensitivity.	131	52.4	119	47.6	228	91.2	22	8.8	26.555	0.000**
Using of public bathes	133	53.2	117	46.8	232	92.8	18	7.2	22.049	0.000**
Not change pad during menstruation	147	58.8	103	41.2	245	98.0	2.0	0.0	7.282	0.007
Don't interest with hygienic care	201	80.4	49	19.6	247	98.8	3	1.2	12.456	0.000**
Weakness of immunity	139	55.6	111	44.4	231	92.4	19	7.6	25.750	0.000**
Bacteria, parasites and fungi	163	65.2	87	34.8	243	97.2	7	2.8	13.493	0.000**
Dryness with used clothes	85	34.0	165	66.0	230	92.0	20	8.0	11.199	0.000**
Complication of vulvitis										
Occurrence of lump	126	50.4	124	49.6	244	97.6	6	2.4	6.247	0.012*
Dystrophy on the vulva	92	36.8	158	63.2	239	95.6	11	4.4	6.700	0.010*
Infertility	93	37.2	157	62.8	245	98.0	5	2.0	3.022	0.082
Cancer in vulva	76	30.4	174	69.6	226	90.4	24	9.6	11.596	0.000**
Upper genital tract infection	115	46.0	135	54.0	215	86.0	35	14.0	34.668	0.000**
preventive measures of vulvitis										
Personal hygiene	125	50.0	125	50.0	239	95.6	11	4.4	11.506	0.000**
Avoidance of factors that lead vulvitis	137	54.8	113	45.2	246	98.4	4	1.6	4.928	0.026*
Avoidance of using of public bathes	128	51.2	122	48.8	235	94.0	15	6.0	16.742	0.000**
Cleaning and dryness the vulva after toilet	116	46.4	134	53.6	238	95.2	12	4.8	10.912	0.000**
Wearing cotton clothes	168	67.2	82	32.8	241	96.4	9	3.6	19.128	0.000**
Avoidance of using of Removal hair cream	101	40.4	149	59.6	233	93.2	17	6.8	12.364	0.000**

\*\*Highly statistically significant difference at  $P \leq 0.001$ \* Statistical significant difference at ( $p \leq 0.05$ )

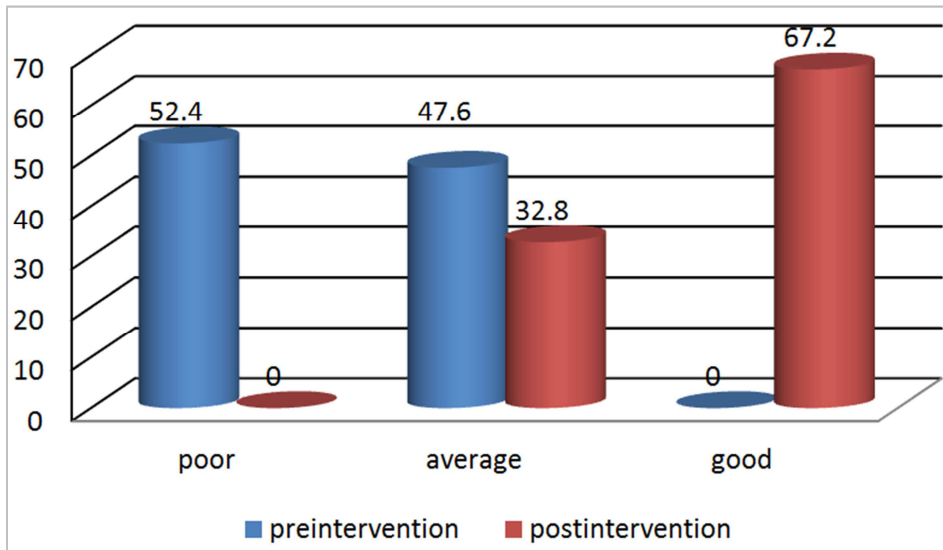


Figure 1. Percentage distribution of total knowledge score pre and post educational program of the students regarding vulvitis (n=250).

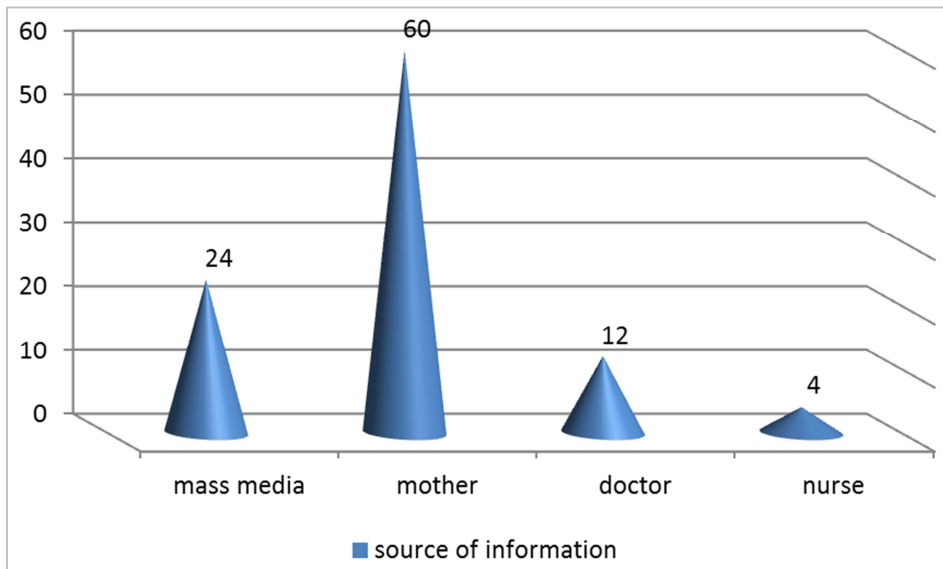


Figure 2. Percentage distribution of the students regarding sources of information about vulvitis (n=250).

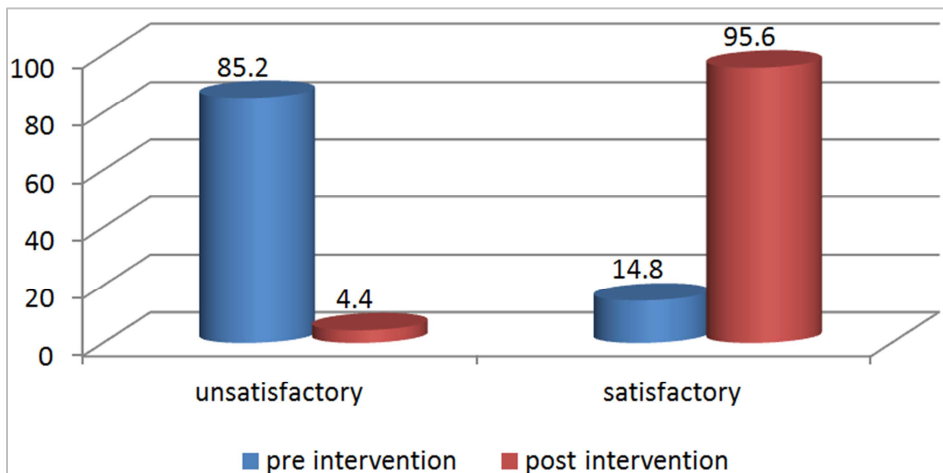


Figure 3. Percentage distribution of total practice score of the students regarding prevention vulvitis pre and post educational program (n=250).

**Table 5.** Frequency distribution of the students regarding their general hygienic reported practices for prevention of vulvitis pre and post educational program(n=250).

items	Pre educational program				Post educational program				Chi square test	p value
	done		Not done		done		Not done			
	No	%	No	%	No	%	No	%		
Washing hand before and after bathing	201	80.4	49	19.6	245	98.0	5	2.0	20.929	0.000**
Cleanliness vulva after each toilet	196	78.4	54	21.6	248	99.2	2	0.8	7.318	0.007*
dryness of vulva after cleanliness	188	75.2	62	24.8	233	93.2	17	6.8	55.309	0.000**
Wearing cotton under wear	201	80.4	49	19.6	228	91.2	22	8.8	98.953	0.000**
Wearing loose under wear	120	48.0	130	52.0	237	94.8	13	5.2	12.658	0.000**
Continuous changing of underwear	190	76.0	60	24.0	239	95.6	11	4.4	36.437	0.000**
Use chlorine and potash for washing underwear Clothes	83	33.2	167	66.8	234	93.6	16	6.4	22.226	0.000**
washing underwear clothes by hot water	137	54.8	113	45.2	243	97.2	7	2.8	8.731	0.003*
Exposing clothes to sun rays	142	56.8	108	43.2	241	96.4	9	3.6	12.275	0.000**
Avoiding use hair removal cream	36	14.4	214	85.6	226	90.4	24	9.6	4.466	0.035*

\*\*Highly statistically significant difference at  $P \leq .001$ \* Statistical significant difference at ( $p \leq 0.05$ )**Table 6.** Frequency distribution of the students regarding their hygienic reported practices during menstruation pre and post educational program(n=250).

Items	Pre educational program				Post educational program				FET	p value
	Done		Not done		Done		Not done			
	No	%	No	%	No	%	No	%		
Taking a shower during menstruation	193	77.2	57	22.8	239	95.6	11	4.4	38.960	0.000**
Cleaning vulva from front to back	186	74.4	64	25.6	238	95.2	12	4.8	36.633	0.000**
Disinfecting toilet before and after use	176	70.4	74	29.6	240	96.0	10	4.0	24.775	0.000**
Using sanitary pad	225	90.0	25	10.0	247	98.8	3	1.2	27.328	0.000**
Use sanitary pad made from cotton	184	73.6	66	26.4	245	98.0	5	2.0	14.224	0.000**
-Changing pad after each bath	152	60.8	98	39.2	242	96.8	8	3.2	5.328	0.021*
Changing pad every 4 hours especially in 1st days then 8hourey	193	77.2	57	22.8	229	91.6	21	8.4	19.917	0.000**
Carefully using personal hygiene Instrument	180	72.0	70	28.0	237	94.8	13	5.2	35.262	0.000**
Exposing personal hygiene instrument to sun rays	159	63.6	91	36.4	231	92.4	19	7.6	4.104	0.043*
Adding antiseptic solution to water during Washing	200	80.0	50	20.0	248	99.2	2	0.8	8.065	0.005*

FET= Fisher Exact Test

\*\*Highly statistically significant difference at  $P \leq .001$ \* Statistical significant difference at ( $p \leq 0.05$ )**Table 7.** Frequency distribution of the students attitude about prevention of vulvitis pre and post educational program (n=250).

Items	Pre educational program						Post educational program						FET	p
	Agree		Uncertain		Disagree		Agree		Uncertain		Disagree			
	No	%	No	%	No	%	No	%	No	%	No	%		
Presence of vulvitis affect health negatively	187	74.8	38	15.2	25	10	214	85.6	36	14.4	0	0.0	186.593	0.000**
Using public toilet increase risk for vulvitis	141	56.4	76	30.4	33	13.2	239	95.6	11	4.4	0	0.0	75.662	0.000**
Cleaning and disinfect the toilet reduce risk for vulvitis	171	68.4	36	14.4	43	17.2	228	91.2	22	8.8	0	0.0	52.819	0.000**
Carful dryness of genital organ reduce risk of infection	161	64.4	68	27.2	21	8.4	246	98.4	4	1.6	0	0.0	7.366	0.025*
Strong cleaning vulva help the growth of bacteria	94	37.6	96	38.4	60	24.0	231	92.4	19	7.6	0	0.0	65.115	0.000**
Setting in warm water increase risk for infection	85	34.0	107	42.8	58	23.2	192	76.8	58	23.2	0	0.0	75.275	0.000**
Using hot baths increase risk for infection	102	40.8	103	41.2	45	18.0	220	88.0	30	12.0	0	0.0	48.654	0.000**
Wearing cotton underwear help to reduce infection	156	62.4	48	19.2	46	18.4	209	83.6	41	16.4	0	0.0	82.555	0.000**
Wearing tight clothes increase risk for infection	152	60.8	50	20.0	48	19.2	233	93.2	17	6.8	0	0.0	72.961	0.000**
Continuous changing of underwear reduce infection	180	72.0	27	10.8	43	17.2	239	95.6	11	4.4	0	0.0	55.391	0.000**
Cotton sanitary pad help to a reduce infection	196	78.4	54	21.6	0	0.0	245	98.0	5	2.0	0	0.0	18.518	0.000**
Changing pad every 4 hours in 1st days then 8hours	148	59.2	78	31.2	24	9.6	229	91.6	21	8.4	0	0.0	50.554	0.000**
Frequency Change pad help to reduce infection	204	81.6	8	3.2	38	15.2	244	79.6	6	2.4	0	0.0	34.297	0.000**
Personal hygiene instrument is a primary preventive measure from infection	155	62.0	78	31.2	17	6.8	242	96.8	8	3.2	0	0.0	113.272	0.000**
Exposing the personal clothes to sun rays help to reduce infection	121	48.4	91	36.4	38	15.2	234	93.6	16	6.4	0	0.0	95.367	0.000**
Using of hair removal cream lead to infection	42	16.8	136	54.4	72	28.8	230	92.0	20	8.0	0	0.0	53.744	0.000**
-Using antiseptic solution reducing infection.	136	54.4	49	19.6	65	26.0	195	78.0	55	22.0	0	0.0	117.448	0.000**

\*\*Highly statistically significant difference at  $P \leq .001$ FET= Fisher Exact Test\*Statistical significant difference at ( $p \leq 0.05$ )



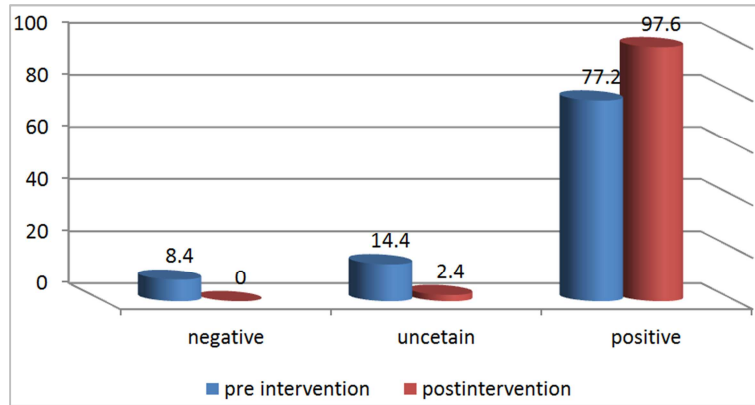


Figure 4. Percentage distribution of total attitude score of the students regarding prevention of vulvitis pre and post educational program (n=250).

Table 8. Correlation coefficient between students' the total knowledge, total attitude and total practices score pre and post educational program.

Score	Time of assessment	Total attitude score		Total practice score	
		r	p-value	r	p-value
Total knowledge score	Pre-intervention	0.157	0.01*	0.140	0.02*
	Post-intervention	0.560	0.000**	0.651	0.000**

\*\*A highly statistical significant correlation ( $p \leq 0.01$ )

\* statistical significant correlation ( $p \leq 0.05$ )

Table 9. Relation between socio-demographic characteristics and students total knowledge, total attitude and total practices score pre and post educational program.

Personal characteristics	knowledge Pre educational program						knowledge Post educational program					
	Good		Average		poor		Good		Average		Poor	
	No	%	No	%	No	%	No	%	No	%	No	%
Age in (years)												
18-	0	0	29	11.6	27	10.8	38	15.2	18	7.2	0	0
19-	0	0	89	35.6	100	40	125	50	64	25.6	0	0
$\geq 20$	0	0	1	0.4	4	1.6	5	2	0	0	0	0
FET p value	1.940 p value 0.379						2.548 p value 0.280					
Residence												
Urban	0	0	36	14.4	15	6	44	17.6	7	2.8	0	0
Rural	0	0	83	33.2	116	46.4	124	49.6	75	30	0	0
FET p value	13.575 p value 0.000						10.576 p value 0.001					
Personal characteristics	Practice pre intervention						Practice post intervention					
	satisfactory		Unsatisfactory				satisfactory		unsatisfactory			
	No	%	No	%	No	%	No	%	No	%	No	%
Age in (years)												
18-	9	3.6	47	18.8	52	20.8	4	1.6				
19-	28	11.2	161	64.4	182	72.8	7	2.8				
$\geq 20$	0	0	5	2	5	2	0	0				
FET p value	0.940 p value 0.625						1.450 p value 0.484					
Residence												
Urban	18	7.2	33	13.2	44	17.6	7	2.8				
Rural	19	7.6	180	72	195	78	4	1.6				
FET p value	21.340 p value 0.000						13.246 p value 0.000					
Personal characteristics	Attitude pre intervention						Attitude post intervention					
	Positive		Uncertain		Negative		Positive		uncertain		Negative	
	No	%	No	%	No	%	No	%	No	%	No	%
Age in (years)												
18-	47	18.8	9	3.6	0	0	56	22.4	0	0	0	0
19-	143	57.2	26	10.4	20	8	183	73.2	6	2.4	0	0
$\geq 20$	3	1.2	1	0.4	1	0.4	5	2	0	0	0	0
FET p value	7.426 p value 0.115						1.984 p value 0.371					
Residence												
Urban	37	14.8	14	5.6	0	0	46	18.4	5	2	0	0
Rural	156	62.4	22	8.8	21	8.4	198	79.2	1	0.4	0	0
FET p value	13.140 p value 0.001						14.994 p value 0.000					

\*\*Highly statistically significant difference at  $P \leq 0.001$

\* Statistical significant difference at ( $p \leq 0.05$ )

## 4. Discussion

Vulva hygiene has a key role in preventing vulva infections; Nurses play a critical part in preventing situations which lead to gynecological infections and in finding out wrong hygiene habits and determining the correct practices. The nurses can undertake the role of a health educator and mentor through proper approaches in identifying and resolving gynecologic problems. Within the context of reproductive health services, nurses are typically expected to have knowledge on the causes of vulvitis and other infections and on the methods of preventing and managing such conditions and teaching these to women. Education provided to women, particularly young female, by nurses and by trainers who have relevant experience and knowledge may ensure proper hygiene practices [26]. The aim of the present study was to evaluate the effect of educational program on vulvitis prevention among nursing students. The present study was framed on the light of the study hypothesis and supported the study hypothesis (Student nurses who received educational program would have improved knowledge, attitude and practices regarding prevention of vulvitis than before educational program).

Regarding socio-demographic characteristics of the students, the results showed that, the mean ages of students were  $18.81 \pm 0.44$  years; this is may be due to considered this age more vulnerable to infections, and infection complications due to deficient knowledge. Around three quarters of them were living in rural areas, all nursing students were single and about three fifths the mothers have basic and secondary education. This result is in the same line with *Ibrahim et al.*, [27] who reported that the majority of female students were single and between ages of 18-19 years, more than three quarters of them were from rural areas and more than one-third of their mothers' can't read & write, and just less than half of them completed only primary education. Also is similar to the findings reported by *Mittal and Goel*, [28] and *Akhtar et al.* [29] who assessed the knowledge and perception about the reproductive health issues among unmarried girls aged 15-19 years. More than half of their respondents were aged 18-19 years (55%). Also in congruent with *Khedr*, [30] more than two third of students' age was ranged from 21-23 years old (71.9%) and (68.2%) were from rural areas.

Concerning menstrual history of the nursing students, the present study showed that the mean age of menarche  $13.90 \pm 1.43$  and that the majority of them frequency of menstruation every twenty six to thirty days. Moreover, about two thirds of students' duration of menstruation from three to five days and most of them complained from dysmenorrhea. This finding agree with *Tolossa & Bekele*, [38] who indicated that among the study participants, (64.2%) started menstruation at the age of 13-15 years followed by the age of <13 years (22.5%) The usual menstrual cycle of the participant was 28 days (57.8%) and menstrual duration was 4-5 days (56.2%).

Also consistent with *Kulkarni & Durge*, [39] revealed that the mean age at menarche of 13.15 and 13.16 years

respectively. in the same line with *Amaze et al.*, [40] who found that high percent of sample was frequency of menstruation regular (84.6%) in addition agree with *Mohite et al.*, [41] who find that 36.08% frequency of menstruation irregular and 63.91% regular menstruation as similar to *patil & angadi*, [42] 7.5% girls had irregular cycle. these result were in disagreement with *lee*, [43] who studied: menstruation among girl in Malaysia: cross section school survey, reported that: abnormal cycle length, majority of a menstrual cycle longer than 35 days these is may be due to emotional and environmental factor or difference due to female students neglect of their complaints or shame to speak about menstruation with a strange person

Dysmenorrhea is the commonest gynecologic disorders among female and is among the commonest gynecologic complaints in young female who present to doctors today. The result of the present study showed that, the majority of students complain from dysmenorrhea this reported agree with *Anandha et al.*, [44] who studied, prevalence of premenstrual syndrome and dysmenorrhea among female medical students and its association with college absenteeism, found that 51% had dysmenorrhea, 66.1% of the students reported pain with menstruation during the previous 3 months. The severity of dysmenorrhea varied greatly.

As regard the previous history of vulvitis among the nursing students less than quarter of them complain of vulvitis and two third of student didn't consult a doctor because all students feeling shyness. This may be due to the Egyptian culture. Traditionally in Egypt, females were shielded from information about reproduction and sexuality until the time of marriage. These results are consistent with *Chauhan, et al.*, [31] who showed that out of total 195 girls who had genital tract infection, 170 girls didn't approach any health facility for the treatment due to various reasons like shyness in 95(55.88%) girls, financial constraint among 65 (38.23%) girls & lack of awareness among 10 (5.89%) girls. Also In the same line with *Kennedy et al.*, [32] in 2010 shows treatment seeking behavior for genital tract infection was only 18% & 12.6% girls respectively.

Regarding, the students total knowledge score pre and post educational program regarding vulvitis the current study illustrated that, more than half had a poor knowledge regarding vulvitis before educational program compare to after program about two thirds had good knowledge. This may be attributed to insufficient education related to reproductive health. this result agreement with *Chauhan*, [33] who reported that significant difference between the mean of pre-test and post-test at  $p < 0.05$  level. Hence, it is interpreted that planned teaching programmed regarding reproductive tract infections was effective in increasing the knowledge of female. Also congruent with *El-Beih et al.*, [34] who pointed out that the majority of the studied students had unsatisfactory knowledge score level about reproductive tract infections. Moreover these findings similar to *Yarmohammadi, et al.*, [35] who showed that, health education in the first and second level of prevention of

genital infection significantly increase after the intervention compared to its previous status in relation to health care by female

Concerning sources of knowledge regarding knowledge about vulvitis, the present study revealed that the main sources of the students' knowledge mothers then mass media. These findings agreed with *Tiwari*, [36] who found that the major sources of information were the mother (60.7%) or elder sister (15.8%) In addition the findings were supported by *Ahmed*, [37]; found that students' mothers were the main sources of adolescent students' knowledge.

Menstruation is a normal physiological phenomenon throughout the childbearing years of the female. Poor hygiene practice during menstruation has been associated with serious ill-health ranging from reproductive tract infection, urinary tract infection, etc. Females are generally expected to exercise good hygienic practices during menstruation to prevent themselves from these problems. In our study, revealed that the majority of students done correct hygienic practices during menstruation regarding used sanitary pads and clean vulva from front to back before educational program with high significant difference after program. This is may be due high availability and increased awareness from television regarding availability and use of sanitary pad. This is consistent with the findings of *Bhattacharjee et al.*, [45] who reported that the majority of girls followed correct hygienic practices during menstruation with respect to the type of towels used were those who used sanitary pads (85.1%). Similarly with *Sevil et al.*, [26] reported that, front to backward genital cleaning and changed pads 6 times or more a day was favored by more than half of the students.

Also the results of current study revealed that the majority of studied student take shower during menstruation after educational program compare with pre program with highly significant difference, This is may be due traditionally forbidden bathing during menstruation in rural cultures in Egypt. This result agreement with *Unni*, [46] who showed that 30.5% of women did not consider bathing during menstruation is healthy, they have persistent belief that bathing during the menstruation is dangerous. Actually, the menstruation is a period of uncleanness and the individuals are at highest risk of infection which requires regular bathing, and reported that a significantly higher proportion was found to bath during menstruation after they had received health education. *El- Gilany*, [47] found that in Egypt, the proportion of females who bath during menstruation was high (70.9%) after education program application. In addition *Anuradha*, [48], illustrated that, hygiene related practices of women during menstruation are of considerable importance as it has a health impact in terms of increased vulnerability to infection.

The type and cleanliness of the underwear as well as the frequency with which it is changed are important factors regarding the risk of getting a vulvitis. Nylon and synthetic underwear does not absorb perspiration as much as the cotton underwear does, causing the perineum to remain humid and

leading an increased risk of genital tract infections *Glenville*, [49]. The present study also demonstrated highly significantly difference ( $p=0.001$ ) after educational program about underwear should be made from cotton, frequency change, Wearing loose under wear, washing by hot water, Using chlorine and potash and exposed to sun

Regarding total students reported practices towards prevention of vulvitis, the present study revealed that the majority of them had unsatisfactory practice regarding menstrual and general hygiene practice before educational program compare with the most of them had satisfactory practice after program. This may be due to the insufficient knowledge and lack of awareness about hygienic practices that negatively affects their practice. This result agrees with *Thakree et al.*, [50] who revealed that, practices of studied females toward cleaning of the external genitalia was unsatisfactory. This may be attributed to insufficient education related to reproductive health.

The researchers believe that having information and knowledge alone is not sufficient to perform self-care behaviors, but the thought and attitude about a disease is an important factor to do or not to do a preventive measure and thoughts lead to behavior and action *Amini*, [51]. In connection with the attitude in this study, there was illustrated that the majority of them had positive attitude after educational program compare to before program. These result similar with *Gaferi*, [52] illustrated that, the highest positive attitudes (96.6%) and (96.3%) were toward education about puberty associated changes and attention to personal hygiene. Moreover similar with *Freeman, et al.*, [53] discussed the importance of skills-based health education using participatory activities to help female acquire knowledge and develop the attitudes and skills required to adopt healthy behaviors.

Regarding correlation between students total knowledge, total practices and total attitudes scores, the present study revealed that, positive statistically significant correlation before educational program compare to after program a positive highly statistically significant correlation. These findings are consistent with *Kadam & Shinde*, [54] who concluded that structured educational program was highly effective to improve the knowledge score and to improve the coping attitude score of subjects towards genital infection Also agreement with *Mudey, et al.*, [55] added in "a cross sectional study on the awareness regarding safe and hygienic practices amongst adolescent girls in the rural areas of wardha district" that inappropriate information about hygiene is the main cause of wrong practices predisposed to genital infection. Proved that genital infections due to lack of information about vulva hygiene. Moreover agreement with *Gothanka, et al.*, [56] who reported that, the majority of females had positive attitude regarding reproductive health and the importance of education, personal hygiene during menstruation also in the same line with *Bobhate & Shrivastava*, [57] who mentioned that significant association was observed between having good/fair knowledge and good practice regarding menstrual health.

Regarding relation between socio-demographic characteristics and nursing students total knowledge, total attitude and total practices scores, there was insignificant relation between age and students total knowledge, total attitude and total practices scores before and after educational program. This may be due to the students approximately the same age. Also there was highly significant relation between students' total knowledge, total attitude and total practices scores and residence before and after educational program ( $p \leq 0.001^{**}$ ). This may be due to increase awareness in the urban area than in rural area. This finding in the same line With *Jamshidi, et al.*, [58] who mentioned that The total mean score of knowledge and total mean score of practice had not a significant relation with age, also consistent with *El-Beih et al.*, [34] who reported a highly statistical significant relation between students' total knowledge score level and their residence.

Finally the previous findings of the present study are attributed to the importance of educational program in improving students' knowledge, practices and attitude which raise awareness, improved outcome towards prevention of vulvitis.

## 5. Conclusion

Based on the results of the present study, it can be concluded that, there was a statistically significant improvement in nursing students' total knowledge, total practice and total attitude scores after the educational program. There is highly statistically significant correlation between students total knowledge, total practice and total attitude scores after educational program. Also insignificant relation between students' total knowledge, total attitude and total practice scores with their age and significant relation between total knowledge, total attitude and total practice scores with their residence, Moreover, the above mentioned results supported and reinforced the study hypothesis.

## Recommendations

In the light of the findings of current study the following recommendations were suggested:

1. Provide students booklets and pamphlet about healthy habits and measures to prevent infection in reproductive system.
2. Replication of the study on a larger sample and in different geographical areas in Egypt is recommended for generalization of findings.

## Limitation of the Study

Space time of participating students was limited and some students were absent they needed more effort and time from the researchers

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