

Assessment of Cofactors that Provoking Genital Tract Infection among Women Diagnosed with Gynecological Infection

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1.ABSTRACT

Background: Genital Tract Infections are considered a major public health problem among women. It is associated with negative impacts on sexual and family lives. **Aim:** This study aimed to assess the cofactors that provoking genital tract infection among women diagnosed with gynecological infection. **Methods:** A descriptive research design was utilized to conduct this study at Gynecology outpatient clinics at Obstetrics & Gynecology New Hospital, Mansoura University, Daqahliya governorate, Egypt, involving a purposive sample of 350 women diagnosed with gynecological infection during the period from February to December 2018. **Tool:** A structured interview questionnaire was used to assess general characteristics, genital hygienic practices and cofactors that provoking genital infection among studied group. **Results:** The majority of the studied group had history of genital infection and dried their genitalia with piece of cloth. Likewise, near to three quarters of them married at young age (18:25 years), bathed in sitting position, didn't wash their hands before toileting and used disposable sanitary pads. Also, more than half of them used IUD as a contraceptive method. **Conclusion:** The current study conclude that marriage at young age, having history of genital infection, bathing in sitting position, not washing hands before toileting, drying genitalia with piece of cloth after toileting, using disposable sanitary pads & IUD as a contraceptive method were the common cofactors that provoke genital tract infection among the studied group. **Recommendation:** Developing health education program aims to improve women's awareness about cofactors that provoking genital tract infection.

Keywords: *Cofactors, Gynecological infection, Provoked.*

2.Introduction:

Genital tract infection (GTI) is a common worldwide health problem among women. It is associated with negative impacts on sexual and family lives. GTI is considered as the foremost causes that lead women to seek medical attention at the obstetrics and gynecology polyclinics (Elbially, El-Shafie, Ebrahim & Khaton, 2019). Globally, approximately 374 million new infections worldwide are exposed yearly to GTIs including trichomoniasis, gonorrhea, chlamydia and syphilis. Also, it was estimated that more than one million cases of GTIs occur every day, while the majority of them had a past history of GTIs (World Health Organization (WHO), 2021).

Genital tract infection includes a variety of different diseases of the genital tract, including vulvitis, vaginitis, cervicitis, and pelvic inflammatory disease (PID), with clinical features such as bilateral lower abdominal tenderness, abnormal vaginal or cervical discharge, fever, abnormal vaginal bleeding, dyspareunia, vaginal itching, and adnexal tenderness (Elbially, et al., 2019; Leifer & Keenan-Lindsay, 2019). GTIs are

more likely related to decrease in vaginal acidity either endogenously by hormones or exogenously by vaginal unhygienic practices such as, excessive use of soaps or intra-vaginal cleansing, excessive vaginal douching, poor menstrual hygiene, reusing premenstrual pads, using of irritating and / or tight nonabsorbent underwear (Abd EL-Menim, Moursi & Sarhan, 2018 & Mohammed, El Kholy, Abd-Elsalam & Ramadan, 2018).

Genital tract infections are associated with numerous risk factors including pregnancy, uncontrolled diabetes mellitus, tight unfitting clothing, synthetic underwear, increase sexual activity and vaginal douching, administering of broad-spectrum antibiotics, contraceptives, hormonal replacement therapy and corticosteroids (Paladine & Desai, 2018).

Nurses have the main role in educating woman about GTIs; their signs, symptoms, complication, treatment, how GTIs occur, cofactors that provoking it's occurrence, how to avoid occurrence of infection and how to cope with it's complication. Furthermore, nurses help women to

identify inappropriate hygiene habits to avoid and determining the appropriate practices to do it. As a part of their education and guiding positions, nurses carry responsibilities regarding reproductive health of the women within the scope of preventive medicine (Abd EL-Menim, et al., 2018; Mohammed, et al., 2018).

2.1 Significance of the study

Genital tract infection is one of the most wide spread health concerns & represent global health problems. It has a main role in gynecology and infertility, affecting the ovary, uterus, the embryo and implantation, which can significantly impair women' health and quality of life. Also, GTI is considered as one of the main causes of maternal morbidity and mortality (Kumari, 2019). Untreated GTIs lead to many complications as pelvic inflammatory disease, ectopic pregnancy, premature births, stillbirths, miscarriages, infertility problems, carcinoma of cervix, congenital anomalies, prognosis of genital tract malignancy (Elbially, et al., 2019; Raman, 2019).

In developing countries, the incidence and prevalence of GTI is very high. In Egypt, a recent study conducted at Zagazig University hospitals by Rashad, Mohamed, Emar, Elsabiey & Morsy, (2021) reported that the majority of the studied women had previous vaginal infection. Another study in Assuit conducted by El-Moselhy et al., (2020), reported that 38% of women were diagnosed as vulvo-vaginal candidiasis, 14% with trichomoniasis and 11% with bacterial vaginosis. Also, Zaher, Khedr & Elmashad, (2017) at Mansoura University showed that 69.8% of the women complained of abnormal vaginal discharge.

Several studies (Hillier, et al., 2021; El-Moselhy et al., 2020; Ahmed & Mohamed, 2019) showed that GTIs are widely spread among women in reproductive age resulting in serious GTIs consequences on women health and society. Thus, there was an urgent need to conduct this study to assess the cofactors provoking GTI.

2.2 Aim of the study

The aim of this study was to assess the cofactors that provoking genital tract infection among women diagnosed with gynecological infection.

2.3 Research question

What are the cofactors that provoking genital tract infection among women diagnosed with gynecological infection?

3. Subjects and Method

3.1 Study Design

A descriptive research design was used to accomplish the aim of this study. The design allows the researcher to describe the study variables as it without manipulating them at specific point of time for defined population.

3.2 Study Setting

The study was conducted at outpatient clinics of Obstetrics & Gynecology New Hospital in Daqahliya governorate, Egypt. They are consisting of eight clinics (three for antenatal follow up, one for vesicular mole pregnancy follow up, one for 4-dimension ultrasound room & two for gynecological cases follow up (Each clinic consists of an examination bed, a table, four chairs and a wardrobe with bed sheets, supplies and machines used in examination and diagnosis, and a basin for washing hands). Nearly 500 patients per week visiting the outpatient clinics for treatment and care

3.3 Study Subjects

This study utilized a purposive sample technique of 350 women who were attending the study sitting from February to December 2018 and they were selected according to the following criteria

Inclusion criteria

- Married women.
- Women who diagnosed with gynecological infection.
- Women's age between 18 and 49 years.

Exclusion criteria

- Divorced & widow women.
- Women who hadn't menses (amenorrhea).

3.4 Sample Size Calculation

Calculating sample size using Dss.research.com web site, as the prevalence of vaginal infection among married women in reproductive age was 93.6% (Hayat, et al., 2015) and it is expected to be 90.0 % in our locality and at confidence 95.0% (∞ error 5.0%) and power of study 80.0% (β error 20.0%); the calculated sample size was 331 women and adding 5.0% for better data quality. So, the study sample was 350 women.

3.5 Tool of Data Collection

The data was collected by using structured interview questionnaire schedule that was designed by the researcher using the national and international references. The questionnaire was consisted of three parts

Part I: This part was designed to collect general characteristics of the studied group which include age, level of education and Obstetric.

Part II: This part was designed to assess the cofactors that provoking genital infection such as age of marriage, frequency of sexual activity / week, husband suffering from GTI before, recurrence of genital tract infection during last year, frequency of recurrence, family planning history.....etc.

Part III: This part was designed to assess the general hygienic practices that provoked genital tract infections among the studied group such as bathing position, underwear type, hand washing before toilet, mode of cleaning the external genitalia, genitalia washing technique after toileting, randomly genitalia drying technique after toileting, napkins type used for drying genitalia after toilet...etc.

3.6 Validity of the study tool:

The content validity of the study tool was determined after reviewing the literature then the tool was reviewed by a panel of three expertise (Assistant Prof. Samia Ibrahim Osman, Assistant Prof. Hanan Awad & Dr. Marwa Ibrahim Hamdy) in the field of woman health & midwifery nursing to test the validity of it's content. Accordingly, the expertise suggestions & modifications were done. These modifications included change some words to be easily understood, add the form number and the final form was used for data collection.

3.7 Reliability of the tool:

Calculating Cronbach's Alpha for the items of the tool by SPSS program. Cronbach's Alpha was (0.712) for cofactors provoking genital tract infection which indicates the reliability of the tool.

3.8 Pilot Study

A pilot study was conducted on 10% (35women) of the total study sample to test the objectivity, applicability of the study tool and the feasibility of the research process as well as to estimate the time needed to answer them. Subjects of the pilot study were excluded from the study.

3.9Field work

The official approvals to carry out the study obtained from the Dean of Faculty Nursing, the Head of woman's Health & Midwifery Department & Head of the outpatient clinics of Obstetrics & Gynecology New Hospital. The researcher attended predetermined setting from February to December 2018, three days/week from 9 AM till 2 PM until the sample size were met.

The study sample was gathered through a face-to-face interview in a private room (separated room away from the examination room). At the beginning of interview; The researcher introduced here self to the study subjects, explained the aim of the study for each one to obtain her confirmed consent to share in the study. During the interview the researcher asked women about research questions & wrote their answer in research sheet. At the end of the interview the researcher answers the women questions& told her about consequences of untreated GTIs & also about cofactors provoking GTIs occurrence & build a trust relationship with the studied group.

After collecting the required sample, the collected data entered into the SPSS program for statistical analysis and made tables & relationships between the tool items. Finally, the researcher discussed the study results with other studies in the same field.

3.10 Ethical considerations

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing – Mansoura University. Official approvals to carry out the study were obtained from the hospital authorities. Informed consent was obtained from women after explaining the aim. Confidentiality of the obtained data was maintained throughout the whole study. Women were assured that they will have the right to withdraw from the study at any time. The results were used as a component of the necessary research for master study as well as for publication and education.

3.11 Statistical analysis:

The collected data were coded, computed and statistically analyzed using SPSS (statistical package of social sciences), version 20. Data were presented as frequency and percentages (qualitative variables) and mean \pm SD (quantitative continuous variables). Chi square (χ^2) was used for comparison of categorical variables, and was replaced by Fisher exact test (FET) or Mont Carlo Exact test if the expected value of any cell was less than 5. Student's t test was used for comparison of continuous quantitative variables (two groups) and one-way anova (F test) was used for comparison of continuous quantitative variables (more than two groups). The difference was considered significant at $P \leq 0.05$.

3.12 Limitation of the study

The current study had two limitations; the first one concerned with data collection which took long time because some of the studied group refused to share in the study as they found the

research questions embarrassing for them. The second one is present of limited recent research studies that were conducted globally on GTI & it's cofactors which led to present of old studies in the current study discussion.

4.Results

Table 1: Shows that, mean age of the studied group was 31.34 ± 8.35 years, 60.3% of them had secondary education, 61.1% of studied group had pregnancy from 1-2 times and 44.3% of them had from 1-2 Para.

Table 2: Shows that, the prominent cofactors that provoking genital infection was marriage at young age (73.7%) with Mean \pm SD = 19.46 ± 3.29 years, married more than 5 years (72.3%), sexual intercourse twice or more / week (65.7%), had history of genital infection (87.7%), use IUD as a contraceptive methods (57.25%), husband had history of GTI (17.7%), exposed to gynecologic examination / last year (38.9%), had recurrent infection / last year (87.7%), infection was recurrent more than 3 times / year (61.6%) & taking the prescribed medications as doctor order (84.3 %).

Figure (1): Show that, 68.6% of the studied group who taking medication were take medication for treatment anemia.

Figure (2): Show that, the common general hygienic practices that provoking genital tract infections were use mixed underwear (48.0 %), washing external genitalia externally with water (47.1%), bathing in sitting position (71.2%), use disposable sanitary pad (73.4%), didn't wash hand before toilet (74.6%), randomly washing and drying genitalia after toilet (45.1% & 44.8%, respectively), use cotton "cloth" for during genitalia after toilet (87.7%), and didn't clean genitalia before intercourse (74.0%).

5.Discussion

The current study aimed to assess the cofactors that provoking genital tract infection among women diagnosed with gynecological infection. This aimed was achieved through answering the research question. the most prominent cofactors that provoking GTI; are the marriage at age less than 25 years & having history of recurrent GTI/ last year.

The current study findings revealed that most of the studied group who suffered from GTI were married at young age (age below 25 years). This finding agreed with the finding by **Hamed (2015)** reported that, the most of the infected subjects were married at age below 25 years. From the researcher point of view, this finding may be

due to the lack of awareness of these young women about GTI, the weaken defense of their incompletely developed genital tract against microorganism.

Regarding the duration of marriage & it's effect on GTI occurrence, the finding of the current study revealed that three quarters of the studied group who had recurrent GTI were married for more than five years. This finding was compatible with the finding by **Mohammed et al. (2018)** to assess knowledge and practice of women with lower genital tract infections; reported that near to half of the subject was married for more than five years. From the researcher point of view, this finding may occur due to recurrence of GTI & failure to follow the appropriate treatment regimen by the couples. In contrast with this finding, **Shazly & Laughlin-Tommaso (2020)** reported that GTI was more among new marriage couples. This contrast may be occurred because that newly married young couples didn't have enough information about GTI.

Repeated intercourse over a short period of time changes vaginal PH, where a single exposure to ejaculation changes vagina pH to be alkaline for 8 hours due to the presence of alkaline semen so that, women who repeat sexual intercourse within a short period of time are more likely to develop GTI (**Northrup, 2020**). The current study findings revealed that more than two thirds of the studied group who practice sexual relation twice or more / week had GTI. This finding was disagreed with the finding by **Hamed (2015)** reported that less than half of the studied group were practice sexual activity two times & more / week. This finding may be occurred due the majority of the studied group had history of GTI, practice sex during treatment, didn't complete the treatment course, reinfection from untreated couple.

Although the reviews reported that the exposure of husbands to GTI was a major factor in the exposure of their wives to this infection (**McKinney, James, Murray, Nelson & Ashwill, 2021; Northrup, 2020**). The current study found that near to three quarters of the husbands don't had history of GTI. From the researcher's point of view, this may due to near to majority (78.9 %) of husbands adhere to the medication prescribed to them by doctors for treat GTI if present.

The current study findings revealed that near to two fifth of the studied group who were exposure to gynecological examination had GTI. These results agree with the results by **Hayat et al (2015)** who evaluate health behaviors that are associated with vaginal infections among married women in Ismailia, Egypt, who reported that near

to two fifth of the studied group had vaginal infection followed gynecological examination. From the researcher point of view, this can be occurred due to contaminated of gynecological equipment & didn't follow aseptic technique during examination.

Regarding recurrence of GTI; the current study found that the majority of the studied group were suffered from recurrent GTI within the last year at least for one time, this finding agreed with the Egyptian studies carried by **Hayat et al (2015)** & **Hamed (2015)**. From the researcher point of view, the recurrence of infection may be due to failure of infected couples to follow treatment regime as prescribed or due to the random use of over counter medications.

Regarding taking prescribed medication as doctor ordered; the present study findings revealed that the majority of the studied group who take doctor consultation were taken the prescribed medication & had GTI. In contrast of that, the finding by **Hamed (2015)** reported that more than half of the infected women didn't take the prescribed medication. This disagree can be occurred because the subjects stop completing the treatment course once infection signs & symptoms disappear, due to practices sexual relation during taking the treatment course and also can be occurred due to re infected from un treated infected couple.

Eating healthy diet is important to help the body to fight infection. The current study finding reported that more than two thirds of the studied group who taken drugs for anemia treatment had GTI. This study finding was agreed with **Hayat et al (2015)**. From the researcher view; this may be explained why study subjects suffered from recurrence of GTI due to the weaken immunity & increased risk for infection as secondary effect of anemia.

The findings of the current study revealed that, more than half of studied group who contraceptive user were use IUD. The present study finding was in agreement with the Egyptian study carried by **Ahmed & Mohamed (2019)** who assessed the effect of nursing intervention on knowledge about genital hygienic practices regarding vaginal infection among intrauterine device users and non-users, reported that; the usage of IUD as a contraceptive method can lead to GTI, because it considered as a foreign body & causes irritation to the surrounding tissues inside the uterus and vagina and because infection can be occurred during insertion or removal of IUD.

The current study revealed that, nearly half of the studied group using mixed underwear. This

result was in agree with the finding by **Hamed (2015)** who assess the impact of genital hygienic practices on the occurrence of vaginal infection, and to develop a nursing fact sheet as a prevention message for vulnerable women, reported that; more than half of the subjects used mixed underwear. The concordance in these results is due to the fact that the subjects of the two research have the same socio-culture as well they were in the same age. While it was in contrast with the study carried by **shah et al. (2019)** to assess the knowledge and practice of genital hygiene among adolescent girls at Lalitpur Metropolitan City, Nepal, reported that; the minority of the subjects used mixed underwear. This contrast can be due to the cost of cotton underwear is very high & also due to the low level of income of the women.

It has been known that; the most important and simplest practice that prevent GTI is washing hands with water, soap and when necessary with an antiseptic solution before & after toileting (**shah et al. 2019**). The finding of current study revealed that the minority of the subjects wash their hands before toileting but almost all of them washing their hands after toileting. The studies by **Yaşar, Terzioğlu & Gülten (2017)** who done to determine the knowledge and practices of genital hygiene of visual-disabled women & **Zaher et al. (2017)** were in agree with the current findings in which the minority of subjects in their studies washed their hands before toileting but the majority wash their hands after toileting. This can be due to most of subjects didn't know that their hands could be contaminated with microorganisms & needed for washed before toileting.

Regarding to the type of napkins used for drying genitalia after toileting; the present study found that, the majority of the studied group used a piece of cloth for drying while the minority used paper rolls for drying. This finding agreed with the findings by **Sevil, Kevser, Aleattin, Dilek & Tijen (2013)** who evaluate the relationship between genital hygiene practices and genital infection in a group of university students; reported that the minority of infected subjects were used a piece of cloth for drying. Which may be due to low income level of subjects.

While the present study finding was disagreed with **Yaşar et al. (2017)** found that the majority of their subjects used toilet roll for drying genitalia. This different may be due to different in socioeconomic status & cultures between the studied subjects and also can be due to the difference in education level and availability of toilet rolls used for drying while the current study

group didn't know the danger of using cloth pieces for drying genitalia.

Bathing in sitting position may increase the prevalence of GTI and urinary tract infections particularly during menstruation which the cervical canal width increases and infection can ascend through vagina (Umami et al. 2022). The study findings revealed that, nearly to three quarters of the studied group bathed in sitting position. From the researcher's point of view the studied group didn't realize the risks of bathing in a sitting position. In contrast the study by Sevil et al. (2013); reported that, more than three quarters of the subjects bathed in standing position

Regarding the type of perineal pads used during menstrual flow: it depends on several factors such as; personal choice, economic status, availability in the local market ...etc. (Tellier & Hyttel, 2018). The findings of the current research work revealed that, nearly three quarters of the studied group used disposable commercial perineal pad. This result was supported by Sonowal & Talukdar (2019) reported that, three quarters of the studied group used disposable commercial sanitary pad. This agreement may be due to convergence in the level of income and knowledge between subjects of both studies.

While the present study findings were incongruent with the study done by Angeline Grace, Arunkumar & Umadevi (2019) to determine the practices followed during menstruation by rural women in Kancheepuram district, Tamil Nadu, India, reported that; neare to one-third of the subjects were using commercial sanitary pad. This may be due to variation of the sociodemographic & socioeconomic characteristics between studied group.

6. Conclusion

Based on the present study findings, it is concluded that

There are several cofactors provoking GTI in which, Marriage at young age, having history of genital infection, bathing in sitting position, not washing hands before toilet, drying genitalia after toilet with piece of cloth, using disposable sanitary pads & using IUD as a contraceptive method.

7.Recommendations

In the light of the present study findings, the following can be recommended

- Developing health education program aims to improve women' awareness about cofactors that provoking genital tract infection.

Further research studies to

- Assess the barriers that hinder women to practice healthy genital hygienic practices.
- Assess the effect of providing health educations for adolescent girls about genital hygienic practices on their genital hygienic practices & on recurrent of GTIs.
- This study should be replicated on a large sample and other setting to generalize its results.

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9. Conflicts of Interests

The authors observe that there is no dispute with respect to this research.

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Table 1: Frequency Distribution of the Studied Group According to their General Characteristics

Characters	no (350)	%
Age		
18-25	92	26.3
26-33	129	36.9
34-41	76	21.7
42-49	53	15.1
Mean± SD= 31.34 ± 8.35 years		
Education level		
Illiterate	46	13.1
Basic education	45	12.9
Secondary education	211	60.3
Higher education	48	13.7
Residence		
Rural	265	75.7
Urban	85	24.3
Gravidity		
None	14	4.0
1-2	214	61.1
≥3	122	34.9
Parity		
None	51	14.6
1-2	155	44.3
≥3	144	41.1

Table 2: Frequency Distribution of the Cofactors that Provoking Genital Tract Infection of the Studied Group

Items	no (350)	%
Age of marriage (years)		
< 18 years	81	23.1
18-25	258	73.7
26-33	9	2.5
>33	2	0.6
Range: 10.0 – 40.0 years, Mean ± SD = 19.46 ± 3.29 years		
Duration of marriage (years)		

Assessment of Cofactors that Provoking Genital.....

< 1 years	28	8.0
1-5 years	69	19.7
>5 years	253	72.3
Range: 0.01 – 35.0 years, Mean ± SD = 11.85 ± 8.14 years		
Frequency of sexual activity / week		
None	7	2.0
Once	113	32.3
Twice or more	230	65.7
Husband having history of GTI*		
Yes	62	17.7
No	258	73.7
Do not know	30	8.6
Exposure to gynecologic examination / the last year		
Yes	136	38.9
No	214	61.1
Recurrence of genital tract infection / last year		
Yes	307	87.7
No	43	12.3
Frequency of recurrence (n = 307)		
Once	31	10.1
2-3 times	87	28.3
>3	189	61.6
Complies to prescribed medications as ordered (n = 235)		
Yes	198	84.3
No	37	15.7
Husband comply to prescribed medication (n = 71)		
Yes	56	78.9
No	15	21.1
Type of contraceptive(n=138)		
IUD*	79	57.25
Injectables	10	7.25
Implanon	2	1.45
Oral contraceptive	25	18.12
Barrier methods	18	12.32
Tubal ligation	5	3.61

GTI* Genital Intract Infection.

IUD * Intra Uterine Device

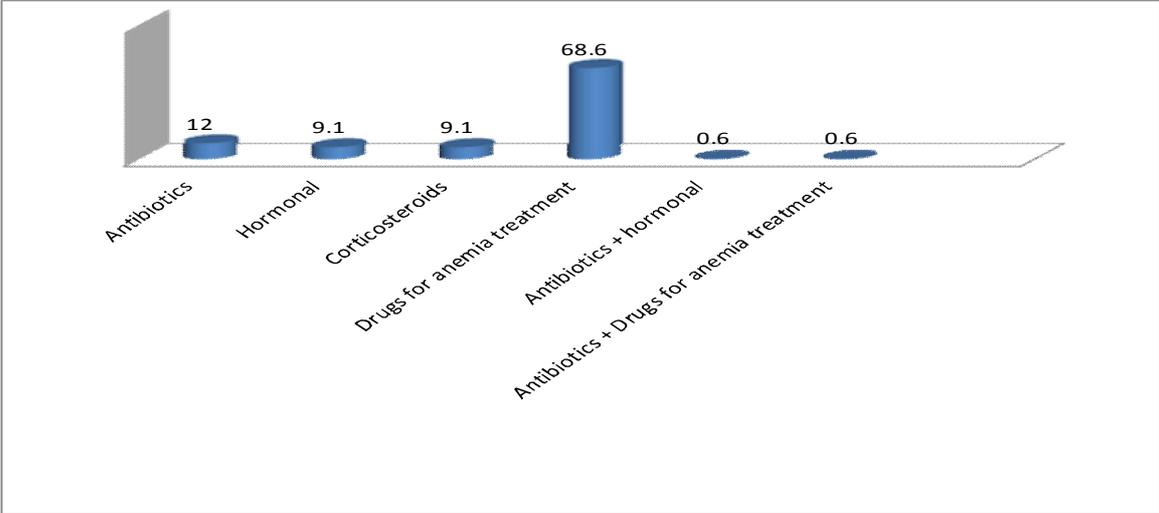


Figure (1): Frequency Distribution of the Studied Group according to the Type of Medications Used.

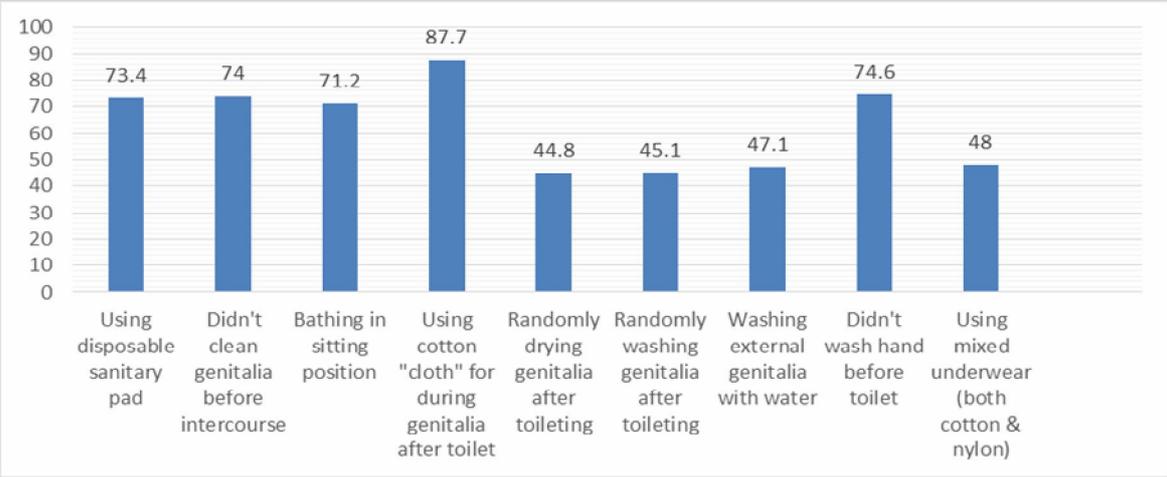


Figure (2): Frequency Distribution of the General Hygienic Practices that Provoking Genital Tract Infections among the Studied Group