

Effect of Instructional Guidelines on Knowledge and Self-care Practices of Pregnant Women with Urinary Tract Infections

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Abstract

Background: Urinary tract infections are the most typical bacterial infection that can occur during pregnancy, and they are the cause of a number of issues that can harm the mother as well as the fetus. Good management based on accurate information and more satisfying self-care practices is key to prevent these issues. **Aim of the study:** To evaluate the effect of instructional guidelines on knowledge and self-care practices of pregnant women with urinary tract infections. **Subjects and method:** **Research design:** Quasi experimental design (pre/post-test). **Setting:** The study was carried out at antenatal care unit in outpatient clinic, at Zagazig University Hospital. **Subjects:** A purposive sampling of 120 pregnant women with urinary tract infections were enrolled and equally divided into intervention and control groups. **Tools of data collection:** Three tools were used. **Tool I:** A structured interviewing schedule which composed of 3 Sections, **Tool II:** **Severity of** urinary tract infections symptoms assessment scale and **Tool III:** Self-assessment interviewing schedule: To assess pregnant women's self-care health practices for urinary tract infections. **Results:** There was a highly statistically significant improvement in total score of all areas of knowledge and total score of self-care practices post intervention in the intervention group than those in control one. Also, there was a highly statistically significant difference in the improvement of urinary tract infection symptoms as reported by pregnant women in intervention group as compared to control group after applying the nursing guidelines. **Conclusion:** The instructional guidelines have been an effective intervention to improve the knowledge of pregnant women and give suitable self-care practices of urinary tract infections that lessen the severity of symptoms. **Recommendations:** All pregnant women should take part in a continuing health education program to better understand urinary tract infections and prevent them from occurring again throughout pregnancy.

Keywords: Instructional Guidelines, Knowledge, Self-care practices, pregnant women, urinary tract infections

Introduction:

Urinary tract infections (UTIs), which are also the second-most prevalent medical complication after anemia, are particularly prevalent during pregnancy. A urinary tract infection is the growth and spread of germs within one or more urinary system organs, including the urethra, bladder, ureter, and kidney. ⁽¹⁾

The term "UTI" covers a wide variety of clinical disorders, from mild kidney and urinary tract infections to uncomplicated bacteriuria with no symptoms. Pregnant women are regarded to be the most susceptible to UTI ⁽²⁾. Due to mechanical and physiological changes, urinary infections in pregnant women were more likely to occur. These infections first appeared in the sixth week and intensified between weeks 22 and 24 ⁽³⁾.

According to estimates, 40% to 50% of women may encounter a symptomatic UTI at least once in their lives, and 25% of women are thought to have a UTI every year. The prevalence of UTIs in pregnant women ranges from 7.2 to 10.4%, and 20 to 40% of them experience symptoms if ignored. Furthermore, studies show that 20% of pregnant women may have colonies of Group B streptococci in their urine. ⁽⁴⁾

Both the mother and the foetus may have severe negative effects from UTIs. Premature birth, low birth weight, sepsis, pneumonia, cystitis, pyelonephritis, and intrauterine growth restriction are a few of the consequences. ⁽⁵⁾

Therefore, all pregnant women should undergo routine urine testing for germs at the beginning of their pregnancy and again at 28 weeks. A low-dose antibiotic course may be beneficial for some pregnant women with

recurrent UTIs in order to avoid reinfection and severe maternal and perinatal morbidity⁽⁶⁾. Quick treatment of urinary tract infections, follow-up care, and clinical evaluation by urine sample and culture, and appropriate self-care practices are necessary to reduce morbidity during pregnancy.⁽⁷⁾

The term "self-care practices" referred to the creation and use of individual health routines and coping mechanisms to maintain well-being, enhance health, and prevent or lessen sickness. It is important to improve pregnant women's awareness and self-care habits in order to treat urinary tract infections efficiently with the right therapy. Regularly consuming 6 to 8 cups of water daily, maintaining good genito-urinary cleanliness, engaging in sexual activity, having routine urine tests, and maintaining a balanced diet are all good habits that should be encouraged.⁽⁸⁾

Urinary tract infections can cause negative consequences to the mother and foetus. If it is disregarded or left untreated it may cause morbidity, mortality and greater pregnancy related medical expenses.⁽⁹⁾ Thus, the maternity nurse is essential in the management and prevention of urinary infections by instructing pregnant women on healthy, effective self-care strategies for urinary tract infections that promote self-care and reduce the risk of recurrent infections.

Significance of the Study:

The most common bacterial disease and the cause of referrals for pregnant women to obstetrical wards are urinary tract infections, which affect 40–50% of women worldwide. Between 12 and 40% of urinary tract infections in pregnant women arise in developing nations because to differences in socioeconomic level and standard of living⁽¹⁰⁾. Furthermore, 22 and 35 percent of Egyptian pregnant women experience UTIs⁽¹¹⁾. Therefore, It's imperative to raise awareness of this condition among women and decrease any harmful impacts it may have. Educational initiatives can improve pregnant women's self-care practises by teaching them health rules and behaviours and helping them for following, therefore, the current study was conducted.

Aim of the study:

The aim of the study was to evaluate the effect of instructional guidelines on knowledge and self-care practices of pregnant women with urinary tract infections.

Such aim had been fulfilled through the following objectives:

1. Determine pregnant women knowledge about UTIs (pre and post intervention).
2. Assess the degree of the severity of UTIs symptoms among the pregnant women (pre and post intervention)
3. Identify pregnant women self-care practices regarding UTIs (pre& post)
4. Design, implement and evaluate the effect of instructional guidelines on knowledge and self-care practices of pregnant women with UTIs.

Research hypotheses:

H1: Knowledge of pregnant women who receive the instructional guidelines will be enhanced than those who do not.

H2: The degree of severity for UTIs symptoms will be decrease in women who receive the instructional guidelines than women who don't receive.

H3: Self-care practices of pregnant women who receive the instructional guidelines will be improved than those who do not receive.

Subjects and Method:

Research design:

Quasi experimental design (pre & posttest) with control group used to investigate the current research problem.

Study Setting:

This study was conducted at the Zagazig University Hospital's outpatient antenatal clinic. This setting was chosen since it was the major health hospital where pregnant women went for antenatal care services. The outpatient antenatal clinic is on the second floor. The main room is well-equipped for exams, while the small room is for the assisting nurse. This unit is adjacent to the gynecological unit, and it is open every day from 9 am to 2 pm.

Study Subjects:

Sampling:

A purposive sample of 120 pregnant women complained with UTIs (60 for the intervention group and 60 for the control one).

Sample size calculation:

Study was done by *Ashour, et al.*,⁽¹²⁾ found that women in intervention group who reported dysuria completely relived (45%), versus (15%) in control group, confidence level is 95% two side with power of study 80%. Sample size calculated using Open Epi, is 60 pregnant women in each group.

The control group was included the first 60 women who received the routine care, while the next 60 mother was included in the intervention group who received the instructional guidelines and met the following inclusion and exclusions criteria

Inclusion criteria: -

- Any pregnant women during their first or second trimesters diagnosed with urinary tract infection by physician based on urine culture (more than 100.000 colony forming unit [CFU]/ml of urine).
- Pregnant women with symptomatic bacteriuria.
- Willingness to engage in the study.
- No underlying obstetric or medical issues.

Tool for data collection:

In order to fulfill the objectives of the study **three tools** were used to collect necessary data:

Tool I: A structured interviewing schedule. It was created by the researchers in basic Arabic in order to gather the information required to accomplish the study's objectives. It was divided into three sections:

Section 1: Demographic characteristics of the study subjects: it composed of 5closed ended questions (as age, level of education, residence, occupation and family income level).

Section 2 : Obstetric & contraceptive history which included: number of parity, gravidity, gestational age, a history of UTIs with previous pregnancies, previous abortion, mode of last delivery, number of living children and contraceptive methods previously used and the duration of its use.

Section 3: Assessment of pregnant woman's knowledge regarding UTIs.

It was adapted from *Emiru et al.*,⁽¹³⁾ and modified by the researchers in simple Arabic language for assessing woman's knowledge about UTIs and was used in pre and post intervention. It included 13 multiple-choice questions about UTIs to gauge the knowledge of

pregnant women of the condition prior to the intervention (pre-test) and two weeks later (post-test). It included the anatomy of the female urinary system, the definition, risk factors, symptoms, diagnostic procedures, complications, treatment, and preventive practices that pregnant women utilized to avoid, manage, or treat UTIs.

Scoring system of knowledge

The overall knowledge score varied from 0 to 13, and for each question, a score of (zero) was given for an incorrect response and (one) for a correct one. To compute the knowledge score percent, the overall knowledge scores for every case were added together and expressed as a percentage of the total corrected knowledge. As a result, the overall knowledge score % has been classified into three categories, Good, Fair, and poor, based on statistical analysis. as follows:

- **Poor <50%**
- **Fair 50-75%**
- **Good >75%**

Tool II: Severity of UTI Symptoms Assessment scale (UTISA),

This scale, was used in pre & post intervention to assess the severity of the seven UTI symptoms of frequency, urgency, burning, inability to completely empty the bladder, lower abdominal discomfort, low back pain, and blood in the urine, was created by *Clayson et al.*,⁽¹⁴⁾ and modified by the researchers. On a 4-point Likert scale (absent, mild, moderate, and severe), each symptom's intensity was evaluated independently and scored from 0 to 3. A higher score meant that the symptom was very severe.

Tool III: Self-assessment interviewing schedule (SCASIS):

The researchers developed this scale after performing a literature analysis (*EL Sayed et al.*,⁽¹⁵⁾ to evaluate pregnant women's self-care practices for UTIs. It was used in pre- and post-assessment. It included practices women performed to alleviate urinary infection symptoms. It had 30 items that fell into **five categories**: nutritional habits, bathing and clothing, urinary habits, genital habits and sexual behaviors habits.

Scoring system:

Each item was to be checked on a Four-point Likert scale ranging from “never” to “always,” scored from 0-3 respectively. For scoring, the scores of the items of each of the five categories and for the total scale were summed-up and the totals converted into percent scores ranging from 0 to 3 so that a higher score indicates more adequate practices.

Scoring system for practice:

- Satisfactory level $\geq 60\%$ of total scores
- Unsatisfactory level $< 60\%$ of total scores.

Content Validity and Reliability:

It was established for assure of content validity by a panel of three experts' professors from faculty of nursing Zagazig University (two from obstetrics and gynecological nursing and one from community nursing) who revised the tools for clarity, usefulness, comprehensiveness, and understandability. Minor modifications were applied accordingly and all suggested changes to the tools were made. The reliability of the tool's items was assessed using Cronbach's alpha coefficients to calculate the tools' internal consistency. Cronbach's alpha values for the study tools were dependable at 0.87 for knowledge, and 0.72 for severity symptoms and 0.83 for practice. All of the coefficients were acceptable and satisfactory

Pilot study

A pilot study was conducted for assessing the feasibility of the study and the clarifying of the tools used before the main investigation. 10% (12) women of the total study sample size that met the established criteria. The aim of the pilot study was to identify any issues that were unique to the statement, such as its clarity and sequence. After doing the pilot study, it was discovered that the tools' questions were relevant and understandable, but a few terms needed to be changed to make them more so. On the basis of the pilot's findings, the data gathering form was finally developed. In the primary study sample, the pilot study's participants were not included.

Field work:

The researchers visited the previously mentioned study setting and met the pregnant women who were willing to participate in the study according to the eligibility criteria. The researchers introduced themselves then

informed women about the study's objectives. They then obtained their agreement as well as to gain their cooperation. After the women's finishing their checkup and follow up visits at the antenatal clinic, they were met 3 days per week (Saturday, Monday and Wednesday) by the researchers where these days were specified for pregnant women follow up from 9:00 am. To 1 pm. The current study was carried out from the beginning of September 2022 up to the end of February 2023 for a period of Six months. The following phases were adopted and followed out through in order to achieve the study's goal:

Preparatory phase:

This phase was concerning to construction of the study tools and creation of instructional sessions which were based on the actual assessment of the subjects' educational needs. It was prepared in Arabic and addresses theoretical and practical facets of UTIs management as well as ways to better their understanding and self-care practices. Women in the control group got routine treatment while the intervention group was interviewed individually by the researchers in the previous mentioned setting and received interventions guidelines through health teaching sessions.

Assessment phase:

After explaining the study purpose, all participants in the intervention and control groups were asked to complete the pretest study tools. They were given individually to each woman and the time consumed for completing was 35 to 45 minutes on average.

Planning & Implementation phase:

The instructional guidelines were developed by the researchers using the assessment phase's results. The needs, requirements, and gaps in knowledge and self-care practices were identified, and these findings were used to define the aims and objectives of the intervention sessions.

Description of Instructional Guidelines:

During the first stages of its development, the primary goal and objectives of these guidelines were established. These objectives were created after considering the demands of the sample. These were organized down into a number of objectives, and the assignments were

then organized in an order that reflected the teaching and learning process. The course was intended to be taught over the course of 4 sessions. The requirements of the study participants and an evaluation of the relevant literature were used to develop the objectives of the guide booklet. The information in the booklet was meant to be distributed to each study participant independently.

General objective of the guidelines: Improve pregnant women understands of healthy self-care practices concerning UTIs.

Specific objectives: At the end of the sessions the women should be able to:

Define UTI, identify incidence of UTI, enumerate causes of UTI, list risk factors of UTI, identify methods of diagnosis, perform urine analysis and culture, list complications of UTI, acquire good practices regarding categories (bathing and clothing, nutritional habits urinary habits, genital habits and sexual behavior habits).

The nursing guidelines consisted of two main parts:

The theoretical part which covered the basic knowledge about UTIs and contain 2 sessions.

The practical part covered healthy practices like(urinary habits, genital habits bathing and clothing habits, sexual behavior habits and dietary habits) contain 2 sessions also.

The sessions were as follows:

• **Session 1:** The definition, prevalence of UTIs during pregnancy and risk factors for UTIs were discussed in the first session.

• **Session 2:** focus on the UTI diagnosis, consequences, and signs & symptoms.

• **Session 3:** The major objective of this practical-focused session was to support women to follow good self-care practices.

• **Session 4:** The goals were to assist study subjects in learning about a healthy practice; the final session included a summary and a revision of the program's goal. The researchers thanked the women for their enthusiastic engagement before calling the meeting to a close.

Implementation phase

The Intervention group:- Six women were placed in each small group throughout each session. Using the teaching strategies and handouts, each group evaluated the instructional guidelines session's content. Each group had a

total of four sessions. It was separated into the following sections: The theoretical portion was covered in two sessions and the practical portion was covered in two sessions. As each session lasted an hour, there were a total of 10 groups in the research, which required a total of 4 hours to complete the instructional guidelines for each group. During each session, the guidelines were explained via a PowerPoint presentation, followed by discussion, demonstrations, and re-demonstrations. Additionally, the health practices were aided by using suitable teaching methods as videos films and pictures.

The researchers spoke simply and clearly during each knowledge session. The researchers emphasized and summarized the key ideas from each session at the conclusion of each one. To make sure the pregnant women remembered the instructions given and to reinforce any knowledge that had been missed or was unclear, the researchers asked them to re-emphasize questions about the topics covered in the previous session before each one began. Each woman received a booklet outlining the UTI educational principles in an effort to capture her interest, inspire her, encourage at-home review, and assist learning and practice. To ensure that the directions were correctly followed, the researchers observed each woman continuously. There was a chance for improvement, retraining, and re-demonstration.

The control group had received only routine hospital care.

Evaluation phase: -

In this phase two weeks after the execution of all of the guidelines' sessions and after the prescribed antibiotics course completed since infection eradication takes seven to 10 days to treat., every woman in the study sample (control and intervention groups) was interviewed (posttest), the same equipment from the pre-test was used again.

Ethical consideration and administrative design:

All ethical issues were taken into account where the Research Ethics Committee (REC) of the Faculty of Nursing at Zagazig University gave its approval to the current study's research. Before using the tools on each woman, the purpose of the study was described in order to earn her confidence and trust. Each woman who

verbally agreed to participate in the study did so after being told that the information acquired would be kept private and that the study methods wouldn't have any adverse impact on the women who were pregnant. Women were informed of their ability to withdraw from the research whenever they wanted and without giving a reason. This was accomplished by requesting official permission from the directors of maternity hospitals and outpatient clinics at the Zagazig University Hospitals, based on letters from the nursing faculty describing the goal of the study, the types of data collection tools used, and the results that could be anticipated from its implementation.

Statistical Analysis:

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA 2011)). Quantitative data were expressed as the mean \pm SD and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or fisher exact test when appropriate. The student "t" test was used for comparison of means of two independent groups of quantitative data which were normally distributed. While, the Mann-Whitney U test was used for comparison of means of two independent groups of quantitative data which were not normally distributed. Pearson correlation coefficient was calculated to assess relationship between study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation & values near 0 indicate weak correlation. Multiple linear regression (step-wise) was also used to predict factors which affect total knowledge and practice scores. Cronbach alpha coefficient was calculated to assess the reliability of the scales through their internal consistency. P-value < 0.05 was considered statistically significant, p-value < 0.001 was considered highly statistically significant, and p-value \geq 0.05 was considered statistically non-significant.

Result

Table (1): Shows baseline characteristics of the studied women. It reveals that the mean age of women in the control and intervention

group was nearly similar to each other (28.28 ± 4.93 & 27.38 ± 4.20 respectively) with no statistically significant difference, furthermore, the educational level was also nearly similar in both groups where 56.7% & 53.3% had basic and secondary education. Concerning to the residence, it was obvious that 53.3% & 51.7% in both groups were coming from rural area. Moreover 61.7% of women in control group were housewives compared to 65.0% in the intervention group with no statistically significant difference.

Table (2): Reveals that, 76.7% & 88.3% in control and intervention group were in the first trimester of pregnancy and had gestational age ≤ 12 weeks and most of them were multigravida with a mean gravidity of 2.11 ± 0.84 & 2.23 ± 0.85 respectively. As for the mode of previous delivery, cesarean section was the most common in both studied groups as it was present in 46.7% & 53.3% respectively in control and intervention group. As for the contraceptive history, it was found that 71.7% & 68.3% of control and intervention group were use a family planning method and IUDs was the common method used in 69.8% & 78.0% respectively.

Figure (1):- Illustrates previous history of urinary tract infections during pregnancy for the both studied groups (control and intervention). It shows that 32% of women in the control group had a previous history of urinary tract infection during pregnancy compared to 36.70% in the intervention one.

Table (3): Clarifies a highly statistically significant improvement in a mean score of all areas of knowledge and its domains like (definition, causes, diagnosis, complications, treatment & prevention) in post intervention than pre intervention among women in the intervention group compared to the control group $p = (0.001^{**})$.

Figure 2: Demonstrates that 18% & 17% of control and intervention group respectively were had good level of knowledge in pre intervention and this level was increased to 49% post intervention in intervention group compared to 21% in control group.

Table (4): shows no significant differences regarding the all degree of urinary infections symptoms severity between the two groups pre intervention, while post the

intervention there was a highly statistical significance differences in intervention group than control one $p = (0.001)$, where the intervention group had an improvement in the degree of their severity of symptoms in post intervention than pre compared to the control group.

Table (5): Represents a highly statistically significant differences in the pre and post intervention between the control and intervention group regarding the total mean score of the severity of urinary infection symptoms $p = (0.001^{**})$.

Table (6): portrays a highly statistically significant differences in a mean score of all self-care practices domains for urinary tract infections in post intervention than pre intervention among women in the intervention group compared to the control group $p = (0.001^{**})$.

Figure (3): Demonstrates that 31% & 29% of control and intervention group had satisfactory self-care practices in pre intervention; meanwhile, after two weeks in post intervention these percentages were improved to 77% in intervention group compared to 38% in control group.

Table (7): Reflects no statistical correlation coefficient between knowledge, health care behavior practices and severity of symptoms pre intervention, meanwhile, post

Discussion

Pregnancy-related urinary tract infections (UTIs) are the second-most common medical consequence after anaemia (**Lowdermilk et al., (1)**). Major problems for both the mother and the foetus can result from UTIs. Among the effects include intrauterine growth restriction, premature birth, low birth weight, pyelonephritis, sepsis, pneumonia, and cystitis **Cameron (5)**.

The development of problems can be avoided by educating pregnant women about urinary tract infections and self-care health behaviors. This study aimed to evaluate the effect of an instructional guideline on knowledge and self-care practices of pregnant women with urinary tract infections. The aim of the present study was achieved through the present study findings.

intervention there was positive correlation with highly statistically significant between total knowledge and total health behavior practice, meanwhile there is a highly statistical negative correlation between the knowledge and severity of symptoms $p < 0.001^{**}$. Additionally, the same table represents the correlation between the health practices and severity of symptoms; it was found a highly statistical negative correlation between the health practices and severity of symptoms post intervention $p < 0.001^{**}$.

Table (8): Step wise multiple linear regression for predicting factors which affect total knowledge score of the pregnant women post intervention. It illustrates that post total health care practices score and post severity of symptoms score were the highly statistical independent positive predictors of pregnant women knowledge at post intervention. The model explains 0.73% of variation in total knowledge post intervention.

Table (9): Step wise multiple linear regression for predicting factors which affect total practice score of the pregnant women post intervention. As regards for predicting factors which affect total health care practice score post intervention, it indicated that post knowledge score and post severity of symptoms score were had a highly significant independent positive predictor. The model explains 0.73% of variation in total health care practice post intervention.

After applying the instructional guidelines, the current study hypothesized that women's knowledge and self-care practices would improve.; this will lead to improvements in UTIs symptoms among women. In compared to the women in the control group, the data showed that women's knowledge and self-care practices had significantly improved. So, it is possible to accept the research hypotheses.

Regarding **demographic characteristics**, the present study findings revealed that women in both groups had closely similar demographic characteristics. Due to the quasi-experimental and non-truly randomized nature of the design, this similarity was crucial for a fair comparison of the two groups. These findings were in accordance with a study by **Baker & Elkazeh (16)** at Tanta entitled "Effect of

Health Education Program Based on Health Belief Model on Prognosis of Urinary Tract Infection in Pregnant Women” who revealed that; there were also similarity findings regarding socio-demographic characteristics and obstetrics & gynecological history among women in study and intervention groups in their study. In addition; **Belete** ⁽¹⁷⁾ conducted a study about “*Bacterial profile and ESBL screening of urinary tract infection among asymptomatic and symptomatic pregnant women attending antenatal care of northeastern Ethiopia region*” found that there was also a resemblance between the pregnant women in study & control groups regardless their demographic data.

The present study revealed that; more than half of women in both groups related to the age group 20-≤30 years old, having a secondary education and coming from rural area. This was in conformity with **Ashour, et al.**, ⁽¹²⁾ in their study entitled “*Effect of Applying Self-efficacy Nursing Guidelines on Pregnant Women’s Performance regarding Urinary Tract Infections*” in Menoufia who reported that; most of the studied pregnant women were between the ages of 20 and 30 years, with nearly half of them having a secondary education in both groups and residing rural areas. From the researchers’ point of view, this might be explained by the increased sexual activity of this age group and the anatomical attachment of the female urethra to the vagina, it is vulnerable to infection during sexual activity, which might enhance the likelihood that bacteria will ascend from the urethra into the bladder (**Gonzalez et al.**) ⁽¹⁸⁾ In addition, women with lower levels of education may experience more UTIs because they are less aware of the self-care practices that are necessary throughout pregnancy. On the same line of the previous mentioned finding (**Elbana & Ali**) ⁽¹⁹⁾ and **Ahmed and Khresheh** ⁽²⁰⁾, they revealed that more than half of their participants were in age group from 20-<30 years old with a mean age of 29.8±9.89 and had secondary education.

Pregnancy-related urinary tract infections begin in the sixth week and reach their peak between the 22nd and 24th weeks as a result of ureteral dilatation, which lasts until delivery. Increased bladder capacity and lower bladder tone can also contribute to increased

urine stasis and ureterovesical reflux, which reduces the lower urinary tract’s ability to fend off invading germs. These elements may contribute to the occurrence of urinary tract infections during pregnancy ⁽³⁾. Concerning to the current gestational age it was found in the present study that all pregnant women in both groups were in the first and second trimester this was core inclusion criteria in the current study. This finding is in line with (**Ashour et al.**) ⁽¹²⁾ and **Ahmed & Khresheh**, ⁽²⁰⁾ who mentioned that all-pregnant women involved in their study were in first and second trimesters also.

One of the likely factors influencing the frequency and incidence of UTIs in pregnant women is gravidity and parity; this high incidence is caused by physiological changes that occur during pregnancy and the fragility of the pelvic floor’s supporting structure during childbirth. The present study found that more than three quarter in both groups were multigravida and nearly half were multiparous. This finding was partially supported by **Parida et al.’s** ⁽²¹⁾ in their study entitled “*Prevalence of urinary tract infections in pregnant women in a tertiary care hospital in Odisha, India*” and found that; more than one-half of the pregnant women were multipara. Meanwhile; this was contradicted with **Ranjan et al** ⁽⁸⁾ who established a study “*Prevalence of urinary tract infections among pregnant women and their sequelae in newborns in India*” and reported that; the majority of women in their study were primigravida. This may be attributed to difference in study setting and subjects

Concerning the **previous history of UTIs during pregnancy**, the present study showed that; more than one third of women in both groups had a previous history of UTIs. This might be attributed to that; mostly of women were young, housewives and coming from rural areas that resulted in inadequate prenatal hygiene, lack of knowledge on the hazards of urinary tract infections for both mother and fetus, and inadequate prenatal education. This was in the agreement with **Ulger et al.** ⁽²²⁾ who developed a study about “*Evaluation of nutrition education during pregnancy and nutritional knowledge of pregnant women*” in Ankara University which also reported that less than half

of the studied women in their study had a previous history of UTIs during pregnancy especially during their first trimester.

While, on the other hand these study findings were partially in agreement with **Abd Elfatah**,⁽⁹⁾ in their study entitled “*Knowledge and Attitudes of Pregnant Women regarding Urinary Tract Infection*” at Banha university which showed that more than half of studied women had previous urinary tract infection during pregnancy especially during 2nd trimester. In India, a substantial number of pregnant women who use ANC services reported similar results (**Kant et al**)⁽²³⁾ as well as in Jordan (**Clouse et al**)⁽²⁴⁾ This may be attributed to difference in study setting, subjects' technique and the time for conducting the study.

Knowledge can refer to familiarity with, awareness of, or comprehension of someone or something, such as propositional knowledge, procedural knowledge, propositional knowledge of skills, or acquaintance knowledge of things. The most frequent etiological pathogen of urinary tract infections during pregnancy is *Escherichia coli*. Pregnant women should receive treatment for urinary tract infections to avoid problems (**Smaili**)⁽²⁵⁾

The current study hypothesized that women's knowledge and self-care practices in the intervention group will be improved after implementing the instructional guidelines which assist them in developing a knowledge of, understanding, and daily appropriate self-care practice, which will lead to improvements in UTI symptoms. This was proved by that there was a highly statistically significant improvement in a **mean score of all areas of knowledge** and its domains like (definition, causes, diagnosis, complications, treatment& prevention) in post intervention than pre intervention among women in the intervention group compared to the control group. The actual content of the intervention may have contributed to its success by addressing knowledge gaps and dispelling misunderstandings. Moreover, use of the instructional nursing guidelines used adult learning techniques to promote learning within the group. In agreement with these results, an intervention study in Philippines by (**Navarro et al**)⁽²⁶⁾ who reported significant improvements in pregnant women's knowledge and hygienic

practices following an educational intervention. Additionally; **Baker & Elkazeh** ⁽¹⁶⁾ whose study findings also demonstrated that; there was significant improvements in women's mean level of knowledge and health behavior practices before and after the nursing intervention, and this was associated with significant improvements in their UTI symptoms, as well as in their laboratory findings in comparison with control group women. Furthermore; **Yakout & Alanazi**,⁽²⁷⁾ reported in their study entitled “*Effect of Health Teaching sessions on Pregnant Women's Knowledge and Health Behavior Regarding Urinary Tract Infection*” conducted at Prince Sultan Military Medical City that; there was a statistically significant difference in mean level of knowledge related to UTIs before and after implementation of health teaching sessions in both intervention and control group (P value:<0.05).

Regarding the **total knowledge score** of pregnant women in both groups about UTIs before and after two weeks of the intervention (pre& post), it was showed that relatively only one fifth of women in control and intervention group were had good level of knowledge in pre intervention phase and this level was increased to nearly half of women during post phase in the intervention group compared to only one fifth in control group. This was in conformity with **Ashour et al.**,⁽¹²⁾ who reported that; following the intervention guidelines, the study group's knowledge of most of the studied topics, including the definition, causes, signs, and symptoms of urinary tract infections (UTIs), risk factors for developing UTIs, and a complication of UTIs that can affect both the mother and the foetus significantly improved from poor to good compared to control group. Also, **Yakout & Alanazi**,⁽²⁷⁾ also found that; 22.0% of women in control group compared to one fifth in the intervention group were had good level of knowledge in pre intervention phase which was upturned to (35.0&32.0% respectively) during post intervention phase. Additionally, **Elbana & Ali** ⁽¹⁹⁾ found that nearly two-thirds of their participants had a poor level of total knowledge pre intervention and after the intervention more than three quarter had a good level. This reflects the success and effectiveness of the implementation of nursing guidelines

One of the main objectives of the current study is to assess the degree of severity of UTIs symptoms before and after the intervention, the present study revealed that all degree of severity which ranged from absent to sever was present among all the participants' women in both groups with no significant differences pre intervention and complain from dysuria, urgency, abdominal and back pain, dyspareunia and burning sensation. This may be attributed to low levels of women's awareness and cultural barriers to delayed diagnosis and treatment. While post the intervention after two weeks there was a highly statistical significance differences in intervention group than control group regarding the degree of this severity of symptoms. This was in conformity with **Ashour, et al.**,⁽¹²⁾ who reported that pre-intervention complaints from the majority of the pregnant women in their research had various UTI symptoms, including frequent urination, back discomfort; lower abdomen pain, pain during sexual activity, exhaustion, and itching and these symptoms had been improved during the post intervention phase of the educational program. Also, this finding was similar to that of **Mohamed et al.**⁽²⁸⁾ in a study entitled "*The effect of health beliefs model-based education on the control of urinary tract infection among pregnant women at Zagazig University*" Egypt. After implementing an educational program based on the health belief model, they reported that there was a statistically significant reduction in the severity of the symptoms of urinary tract infections.

In accordance, the findings of this study agreed with those of **Karishetti & Shaik**⁽²⁹⁾ in a study about "*The impact of instructional programs on the prevention of urinary tract infection recurrence on the level of knowledge and self-care behaviors among women with UTIs*" in Saudi Arabia. Additionally, they highlighted how the nursing guidelines had a substantial impact on the alleviation of UTI symptoms following the adoption of the intervention and provided instructions for women on how to engage in good self-care practices.

In order to avoid UTIs, it is essential to increase pregnant women's knowledge of healthy sexual, menstrual, and genitourinary

practices. This is because unhealthy behaviors may lead to the development and aggravation of UTIs. As regards to **Mean Scores of Self-care Practices**, the results from our study showed the self-care practices score percentage of participants to adapt to healthcare practices related to UTIs after implementation of instructional guidelines showed statistically significant difference between both groups.

This was in agreement with **Yakout & Alanazi**,⁽²⁷⁾ who also reported statistically significant difference between both groups related to mean score of practice related to UTIs pre & post intervention phases. In addition; **Navarro et al.**⁽²⁶⁾ in their study also indicated that The health education sessions' intervention promoted healthy lifestyle habits and was a key factor in the participants' improved hygiene practices. This finding achieved the study aim and supported the hypothesis.

Moreover; **Ashour et al.**,⁽¹²⁾ reported that; there was a highly significant difference within the study group regardless preventive and management self-care practices to relieve UTIs during post intervention compared to pre intervention. These results might be explained by the absence of prenatal education on the topic of UTIs in pregnancy prior to the introduction of nursing guidelines. In addition, **Abd El Aziz, et al.**⁽³⁰⁾ in their study about "*the Effect of the application of the health belief model on pregnant women's knowledge and health beliefs regarding urogenital infections*" in Egypt reported that (HBM) was successful in enhancing the knowledge, health beliefs, and self-care practices of pregnant women to avoid urogenital infections during post intervention phase. This reflected the effectiveness of the instructional guidelines in the current study.

Concerning **the total practice score** the current study revealed that one third of women in control and intervention group had a satisfactory practice pre intervention, meanwhile post intervention three quarter of the intervention group had a satisfactory practice compared to one third in control group with statistically significant difference. These findings might be related to pregnant women compliance to the received instructional guidelines and reflect the positive impact of it in improving women's practices. This was in conformity with

Baker & Elkazeh, ⁽¹⁶⁾, **Yakout & Alanazi** ⁽²⁷⁾ & **Ashour E., et al.,** ⁽¹²⁾ who reported that the total behavioral score of participants in their study to adapt to healthcare practices related to UTI after implementation of health teaching sessions showed statistically significant improvement among the intervention group than control group (P-value < 0.001).

Regarding the **correlation between the studied women's total knowledge and total practice score & degree of severity of symptoms** the present study showed that there was a positive correlation with highly statistically significant between them post intervention ($p < 0.001$). This may be due to the improvement of knowledge owing to improved practice and good recovery from symptoms. Additionally, the majority of individuals need a certain level of understanding to practice well. There is also the presumption that providing safe and efficient treatment directly correlates with this degree of expertise. The present study hypothesis is being supported by these findings.

This was in agreement with **Elbana & Ali,** ⁽¹⁹⁾ who reported that there was a statistically positive correlation between total knowledge and self-practices score before and after the intervention. Furthermore; these findings are in congruence with **Moradpour et al.** ⁽³¹⁾ who clarified a positive, highly statistically significant correlation between total knowledge and total practice scores and total knowledge and total intention to practice healthy behaviors. Also, **Ahmed et al.** ⁽³²⁾ in their study about "The impact of lower urinary tract symptoms on the quality of life during pregnancy" in Palestine reported a remarkable correlation between urinary tract infections' symptoms and quality of life among the pregnant women.

Concerning **the multiple linear regression analysis**, the present study's findings revealed that post total health care practices score and post severity of symptoms score were the highly statistical independent positive predictors of pregnant women knowledge at post intervention. The model explains 0.73% of variation in total knowledge

post intervention. Also, it indicated that post knowledge score and post severity of symptoms score were had a highly significant independent positive predictor. The model explains 0.73% of variation in total health care practice post intervention. This was in conformity with **Baker & Elkazeh,** ¹⁶ who also found that the knowledge score was a positive predictor of the HBM, level of practices, and severity of symptoms scores post intervention phase. This may be related to the fact that; improvement of knowledge level of women affects their self-care behaviors and which subsequently relieve the severity of symptoms.

Conclusion

The current study's findings, which supported the research hypotheses, showed that pregnant women exposed to instructional guidelines had higher levels of knowledge and good practices than those who were not; additionally, the level of satisfactory knowledge and practices at post intervention was significantly higher than that at pre intervention. Also, the current study revealed a significant decrease in the severity of UTIs symptoms in post intervention especially for the intervention group than those in the control group and this proved the study research hypotheses

Recommendations: -

- **Based on the results of the present study, the following recommendations were suggested to be implemented: -**
 - Every pregnant woman should take part in ongoing health education to improve their knowledge of UTIs and prevent them from recurring during the pregnancy.
 - All pregnant women should follow the instructional nursing recommendations for self-care healthy behaviors at antenatal follow-up visits to avoid urinary tract infections and minimize associated maternal and foetal issues.
 - For the results to be generalizable, a replication of the current study with a larger probability sample is recommended.

Table (1): Demographic Characteristics of the Studied Pregnant Women in Both Groups. n= (120).

Items	Control group (n=60)		Intervention group (n=60)		FET (p-value)
	No.	%	No.	%	
Age					
20- ≤30 years	32	53.3	35	58.3	0.713
>30-35 years	28	46.7	25	41.7	
Mean± SD	28.28±4.93		27.38±4.20		
Level of education					
Basic and Secondary school	34	56.7	32	53.3	0.855
University	26	43.3	28	46.7	
Residence					0.999
Urban	28	46.7	29	48.3	
Rural	32	53.3	31	51.7	
Occupation					0.850
Working	23	38.3	21	35.0	
Housewife	37	61.7	39	65.0	
Family Income Level					0.709
Insufficient	25	41.7	22	36.7	
Enough	35	58.3	38	63.3	
FET: Fisher exact test,					<i>non-significant (p>0.05)</i>

Table (2): Obstetric and Contraceptive History of the Studied Pregnant Women in Both Groups. n= (120).

Items	Control (n=60)		Intervention (n=60)		Test of significance χ^2	(p-value)
	No.	%	No.	%		
Gestational age						
≤12 weeks	46	76.7	53	88.3	FET	0.148
13-24 weeks	14	23.3	7	11.7		
Gravidity						
Primigravida	16	26.7	13	21.7	FET	0.670
Multigravida	44	73.3	47	78.3		
Mean± SD		2.11±0.84		2.23±0.85		
Range		1-4		1-4		
No. of parity						
Null para	17	28.3	16	26.7	0.392	0.822
1-2	29	48.4	27	45.0		
> 2	14	23.3	17	28.3		
Mean± SD		0.95±0.72		1.02±0.74		
Previous abortion						
0	50	83.3	48	80.0	0.427	0.808
1	9	15.0	10	16.7		
>1	1	1.7	2	3.3		
Number of living children						
0	17	28.3	16	26.6	0.484	0.785
1	33	55.0	31	51.7		
>1	10	16.7	13	21.7		
Mode of last delivery						
None	17	28.3	16	26.7	0.630	0.730
NVD	15	25.0	12	20.0		
C.S	28	46.7	32	53.3		
Use of family planning methods:						
Yes	43	71.7	41	68.3	FET	0.842
No	17	28.3	19	31.7		
Type of contraceptive methods					3.952	0.139
Pills	5	11.6	7	17.1		
IUD	30	69.8	32	78.0		
Others	8	18.6	2	4.9		

FET: Fisher exact test , χ^2 : Chi square test , non-significant($p>0.05$).

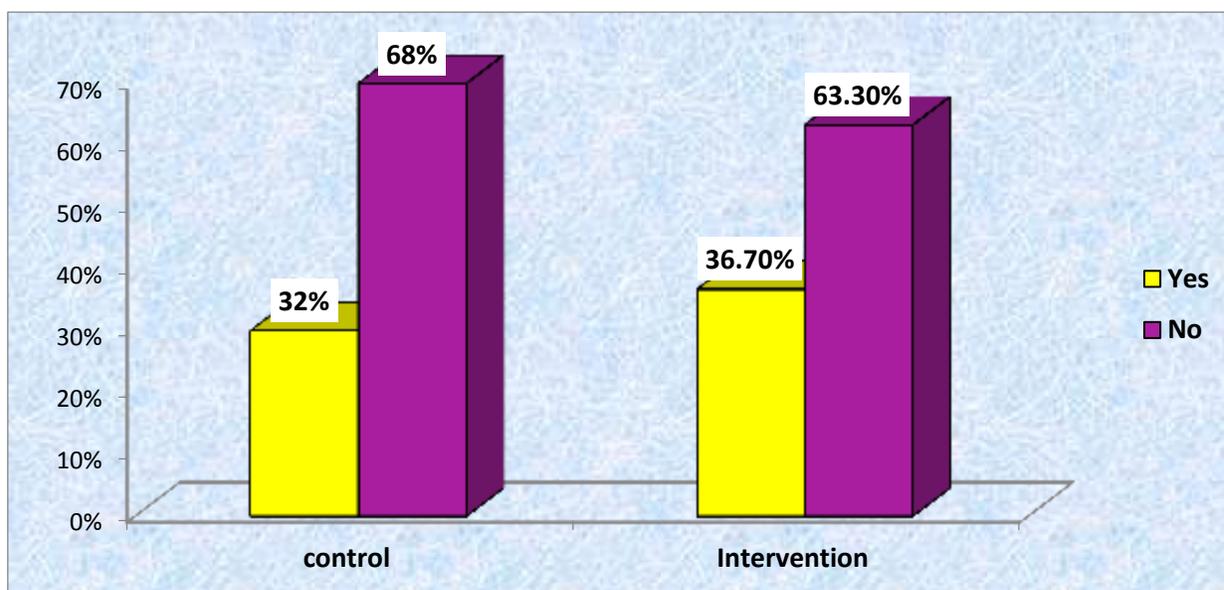


Figure (1): Previous History of Urinary Tract Infections during Pregnancy for Both Studied Groups (Control and Intervention). n=120

Table (3): Total Mean Scores Of Knowledge Level Between Control and Intervention Groups Throughout Study Phases. n= 120.

Items of knowledge		Control (n=60)	Intervention (n=60)	MW- test	p-value
		Mean± SD	Mean± SD		
Anatomy of urinary system	Pre	0.45±0.50	0.46±0.50	0.182	0.855
	Post	0.48±0.51	0.95±0.22	5.649	0.001**
Definition and prevalence	Pre	0.48±0.50	0.51± 0.50	0.364	0.716
	Post	0.55±0.50	0.90±0.30	4.275	0.001**
Causes and risk factors	Pre	0.43± 0.49	0.52± 0.50	0.910	0.363
	Post	0.50±0.50	1.40±0.61	6.825	0.001**
Signs and Symptoms	Pre	0.55±0.50	0.61± 0.49	0.738	0.461
	Post	0.58±0.49	1.35±0.633	6.105	0.001**
Methods of Diagnosis	Pre	0.41± 0.497	0.48± 0.50	0.731	0.465
	Post	0.48±0.50	0.86±0.34	4.464	0.001**
Complication for fetus and mother	Pre	0.48±0.50	0.51±0.50	0.364	0.716
	Post	0.55±0.50	1.68±0.46	8.377	0.001**
Treatment	Pre	0.45±0.53	0.50±0.53	0.535	0.593
	Post	0.51±0.53	1.50±0.50	7.522	0.001**
Ways of prevention and healthy practices	Pre	0.60±0.49	0.66±0.47	0.755	0.451
	Post	0.66±0.47	1.73±0.44	8.453	0.001**
Total	Pre	4.80±1.99	4.28±1.12	1.188	0.235
	Post	5.00±2.11	11.57±0.963	9.513	0.001**

MW: Mann-Whitney U test, statistically non-significant (p>0.05), **: statistically highly significant (p<0.001).

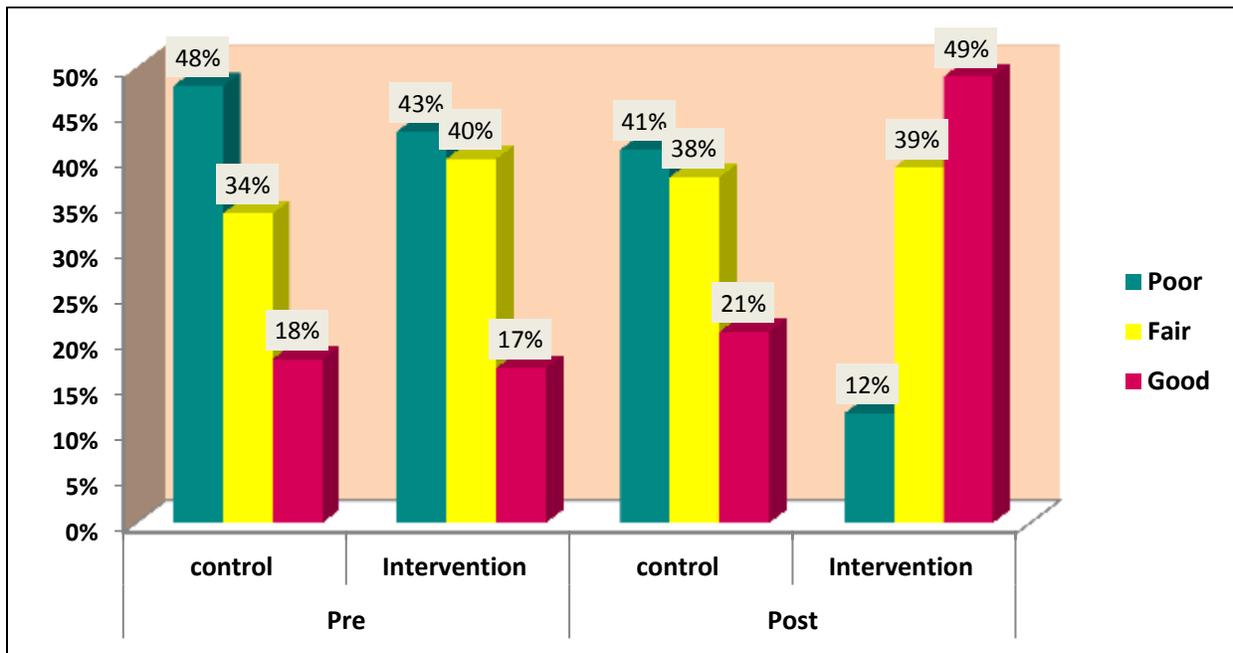


Figure 2: Total Knowledge Score UTIs for Control and Intervention Group Throughout the Study Phases. n=120

Table (4): Statistical Comparison Between Control and Intervention Groups Regarding Severity of UTIs Symptoms Throughout Study Phases. n=120.

Variables of symptoms	Groups	Pre								χ^2 (p-value)	Post								χ^2 (p-value)
		Absent		Mild		Moderate		Severe			Absent		Mild		Moderate		Severe		
		N	%	No	%	N	%	N	%		No	%	No	%	No	%	No	%	
Dysuria (pain during urination)	Control	0	0.0	21	35.0	26	43.3	13	21.7	1.060 (0.589)	3	5.0	21	35.0	30	50.0	6	10.0	26.366 0.001**
	Intervention	0	0.0	16	26.7	28	46.7	16	26.7		16	26.7	33	55.0	11	18.3	0	0.0	
Urgency and frequency of urination	Control	3	5.0	23	38.3	26	43.3	8	13.3	5.336 (0.149)	4	6.7	25	41.7	29	48.3	2	3.3	17.939 0.001**
	Intervention	0	0.0	22	36.7	23	38.3	15	25.0		12	20.0	38	63.3	10	16.7	0	0.0	
Lower abdominal pain	Control	0	0.0	16	26.7	27	45.0	17	28.3	5.148 (0.161)	3	5.0	24	40.0	32	53.3	1	1.7	26.038 0.001**
	Intervention	2	3.3	23	38.3	25	41.7	10	16.7		18	30.0	33	55.0	9	15.0	0	0.0	
Pain during the intercourse	Control	0	0.0	10	16.7	31	51.7	19	31.7	2.639 (0.267)	0	0.0	17	28.3	43	71.7	0	0.0	36.703 0.001**
	Intervention	0	0.0	17	28.3	29	48.3	14	23.3		13	21.7	35	58.3	12	20.0	0	0.0	
Back pain	Control	6	10.0	13	21.7	30	50.0	11	18.4	7.00 (0.136)	4	6.7	17	28.3	39	65.0	0	0.0	21.290 0.001**
	Intervention	1	1.7	21	35.0	31	51.7	7	11.7		11	18.3	35	58.3	14	23.3	0	0.0	
Itching sensation	Control	0	0.0	13	21.7	33	55.0	14	23.3	4.824 (0.185)	2	3.3	22	36.7	36	60.0	0	0.0	24.741 0.001**
	Intervention	2	3.3	19	31.7	31	51.7	8	13.3		16	26.7	32	53.3	12	30.0	0	0.0	
Blood in urine	Control	0	0.0	9	15.0	39	65.0	12	20.0	1.987 (0.575)	1	1.7	25	41.7	34	56.7	0	0.0	42.590 0.001**
	Intervention	1	1.7	13	21.7	35	58.3	11	18.3		23	38.3	32	53.3	5	8.3	0	0.0	

χ^2 : Chi square test , non-significant($p>0.05$), **: statistically highly significant ($p<0.001$).

Table (5): Statistical Comparison Between Control and Intervention Groups Regarding Total Mean Score Of Severity Of Symptoms Throughout Study Phases. N= 120.

Items		Control (n=60)	Intervention (n=60)	MW- test	p-value
		Mean± SD	Mean± SD		
Severity of symptoms	Pre	13.66±2.44	12.96±2.04	1.386	0.166
	Post	11.06±1.43	6.40±2.12	8.65	0.001**

MW: Mann-Whitney U test, statistically non-significant ($p>0.05$), **: statistically highly significant ($p<0.001$).

Table (6): Statistical Comparison Between Control and Intervention Groups Regarding Total Mean Scores Of Self-Care Practices And Its Domains Throughout Study Phases. n= 120.

Items		Control (n=60)	Intervention (n=60)	t- test	
		Mean± SD	Mean± SD		p-value
Nutritional Practices	Pre	4.73±1.219	5.18±1.86	1.565	0.120
	Post	5.75±1.33	9.02±1.50	12.592	0.001**
Bathing and clothing Habits	Pre	9.38±1.78	8.82±2.47	1.439	0.153
	Post	10.17±1.99	14.13±1.77	11.526	0.001**
Urinary habits	Pre	3.95±1.38	4.18±1.44	0.904	0.368
	Post	5.05±1.28	6.50±1.35	6.013	0.001**
Menstrual and Genito habits	Pre	12.50±1.89	12.45±2.89	0.112	0.055
	Post	13.15±1.93	17.90±1.72	14.183	0.001**
Sexual practices	Pre	16.92±2.82	17.85±3.09	1.725	0.087
	Post	17.95±3.15	26.07±1.89	17.089	0.001**
Total	Pre	53.63±4.48	53.87±4.52	0.288	0.774
	Post	57.85±4.91	81.79±3.77	29.941	0.001**

t: student t-test, statistically non-significant (p>0.05), **: statistically highly significant (p<0.001)

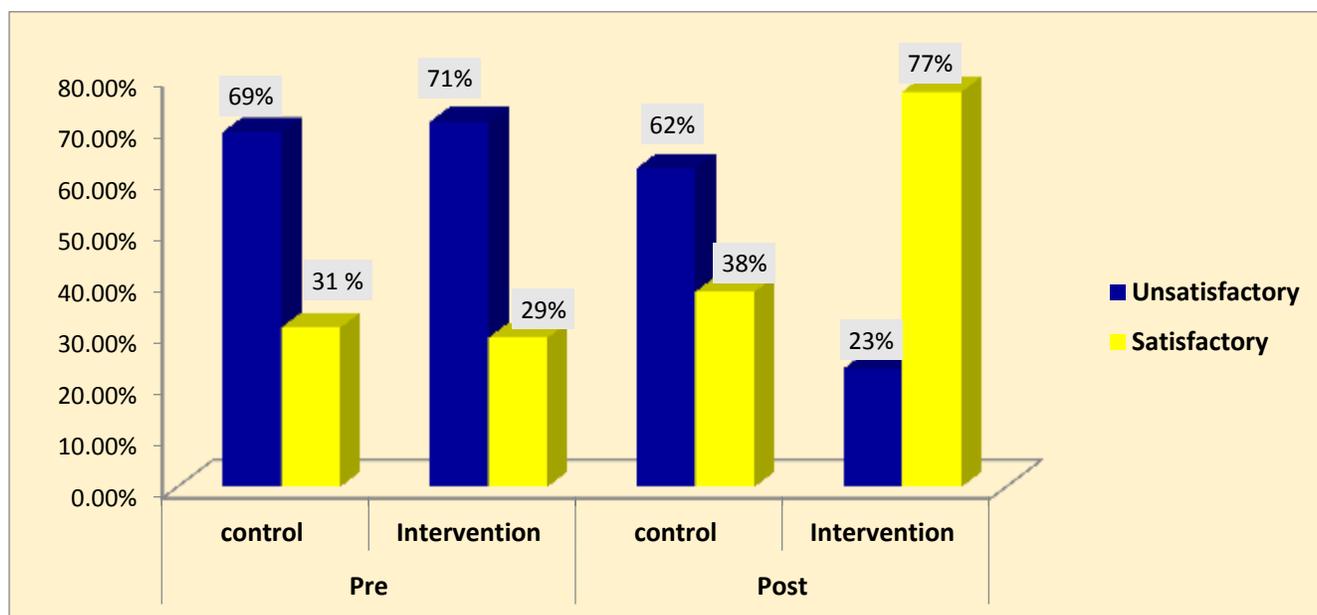


Figure (3): Total Score of Self-Care Practices for Urinary Tract Infections Between Control and Intervention Group Throughout The Study Phases. n=120.

Table (7): Correlation Between Total Knowledge and Total Health Care Practices & Severity of Symptoms Throughout Study Phases.

Parameter	Total Knowledge			
	Pre Intervention		Post Intervention	
	(r)	P	(r)	P
Total self-care Practices	Pre	0.018	0.849	
	Post			0.833 <0.001**
Severity of symptoms	Pre	0.046	0.616	
	Post			-0.636 <0.001**
Total self-care behavior Practices				
Severity of symptoms	Pre Intervention		Post Intervention	
	(r)	P	(r)	P
	Pre	0.086	0.350	
Post			-0.741 <0.001**	

Non-significant (p>0.05) **: statistically highly significant (p<0.001), r: correlation coefficient

Table (8): Step Wise Multiple Linear Regression For Predicting Factors Which Affect Total Knowledge Score Of The Pregnant Women Post Intervention.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	-2.638	2.137		-1.233	0.001**	-6.918	1.583
Post total self-care Practices	.197	.021	.680	10.174	0.001**	.158	.238
Post-Severity of symptoms score	-.246	.082	-.206	-3.045	0.001**	-.428	-.088

** : statistically highly significant (p<0.001). R-square=0.737, ANOVA: F= 146.031 , P<0.001
 Variables entered and excluded: age, level of education , residence, occupation, family income level, gestational age, no. of parity, previous abortion, number of living children, mode of last delivery, use of family planning methods, type of contraceptive methods and Previous history of UTI.

Table (9): Step Wise Multiple Linear Regression For Predicting Factors Which Affect Total Practice Score Of The Pregnant Women Post Intervention.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	61.51	4.781		12.845	.000	52.021	70.980
Post-knowledge	2.335	.232	.665	10.174	0.001**	1.874	2.816
Post-Severity of symptoms score	-.963	.277	-.241	-3.453	0.001**	-1.510	-.416

** : statistically highly significant (p<0.001). R-square=0.733, ANOVA: F= 162.325, P<0.001

Variables entered and excluded: age, level of education , residence, occupation, family income level, gestational age, no. of parity, previous abortion, number of living children, mode of last delivery, use of family planning methods, type of contraceptive methods and Previous history of UTI

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