



Effect of Applying Self-efficacy Nursing Guidelines on Pregnant Women's Performance regarding Urinary Tract Infections

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ABSTRACT

Background: The most common bacterial infection during pregnancy is urinary tract infection, and it is the primary cause of many complications for both mother and fetus. As a result, effective management based on correct knowledge and more satisfying self-care practices are crucial to prevent these issues. The study **aimed** to examine the effect of applying self-efficacy nursing guidelines on pregnant women's performance regarding urinary tract infections. **Method:** The researcher used a quasi-experimental research design. A purposive sampling of eighty pregnant women with urinary tract infections was enrolled to study and control groups, each with forty women. The researcher conducted the research at Shebin El-Kom, Menoufia Governorate's Maternal and Child Health Centers (Quibli and Bahari). The researchers used a structured interview questionnaire, a self-care evaluation interviewing schedule, and an assessment of urinary tract infections' symptoms recovery. **Results:** Before applying the guidelines, more than forty percent of the pregnant women had poor knowledge and unsatisfactory performance related to self-care of urinary tract infections. In addition to two weeks and three months after the intervention, the study group had a statistically significant increase in total knowledge scores (seventy-five and sixty-five percent, respectively had good knowledge scores) and perceived self-efficacy in performing self-care practices (seventy-five and seventy-nine percent, respectively had satisfactory scores) to relieve urinary tract infection symptoms in contrast to before. However, the difference was not noticeable in the control group. Also, there was a highly statistically significant difference in the recovery of urinary tract infection symptoms as reported by pregnant women after applying the nursing guidelines. **Conclusion:** The self-efficacy nursing guidelines have been a successful intervention in increasing the pregnant women's knowledge and performance related to self-care of urinary tract infections to relieve symptoms of urinary tract infections. **Recommendations:** During antenatal follow-up visits, all pregnant women should follow the self-efficacy nursing guidelines concerning healthy practices to reduce urinary tract infections and avoid related maternal and fetal complications.

Keywords: Self-efficacy nursing guidelines, pregnant women's performance, urinary tract infections

Introduction

Urinary tract infections (UTIs) are particularly prevalent in pregnancy and are the second most frequent medical complication after anemia (Lowdermilk et al., 2020). The development and spread of bacteria inside one or more segments of the urinary system, such as the urethra, bladder, ureter, and kidney,

is described as a urinary tract infection (UTI). It can range from asymptomatic bacteriuria to pyelonephritis, according to the researchers. Moreover, Paxton (2017) added that urinary tract infections afflict an estimated 10% of all hospitalizations during pregnancy, with *Escherichia coli* causing 80–90% of the cases. Mussaed (2018) identified a strong link between pregnancy and

the occurrence of urinary infections, which started in the sixth week and escalated between the 22nd - 24th weeks due to mechanical and physiological changes.

UTIs can cause significant complications for the mother and the fetus. Cystitis, pyelonephritis, sepsis, pneumonia, preterm birth, low birth weight, and intrauterine growth restriction are among the consequences (Cameron, 2020). As a result, all pregnant women should have regular urine analysis for bacteria at the start of their pregnancy and repeated at 28 weeks. In the same line, Ahmadi et al. (2020) indicated that some women with recurrent UTIs during pregnancy may receive a low-dose antibacterial course to avoid reinfection and significant maternal and perinatal morbidity. In this regard, Amiri et al. (2019) mentioned that urinary tract infections respond promptly to treatment, along with the follow-up and clinical evaluation by urine sample and culture, with appropriate self-care practices, are essential for limiting morbidity during pregnancy.

As a result, pregnant women who want to avoid or decrease urinary tract infections, particularly in the early stages of inflammation, can follow several simple guidelines. In this context, El Sayed et al. (2019) added that the self-efficacy nursing guidelines are those guidelines that contain systematically developed instructions to increase self-care practices regarding urinary tract infections to prevent any complications during pregnancy and maintain optimal urinary health. Furthermore, according to Ranjan et al. (2018), these recommendations include drinking lots of fluids, typically 6-8 cups of water daily, and developing a urinating routine, not delaying urination. These guidelines also include emptying the bladder, applying proper genital hygiene after urination, defecation, and sexual activity. Besides not regularly having sexual contact, wearing suitable underwear, performing

routine urine analysis, and eating a healthy diet are all recommended.

According to Gonzalez et al. (2020), recognizing the effect of self-efficacy nursing guidelines for adopting good self-care practice is crucial nowadays. Self-efficacy is the ability to conduct particular self-care practices and tasks and the confidence to make accurate decisions and handle situations or respond to specific events (Abd Elfatah et al., 2021). Individuals with a high level of self-efficacy are also more likely to begin self-care activities, persevere in the face of adversity, and master new practices. In this context, Navarro et al. (2019) discovered that self-efficacy is a primary mediator of the association between knowledge and practice. As a result, increasing self-efficacy regarding urinary tract infections during pregnancy requires special attention.

The motivation for this research and its significance stems from several existing studies. First, Navarro et al. (2019) argued that pregnant women with urinary tract infections should learn about self-care practices related to the self-efficacy nursing guidelines to decrease symptoms and improve their quality of life. Second, Kalinderi et al. (2018) identified the maternity nurses' primary roles in managing UTIs during pregnancy to provide health education to change their unhealthy habits, reduce UTIs development and recurrence, and enhance wellness and empowerment. In addition, Ribeiro (2015) stated that maternity nurses should satisfy the self-care demands of pregnant women and assist and improve their self-abilities to perform self-care tasks to alleviate pregnancy problems. This contribution is significant as many authors have stated that teaching self-care skills and prevention measures are critical nursing tasks for preventing and managing urinary tract infections during pregnancy (Al-Ateeq, & Al-Rusaies, 2015).

In addition, genitourinary health highlights the significance of education in promoting effective preventive health habits (Parida et al., 2018). It is also critical to educate pregnant women regarding UTI prevention, where and how to obtain primary healthcare, self-care habits, diet modification, and correct sexual practices to avoid the recurrence of UTIs. In this respect, Shaheen et al. (2019) suggested that teaching women to follow the required proper hygiene practices to minimize the incidence and recurrence of UTIs, counseling for prevention, and explaining the prescribed medications are all examples of self-efficacy nursing guidelines for UTIs. It's also important to discuss the risks of self-diagnosing, including using over-the-counter or herbal remedies rather than seeking early diagnosis and treatment.

Significance of the study:

The most prevalent bacterial disease and the reason for referral to obstetrical wards during pregnancy are urinary tract infections (Manges, 2017). Also, UTIs affect 40–50% of women worldwide. Furthermore, Smaill and Vazquez (2019) reported that urinary tract infections during pregnancy range from 12–40% in developing countries due to socioeconomic status and quality of life disparities. In addition, UTIs affect 22 to 35 percent of Egyptian pregnant women. Untreated UTIs can cause severe maternal and fetal problems and are responsible for nearly 150 million deaths globally during pregnancy (Luszczynska et al., 2018).

Urinary tract infections are also associated with negative impacts on the fetus and the mother. If neglected or untreated, it can lead to morbidity, mortality, and increased pregnancy-related health care costs (Abd El Fatah et al., 2021). As a result, the maternity nurse plays a significant role in preventing and controlling urinary infections by teaching pregnant women healthy, satisfactory urinary tract infection self-

care techniques that encourage self-care and minimize the risk of recurring infections. However, if performed without professional counseling and based on inaccurate information, these activities could be dangerous (Hassan, 2015). The current study was performed to examine the effect of applying self-efficacy nursing guidelines on pregnant women's performance regarding urinary tract infections due to the potential hazards to the fetus and infectious pathogens in the mother.

Theoretical and operational definitions

Self-efficacy Nursing Guideline

It is one of the essential requirements in health education, and it is a person's trust in the capability to accomplish the task correctly (EL Sayed et al., 2019). In this study, it is a link between knowledge, practice, and self-assurance in one's capability to perform the task using instruments I, II, and III.

Aim of the study:

To examine the effect of applying self-efficacy nursing guidelines on pregnant women's performance regarding UTIs through:

- 1- Assessing pregnant women's knowledge regarding the self-efficacy nursing guidelines, which means their reported self-care practices regarding urinary tract infections, risk factors, signs, symptoms, and complications.
- 2- Applying self-efficacy nursing guidelines for increasing pregnant women's level of performance regarding UTIs.

Research Hypotheses:

- Pregnant women who follow the self-efficacy nursing guidelines have a higher knowledge score regarding urinary tract infections than those who do not.
- Pregnant women who follow the self-efficacy

nursing guidelines have a higher level of self-efficacy in executing their self-care practices for urinary tract infections than those who do not, which means relief from most of their urinary tract infections' symptoms.

Method

Research Design:

The researcher employed a quasi-experimental research design with two groups (time series) to achieve the stated purpose. Because of the nature of the research topic, Maciejewski (2020) believes that having two groups examine pre, post, and follow up the intervention is significant.

Settings:

The study's settings for collecting all cases were the Maternal and Child Health Centers (Quibli and Bahari) at Shebin El-Kom in Menoufia Governorate. The selected health care centers are located across Shebin El-Kom City, indicating a high percentage of female attendance from the surrounding urban and rural regions. These institutions also provide free mother and child health services, prenatal, natal, and post-natal care, and contraception to women in Shebin El-Kom city.

Sampling:

Sample type: The researcher selected a purposive sample for the study.

Sample size: It included 80 pregnant women (50 from MCH in Qibli and 30 from MCH in Bahari) who fulfilled the inclusion criteria and were enrolled to achieve the purpose of this study.

Sample size calculation: Reviewing the previous studies, Moradpour (2020) examined the same outcomes and found significant differences in women's knowledge and practices scores with a moderate statistical power (Cohen D = 0.6). The average sample

size was 40 women per group. The researcher calculated the sample size per group at a 95% level of confidence, 80% power, and a significant level of 5% to detect significant differences. As a result, the sample size is 40 cases each group.

The pregnant women recruited in this study were randomly allocated to either the study or control group using sequentially numbered sealed opaque envelopes. This technique helped in avoiding sample contamination and bias.

The inclusion criteria include primigravida or multigravida with urinary tract infections during their first or second trimesters, no underlying medical or obstetric concerns, and willingness to participate in the research.

The exclusion criteria include pregnant women with heart disease, gestational diabetes, renal pathology, chronic renal disease, renal transplant, preterm labor, or immunosuppressive therapy

Instruments for collecting data

The researcher used three instruments to collect the relevant data:

Instrument I: A structured interview questionnaire: The researchers established this questionnaire based on a review of relevant literature (Mohamed et al., 2020) to acquire comprehensive data on urinary tract infections and self-care in pregnant women. It comprised of the following components:

Part 1: Demographics of the pregnant women: It included age, educational level, address, employment, and phone number.

Part II: Previous obstetrics history: It included gravidity, parity, a history of UTIs with previous pregnancies, mode of delivery, and contraceptive methods previously used.

Part III: Assessment of women's current UTI symptoms: It included data related to UTI symptoms. Does urinary tract infections' symptom affect her? Does she seek medical advice? If not, why? And reason for attendance? using closed ended questions.

Part IV: Assessment of pregnant women's level of knowledge concerning urinary tract infections: It comprised ten questions regarding UTIs to measure pregnant women's knowledge about UTIs before the intervention (pre-test), two weeks after the intervention (post-test), and three months after the intervention (follow-up). It covered the definition, causes, symptoms, risk factors, the impact of UTIs on mothers and fetuses, the link between sexual intercourse and UTIs, and what self-care procedures the pregnant women used to avoid, manage or alleviate UTIs?

Scoring system: Every item of knowledge was assigned a rating: (2) for accurate and complete answers, (1) for accurate and incomplete answers, and (0) for wrong or don't know responses (Mohamed et al., 2020). The sum of the "known items" scores yielded the overall score. These values were converted to percentages. The total score can vary from 0 to 20. Overall knowledge scores were categorized as good if they exceeded 75% of knowledge, fair if they were between 50% and 75% of total knowledge, and poor if they were less than 50%.

Validity and reliability of the instrument:-

Five experts evaluated the instrument for its content and internal validity (two experts in Maternal and Newborn Health Nursing, two experts in Obstetrics & Gynecology, and one expert in Urology specialists). They also assessed the items for their usefulness, thoroughness, comprehension, and simplicity of

application. Cronbach's alpha coefficient test demonstrated that each item of the used instrument relates to each other or is roughly homogeneous, indicating an instrument reliability of 0.89.

Instrument II: Self-care assessment interviewing schedule (SCASIS): The researchers created this instrument after conducting a literature study to measure pregnant women's self-care habits for UTIs (EL Sayed et al., 2019). It included personal practices **and** actions done by women to alleviate symptoms of urinary infections. It comprised 30 questions covering five basic categories (clothing, dietary habits, urine habits, cleanliness habits, and sexual behavior habits) (pre, post, and follow-up tests).

Scoring system: The scoring system was set up to give a (0) for the incorrect practice and a (1) for the correctly done. Each pregnant woman's total score was divided into two categories: unsatisfied practice < 60 percent (1-18) and satisfied \geq 60% (18-30).

Validity and reliability of the instrument:

Three experts determined the validity of an instrument by evaluating validity measures (content validity) (one expert in Maternal and Newborn Health Nursing, one expert in Obstetrics & Gynecology, and one expert in Urology specialists). They also rated the items for overall usefulness, thoroughness, comprehension, and simplicity of application. Cronbach's alpha coefficient test indicated that each item of the used instrument is related to each other or is roughly homogeneous, determining the reliability with an $r = 0.92$ reliability coefficient.

Instrument III: Assessment of urinary tract infections' symptoms recovery: It was adapted from Ahmed & Khreisheh (2018) to examine the impact of nursing guidelines on relieving UTIs symptoms two weeks after the intervention and three months afterward (completely relieved, moderately relieved, and not relieved).

Validity and reliability

Four experts in Maternal and Newborn Health Nursing, Obstetrics & Gynecology, and Urology specialists examined the instrument for clarity, comprehensiveness, appropriateness, application, and relevance using face validity. Chronbach's alpha was employed to determine the instrument's reliability, and all of the coefficients were acceptable and satisfactory, with an $r = 0.85$.

Administrative Approvals:- The Dean, Faculty of Nursing, Menoufia University, sent a formal approval to the directors of MCH centers containing the title and purpose of the study to acquire their permission and collaboration.

Ethical Considerations:

Approaches to assure the ethical issues of confidentiality and informed permission were explored in the study. The participants' names were substituted with code numbers on locked sheets, which ensured confidentiality. In addition, the researchers introduced themselves to the pregnant women and explained the purpose of the study and nature of the study to secure their consent to participate in the study and their cooperation. All of the study participants were told that

the information they supplied would be kept private and used exclusively for research purposes. After completing the study, the findings would be displayed as group data, with no personal information about the participants remaining. All pregnant women gave their informed consent.

Each woman was assured that participation in research was entirely voluntary and that she had the ability to withdraw at any moment. Each woman was given the option to decline participation at any time. They were free to inquire about the study's specifics. The nursing guidelines were advantageous in that they assisted pregnant women with UTIs in obtaining proper therapy and investigating recurrence. The control group was handed an instructional booklet at the end of the session and asked to answer any questions.

Pilot study: Before beginning data collection, a pilot study was undertaken to establish the research feasibility, application, and clarity of the instruments and the amount of time required for interviewing and evaluating the adequacy of the settings for conducting the assessment. According to the selection criteria, it was performed on 10% of the whole sample (8 pregnant women with UTI symptoms attending the previously described settings). The study did not include pregnant women in the pilot phase. The pilot's findings aided in refining the interviewing questions and set the final timetable. The elements were rectified, updated, removed, or added as needed based on the pilot study findings.

Procedure:

- After receiving official permission from the directors of MCH centers, the researchers recruited 80 pregnant

women with UTIs according to the pre-mentioned eligibility criteria through preparatory, assessment, planning, implementation, evaluation, and follow-up phases. These phases took place for three months, from the beginning of October 2021 to the end of November 2021, from 9.00 a.m. to 12.00 p.m. The researchers visited the listed settings twice a week (Monday and Wednesday). The researchers interviewed the pregnant women while visiting MCH for standard prenatal care. The researchers educated the pregnant women first about the study's purpose, nature, and expected outcomes.

1- The preparatory phase:

- The researchers conducted an extensive review of recent relevant local and international related literature using books, articles, and scientific magazines to familiarize them with the problem and guide them through the process of instrument design in terms of validity and reliability. A pilot study was carried out.

2- Assessment phase:

- During this phase, the researchers conducted individual face-to-face interviews with the study and control groups on-site in a private room to gather baseline data and assess the gaps and requirements of women through an interview.

- The researchers stood in front of the women and asked them questions in Arabic, recording their responses on a specific instrument. The researchers measured the existing difficulties to assess the pregnant women's understanding. The guide booklet's goals were determined based on the requirements of the study participants and an assessment of related literature. The booklet's content was intended to be given to each study woman separately. The researchers then used instrument II to examine the symptoms of UTIs to establish a baseline. It took roughly 5 minutes to

complete. The researcher recorded the telephone numbers and addresses of the studied participants to facilitate communication.

- During the interview, each woman received around 15-20 minutes of attention. According to the availability of pregnant women who fulfilled the inclusion criteria, the researcher interviewed an average of 6-7 women every week. This procedure was followed until the required number of women had been attained.

3- Planning phase:

The researchers developed a self-efficacy nursing guidelines booklet and teaching sessions relevant to the specific needs of pregnant women based on the findings from the assessment phase and a thorough study of the relevant literature. It was constructed to fill up the gaps in women's awareness about UTIs and to assess their self-care habits. The booklet is written in easy Arabic and illustrated with colored diagrams and pictures to help comprehend the textual content. It was then reviewed and updated in response to expert feedback. It had three chapters that educated pregnant women on urinary tract infections (UTIs) and self-care activities relevant to genital, urinary, and coitus to reduce and prevent recurrent UTIs episodes.

4-The implementation phase: (the self-efficacy nursing guidelines were applied to the study group only)

- The instruments were used three times: first, before the self-efficacy nursing guidelines, to assess the pregnant women's knowledge and reported self-care practices regarding urinary tract infections; second, after two weeks; and third, after three months to evaluate the effect of the self-efficacy nursing guidelines.

- Based on a study of relevant literature, the researchers developed the self-efficacy nursing guidelines to assist pregnant women in knowing, understanding, and practicing appropriate self-care activities in their daily lives to treat their UTIs symptoms throughout pregnancy (Rahimi et al., 2016). The self-efficacy nursing guidelines incorporated simple information on urinary tract infections. It also covered the definition, etiology, risk factors, clinical symptoms, and the harmful consequences of UTIs on the mother and the fetus. In addition, management and self-care activities help alleviate UTI symptoms in pregnant women and prevent a recurrence. The pregnant women were encouraged to drink 6–8 cups of water and unsweetened cranberry juice on a daily basis, to change their underwear every day, avoid wearing tight-fitting underwear, wear all cotton or cotton-crotch underwear, to develop the habit of urinating as soon as the urge hit, to empty their bladder when urinating, to urinate before and after the intercourse, and to avoid the intercourse during UTIs treatment. The researcher also educated the pregnant women about genital hygiene, bathing, urine analysis frequency, and seeking medical care.

- The researchers provided two teaching sessions for the study group, each session lasting 30-45 minutes over two weeks. The sessions were repeated for each subgroup (2-4 women/per session) in the outpatient clinics. Different methods of teaching and materials were utilized, such as lectures, group discussion, role-playing, and a guiding booklet.

- Women's questions were answered through discussion at the end of each session, correcting any misinterpretation and directing pregnant women toward proper UTIs practices. The subsequent session started with feedback about the previous session and the objectives of the new session.

- The first session covered general information on UTIs as definition, prevalence; risk factors; signs, symptoms,

complications, health education regarding treatment, and UTIs prevention.

- The second teaching session focused on self-efficacy nursing principles for improving pregnant women's knowledge and performance-related UTIs and preventing recurrences. In terms of nutrition, women were told to have a well-balanced diet, change bad eating habits, limit their intake of processed and sugar-rich foods and carbs, eat more fresh vegetables and fruits, and drink more milk. Maintaining weight control and reducing obesity are also goals. In terms of physical activity, the researcher instructed the women to walk for at least 30 minutes three times per week and to conduct any regular exercises at least three times per week. The researcher also taught the women the nursing measures to reduce and cope with stress, such as sleeping 7-8 hours each night, engaging in relaxation activities such as slow and deep breathing exercises, listening to music, seeking social support, and maintaining communications with others. As a result, overcoming embarrassment and strengthens talking with their husband about UTI symptoms and complaints. In addition, the researcher explored the substantial obstacles that prohibit pregnant women from obtaining treatment.

- After the session, each pregnant woman in the study group was given a guide booklet containing the self-efficacy nursing guidelines and was advised to use the guidelines to improve their UTIs performance and thus reduce UTIs symptoms. The researchers used the telephone to confirm that the nursing recommendations were followed.

- The women in the control group just got regular hospital routine care. In the first and second trimesters, they were also interviewed to measure their level of knowledge and performance (pre-test). The researchers did not provide them with any intervention. They were

given a guide booklet with self-efficacy nursing recommendations in it. The researchers scheduled each woman for a post-test two weeks later in outpatient clinics or over the phone and three-months after the intervention.

4-The evaluation and follow-up phase:

- After the implementation phase, two evaluations were conducted for the enrolled pregnant women using the instruments I, II, and III.

- The first evaluation was conducted two weeks following the intervention (post-test), as infection eradication requires a seven- to ten-day treatment time.

- The second evaluation (follow-up test) occurred three months following the intervention using the same instruments. The pregnant women of both groups completed the post-test and follow-up test to measure their knowledge and performance. Pregnant women were contacted by phone before each meeting. They were also assessed for UTIs symptoms using the instrument three after two weeks and three months of the intervention to determine whether they were totally relieved, moderately relieved, or not relieved. To analyze the efficiency of the self-efficacy nursing guidelines, the researchers received data via telephone contact. The post-test took around 10 minutes, and the phone conversation took about 15 minutes for each woman.

- The study and control groups were then compared (before, post-test, and follow-up) to determine if there was a significant difference in the pregnant women's knowledge and performance-related urinary tract infections. Before and after the intervention, this was determined using an interviewing questionnaire.

Statistical Analysis:

Data and statistical analysis were performed on an IBM personal computer using the Statistical Package of

Social Sciences (SPSS) for Windows, version 22 (SPSS, Inc, Chicago, Illinois, USA). The data were analyzed using the Chi-square test, Fisher exact test (FE), and Mc Nemar test. For qualitative variables, descriptive statistics in the form of frequencies and percentages were used, whereas for quantitative data, mean and SDs were used. The t-test was used to compare the results of the two means tests. P-values less than 0.05 were statistically significant, suggesting a statistically significant difference.

Results

The current study's findings were organized and discussed in (5) tables, and (2) figures.

Table (1) indicates the demographic features of pregnant women. Fifty percent of the control group, in contrast to 62.5 percent of the study group, was between 20 and 30 years old. Also, 42.5 percent of pregnant women in the study group had secondary education, compared to 32.5 percent in the control group. Regarding occupation, 70.0% and 67.5% of the studied pregnant women were housewives. Meanwhile, the study and control groups were from rural areas (57.5% and 77.5%). The table also shows that more than half of pregnant women in the study and control groups (62.5% and 60.0%, respectively) reported that they had insufficient income. discussed in (6) tables, and (2) figures.

Table (2) explains the obstetrics history of the pregnant women. The table reveals that 100% of the pregnant women had a normal pregnancy and most of them (60.0 % and 47.5 %) being between 10 to 12 weeks. According to gravidity, 32.5 percent of the study group, and only 25.0 percent % of the control group was pregnant three times. However, 30.0% of the study group had delivered twice compared to 25.0% in the control group. Moreover, more than one-half of the

study and control groups had previously delivered through caesarean section (62.5 percent and 55.5 percent). Furthermore, the intrauterine contraceptive devices were utilized by the majority of the study and control groups (84.4 percent and 70.0 percent, respectively). In addition, the table also illustrates that most of the study and control groups (60.0 percent and 55.0 percent, respectively) had never experienced a urinary tract infection.

Table (3) illustrates the signs and symptoms of UTIs in the studied pregnant women. According to the table, there was no statistically significant difference between the study and control groups as all signs and symptoms of UTIs reported by the pregnant women before the intervention. Furthermore, urinary tract infection symptoms affected 100% of the studied pregnant women. Similarly, most pregnant women (80.0 percent and 75.0 percent, respectively) did not seek medical assistance since two-thirds (68.7 percent and 66.7 percent, respectively) believed that UTIs do not affect pregnancy. It also revealed that 80 percent of the study group and 75.0% of the control group only visited maternal and child health care centers for follow-up.

Table (4a & b) represents the pregnant women's self-care practices for UTIs' signs & symptoms before the intervention. Moreover, more than one-half of the study and control groups (60.0 percent and 75.0 percent, respectively) consume coffee or tea regularly. Almost 60 % of the study group favored spicy and fatty meals compared to 65.5% of the control group. Meanwhile, more than one-half of the participants in the study and control groups (52.5 percent and 55.0 percent, respectively) drank fewer than six glasses of water per day. It also shows that most study and control groups (97.5% and 100%) did not drink home remedies. About 55.0% of the study group wore synthetic underwear compared to 67.5% of the control group. In addition,

about 52.5% of the study group did not change their underwear every day compared to 65.0% of the control group. About 55% of the study group and 50% of the control group washed their genitalia with soap and water. About 25.0 percent of the study group utilized vaginal douching compared to 30.0 percent of the control group. The majority of the study and control groups (72.5 percent and 70.0 percent, respectively) cleansed their genitalia from back to front after toileting. In addition, one-half of the pregnant women (50.0 percent and 55.0 percent) engaged in sexual activity three times each week. The majority of the study and control groups cleansed their hands after toileting (80.0 percent and 72.5 percent). In addition, 85.0 percent of the study group urinated after the intercourse compared to 82.5 percent of the control group. The table also reveals that about 50.0 percent of the study group compared to 62.5 percent of the control group did not empty the bladder regularly. Only 52.5 percent of the study group, compared to 47.5% of the control group, maintained their genital area clean and dry.

Figure (1) describes the total knowledge score of pregnant women about UTIs before the intervention (pre), two weeks after the intervention (post), and three months later (follow up). The figure shows that more than one-half of the pregnant women in both groups had a fair knowledge score before the intervention (pre-test). While most of the study group had a good knowledge score two weeks and three months after the intervention (72.5 percent & 65 percent, respectively) compared to more than one-half of the control group had a fair knowledge score two weeks and three months after the intervention (62.5 percent & 57.5 percent, respectively). There was a statistically significant difference in the total knowledge score of pregnant women about UTIs between the study and control

groups throughout the intervention phases. It indicates that the self-efficacy nursing guidelines were successful in increasing the knowledge score of pregnant women regarding UTIs.

Figure (2) clarifies that 19.4 percent and 18.3 percent of women in the study and control groups had satisfying self-care practices for UTIs before the intervention. Meanwhile, two weeks after the intervention and three months later, 75.5 percent and 79.6 percent versus 21.4 percent and 23.5 percent of women in the study and control groups had satisfying self-care practices for UTIs. It suggests that the self-efficacy nursing guidelines were effective in improving pregnant women with UTIs performance.

Table (5) referred to the study pregnant women's UTIs signs & symptoms at two weeks and three months after the intervention (follow-up). The table revealed that there was a highly statistically significant difference between the study and control groups regarding the urinary tract infections' signs & symptoms recovery, particularly dysuria, urgency, frequency of urination, lower abdominal pain, pain during intercourse, and

itching sensation at two weeks and three months after the intervention. After three months of intervention, there was no statistically significant difference between the study and control groups regarding the urinary tract infections' symptoms recovery including back pain and fatigue after 3 months of the intervention between the study and control group. It indicates that the self-efficacy nursing guidelines were beneficial in relieving most of urinary tract infections symptoms.

Table (1): The demographic characteristics of the pregnant women of the study (N= 80)

Variables	Study group (N=40)		Control group (N=40)		X ²	P-value
	No.	%	No.	%		
Age / years						
< 20	2	5.0	5	12.5	1.98	0.371
20 – < 30	25	62.5	20	50.0		
30 – 40	13	32.5	15	37.5		
Educational level					1.68	0.640
Illiterate	5	12.5	4	10.0		
Basic	6	15.0	10	25.0		
Secondary	17	42.5	13	32.5		
University	12	30.0	13	32.5		
Occupation					0.058	0.809
Housewife	28	70.0	27	67.5		
Working	12	30.0	13	32.5		
Residence					3.64	0.056
Rural	23	57.5	31	77.5		
Urban	17	42.5	9	22.5		

Income						
Enough	15	37.5	16	40.0	0.053	0.818
Not enough	25	62.5	24	60.0		

Table (2): The obstetrics history of the pregnant women (N= 80)

Variables	Study group (N=40)		Control group (N=40)		X ²	P-value
	No.	%	No.	%		
Course of the current pregnancy?						
Normal						
High risk pregnancy	40	100	40	100	0	1
	0	0.0	0	0.0		
Gestational age / weeks?						
4- 9 weeks	12	30.0	10	25.0	4.03	0.133
10 – 12 weeks	24	60.0	19	47.5		
13 – 24 weeks	4	10.0	11	27.5		
Number of pregnancies						
One	8	20.0	10	25.0	0.85	0.838
Two	11	27.5	13	32.5		
Three	13	32.5	10	25.0		
More than three	8	20.0	7	17.5		
Parity						
One	12	30.0	13	32.5	0.51	0.916
Two	12	30.0	10	25.0		
Three	8	20.0	7	17.5		
No one	8	20.0	10	25.0		
Mode of previous delivery?						
Vaginal	7	17.5	8	20.0	0.48	0.786
Caesarian	25	62.5	22	55.0		
None	8	20.0	10	25.0		
Previous family planning methods?						
Yes	32	80.0	30	75.0	0.29	0.592
No	8	20.0	10	25.0		
The method used?	N=32		N=30			
Intrauterine contraceptive device	27	84.4	21	70.0	FE 3.61	0.164
Oral contraceptive pills	1	3.10	0	0.0		
others	4	12.5	9	30.0		
Previous history of urinary tract infections during pregnancy?						
Yes	16	40.0	18	45.0	0.205	0.651
No	24	60.0	22	55.0		

*FE: Fisher exact test

Table (3): Signs and Symptoms of Urinary tract infections in the studied pregnant women before the intervention (N= 80)

Variables	Study group (N=40)		Control group (N=40)		X ²	P value
	No.	%	No.	%		
Dysuria (pain during urination)						
Yes	40	100	40	100	0	1
No	0	0.0	0	0.0		
Urgency and frequency of urination						
Yes	36	90.0	37	92.5	FE 0.157	0.692
No	4	10.0	3	7.5		

Lower abdominal pain						
Yes	25	62.5	28	70.0	0.502	0.478
No	15	37.5	12	30.0		
Pain during the intercourse						
Yes	25	62.5	27	67.5	0.220	0.639
No	15	37.5	13	32.5		
Back pain						
Yes	30	75.0	32	80.0	0.287	0.592
No	10	25.0	8	20.0		
Itching sensation						
Yes	15	37.5	10	25.0	1.45	0.228
No	25	62.5	30	75.0		
Fatigue						
Yes	25	62.5	23	57.5	0.208	0.648
No	15	37.5	17	42.5		
Do urinary tract infections' symptoms affect you?						
Yes	40	100	40	0.0	0	1
No	0	0.0	0	100		
Do you seek medical advice?						
Yes	8	20.0	10	25.0	0.29	0.592
No	32	80.0	30	75.0		
If not, why?	N=32		N=30			
I believe it will not affect pregnancy	22	68.7	20	66.7	2.01	0.365
I believe it will not affect the fetus	2	6.3	5	8.3		
I believe that it is physiological event with pregnancy	8	25.0	5	25.0		
Reason for attendance?						
Seek medical advice to treat symptoms	8	20.0	10	25.0	0.29	0.592
Follow up visit	32	80.0	30	75.0		

*FE: Fisher exact test

Table (4a): Pregnant women's reported self-care practices for UTIs' signs & symptoms before the intervention (N = 80)

Variables	Study group (N=40)		Control group (N=40)		X ²	P value
	No.	%	No.	%		
Do you drink coffee or tea?					0.567	0.753
None of them	14	35.0	8	20.0		
Both of them	2	5.0	2	5.0		
One of them	24	60.0	30	75.0		
Do you prefer eating spicy meals?					.213	0.644
Yes	24	60.0	26	65.5		
No	16	40.0	14	35.5		
Do you prefer eating fatty meals?					.213	.644
Yes	24	60.0	26	65.5		
No	16	40.0	14	35.5		
How many cups of water do you drink per day?					1.125	0.570
6 – 8 cups	15	10.0	17	42.5		
8 – 10 cups	3	37.5	1	2.5		
< 6 cups	22	52.5	22	55.0		
Do you drink home remedies?					1.03	.314
Yes	1	2.5	0	0.0		
No	39	97.5	40	100		

Types of underwear?						
Synthetic	22	55.0	27	67.5	1.32	.251
Cotton	18	45.0	13	32.5		
Frequency of change of underwear per day?						
One	19	47.5	14	35.0	1.28	0.256
None	21	52.5	26	65.0		
Do you use vaginal douching?						
Yes	10	25.0	12	30.0	.251	.617
No	30	75.0	28	70.0		
Do you use soap and water in washing the genitalia?						
Yes	22	55.0	20	50.0	0.201	0.654
No	18	45.0	20	50.0		
Manner of washing the genitalia after toileting?						
From front to back	11	27.5	28	30.0	0.061	0.805
From back to front	29	72.5	12	70.0		
Hand washing after toileting?						
Yes	32	80.0	29	72.5	0.621	0.431
No	8	20.0	11	27.5		

Table (4b): Pregnant women's reported self-care practices for UTIs' signs & symptoms before the intervention (N = 80)

Variables	Study group (N=40)		Control group (N=40)		X ²	P value
	No.	%	No.	%		
Frequency of the intercourse per week?						
One	3	7.5	3	7.5	0.220	0.896
Two	17	42.5	15	37.5		
Three times	20	50.0	22	55.0		
When do you wash the genital area when having an intercourse?						
Before the intercourse	0	0.0	0	0.0	0.061	0.805
After the intercourse	10	25.0	11	27.5		
Before and after the intercourse	2	5.0	0	0.0		
None of them	28	70.0	29	72.5		
When do you urinate when having an intercourse?						
Before the intercourse	0	0.0	0	0.0	3.13	0.209
After the intercourse	34	85.0	33	82.5		
Before and after the intercourse	3	7.5	0	0.0		
None of them	3	7.5	7	17.5		
Do you empty the bladder frequently when full?						
Yes,	20	50.0	15	37.5	1.27	0.260
No	20	50.0	25	62.5		
Do you keep the genital area clean and dry?						
Yes	21	52.5	19	47.5	0.200	0.655
No	19	47.5	21	52.5		

Figure (1): Total knowledge score of pregnant women about UTIs in both Groups throughout the intervention phases (N= 80)

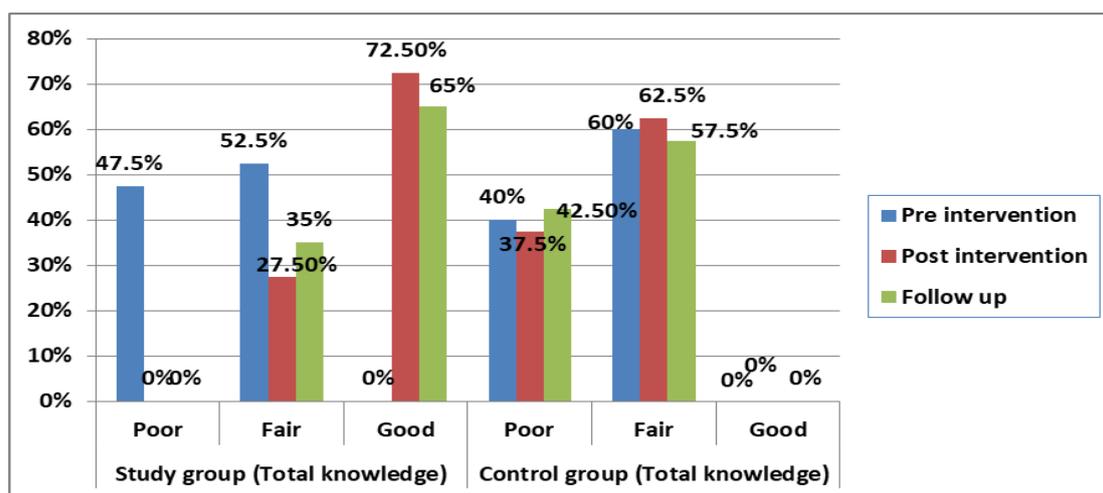


Figure (2): The studied pregnant women's self-care practices for UTIs in both Groups throughout the intervention phases (N= 80)

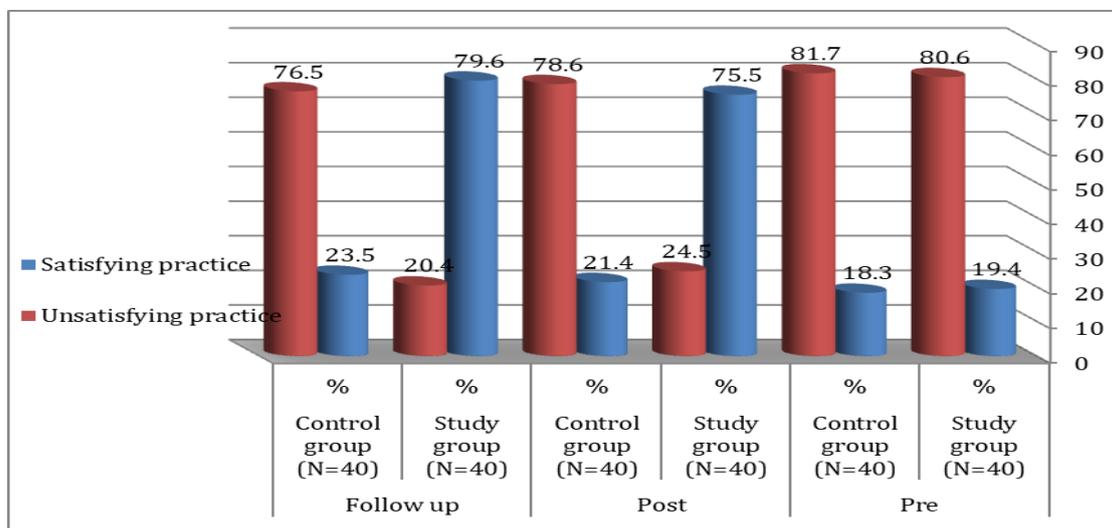


Table (5): The studied pregnant women' UTIs signs & symptoms at 2 weeks and 3 months after the intervention (Post & follow-up)

Urinary tract infections' symptoms	Post				Follow up				X ²	P value
	Study group		Control group		Study group		Control group			
	No.	%	No.	%	No.	%	No.	%		
Dysuria	N= 40		N= 40		N= 22		N= 34		10.2 13.6	0.001**
Completely relieved	18	45.0	6	15.0	12	54.5	16	47.1		
Moderately relieved	14	35.0	4	10.0	9	41.0	11	32.4		
Not relieved	8	20.0	30	75.0	1	4.5	7	20.5		
Urgency and frequency of urination	N= 36		N=37		N= 18		N=31		18.6 17.5	0.005**
Completely relieved	18	50.0	6	16.2	11	61.1	2	6.5		
Moderately relieved	11	30.6	8	21.6	3	16.7	9	29.0		
Not relieved	7	20.4	23	62.2	4	22.2	20	64.5		

Lower abdominal pain	N=25		N=28		N=14		N=22			
Completely relieved	11	44.0	6	21.4	6	42.8	1	4.6	10.2	0.001**
Moderately relieved	7	28.0	8	28.6	4	28.6	9	40.9	13.65	
Not relieved	7	28.0	14	50.0	4	28.6	12	54.5		
Pain during intercourse	N=25		N=27		N=14		N=22			
Completely relieved	11	44.0	5	18.5	6	42.8	1	4.6	10.2	0.011*
Moderately relieved	7	28.0	8	29.6	4	28.6	9	40.9	13.65	
Not relieved	7	28.0	14	51.9	4	28.6	12	54.5		
Back pain	N= 30		N=32		N= 11		N=28			
Completely relieved	19	26.6	4	12.5	6	54.5	6	21.4	17.5	0.249
Moderately relieved	9	33.1	9	28.1	4	36.4	8	28.6	6.35	
Not relieved	2	40.3	19	59.4	1	10.1	14	50.0		
Itching sensation	N=15		N=10		N=6		N=9			
Completely relieved	9	60.0	1	10.0	4	66.7	1	10.2		0.001**
Moderately relieved	4	26.7	3	30.0	2	33.3	4	44.4	12.2	
Not relieved	2	13.3	6	60.0	0	00.0	4	44.4		
Fatigue	N=25		N=23		N=14		N=21			
Completely relieved	11	44.0	2	8.7	9	64.3	2	9.5	10.2	0.249
Moderately relieved	7	28.0	9	39.1	4	28.6	9	42.9	6.35	
Not relieved	7	28.0	12	52.2	1	7.1	10	47.6		

Discussion

The findings of the current study indicated that the self-efficacy nursing guidelines were effective in enhancing pregnant women's knowledge and their performance related to UTIs. Regarding the demographic features of the pregnant women with UTIs, the current study revealed 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. It could be because women in this age group are more sexually active, and the female urethra's anatomical relationship with the vagina makes it susceptible to infection during sexual intercourse, which could lead to an increased tendency for bacteria to ascend from the urethra into the bladder (Schlegel et al., 2020). In addition, a lack of understanding of the needed self-care practice guidelines during pregnancy may be a cause of increased UTIs among women with low levels of

education.

Ahmed and Khreisheh (2018), on the other hand, published a study titled "Urinary tract infections in pregnant women and the assessment of associated risk factors in Saudi Arabia." They reported that urinary tract infections are more prevalent in women between 30 and 40 years old. According to Ahmed and Khreisheh (2018) study, it might be due to the multipara and physiological changes that occur during pregnancy, which increase the risk of UTIs. In addition, the findings of this study revealed that around three-quarters of the study and control groups were housewives who lived in rural regions, with more than half of them reporting insufficient income. It might be explained by the fact that poor socioeconomic status and insufficient income increase the likelihood of UTIs, which lead to kidney failure.

This finding was in line with Vazquez & Abalos (2015), who evaluated the treatment of symptomatic

UTIs during pregnancy in Mexico. They determined that substandard housing, poor drainage systems, a lack of sufficient personal hygiene, and poor environmental hygiene increase the frequency of urinary tract infections in illiterate people and those with lower socioeconomic levels. It's also plausible to suggest that a university degree might help pregnant women better comprehend and cope with their circumstances. Furthermore, this conclusion contradicts Okonko et al. (2015), who conducted research at Oluyoro Catholic Hospital in South-Western Nigeria on urinary tract infections among pregnant women. They discovered that pregnant employees had the highest rate of urinary tract infections. It may employ women who cannot go to the health care facility for prenatal care in the morning because of work, do not drink enough water, and do not void during working hours because of job pressure, all of which contribute to UTIs.

According to the obstetric history, most pregnant women in the study were multigravida and multipara because of sexual activity, pelvic floor stress during birth, and weakening of supportive structures. It is consistent with Parida et al.'s investigation (2018) of the prevalence of urinary tract infections in pregnant women in a tertiary care hospital in Odisha, India. They found that more than one-half of the pregnant women were in their third trimester. Parity is one of the probable variables determining the prevalence and incidence of UTIs among pregnant women. Furthermore, this is contradicted by Ranjan et al. (2018) reported that the highest incidence of UTIs is seen in primigravida in a study about the prevalence of urinary tract infections among pregnant women and their sequelae in newborns in India. This is understandable because there is no link between gravidity and the risk of UTIs during pregnancy.

The current study found that all pregnant women

involved in the study were between the ages of 6 and 24 weeks, which was one of the core inclusion criteria of the sample. Urinary tract infections in pregnancy start in the sixth week and peak between the 22nd and 24th week due to ureteral dilation, which will last until birth. Increased bladder volume and reduced bladder tone also contribute to increased urine stasis and ureterovesical reflux, lowering the lower urinary tract's capacity to fight invading microorganisms. These variables might have a role in developing urinary tract infections when pregnant.

This finding was supported by Ahmed & Khreisheh (2016), who investigated the impact of intervention guidelines on the self-care practices of pregnant women with UTIs in Egypt, with pregnant women in their first and second trimesters being one of the sample's core inclusion criteria. On the other hand, Ashshi et al. (2016) found that pregnant women in their 6th and 7th months of pregnancy had a higher incidence of UTIs, while pregnant women in their early pregnancy had a lower incidence in a study about urinary tract infections in pregnant women: assessment of associated risk factors in KSA. This might be due to the gravid uterus's pressure on the ureters, which causes a blockage in urine flow, hormonal and immunological changes that occur during normal pregnancy and the significant abdominal distention experienced during this stage of pregnancy, which makes fecal contamination and personal hygiene more difficult.

Concerning the urinary tract infections' symptoms and signs before the intervention, the majority of the studied pregnant women in both groups complained of multiple UTIs symptoms. Most of the study sample reported dysuria, frequency of urination, back pain, lower abdominal pain, and pain during intercourse, fatigue and itching sensation. This may be related to low levels of women's awareness and cultural

barriers to delayed diagnosis and treatment regardless of the symptoms. This finding is similar to that of Mohamed et al. (2020) in a study about the effect of health beliefs model-based education on the control of urinary tract infection among pregnant women at Zagazig University, Egypt. They mentioned that frequency and urgency of urination, pain or burning when passing urine, not being able to empty the bladder completely, uncomfortable pressure in the lower abdomen and low back pain are the most common urinary tract infections.

Kazemier et al. (2017) in a study about costs and effects of screening and treating low-risk women with a singleton pregnancy for asymptomatic bacteriuria in the Netherlands, Western Europe. They reported that the common symptoms of UTIs include burning during urination, frequent or intense urge to urinate, even when one has little urine to pass, pain in the back or lower abdomen, cloudy, dark, or unusual smelling urine, and fatigue. Furthermore, Haider et al. (2016) in a study about risk factors of urinary tract infection in pregnancy, they reported that the common urinary tract infections' symptoms are abnormal voiding patterns followed by irritative symptoms and voiding difficulties

These urinary tract infections' symptoms bother the majority of the study and control group. This is in accordance with Hassan & Hassan's study, (2016) a study about the effect of intervention guidelines on self-care practices of pregnant women with urinary tract infections in Egypt. They reported that urinary tract infections' symptoms include burning sensation, lower abdominal discomforts, disturbing pregnant women's sleep, and interfering with daily life activities. Also, Safarini et al. (2020) 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.

As regards to the study participants' knowledge score regarding the urinary tract infections, significant improvements were shown from poor knowledge score to good knowledge score of the study group after the intervention guidelines regarding most of the studied areas related to the definition, causes, signs, and symptoms, risk factors of urinary tract infection, a complication associated with UTIs on both the mother and the fetus. Also, preventive and management self-care practices to relieve UTIs. There was a highly significant difference within the study group before and after implementing the intervention guidelines. These findings may be interpreted due to the lack of antenatal classes on the issue of urinary tract infections during pregnancy. Meanwhile, these results were in agreement with Ahmed & Khresheh et al. (2016) in a study about the impact of instructional programs on the prevention of urinary tract infections recurrence on the level of knowledge and self-care behaviors among women with urinary tract infections at KSA. They found serious deficiencies in the pregnant women's knowledge regarding most of the study items including the meaning of UTIs and also unaware of the adverse effect of UTIs on themselves and their fetuses which could be due to their low level of education before implementation of the instructional program. Similarly, El Fatah et al. (2021) in a study about knowledge and attitudes of pregnant women regarding urinary tract infection in India and reported that less than three-quarters of the study participants had average total knowledge, while one-quarter of them had poor total knowledge and the minority of them had good total knowledge. This low score of knowledge might be due to a lack of awareness-raising programs about urinary

tract infections and their effect on both the mother and the fetus and the absence of health care providers' advice regarding UTIs during pregnancy. Although most pregnant women should be pleased and comfortable with their pregnancy, the symptoms of UTIs with pregnancy tend to cause discomfort to the woman and may become frustrated. So, the nurse should be knowledgeable with good teaching skills to provide sound advice about measures to relieve UTIs discomforts and help to promote the overall health and wellbeing of a pregnant client. This finding achieved the first aim and supported the first hypothesis.

Regarding the self-care practices as reported and performed by the studied pregnant women to relieve their signs and symptoms of UTIs mentioned before, the present results clarified that more than three-fourths of the studied pregnant women had unsatisfactory practices to prevent and manage UTIs. The findings of the current study can be explained by the fact that a lack of knowledge and awareness about UTIs can lead to unhealthy practices. Unhealthy practices may contribute to the development and aggravation of UTIs, which refers to the crucial need for health education programs to raise women's awareness and improve regular practices. So, a high statistically significant difference was observed in the study group compared to the control group after two weeks and three months of intervention. These findings might be related to women's commitment to the received self-efficacy nursing guidelines. Moreover, the majority of the studied pregnant women performed incorrect self-care measures to deal with their UTI symptoms and perceived them as effective and so beneficial before the implementation of the intervention. These findings may reflect the misguidance and ignorance of pregnant women regarding the adverse effect of these wrong behaviors

on their pregnancy. In fact, these traditional self-care practices are considered mostly incorrect or unhealthy behavior and may not be applied correctly (unsatisfactory self-care practices) which may lead to negative or adverse effects on pregnancy outcomes. Hence pregnant women were in great need to increase their awareness and knowledge regarding the risk of urinary tract infection and its possible complications. The raised level of knowledge and behavior such as proper health behaviors, sexual habits, and prevention of urinary tract infections play a very important role in the prevention of UTIs. On the other hand, Saatloo et al. (2014), in a study about the effect of education based on empowerment models on knowledge, self-efficacy, and practice of mothers with young girls for preventing UTIs in Iran. They reported that more than two-thirds of the studied samples had satisfactory practices. This difference in results may be attributed to differences in study methodology as; samples, setting, and demographic characteristics. From the researchers' point of view, it reflected the positive impact of the educational guidelines in improving women's practices. These are confirmed effective modifications in the pregnant women's practices that reflected the success of the main goals of the implementation of the self-efficacy nursing guidelines. This finding achieved the second aim and supported the second hypothesis.

Meanwhile, the present study reported that there was a significant impact of the educational guidelines on the relief of UTIs' symptoms within 2 weeks and 3 months after the intervention among the study participants. It revealed that most of the UTIs' symptoms have been significantly relieved or somewhat improved by a way or another after healthy self-care measures and health-promoting behaviors have been instructed, followed and used. This result may be due to the efficiency of the intervention

guidelines and the educational sessions. This finding achieved the second aim and supported the second hypothesis.

This finding was supported by Ahmed, (2015) in a study about the effect of intervention guidelines on self-care practices of pregnant women with urinary tract infection in Egypt and concluded that the application of the educational guidelines for the pregnant women regarding the performance of healthy self-care practices had a significant influence on the relief of UTIs' symptoms. In accordance, the findings of this study agreed with those of Karishetti & Shaik (2019) 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. They pointed out a significant effect of the nursing guidelines on the relief of UTIs' symptoms after implementation of the intervention and the instructed guidelines for women regarding the performance of healthy self-care practices. Also, Mohamed et al., (2020) in a study about the effect of health beliefs model-based education on the control of urinary tract infection among pregnant women at Zagazig University, Egypt. They reported that there was a statistically significant improvement in urinary tract infections' symptoms severity after the application of an educational program based upon the health belief model

This finding agrees with Mohamed et al., (2020) who studied the effect of the health beliefs model-based education on the control of urinary tract infection among pregnant women, in Zagazig University, Egypt and proved that implementing the intervention guidelines by the pregnant women had a significant positive influence on their relief of urinary tract infections' symptoms. These findings can be

attributed to the implementation of the intervention guidelines which have been applied with considerable success to a range of health behaviors, particularly preventive behaviors, such as adherence to recommended medical treatments. Moreover, Kazemier, et al. (2017) in a study entitled costs and effects of screening and treating low-risk women with a singleton pregnancy for asymptomatic bacteriuria in the Netherlands, Western Europe reported that the positive improvements in urinary tract infections' symptoms were observed among the study group after the intervention and there were no significant difference improvements among the control group. This improvement refers to the effectiveness of the intervention guidelines and teaching sessions given to pregnant women to change their behavior, enhance and upgrade their self-care practices to relieve their UTIs' symptoms, and reduce the recurrence of UTIs among the study group in comparison to the control group.

This study result is consistent with Nejad Sadeghi, and Taghdisi, (2014), in their study about the evaluation of the modification of the behavior of pregnant women in the field of urinary infections based on the health belief model in Iran. They reported that designing and implementing educational programs according to health belief models can be effective in preventive behaviors from UI in pregnant women. In addition, Abd El Aziz, et al. (2016) 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 and proved that (HBM) was effective in improving pregnant women's knowledge, health beliefs, and health behaviors to prevent urogenital infections. This result goes in line with Changizi et al. (2014), study about beliefs of female teenagers on prevention of urinary tract infection: application of health belief model finding in

Iran who concluded that implementing educational programs to increase the susceptibility of getting urinary tract infection amongst female students was beneficial in preventing urinary tract infection.

This improvement refers to the effect of the educational guidelines and teaching sessions given to pregnant women to change their behaviors, and enhance and upgrade their self-care practices to relieve their UTIs' symptoms. Urinary tract infection can be reduced by doing the following healthy measures such as developing a habit of urinating as soon as the need is felt and emptying the bladder completely when you urinate. Urinate before and after intercourse, avoid intercourse while you are being treated for UTIs, after urinating blot dry (do not rub), and keep your genital area clean. Make sure that you wipe from the front toward the back, and avoid using strong soaps, douches, antiseptic creams, feminine hygiene sprays, and powders. Change underwear and pantyhose every day; avoid wearing tight-fitting pants. Wear all-cotton or cotton-crotch underwear and pantyhose; don't soak in the bathtub longer than 30 minutes or more than twice a day, drink 6-8 glasses of water each day, and unsweetened cranberry juice regularly, and eliminate refined foods, fruit juices, caffeine, alcohol, and sugar. So, this study highlighted that there was a lack of women's knowledge regarding physiological changes during pregnancy and they also lacked the concept of self-care practice as well as the basic health practices. However, the need to raise awareness regarding UTIs and to expand services for prevention and treatment for pregnant women as well as health education to learn about self-care practices during pregnancy is crucial.

Finally, symptomatic UTI prevalence is due to a lack of knowledge and suboptimal self-care practices regarding UTIs. Therefore, being aware of the potential factors of UTIs, and modifying these habits play a vital

role in the prevention, management, and recurrence of UTIs and their serious consequences, especially during pregnancy. Therefore, maternity nurses are responsible for educating pregnant women regarding various aspects of UTIs and how to prevent them. Also, encouraging them to recognize early UTIs, initiate appropriate treatment, and take the necessary precautions to protect and improve their health.

Conclusion

According to the findings, there was a lack of women's knowledge and performance about UTIs and their effects on themselves and their fetuses before implementing the self-efficacy nursing guidelines, implying that they do not understand satisfying self-care practices. However, increasing UTIs awareness and expanding prevention and health education to learn about self-care practices throughout pregnancy is critical. Meanwhile, the self-efficacy nursing guidelines were successful for pregnant women in increasing total knowledge scores about urinary tract infections, which means having a substantial impact on the relief of UTIs symptoms. It achieved the first aim and supported the first study hypothesis.

Moreover, the study findings also revealed that the self-efficacy nursing guidelines application was an effective intervention for pregnant women in enhancing their self-efficacy in performing their self-care practices for UTIs, which had a substantial impact on the relief of UTIs' symptoms. It achieved the second aim and supported the second study hypothesis. The findings of the present study supported the purpose of the study and confirmed the effectiveness of self-efficacy nursing guidelines and their positive effects as a valuable and useful method for increasing pregnant women's knowledge and enhancing their performance in relieving urinary tract infections' symptoms. As a result, we fail to accept the null hypothesis.

Recommendations

Therefore, the recommendations of this study could be

- Teaching self-care measures and preventative techniques are crucial self-efficacy nursing guidelines for UTIs prevention and management throughout pregnancy.
- Instructing women on how to use correct self-efficacy nursing guidelines to prevent UTIs from developing and recurring.
- Routine screening of all pregnant women for early diagnosis and proper treatment of UTIs during the three trimesters of pregnancy, including bacteriuria examination and urine culture.
- All pregnant women should participate in a continuous health education program to increase their understanding of self-efficacy nursing guidelines to avoid recurrent UTIs throughout pregnancy.
- More research is needed to determine adherence to nursing guidelines for healthy self-efficacy and to assess the long-term impact of educational guidelines on recurrent UTIs.
- Replication of the current study on a larger probability sample is recommended for the generalizability of the results.

References

- Abd El Aziz MS., Ibrahim HA-F., & Elgzar WTI., (2016); Effect of application of health belief model on pregnant women's knowledge and health beliefs regarding urogenital infections. *JNHS*. 5(5):34–44. DOI: 10.9790/1959-0505013444].
- Abd Elfatah, S. E., Ramadan, S. A. E., Gonied, A. S., & Ali, F. K., (2021); Knowledge and Attitudes of Pregnant Women regarding Urinary Tract Infection. *Journal of Nursing Science Benha University*, 2(1), 147-158. Saudi Arabia, *JNHS*, 5(3), 43-51.
- Ahmed, M. H., (2015); Effect of intervention guidelines on self-care practices of pregnant women with urinary tract infection, *Life Science Journal*, 12(1), 113-24.
- Ahmed NM, & Khreisheh RMH., (2016); Impact Of Instructional Program About Prevention Of UTI Recurrence On The Level Of Knowledge And Self-Care Behaviors Among Women With. UTI in Saudi Arabia *JNHS*, 5(3):43–51. DOI: 10.9790/1959-0503034351].
- Ahmed, N. M., & Khreisheh, R. M. H., (2018); Impact Of Instructional Program About Prevention Of UTI Recurrence On The Level Of Knowledge And Self-Care Behaviors Among Women With UTI In Saudi Arabia. *JNHS*, 5(3), 43-51.
- Ahmadi Z, Shamsi M, Roozbahani N, & Moradzadeh R., (2020); The effect of an educational intervention program on promoting preventive behaviors of urinary tract infection in girls: a randomized controlled trial, *BMC Pediatr*, 20(1):1–10. doi:10.1186/s12887-020-1981-x].
- Al-Ateeq, M. A., & Al-Rusaieess A. A. (2015); Health education during antenatal care: the need for more. *International Journal of Women's Health*; 7: 239–242.
- Amiri, F. N., Rooshan, M. H., Ahmady, M. H., & Soliamani, M. J., (2019); Hygiene practices and sexual activity associated with urinary tract infection in pregnant women, *EMHJ-Eastern Mediterranean Health Journal*, 15 (1), 104-110, 2019.
- Ashshi, A. M., Faidah, H. S., Saati, A. A., El-Ella, G. A. A., Al-Ghamdi, A. K., & Mohamed, A. M., (2016); Urinary tract infections in pregnant women, assessment of associated risk factors in Makkah, KSA. *Biosciences Biotechnology*

- Research Asia, 10(1).
- Cameron, P.; Little, M.; Mitra, B.; Deasy, C. (2020): Textbook of Adult Emergency Medicine. 5th ed., Edinburgh: Elsevier Health Sciences; 403-405.
- Changizi, M., Zadeh, D. S., Zinat-Motlagh, F., & Mahboubi, M. F. M., (2014); Beliefs of Female Teenagers on Prevention of Urinary Tract Infection: Application of Health Belief Model. *Journal of Biology and Today's World*, 3(10), 223-226.
- EL Sayed HA., Aboud SA., & Ali FK., (2019): Effect of implementing nursing intervention guidelines on recurrent vaginitis among reproductive-age women, *IOSR Journal of Nursing and Health Science (IOSR-JNHS)* e-ISSN: 2320-1959, p-ISSN: 2320-1940 8 (6). III., PP 59-74 www.iosrjournals.org
- Gonzalez G, Vaculik K, Khalil C, Zektser Y, Arnold C, & Almario CV., (2020); Women's Experience with Stress Urinary Incontinence: Insights from Social Media Analytics. *The J Urol*. 203(5):962-8. DOI:10.1097/JU.0000000000000706].
- Haider, G., Zehra, N., Munir, A. A., & Haider, A. (2010); Risk factors of urinary tract infection in pregnancy. *JPMA. The Journal of the Pakistan Medical Association*, 60(3), 213.
- Hassan, M. H. A., & Hassan, A. (2016); Effect of intervention guidelines on self-care practices of pregnant women with urinary tract infection. *Life Science Journal*, 12(1), 113-24
- Hassan MH., (2015); Effect of intervention guidelines on self-care practices of pregnant women with urinary tract infections, *Life Science Journal*, 12 (1), 212-224
- Kalinderi, K., Delkos, D., Kallinderis, M., Athanasiadis, A., & Kalogiannidis, I. (2018): Urinary tract infections during pregnancy: current concepts on a common multifaceted problem. *Journal of Obstetrics and Gynaecology*, 38(4), 448-453.
- Karishetti, M. S., & Shaik, H. B. (2019). Clinicomicrobial assessment of urinary tract infections in a tertiary care hospital. *Indian Journal of Health Sciences and Biomedical Research (KLEU)*, 12(1), 69.
- Kazemier, B. M., Schneeberger, C., De Miranda, E., Van Wassenae, A., Bossuyt, P. M., Vogelvang, T. E., & Geerlings, S. E., (2017); Costs and effects of screening and treating low-risk women with a singleton pregnancy for asymptomatic bacteriuria, the ASB study, *BMC pregnancy and childbirth*, 12(1), 1-5.
- Lowdermilk, D. L.; Perry, S. E.; Cashion, M. C.; Alden, K. R.; & Olshansky, E. (2020): *Maternity and women's health care. Pregnancy*, 12th edit, St. Louis: Elsevier; 257-258.
- Luszczynska, A., Scholz, U., & Schwarzer, R., (2018); The general self-efficacy scale: multicultural validation studies, *The Journal of Psychology*, 139(5), 439-457.
- Maciejewski, M., (2020); Quasi-Experimental design, *Biostatistics & Epidemiology*; 4 (1): 38-47.
- Manges, A. R. (2017). *Escherichia coli and urinary tract infections: the role of poultry-meat. Clinical Microbiology and Infection*, 22(2), 122-129.
- Moradpour SH., Shahnazi H., & Hassanzadeh A., (2020); The Effect of Theory of Planned Behavior-Based Education in Adopting the Urinary Tract Infection Prevention Behavior in

- Pregnant Women: A Randomized Controlled Trial, Researchsquare, <https://doi.org/10.21203/rs.3.rs-52176/v1>
- Mohamed, N. R., Omar, H. H. H., Abd-Allah, I. M., & Nour, S. A., (2020); Effect of Health Beliefs Model-Based Education on the Control of Urinary Tract Infection among Pregnant Women, *shock*, 12, 13.
- Mohamed NR., Omar H., Abd-Allah IM., Nour SA., (2020); Self-efficacy and practices of pregnant women with Symptomatic Urinary Tract Infection *International Journal of Novel Research in Healthcare and Nursing Vol. 7, Issue 3, pp: (96-107)*, Available at: www.noveltyjournals.com
- Mussaed, E.A. (2018): Bacterial Identification and Drug Susceptibility Patterns in Pregnant and Non-Pregnant UTI Patients. Singapore, Springer; 1-18.
- Nejad Sadeghi, E.; & Taghdisi, M. h. (2014): evaluation of modification of the behavior of pregnant women in the field of urinary infections based on the health belief model. *Hormozgan Medical Journal*; 18(3):317–327.
- Okonko, I. O., Ijandipe, L. A., Ilusanya, A. O., Donbraye-Emmanuel, O. B., Ejembi, J., Udeze, A. O., & Nkang, A. O., (2015); Detection of urinary tract infection (UTI) among pregnant women in Oluyoro Catholic Hospital, Ibadan, South-Western Nigeria, *Malaysian Journal of Microbiology*, 6(1), 16-24.
- Parida, B., Projna Paty, B., Padhi, A., Padhi, S., Narasimham, M., & Sahu, S., (2018); Prevalence of urinary tract infection in pregnant women in a Tertiary Care Hospital of Odisha, *IOSR Journal of Dental and Medical Sciences*, 17(5), 47-50.
- Paxton, R. (2017): *Infectious Disease, an Issue of Physician Assistant Clinics*. Philadelphia: Elsevier Health Sciences; 240-247.
- Rahimi SF., zareban I., Shahraki Poor M., Zhianian A., Keykhaee Z., Hosseini ES., & Karami bojd F., (2016); Predictors of Preventive Behaviors of Urinary Tract Infections Based on Health Belief Model among Pregnant Women in Zahedan, *Caspian Journal of Health Research*, 1(2): 9-17
- Ranjan, A., Sridhar, S. T. K., Matta, N., Chokkakula, S., & Ansari, R. K., (2018); Prevalence of UTI among pregnant women and its complications in newborns, *Indian Journal of Pharmacy Practice*, 10(1), 45-49.
- Ribeiro, S. (2015): Nursing management of urinary tract infections, *nursing older people*, 27(7).
- Shaheen, H. M., Farahat, T. M., & Hammad, N. A. E. H., (2019); Prevalence of urinary tract infection among pregnant women and possible risk factors, *Menoufia Medical Journal*, 29(4), 1055.
- Smail, F. M., & Vazquez, J. C., (2019); Antibiotics for asymptomatic bacteriuria in pregnancy, *Cochrane database of systematic reviews*, (11).
- Saatloo, B., Taghdisi, M., Shojaizade, D., Baghaei, R., & Hosseini, F., (2014); The effect of education based on empowerment models on knowledge, self-efficacy, and practice of mothers with young girls for preventing urinary tract infection. *Journal of Research and Health*, 4(1), 584-591.
- Navarro, A., Tiongco, R. E., & Bundalian Jr, R. (2019); Knowledge, attitude, practices, and health

beliefs of pregnant women about urinary tract infection and its associated risk factors: a local Filipino community experience. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal)*, 14(2), 82-87.

Vazquez, J. C., & Abalos, E., (2015); Treatments for symptomatic urinary tract infections during pregnancy, *Cochrane Database of Systematic Reviews*, (1).

Zhianian, A., Zareban, I., Ansari-Moghaddam, A., & Rahimi, S. F., (2016); Improving self-care behaviors in pregnant women in Zahedan: Applying self-efficacy theory, *Caspian Journal of Health Research*, 1(1), 18-26.