

Effect of Implementing Clinical Pathway among Pregnant Women with Pyelonephritis on Childbirth and Neonatal Outcome

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Abstract Aim of this study to determine the effect of implementing clinical pathway among pregnant Women with pyelonephritis on childbirth and neonatal outcomes. **Design:** A quasi –experimental design. **Setting:** The study was conducted at outpatient’s clinic of obstetric department at Shebin EL-Kom Teaching Hospital, Menoufia University hospital at Shebin EL-Kom. **Subjects:** Convenient sample was used all staff nurses in the obstetric department (20 nurses) as well as 50 pregnant mothers will selected and divided into two equal groups; intervention group (25mothers who received clinical pathway during second trimester of pregnancy) and control group (25 mothers who not received clinical pathway). **Instruments:** interviewing questionnaire for pregnant mothers, & nurses and Observation checklist of neonatal outcomes. **Results:** The study revealed that there was highly significant improvement in women knowledge after implementing clinical pathway, there was significant improvement in nurse’s knowledge, childbirth, and neonatal outcomes. **Conclusion:** There was significant improvement was obvious among women relief of their reported symptoms and their knowledge about pyelonephritis and measures to relieve it. **Recommendations:** Improve the quality of health care provided through routine screening of pregnant women and applying workshops for nurses to improve their knowledge about pyelonephritis during pregnancy.

Keywords: clinical pathway, pyelonephritis, childbirth, neonate

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1. Introduction

Pyelonephritis is inflammation of the kidney, typically due to a bacterial infection, which its incidence during pregnancy was found when the patient’s history contained some indication of an earlier renal disease, and it is one of the most common causes of hospitalization during the prenatal period [1].

There is an indication predisposition to pyelonephritis within the gestational period due to physiological changes that occur during gestation. From the 12th week of gestation, it is possible to observe ureteral dilatation and renal colices due to the progesterone-induced relaxation. Therefore, there is a decrease in ureteral peristalsis, which appear with ureteral enlargement and ureteral compression, especially on the right side, as well as compression of the bladder, with consequent loss of emptying capacity, associated with increased urine output, may contribute to urine stasis [2].

“The clinical findings of pyelonephritis are fever with sudden onset, acute lower abdominal pain, burning sensation during urination, cloudy urine, nausea and vomiting” [3].

Identification of the pathogen for diagnosis and treatment planning is done by urine culture. The most common uro-pathogen in urine samples is *Escherichia coli*, appear in %95 of the cases of pyelonephritis pregnant women [4].

Pregnant women diagnosed with pyelonephritis should be initially hospitalized for empirical treatment until the result of the uro-culture for pathogen identification and the antibiotic sensitivity test [5]. In case of untreated pyelonephritis, there is an increased risk of fetal and maternal morbidity such as fever, renal failure, preterm birth and stillbirth [6].

Mothers who have a pyelonephritis are at high risk for pregnancy complications, including miscarriage, stillbirth, preterm birth, and preeclampsia [7].

Clinical pathway is documented sequence of clinical interventions, placed in an appropriate timeframe, written, and agreed by a multidisciplinary team, which help a patient with a specific condition or diagnosis move continuously through a clinical experience to a desired outcome [8].

Clinical pathways are more utilized for high-risk care for improvement of maternal and neonatal outcomes. Clinical pathways are widely regarded as providing valuable knowledge about specific types of patients and

their care, as well as providing direct guidance in clinical practice [9].

2. Aim of the Study

To determine the effect of implementing clinical pathway among pregnant Women with pyelonephritis on childbirth and neonatal outcomes.

3. Research Hypotheses

1. Nurses who participate in knowledge sessions about pyelonephritis (posttest) will have higher knowledge than nurses who do not participate in knowledge sessions (pretest).
2. Pregnant mothers with pyelonephritis who participate in implementing clinical pathway will have higher knowledge regarding pyelonephritis than mothers who do not participate in implementing clinical pathway.
3. Pregnant mother who will participate in implementing clinical pathway are more likely to have better neonatal outcomes (APGAR score) than who do not participate in implementing clinical pathway.

4. Subjects and Methods

4.1. Research Design

A quasi –experimental design with (Pre and-Posttest) was utilized to accomplish the aim of this study.

4.2. Setting

The study was conducted at outpatient’s clinic of obstetric department at Shebin EL-Kom Teaching Hospital, Menofia University hospital at Shebin EL-kom

4.3. Sampling

Convenient sample of 20 staff nurses were recruited from the obstetric department of the study setting. 50 pregnant mothers were selected and divided into two equal groups; intervention group (25mothers who received clinical pathway during second trimester of pregnancy) and control group (25 mothers who not received clinical pathway).

The inclusion criteria of these women were:

- Medically diagnosed with pyelonephritis
- Pregnancy with gestational age between 20-36 weeks
- No history of chronic disease as (diabetes, hypertension, heart disease anemia)

4.4. Data Collection Instruments

It was developed by the researchers and used to collect the necessary data and revised by qualified experts, then tested for validity and reliability.

An interviewing questionnaire for pregnant mothers It entailed four parts:

Part 1: Assess the socio-demographic data of the pregnant mothers (age, level of education, occupation and years of experiences,

Part 2: Assessed mother's obstetrical history: Parity, abortions, number of living children, previous use of contraceptive method, follow up visits and previous history of urinary tract infection or pyelonephritis with previous pregnancies.

Part 3: Assess mother's knowledge: Assessment of women with current pyelonephritis symptoms

Clinical pathway structured interviewing schedule:

It was developed by the researcher to collect data related to pregnant women`s reported intervention including their personal daily habits as measures taken by women to relieve the symptoms

Part 4: Observation checklist for childbirth: It was used to assess mother's Labor outcomes.

Validity and Reliability was done by the researcher.

4.5. Human Rights and Ethical Considerations

The ethical endorsement was acquired from the committee of ethics at faculty of nursing Menoufia University and hospitals that incorporated into the study. An informed assent was obtained. Participants signed the informed consent and were welcome to go to the study.

4.5.1. Pilot Study

It was conducted on 10% of the total sample according to the selection criteria who were excluded from the main sample to test applicability of the instruments, feasibility of the study and the necessary modification were done accordingly.

4.5.2. Field Work

- Data collection for this study was carried out in the period from September 2020 to March 2021.
- The researcher went to the out patients of the University Hospital 2 days weekly (Sunday and, Monday) for 8 weeks and interviewed 2-3 women in a day then went to Teaching Hospital in different 2 days weekly (Tuesday and Thursday) from 9 AM to 12 PM and the researcher interviewed with 1-2 women in a day.
- During the initial contact with the participant, the researcher clarified the aim of the research and verbal agreement was obtained from all participants.
- The researcher also collected the data from women (only study group) again after implementing clinical pathway to assess the effect of knowledge sessions at delivery and their babies.
- The researcher also collected the data from the nurses for assessing their knowledge about pyelonephritis and apply knowledge sessions for improving their knowledge and how to manage pregnant women with pyelonephritis and then repeat the questionnaire to assess the effect of this sessions on nurse’s knowledge.

4.6. Statistical Analysis

The collected data were coded, computerized, tabulated and analyzed by using SPSS (Statistical Package of Social Science) version 22 on IPM personal computer.

Quantitative data were expressed in the form of mean, standard deviation (SD) and tested by student t-test. Qualitative data were expressed in the form numbers and percentages and analyzed by applying chi-square test. Level of significance was set as

P value <0.05 for all significant tests.

P value of >0.05 statistically non-significant.

P value of <0.001 statistically highly significant.

4.7. Limitation of the Study

1. Appearance of Covid 19 virus, which interfere with application of questionnaire and knowledge sessions with mothers and communication with my supervisors.
2. The sample size was small (50 pregnant women) but take time for collecting the data and implementing the clinical pathway.
3. Some women refuse filling the questionnaire because they did not come to follow up regularly.
4. Limited studies were done about pyelonephritis during pregnancy so there was difficulty in the research.

5. Results

Table 1 shows socio-demographic data of the studied nurses while their age ranged between (23-39) years and all of them are married with mean and standard deviation

(30.5±3.60). Concerning near half of them(45%) have graduated from faculty of nursing and (40%) have diplomat degree of nursing. Meanwhile most of the studied nurses (65%) have information on application of clinical pathway which they got from training courses (38.5%), from the internet (38.5%) and from the lectures (23%).

Table 2 shows comparison between the nurses knowledge about the symptoms of pyelonephritis before and after knowledge sessions which represents that there were significant differences in their knowledge after implementing clinical pathway with (P value 0.001) as pain during urination, burning sensation during urination, some vaginal secretion, feeling urgency while urination, lower abdominal pain, changing in color and smell of the urine, high temperature, pain during the intercourse, nausea and swelling of the foot.

Table 3 shows comparison between the study group and control group regarding their evaluation during the delivery which represent most of mothers in the two groups, their first stage were < 8 hours and most of them have C.S, but there were differences in the main cause of C.S, in the study group was previous C.S and in the control, group was rupture of membrane.

Table 4 shows that there is no significance differences in the baby in the two groups while the APGAR score of the baby immediately after the delivery ranged between (7-10) and the weight ranged between (2-4.5) kg.'s of the babies don't need intensive care unit and most of them start breast feeding within 12 hours after birth.

Figure 1: Comparison between study group and control group regarding symptoms and signs of pyelonephritis in the current pregnancy post intervention

Figure 2: Comparison between study group and control group regarding ways to relieve symptoms of pyelonephritis pre and post intervention

Table 1. Socio demographic characters of the studied nurses (N= 20)

Socio demographic characters	No.	%
Age / years		
Mean ±SD		30.5±3.60
Range		23 – 39
Marital state		
Married	20	100
Educational level		
Diploma f nursing	8	40.0
Institute of nursing	3	15.0
Faculty of nursing	9	45.0
Job description		
Nursing technician	11	55.0
Nursing specialist	6	30.0
Nursing supervisor	3	15.0
Years of experience		
Less than 2 years	4	20.0
2 – 5 years	7	35.0
5 – 10 years	3	15.0
> 10 years	6	30.0
Do you have information on application of clinical pathway?		
Yes	13	65.0
No	7	35.0
If yes, where did you get the information		
Lectures	3	23.0
Training courses	5	38.5
Internet	5	38.5

Table 2. Frequency distribution of nurse's knowledge about the symptoms of pyelonephritis pre and posttest (N=20)

Symptoms of pyelonephritis	Pretest		Post test		McNemar test	P value
	No.	%	No.	%		
Pain during urination						
Yes	20	100	20	100	--	--
No	0	0.00	0	0.00		
Pain of intercourse						
Yes	5	25.0	13	65.0	6.46	0.011*
No	15	75.0	7	35.0		
Feeling urgent or urgent while urinating						
Yes	10	50.0	17	85.0	5.58	0.018*
No	10	50.0	3	15.0		
Burning sensation during urination						
Yes	15	75.0	19	95.0	3.14	0.076
No	5	25.0	1	5.00		
Change in color and smell						
Yes	7	35.0	14	70.0	4.91	0.026*
No	13	65.0	6	30.0		
Pain below abdomen						
Yes	8	40.0	17	85.0	8.64	0.003**
No	12	60.0	3	15.0		
High temperature						
Yes	9	45.0	13	65.0	1.62	0.203
No	11	55.0	7	35.0		
Nausea						
Yes	4	20.0	7	35.0	1.13	0.288
No	16	80.0	13	65.0		
Some vaginal secretion						
Yes	9	5.0	19	95.0	11.9	0.001**
No	11	55.0	1	5.00		
Swelling of the foot						
Yes	2	10.0	14	70.0	15.0	0.001**
No	18	90.0	6	30.0		

Table 3. Mother's evaluation during delivery among the studied pregnant women (N=50):

Mother's evaluation during delivery	Study group		Control group		X ²	P value
	No.	%	No.	%		
Duration of the first stage of delivery						
< 8 hours	20	80.0	11	44.0	9.30	0.010*
8 – 12 hours	5	20.0	8	32.0		
> 12 hours	0	0.00	6	24.0		
Duration of the second stage of delivery						
Less than 20 minutes	25	100	25	100	-	-
Type of delivery						
Vaginal	7	28.0	6	24.0	0.104	0.747
Caesarian	18	72.0	19	76.0		
Causes of caesarian delivery	N=18		N=19			
Rupture of membrane	4	22.2	6	31.5	9.64	0.086
Oligohydramnios	2	11.1	1	5.30		
Previous C.S	10	55.6	4	21.0		
Wrap the umbilical cord around fetus	2	11.1	1	5.30		
Bleeding	0	0.00	3	15.8		
Preeclampsia	0	0.00	3	15.8		
Twin	0	0.00	1	5.30		

*significant.

Table 4. Frequency distribution of baby evaluation immediately after delivery (N=50)

Baby evaluation immediately after delivery	Study group		Control group		X ²	P value
	No.	%	No.	%		
APGAR score	9.76±0.83		9.72±0.79		U 0.391	0.695
Mean ±SD	7 - 10		7 - 10			
Weight / Kg	3.20±0.36		3.10±0.50		U 1.10	0.271
Mean ±SD	2 - 4.50		2 - 4.00			
Need for PICU					FE 0.22	0.637
Yes	2	8.00	3	12.0		
No	23	92.0	22	88.0		
Time of starting breast feeding					1.48	0.397
After birth	7	28.0	5	20.8		
Within 12 hours after birth	13	52.0	10	41.7		
After 12 hours	5	20.0	9	37.5		
Is breastfeeding started well					FE 0.35	0.551
Yes	24	96.0	23	92.0		
No	1	4.00	2	8.00		

U: Mann Whitney test, FE: Fisher exact test p.

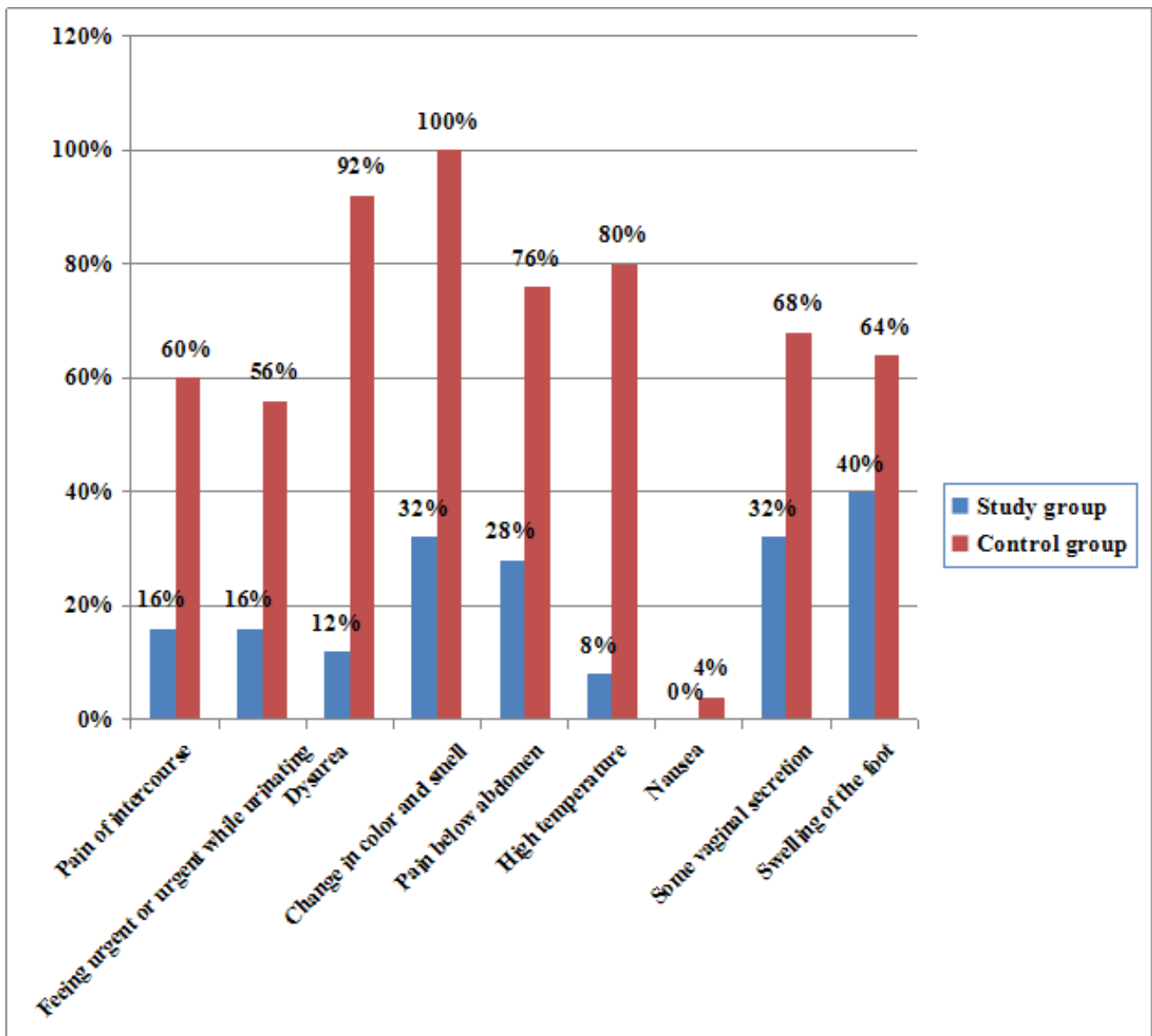


Figure 1. Comparison between study group and control group regarding symptoms and signs of pyelonephritis in the current pregnancy post intervention

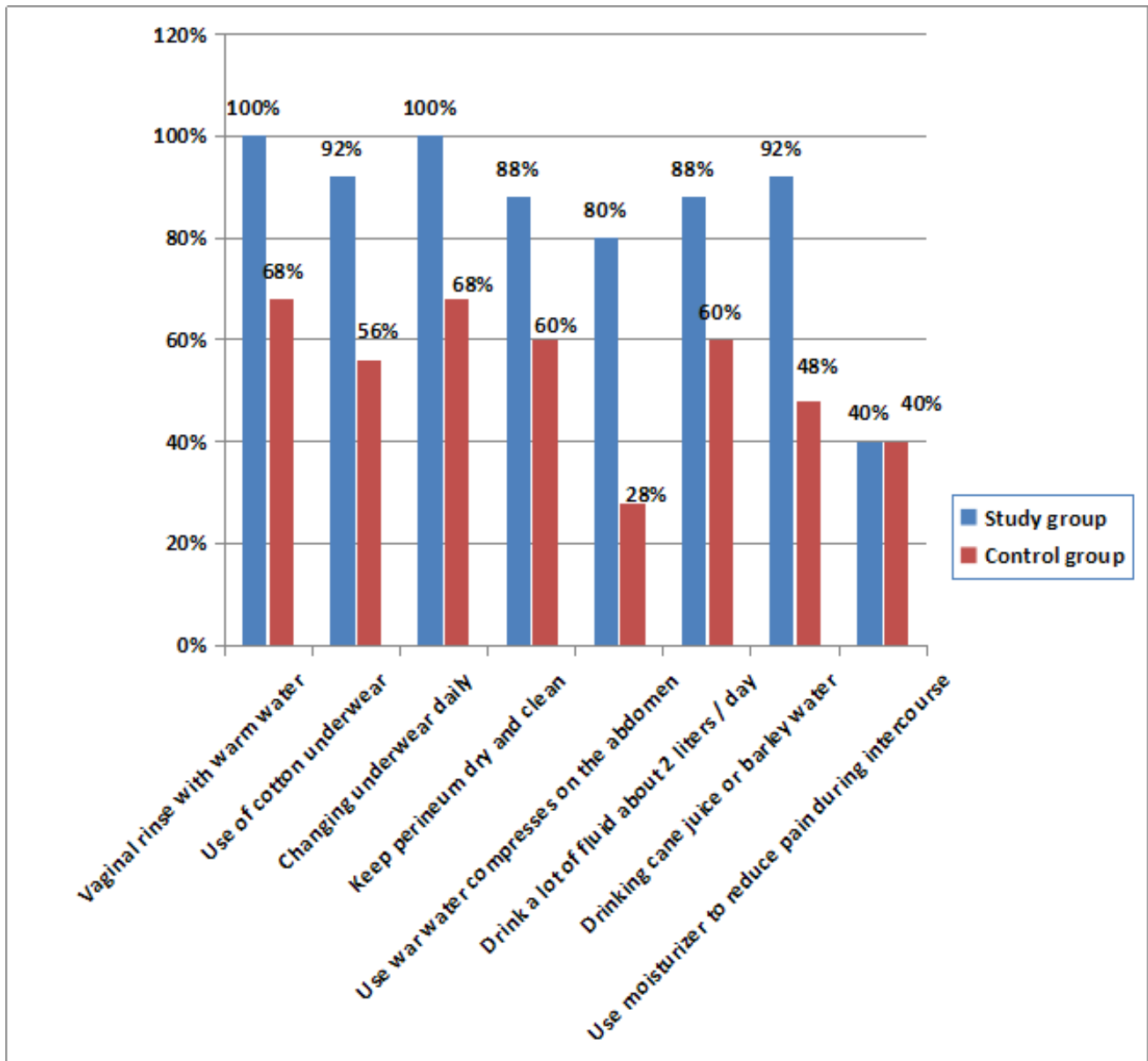


Figure 2. Comparison between study group and control group regarding ways to relieve symptoms of pyelonephritis pre and post intervention

6. Discussion

The present study showed that many nurses have good knowledge after the knowledge sessions (posttest) and about two fifth have good knowledge before the knowledge sessions (pretest). “In the light of this finding, several complications may be prevented if nurses understand pain as a major vital sign during gestation.” “The assistance to pain is complex, requiring both knowledge and skills to adequately perceive and treat pain. So, the participation of nurses in prenatal programs implies their clinical qualification to identify real and potential problems during gestation.”

This may be rationalized as the nurses need continuous up- dating their knowledge. The study is agreeing with [10] “who reported that maternity nurses still lack more knowledge about pain as clinical sign of diseases such as UTI. It is known that the responsibility given to nurses to deal with pain and the several aspects depending on them for quality assistance might help understanding the reason for the high valuation and concern with technical precision

in pain.” The present study revealed there is significant differences in nurse knowledge about pyelonephritis after knowledge sessions (posttest).

The present study reported that most of the study sample reported pain during urination and burning sensation, dysuria, dyspareunia, urgency, lower abdominal pain, change in color and odor of the urine, fever, vaginal discharge, and some women reported swelling in their foot. The present study revealed that there is significant improvement in symptoms after implementing clinical pathway. This may be rationalized that antenatal follow up is very important to treat any symptoms early.

[11] Said that the most common clinical and laboratory findings were fever followed by leukocyturia then lower abdominal pain or pain in costovertebral angle. Also [12] “reported that Symptoms included back pain, fever, loin pain and dysuria, pyrexia with renal angle tenderness. On the other hand” [13] Said that the common symptoms of pyelonephritis include burning feeling during urination, urgency to urinate, lower abdominal pain cloudy, dark or unusual smelling urine and fever [14] also reported that

the back pain or flank pain, dysuria, hematuria, nausea, vomiting and fever were the most common symptoms between the studied mothers.

The present study findings showed that there are deficiencies in pregnant women knowledge regarding ways to prevent or reduce symptoms of pyelonephritis before implementation of clinical pathway. Some of pregnant women have lacked knowledge about how to use warm water for genital hygiene, changing underwear daily and cotton underwear, applying warm compress on abdomen, drink a lot of fluids daily, drink cane juice of barely water and use moisturizer to reduce pain during intercourse. The present study revealed there is significant improvement in women knowledge about ways to relieve symptoms after implementing clinical pathway through educational sessions. "So, this result may attribute to the antenatal classes have positive effect in improving symptoms and improve mother's knowledge about pyelonephritis in the presence of clinical pathway intervention knowledge."

[15] "who reported that It is important to orient pregnant women about healthy micturition practices such as: avoid delaying micturition and acquiring the habit of micturition before sleep and after intercourse. Patients should also be oriented about increasing fluid ingestion and daily hygienic care, during bath, after micturition and evacuation and sexual practices" [16].

As well as [14] "who reported that pyelonephritis symptoms can be relieved by take warm shower, avoid certain food as hothouse, drink hot herbal as (Fenugreek), seek un-prescribed medication from the pharmacy and utilize health services for examination".

The present study reported that there is significant improvement in childbirth process after implementing clinical pathway. This result revealed the majority of pregnant women with pyelonephritis, the duration of the first stage were less than 8 hours and their delivery were cesarean section due to bleeding, preeclampsia, oligohydramnios, previous c.s and amnionitis. "The results of the present study revealed that continuous care provided through clinical pathway intervention before and during labour had positive effect with the birth process experience."

The present study reported that the baby's weight of the study group ranged between 2-4.5 k.g, do not need PICU and the APGAR score of babies were (7-10). The present study revealed that there is positive effect on neonatal outcomes and normal APGAR score. This study is similar with [17] showed that pyelonephritis is considered one of the main factors contributed to preterm labor and LBW. [18] also reported that pyelonephritis is associated with preterm labor, low birth weight, hypertension, preeclampsia, maternal anemia, and amnionitis. [19] "reported that the probability of delivering premature infants and low birth weight is higher among women with pyelonephritis during pregnancy and causing preterm delivery".

7. Conclusion

According to the study finding, most of the studied women were lacked knowledge about signs and symptoms of pyelonephritis and some of them were lacked knowledge regarding measures to relieve these symptoms.

Meanwhile, after implementing clinical pathway on pregnant women, significant improvement was obvious among women relief of their reported symptoms and their knowledge about pyelonephritis and measures to relieve it.

The present study also reported that the nurses have good knowledge about pyelonephritis and have knowledge about health education for pregnant women to relieve symptoms of pyelonephritis.

8. Recommendations

Based on the finding of the present study, the following recommendation were suggested:

1- Improve the quality of health care provided at the community level through routine screening of pregnant women for any signs of infection for early identification of diseases.

2-Raising women awareness through applying booklets in the outpatient clinics about physiologic changes during pregnancy and signs and symptoms of pyelonephritis and measures to relieve these symptoms.

3-Applying workshops and lectures for nurses to improve their knowledge about pyelonephritis during pregnancy.

4- The pathway model can be adapted and applied to other diseases and is generalizable to other maternity settings.

References

- [1] Wing, D. A., Fassett, M. J., & Getahun, D. (2014). Acute pyelonephritis in pregnancy: an 18-year retrospective analysis. *American journal of obstetrics and gynecology*, 210(3), 219-e1.
- [2] Jolley, J.A., & Wing, D.A. (2013). Pyelonephritis in pregnancy: an update on treatment options for optimal outcomes. *Drugs* 70(13): 1643-1655.
- [3] Cunningham, F.G., & Leveno, K.J. (2016). *pyelonephritis in pregnancy*, 24 a ed. Porto Alegre: AMGH.
- [4] Ovalle, A., & Levancini, M. (2012). Urinary tract infection in pregnancy. *Curropinurolog*: 11(01): 55-59.
- [5] Artero, A., Alberola, J., Eiros, J. M., Nogueira, J. M & Cano, A. (2013). Pyelonephritis in pregnancy, How adequate is empirical treatment. *Rev Esp* 26(01): 30-33
- [6] Farkash, E., Weintraub, A.Y., Sergienko, R., Wiznitzer, A., Zlotnik, A., & Sheiner, E. (2012). Acute antepartum pyelonephritis in pregnancy: critical analysis of risk factors and outcomes. *Eur J ObstetGynecol. RepordBiol*: 162 (01): 24-27.
- [7] Snyder, C.C., Barton, J.R., Habli, M & Sibai, B.M. (2013). Sever sepsis and septic shock in pregnancy, Indication for delivery and maternal and perinatal outcomes. *Med* 26(05) 503-506.
- [8] Bryan, S., Holmes, S., Postlethwaite, D., & Carty, D. (2012). The role of integrated care pathways in improving the patient experience. *Prof Nurse*; 18(2): 77-79.
- [9] Campbell, M. A. (2006). Development of clinical pathway for near term and premature infants in level 2 nursery *Adv neonatal care*. 6(3): 150-164.
- [10] Barros, S.R.A.F., Pereira, S.S.L & Almeida, N.A. (2017). A formacao de academicos de enfermagem quanto a percepcao. *Rev Dor* 2011; 12(2): 131-7.
- [11] Zanatta, D.A., Rossini, M & Junior, A.T. (2017). Pyelonephritis in pregnancy: clinical and laboratorial aspects and perinatal results. *Rev Bras Ginecol Obstet* 2017, 39: 653-658.
- [12] Clooney, A., Ronayne, K., Glennon, M., Brennan, N., Hickey, C., Magee, S., Cooley, M & Eogan, R.J. (2019). Impact of introduction of clinical pathway for the management of pyelonephritis on obstetric patients.
- [13] Kazemier, B. M., Schneeberger, C., De Miranda, E., Van Wassenaer, A., Bossuyt, P. M., Vogelvang, T. E., ... & Geerlings, S. E. (2012). 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.
- [14] El-Razek A., Heba A., Aziza A., & Abear Y. (2012). Effect of Pyelonephritis during pregnancy on Mother's Quality of Life. 4th (ISNC) Faculty of Nursing Helwan University in Collaboration with Kennesaw University (KSU), USA.
- [15] Silveira, M.F., Barros, A.J.D., Santos, I.S., et al. (2016). Exam de urina no prenatal. 42(3): 389-95.
- [16] Radwan, R.A. (2013). Self care practices among women with common gynecological symptoms. Alexandria university: Egypt 26-29.
- [17] Michael, E. (2017). Urinary tract infection and its effect on outcome of pregnancy, *Indian journal of obstetrics and gynecology research*. 4(2): 108-111.
- [18] Colgan, R., Williams, M., & Johnson, J. R. (2013). Diagnosis and treatment of acute pyelonephritis in women. *American family physician*, 84(5), 519-526.
- [19] Jarvis, T.R., Chan, L., & Gottlieb, T. (2014). "Assessment and management of lower urinary tract infection in adults". *Australian Prescriber* 37 (1): 7-9.



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