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Advancing Diagnostic Approaches For Urinary Tract Infections In Pregnancy: A Clinical Intervention Study

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ABSTRACT
UTIs in pregnancy are a common clinical problem that has significant consequences to maternal renal health and pregnancy outcomes, especially when they are diagnosed late or incorrectly. Although there are established guidelines in the diagnosis, any knowledge gap in the field of diagnosis in pregnant women could result in under-recognition and subsequent delay in clinical involvement. The study aligns with the United Nations Sustainable Development Goals (SDGs), particularly **SDG 3: Good Health and Well-Being**, by promoting improved maternal health care outcomes through enhanced education of future healthcare providers The study aimed to assess the baseline diagnostic knowledge of urinary tract infections in pregnant women and assess the efficacy of a structured educational intervention in enhancing this diagnostic knowledge. The study was a pre- post intervention, questionnaire-based study that was carried out on 110 pregnant women who were aged between 24 and 35 years and received antenatal care. A well-established Likert-scale questionnaire was used to evaluate the level of knowledge of the participants regarding symptoms, risk factors, diagnostic strategies, and management techniques at the beginning and end of a systematic learning activity centred around evidence-based diagnostic techniques. The results of pre-intervention showed uneven knowledge levels, specifically in the area of haematuria, diagnostic criteria and urgency to receive treatment. The post-intervention analysis revealed that there were significant improvements in all areas, and the mean knowledge scores increased significantly and theSre were large effect sizes that showed that the intervention had a strong educational impact. The results reveal the importance of patient-centred educational interventions in the form of structured strategies as a form of complementary diagnostic supportive activity in antenatal care.

Keywords: Urinary Tract Infection, Pregnancy, Diagnostic Knowledge, Educational Intervention, Renal Health, ,Maternal health, Inclusive health

1. INTRODUCTION

UTIs are among the most frequent cases of bacterial infections in pregnancy and a severe issue that continues to face maternal healthcare systems across the global population. The physiological alterations, which include ureter dilation, urinary stasis, and the changes in immune responses predisposes women to infection during pregnancy and heighten the risks of the occurrence of adverse maternal and fetal effects in case UTIs are not diagnosed correctly or treated appropriately [1]. Although better diagnostic technology and clinical guidance have been developed, the UTI in the course of pregnancy remains a clinical and diagnostic complication that poses a greater challenge than normal clinical practice.

UTIs during pregnancy are not isolated clinical events but tend to be linked to more general maternal health issues that are involved in determining postpartum morbidity and healthcare burden. Postpartum care settings show that infection-related complications are still common in the immediate and postpartum period and hence the need to ensure that they are detected and

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prevented early in the antepartum period [2]. Both symptomatic UTIs and asymptomatic bacteriuria in pregnant women contribute to the further worsening of the clinical decision-making, as untreated infections can further develop into pyelonephritis, preterm birth, or low birth weight [3].

Mother and social risk factors are a number of factors that contribute to the occurrence and recurrence of UTIs in the course of pregnancy. It has been associated with comorbid conditions, psychosocial stressors, and behavioral factors, and the multifactorial issue of UTIs in pregnant populations was highlighted [4]. The clinical recommendations on recurrent uncomplicated UTIs in women highlight the importance of correct diagnosis and prudent use of antibiotics, especially during pregnancy, where the decisions to be made on treatment should be made in the best interest of the mother and the safety of the unborn baby [5].

The recent studies have been aimed at enhancing diagnostic stewardship to reduce unwarranted testing and unnecessary exposure to antibiotics in pregnant women. Structured diagnostic algorithms have proven to be promising to streamline the testing practice and encourage responsible use of antimicrobials in the case of asymptomatic bacteriuria during pregnancy [6]. The success of these protocols, however, is strongly dependent on the degree of diagnostic knowledge between patients and health care providers, which is still uneven among the settings.

The gaps in knowledge regarding the diagnosis of UTI are not confined to patients only. The surveys of healthcare professionals indicate inconsistencies in diagnostic practices and confusion between the use of proper tests and treatment thresholds, despite the lack of income disparities in healthcare systems [7]. Diagnostic stewardship programs are based on the significance of aligning clinical decisions with evidence-based standards to minimize overtreatment and misdiagnosis [8]. International laboratory standards also emphasize on standard interpretation of the parameters of urinalysis, with an aim of improving the accuracy of diagnosis in different clinical situations [9]. Whereas algorithm-based methods of UTI diagnosis during pregnancy have been verified, their practical implications are based on the continuity of their application and patient interaction [10]. Regarding the nursing and allied health aspect, basic knowledge of Patho pharmacology and pathophysiology of infections is needed to educate patients about possible infections and identify symptoms at their early stages in the process of antenatal care [11]. UTIs also have a significant disease burden in women across the world, which supports the need for preventive and educative measures that are specific to vulnerable groups of individuals, such as pregnant women [12].

The difficulty of the diagnosis is also made difficult due to the clinical overlap with other genitourinary infections and the constraints of laboratory testing. Laboratory diagnostic progress has emphasized the necessity of accuracy when distinguishing between types of infections in order to prevent misdiagnosis and unnecessary treatment [13]. When applied to the pregnant case, the treatment approach should consider the safety profile of antimicrobials, resistance patterns, and pregnancy-related factors, which have gained more and more prominence in recent clinical reviews [14].

Despite these developments, UTI in pregnancy is still a known issue, with research indicating that improper interpretation of the diagnostic procedures is a major factor in under-treatment and over-treatment [15]. Mother- infant health outcomes also depend on maternal infection control indirectly since maternal UTIs may influence the neonatal health outcomes more broadly, highlighting the importance of diagnostic accuracy in pregnancy [16]. International principles in the treatment of sexually transmitted and urinary infections also focus on combined diagnostic pathways so that those with reproductive health services receive appropriate and timely care [17].

Although there is much literature on clinical diagnostics and treatment models, there is a lack of studies devoted to diagnostic knowledge of pregnant women themselves and their capacity to identify symptoms, comprehend risk factors, and interact with diagnostic procedures. Extended literature reviews of medical conditions during pregnancy regularly describe patient education as a pillar of successful antenatal care, but well-organized educational interventions aimed at diagnostic awareness have not received much attention [18]. This gap indicates that there is a need to conduct a special study that will determine whether educational interventions can effectively enhance diagnostic knowledge in pregnant women.

In spite of the presence of diagnostic algorithms, laboratory guidelines and treatment protocols in UTIs during pregnancy, not much focus has been made on the evaluation and the enhancement of diagnostic knowledge among pregnant women. Lack of awareness of symptoms, risk factors, and diagnostic pathways can slow the care-seeking behaviour and lead to poor outcomes. The need to estimate the capability of the structured educational interventions to reduce this gap in knowledge and improve the diagnostic literacy of pregnant groups is evident.

. The present research is anchored in the framework of the United Nations Sustainable Development Goals (SDGs). Specifically, it supports **SDG 3: Good Health and Well-Being**, which emphasizes reducing maternal mortality and ensuring universal access to quality healthcare services. By equipping future nurses with strengthened competencies in maternal infection management, the study contributes to better health outcomes for pregnant women. Moreover, the intervention upholds **SDG 4: Quality Education**, promoting inclusive, high-quality training that enhances professional skills. Indirectly, it also advances **SDG 5: Gender Equality**, recognizing the crucial role of well-trained female healthcare providers in improving maternal health.

Objectives of the Study

1. To assess baseline diagnostic knowledge regarding urinary tract infections among pregnant women before a structured educational intervention.

2. To evaluate the effectiveness of a structured educational intervention in improving diagnostic knowledge related to urinary tract infections in pregnancy

2. METHODOLOGY

2.1 Research Design

It was a pre- post intervention study that employed a questionnaire-based research design to evaluate the efficacy of an educational intervention that could be used to enhance diagnostic knowledge on Urinary Tract Infections (UTIs) during Pregnancy. The study used 110 pregnant women who took part in the research, taking a questionnaire prior to and after the educational session. The baseline knowledge was measured by the pre-intervention questionnaire and the post-intervention questionnaire measured the knowledge acquired during the educational session.

2.2 Study Population

The study considered 110 expectant mothers who were willing to participate and available during data collection. receiving prenatal services in local medical institutions, including hospitals and clinics. The females aged 24-35 years were the participants, and all of them were chosen due to their readiness to take part and give informed consent. The study included pregnant women aged between 24 and 35 years who were willing to participate and provided informed consent. Eligibility was further restricted to participants who were able to understand the study procedures and independently complete the questionnaire. Participants were excluded from the study if they had prior exposure to or knowledge of the educational intervention before enrolment. Pregnant women with cognitive impairments or mental health conditions that could interfere with their ability to comprehend or complete the questionnaire were also excluded.

2.3 Sample Size

Sampling population includes One hundred and ten subjects were recruited to have adequate statistical power to identify any significant differences in pre and post intervention knowledge scores. The sample size used was calculated statistically, taking into consideration a medium effect size (Cohen d = 0.5) and a 95% confidence level and a power of 80.

2.4 Data Collection Tool

The structured questionnaire was used to collect data on the knowledge of the UTI symptoms, risk factors, diagnostic and management of the symptoms during pregnancy. To assess the level of knowledge before and after the teaching intervention, the questionnaire included a 5-point Likert scale (including Strongly Disagree to Strongly Agree). The questionnaire included the following parts: Demographic Information: Age, pregnancy stage, etc., Pre-Intervention Knowledge: determining the knowledge level before the educational intervention and feedback on Educational Intervention: Gathering feedback on the effectiveness of the educational session.

2.5 Educational Intervention

The educational intervention was designed to enhance participants' knowledge of the diagnosis and management of urinary tract infections during pregnancy. The intervention included workshops or online modules covering UTI symptoms, risk factors, diagnostic techniques such as urine dipstick testing and urine culture, and appropriate management strategies. Printed educational materials, including pamphlets and infographics, were provided to reinforce key concepts. In addition, interactive case studies were used to enable participants to apply diagnostic knowledge to real-life clinical scenarios. The educational program lasted approximately 60–90 minutes and was conducted by healthcare professionals specializing in obstetrics, nephrology, or urology.

2.6 Data Collection Process

The participants were given the pre-intervention questionnaire to determine the volume of their initial understanding of UTIs in pregnancy. Having answered the pre-intervention questionnaire, the participants attended the educational session, which consisted of a structured presentation, case studies, and educational materials. After the educational intervention, the post-intervention questionnaire was administered in order to determine what the participants were able to learn from the intervention. The questionnaire that was used post-intervention was the same as the one that had been used in the pre-intervention; hence, it could be directly compared.

2.7 Ethical Considerations

Participation was informed and the participants were made aware of the study's objective and procedures involved and their right to confidentiality. Personal data of the participants was collected, along with the confidentiality of the information, which was utilized only to conduct a study.

2.8 Data Analysis

Descriptive statistics were used to analyze the data gathered in the questionnaires so as to summarize the demographics and knowledge scores of the participants before and after the intervention. The comparison of the pre-intervention and post-intervention knowledge scores was done through a paired t-test (or Wilcoxon signed-rank test in case normality was not upheld). The level of effect (Cohen's d) was determined to determine the extent of knowledge acquisition after the educational process.

3. RESULTS

3.1 Demographics of Participants

The authors involved 110 pregnant women who were between 24 and 35 years old. Most of the respondents were in the second and third trimesters of pregnancy, as shown in Table 1. The demographic data resulting from

the collection with the help of the questionnaire will be summarized as follows:

Table 1: Demographics of Participants

Characteristic	Category	Number of Participants	Percentage
Age	24-27 years	38	34.5%
	28-31 years	35	31.8%
	32-35 years	37	33.6%
Trimester	First Trimester	25	22.7%
	Second Trimester	45	40.9%
	Third Trimester	40	36.4%

The number depicts an even age distribution among the pregnant respondents, with the majority falling within the age category of 28-31 years, as demonstrated in Figure 1. The sample of study participants is well-represented with over 50% of second and third trimester participants in all age groups, which implies that the stages of mid-to-late pregnancy are also sufficiently represented.

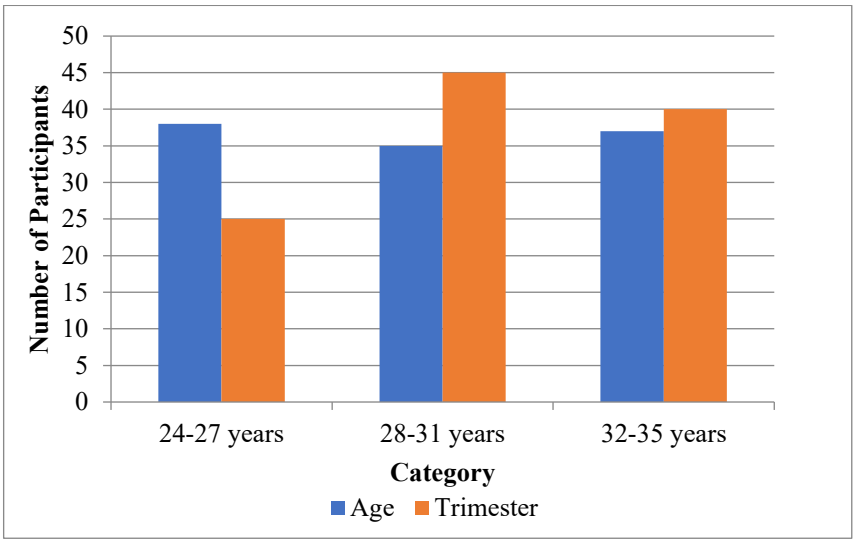

Figure 1: Demographics of Participants

3.2 Pre-Intervention Knowledge

The pre-intervention questionnaire was used to determine the level of knowledge of the respondents on UTI symptoms, risk factors, diagnosis approach, and management of the condition during pregnancy. The findings showed that the degree of knowledge in different fields was different and are shown in Table 2.

Table 2: Baseline Knowledge of Urinary Tract Infection Symptoms, Risk Factors, and Diagnostic Methods Among Pregnant Women (Pre-Intervention)

Category	Statement	Mean Score (Pre-Intervention)
UTI Symptoms	Painful urination (dysuria) is common.	3.8
	Blood in urine (hematuria) is common.	2.9
	Lower abdominal pain is common.	3.2
Risk Factors	Pregnancy increases UTI risk.	4.1
	Previous UTIs increase recurrence risk.	3.9
	Sexual activity increases UTI risk.	3.2
Diagnostic Methods	Dipstick tests are reliable for UTIs.	3.7
	Urine culture is the gold standard.	3.4
	Positive leukocyte esterase indicates UTI.	3.5
Management of UTIs	Antibiotics are essential for treatment.	4.2
	Immediate treatment prevents complications.	3.8

3.3 Post-Intervention Knowledge

After the educational intervention, the levels of knowledge grew tremendously in all spheres associated with UTI symptoms, risk factors, diagnostic procedures, and management patterns. The post-intervention scores were also a definite improvement in

the understanding of the participants. In the case of the Symptoms of UTIs in Pregnancy, the participants were more confident about the common symptoms of UTIs in pregnancy and were more confident after the intervention, as shown in Table 3.

Table 3: Baseline Knowledge of Urinary Tract Infection Symptoms, Risk Factors, and Diagnostic Methods Among Pregnant Women (Post-Intervention)

Category	Statement	Mean Score (Post-Intervention)
UTI Symptoms	Painful urination (dysuria) is common.	4.5
	Blood in urine (hematuria) is common.	4.1
	Lower abdominal pain is common.	4.3
Risk Factors	Pregnancy increases UTI risk.	4.7
	Previous UTIs increase recurrence risk.	4.6
	Sexual activity increases UTI risk.	4.0
Diagnostic Methods	Dipstick tests are reliable for UTIs.	4.8
	Urine culture is the gold standard.	4.6
	Positive leukocyte esterase indicates UTI.	4.5
Management of UTIs	Antibiotics are essential for treatment.	4.8
	Immediate treatment prevents complications.	4.7

3.4 Statistical Analysis

The pre- and post-intervention knowledge scores were compared by conducting a paired t-test. The findings indicated statistically significant improvement in all knowledge areas, including p-values of less than 0.05. UTI Symptoms, the mean score of symptom knowledge improved, but was not statistically significant (3.3 pre-intervention and 4.3 post-intervention), as shown in Figure 2. Risk Factors, understanding of risk factors has risen by 3.5 to 4.4 and a significant difference has been observed ($p < 0.01$). Diagnostic Methods, the score of Diagnostic knowledge rose by 3.6 up to 4.5, with $p < 0.01$ denoting a significant rise in confidence and understanding. Management: The level of management knowledge rose by 4.0 to 4.8, which is statistically significant ($p < 0.01$).

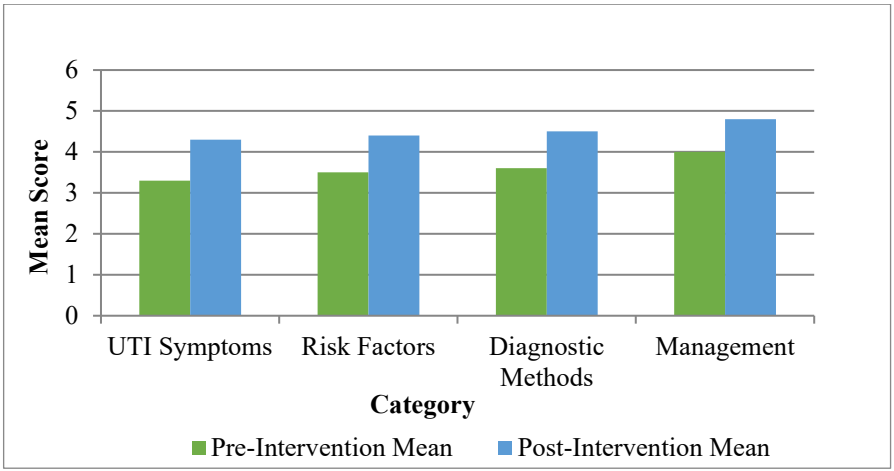

Figure 2: Pre- and Post-Intervention Knowledge Scores

Effect Size

The value of Cohen's d showed there was a large impact of the education intervention in all the areas, implying that the educational intervention was effective in enhancing the knowledge of the subjects. In particular, the UTI symptoms have a large effect size (1.2), which demonstrates that the level of awareness of the participants about UTI symptoms has significantly increased at the end of the educational experience. Correspondingly, the risk factors associated with UTIs had a big effect size with a Cohen's d of 1.1, indicating a significant enhancement in the awareness of the participants on the risk factors of UTI during pregnancy. Regarding the diagnostic techniques, the Cohen's d value was 1.3, which means that there was a significant increase in the knowledge of the participants on diagnostic methods such as urine dipstick tests and urine culture. Lastly, the knowledge about management of UTIs during pregnancy had the greatest effect size, with a Cohen's d of 1.4, showing a massive enrichment in the confidence of the participants to handle UTIs following the learning intervention.

3.5 Feedback on Educational Intervention

The responses regarding the education session were quite positive. Most of the participants claimed that the learning resources enabled them to improve their knowledge of UTIs during pregnancy, with an average score of 4.6. The session was also successful in dispelling the misconceptions about the UTI

diagnostics (mean score = 4.5) and the majority of the participants were sure they were able to diagnose UTIs during the session (mean score = 4.7).

4. DISCUSSION

The results of the study indicate an objective and uniform increase in the knowledge of diagnosis of urinary tract infections (UTIs) in pregnancy after the systematic educational intervention. Significant improvement was found in all thematic areas, such as the ability to recognize symptoms, the knowledge of risk factors, the knowledge of diagnostic approaches, and the knowledge of how it is to be managed. The fact that the mean scores of the post-intervention improved shows that the specific educational input worked out as the means of improving the conceptual clarity and confidence of the participants in terms of the diagnosis of UTI during pregnancy. The significant effect sizes further support the idea that the intervention was not only statistically significant but also educationally significant, which implies a great learning effect as opposed to a slight enhancement. Particular attention should be paid to better awareness of such symptoms as hematuria and lower abdominal pain that are too often not recognized as this or that indicator of UTI during pregnancy and may cause a delay in diagnosis. Greater knowledge about the diagnostic tools, in particular, the urine dipstick testing and urine culture, indicates better compliance with the evidence-based diagnostic pathways. In general, the findings underscore the success of organized education in eliminating the knowledge gap among pregnant women, which is essential in early diagnosis and prompt treatment of UTIs.

The observed change in the level of diagnostic awareness could be attributed to the previous studies that have highlighted the significance of systematic diagnostic strategies during pregnancy-related UTIs, especially when it comes to minimizing variability in the clinical decision-making process [19]. The same enhancements have been seen in the interpretation of the urine dipstick reliability in an environment that inculcated educational reinforcement on the pregnant populations [20]. The knowledge gain after intervention on the topic of symptom recognition and diagnostic accuracy is similar to the outcomes that have been observed in the recent obstetric literature which points to education as one of the primary elements of infection prevention in pregnancy [21]. The efficacy of the structured interventions as realised in this research is comparable with the wider frameworks of structural public health education that is shown to have better results under the circumstances where educational fidelity is observed [22]. Better knowledge on risk stratification can also denote similarities with diagnostic education in other conditions related to pregnancy, like the metabolic conditions, where structured learning had a great impact to improve the diagnostic accuracy [23,24]. Innovations in the accuracy of diagnosis as reported in the literature that aim at minimizing misdiagnosis in pregnancy also indicate the applicability of the educational interventions on diagnostic parameters [25]. The identified improvements can also be considered in line with the latest reviews that state that knowledge-based interventions are crucial in increasing maternal awareness related to the complications associated with UTI [26,27]. Furthermore, scientific reviews of diagnostic instruments point to the fact that knowledge of the test's weaknesses and strengths enhances confidence in the diagnosis greatly, as it is manifested in the current results [28]. A combination of all these comparisons supports the idea that the findings of this study are quite consistent with the current literature and provide additional evidence on the functionality of education in enhancing diagnostic literacy in pregnancy.

The better diagnostic understanding, as shown in this study, has significant clinical and population health values. The increased awareness of UTI symptoms and risk factors among pregnant women will be able to encourage earlier healthcare-seeking behaviour, which will decrease the risk of developing severe complications, including pyelonephritis or preterm labour. Better knowledge of diagnostic pathways can also be used to conduct more constructive dialogues between healthcare providers and patients to facilitate shared decisions and compliance with recommended investigations. Systematically, the results indicate that structured educational interventions incorporated into normal antenatal care may enhance preventive interventions and minimize the duration of diagnoses. These interventions can also be used to supplement clinical screening programs by giving pregnant women information to enable them to report symptoms early enough. Educational interventions are especially useful in areas with limited resources, where it is essential to detect infection as early as possible to maximize the outcome of both the mother and the baby. Overall, the results indicate the inclusion of systematic diagnostic training in the mainstream antenatal health promotion programs.

This study has a number of limitations that may be highlighted despite its strengths. Use of self-report questionnaire data can also create bias in the responses, as the participants will tend to overreport their comprehension of the intervention after the intervention. Lack of long-term follow-up prevents the evaluation of knowledge retention over time or its application in practical clinical practice. The sample of the study was also limited to a narrow age group and geographic location, which can limit its applicability to larger or more heterogeneous groups of people. The unavailability of objective clinical outcome measures, including real diagnostic accuracy improvement or a decrease in UTI-related complications, also limits the possibility of directly associated knowledge improvement and clinical impact. The results should be interpreted with these limitations in mind.

Future research ought to focus on determining the long-term sustainability of the acquisition of education with the consideration of follow-up assessments at several time stages. Generalizability would also be improved by conducting the study on a broader population with

diverse settings in health care. The comparison of various models of delivering education, including online application or face-to-face meetings, might aid in determining the most efficient approach. More studies on the relationship between educational interventions and clinical outcomes, including decreased rates of misdiagnosis or better treatment adherence, would be more convincing at the policy level implementation. Also, incorporating educational intervention and new diagnostic technologies can help improve the accuracy of diagnoses and maternal safety in pregnancy-associated UTIs further (10).

5. CONCLUSION

This study has shown that a well-planned educational intervention had a significant positive influence on the diagnostic knowledge regarding urinary tract infection in pregnant women. Significant improvements were seen in all of the major areas, such as awareness of the symptoms of UTI, the knowledge of risk factors, the knowledge of diagnostic techniques, and the knowledge of the strategies of managing the condition. The drastic improvement in post-intervention scores, with the significant effect sizes, indicates the efficacy of specially provided education in enhancing diagnostic literacy during pregnancy. Better knowledge of diagnostic methods that include urine dipstick tests and urine culture is especially applicable to nephrology and urology as early and precise diagnosis is at the core of preventing the upper urinary tract involvement and kidney problems in pregnancy. The results highlight the clinical significance of patient-centred educational interventions in the antenatal period, particularly with conditions that overlap between renal and maternal care. Improved diagnostic awareness in pregnant women can be used to promote timelier symptom reporting, better use of diagnostic services, and clinical management pathway involvement. The future studies must be devoted to the comparison of the long-term retention of diagnostic information and subsequent implementation to clinical outcomes, including lower incidences of pyelonephritis or hospitalization associated with UTIs in the course of pregnancy. The further increase in the number of similar educational interventions implemented in various healthcare environments and their integration with digital health platforms can further fortify the early detection strategies. Moreover, the study using objective clinical outcomes and microbiological data may give more information about the effects of patient education on the renal health outcome in pregnancy is highlighted in this study

REFERENCE

1. Gupta K, editor. Urinary tract infection challenges: beyond the basics. Infect Dis Clin North Am. 2024;38(2). Elsevier Health Sciences.
2. Hoque AM, Buckus S, Hoque M, Hoque R. Estimation of postpartum morbidities and risk factors of women presenting for their first postpartum visit at a midwife obstetric unit in eThekwini, South Africa. S Afr J Public Health. 2025; e2807–e2807.
3. Azami M, Jaafari Z, Masoumi M, Shohani M, Badfar G, Mahmudi L, Abbasalizadeh S. The etiology and prevalence of urinary tract infection and asymptomatic bacteriuria in pregnant women in Iran: a systematic review and meta-analysis. BMC Urol. 2019;19(1):43.
4. Donatucci K, Pathak S, McPherson K, Price J, Hartwell M. Associations of comorbidities, opioid use, and intimate partner violence with urinary tract infections in pregnancy: implications for prevention and screening. J Osteopath Med. 2025;0:0.
5. Panel G, Panel A. Recurrent uncomplicated urinary tract infections in women: AUA/CUA/SUFU guideline (2019, confirmed 2022, amended 2025). 2025.
6. Bergbower SB, Saad AF, Williams-Bouyer NM, Rajendran R. Implementation of an algorithm for testing, diagnosis, and antibiotic stewardship of asymptomatic bacteriuria in pregnancy. Am J Obstet Gynecol MFM. 2024;6(11):101516.
7. Cox SML, Giorgi W, Platteel TN, Cals JW, de Bont EG. Knowledge, attitudes and practices around urinary tract infections of general practitioners in the Netherlands: a cross-sectional internet survey. BMJ Open. 2024;14(10):e083263.
8. Clarke RK. Diagnostic stewardship and the mitigation of treatment of asymptomatic bacteriuria. 2025.
9. Kouri TT, Hofmann W, Falbo R, Oyaert M, Schubert S, Gertsen JB, et al. The EFLM European urinalysis guideline 2023. Clin Chem Lab Med. 2024;62(9).
10. Bergbower SB, Saad AF, Williams-Bouyer NM, Rajendran R. Implementation of an algorithm for testing, diagnosis, and antibiotic stewardship of asymptomatic bacteriuria in pregnancy. Am J Obstet Gynecol MFM. 2024;6(11):101516.
11. Braun C, Roberts AW. Pathopharmacology for nurses: an integrated approach. Philadelphia: Lippincott Williams & Wilkins; 2025.
12. Baimakhanova B, Sadanov A, Trenozhnikova L, Balgimbaeva A, Baimakhanova G, Orasymbet S, et al. Understanding the burden and management of urinary tract infections in women. Diseases. 2025;13(2):59.
13. Sun Y, Dong S, Zhou Q. Laboratory detection methods for Chlamydia trachomatis infection in children: a review. Eur J Clin Microbiol Infect Dis. 2025;1–16.
14. Grant A, Bai K, Badalato GM, Rutman MP. Advances in the treatment of urinary tract infection and bacteriuria in pregnancy. Urol Clin North Am. 2024;51(4):571–83.
15. Liu Z, Liu D, Su G, Yang W. Reduction of misdiagnosis in urinary tract infections during pregnancy: the role of adjusted urine flow cytometry parameters. PLoS One. 2024;19(9):e0308253.
16. Moghnia OH, Al Otaibi HS, Al Haqqan AM, Sokhn ES, Pathan SS, Abdulaziz NE, et al. Prevalence of urinary tract infections and antibiotic susceptibility patterns of uropathogens among neonates in a

maternity hospital in Kuwait: a six-year retrospective study. Med Princ Pract. 2025;34(3):250–61.
17. White JA, Dukers-Muijrers NH, Hoebe CJ, Kenyon CR, Ross JDC, Unemo M. 2025 European guideline on the management of Chlamydia trachomatis infections. Int J STD AIDS. 2025;36(6):434–49.
18. Thenmozhi, P; Dineshkumar, P; Bhuvaneswari, G; Minolin, T Mary; Tamilselvi, S. Thoracic squeezing on airway secretion and respiratory parameters in mechanically ventilated patients: An interventional study. Journal of Education and Health Promotion 14(1):69, February 2025. | DOI: 10.4103/jehp.jehp_695_24
19. Werter DE, Kazemier BM, van Leeuwen E, de Rotte MC, Kuil SD, Pajkrt E, Schneeberger C. Diagnostic work-up of urinary tract infections in pregnancy: study protocol of a prospective cohort study. BMJ Open. 2022;12(9):e063813.
20. Demilie T, Beyene G, Melaku S, Tsegaye W. Diagnostic accuracy of rapid urine dipstick test to predict urinary tract infection among pregnant women in Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia. BMC Res Notes. 2014;7(1):481.
21. Silverman MD, Turrentine MA. Urinary tract infections in pregnant individuals. Obstet Gynecol. 2023;142(2):435–45.
22. Beautily, V. and Jeevitha, U., 2024. Effectiveness of autogenic training on anxiety of the mothers with autistic children in selected hospital. In: 2024 OPJU International Technology Conference (OTCON) on Smart Computing for Innovation and Advancement in Industry 4.0, 5 June 2024, pp.1–6. IEEE
23. Adamu AA. Assessing implementation fidelity of community-based integrated mass drug administration for neglected tropical disease control in Kano State, Nigeria [master's thesis]. Johannesburg: University of the Witwatersrand; 2017.
24. Aranaz P, Navarro-Herrera D, Zabala M, Miguéliz I, Romo-Hualde A, López-Yoldi M. Diagnosis and classification of diabetes mellitus. Diabetes Care. 2010;33(1):S62–69.
25. paluchamy T., Steni, D. S., & Stephen, S.,2024. Effect of green tea mouthwash on chemotherapy induced oral mucositis in cancer patients. Journal of Chemical Health Risks, 14(1). https://doi.org/10.60829/jchr.2024.1103158
26. Laveena S , Vignesh Srinivasan , Anitha A , Ramana K , Mugilan B: Effectiveness of Autogenic Relaxation Training with Cognitive Graded Activity Training for Post Stroke Apathy Patients. Texila International Journal of Public Health Special Issue 2-2025
27. Liu Z, Liu D, Su G, Yang W. Reduction of misdiagnosis in urinary tract infections during pregnancy: the role of adjusted urine flow cytometry parameters. PLoS One. 2024;19(9):e0308253.
28. Radhakrishnan A, Sharma N, Archunan PA. Menstrual challenges in puberty: Investigating menorrhagia in adolescent girls [Internet]. Indian J Obstet Gynecol Res. 2024;11(4):640-646. Available from: https://doi.org/10.18231/j.ijogr.2024.115
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