

## Risks and consequences of urinary infections during pregnancy: A longitudinal study

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### ABSTRACT

The general objective of this article is to evaluate the impacts of urinary tract infections (UTIs) on maternal and fetal health during pregnancy. Specific objectives include determining the main risk factors associated with the development of urinary tract infections during pregnancy, analyzing the most common symptoms presented by pregnant women with urinary tract infections, comparing the effectiveness of different diagnostic methods used to identify urinary tract infections in pregnant women, evaluating the most common treatments for urinary tract infections during pregnancy and their effectiveness, to examine the fetal consequences of urinary tract infections during pregnancy, and to propose clinical management protocols for the prevention and treatment of urinary tract infections in pregnant women. The methodology used was a descriptive and qualitative literature review, analyzing studies published between 2004 and 2024, in Portuguese and English.

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The databases consulted were PubMed, Scielo and Google Scholar. The analysis focused on the prevalence of urinary tract infections during pregnancy, diagnostic methods, treatments, and consequences for maternal and fetal health. The results indicate that urinary tract infections are common during pregnancy, with asymptomatic bacteriuria progressing to pyelonephritis if not treated properly. Diagnostic methods include urinalysis and urine culture, the latter being the gold standard. The most common treatments involve antibiotics such as nitrofurantoin, cephalexin, and amoxicillin, which are considered safe to use during pregnancy. Complications associated with urinary tract infections include preeclampsia, preterm birth, and low birth weight. The conclusion highlights the importance of early diagnosis and proper management of urinary tract infections to minimize risks and ensure the health of the maternal-fetal binomial. Screening and treatment protocols, education on preventive measures, and a multidisciplinary approach are essential to improving maternal and newborn health outcomes. Continuing research in this area is crucial to improve treatment strategies and ensure the safety and efficacy of procedures.

**Keywords:** Urinary tract infections, Pregnancy, Maternal health, Antibiotics.



## INTRODUCTION

Urinary tract infections (UTIs) during pregnancy are a significant concern due to the risks and consequences they can entail for both mother and fetus. Pregnancy is a period of increased susceptibility to infections, including those of the urinary tract, due to physiological and anatomical changes that occur in a woman's body. These infections can range from asymptomatic bacteriuria to more serious conditions like cystitis and pyelonephritis, which can lead to severe complications if not properly diagnosed and treated.

The risks associated with urinary tract infections in pregnancy include the possibility of developing preeclampsia, premature birth, low birth weight and, in more severe cases, maternal sepsis. In addition, pyelonephritis, a kidney infection, can result in hospitalization and intensive care, increasing the risk of complications for both mother and fetus. Early identification and proper management of these infections are crucial to minimize risks and ensure the health of the maternal-fetal binomial.

The general objective of this article is to evaluate the impacts of urinary tract infections on maternal and fetal health during pregnancy. The specific objectives outlined to achieve this goal include: determining the main risk factors associated with the development of urinary tract infections during pregnancy; analyze the most common symptoms experienced by pregnant women with urinary tract infections, compare the effectiveness of different diagnostic methods used to identify urinary tract infections in pregnant women, evaluate the most common treatments for urinary tract infections during pregnancy and their effectiveness, examine the fetal consequences of urinary tract infections during pregnancy, including prematurity and low birth weight, To propose clinical management protocols for the prevention and treatment of urinary tract infections in pregnant women.

Thus, this current study is essential, since urinary tract infections in pregnancy are common and can lead to serious complications for both mother and fetus, including increased risk of preterm birth, low birth weight, and preeclampsia. Early diagnosis and proper management are essential to prevent these complications. Studies indicate that asymptomatic bacteriuria, if left untreated, can progress to pyelonephritis in pregnant women, highlighting the importance of rigorous screening and treatment protocols. Improving diagnosis and management can significantly reduce associated risks and improve maternal and neonatal outcomes.

## METHODOLOGY

The current study is a fundamental research based on a detailed literature review, with the aim of evaluating the impacts of urinary tract infections on maternal and fetal health during pregnancy. Urinary tract infections (UTIs) during pregnancy are a significant concern due to the risks and



consequences they can entail for both mother and fetus. Pregnancy is a period of increased susceptibility to infections, including those of the urinary tract, due to physiological and anatomical changes that occur in a woman's body. These infections can range from asymptomatic bacteriuria to more serious conditions like cystitis and pyelonephritis, which can lead to severe complications if not properly diagnosed and treated.

The risks associated with urinary tract infections in pregnancy include the possibility of developing preeclampsia, premature birth, low birth weight and, in more severe cases, maternal sepsis. In addition, pyelonephritis, a kidney infection, can result in hospitalization and intensive care, increasing the risk of complications for both mother and fetus. Early identification and proper management of these infections are crucial to minimize risks and ensure the health of the maternal-fetal binomial.

The search strategy will involve the use of electronic databases such as Google Scholar, Scielo and PubMed, using keywords aligned with specific objectives, such as "urinary tract infections in pregnancy", "diagnosis of UTIs in pregnant women", "treatment of UTIs during pregnancy" and "fetal impacts of UTIs in pregnancy". The study selection process will follow a qualitative and descriptive approach. Initially, abstracts that appear to meet the inclusion criteria will be identified, followed by a thorough review of the full articles to verify their adequacy and relevance in relation to the research objectives.

Detailed information will be collected on the risk factors associated with the development of urinary tract infections during pregnancy, the common symptoms presented, the effectiveness of the diagnostic methods used, the most common treatments and their effectiveness, the fetal consequences of urinary tract infections, and the proposed clinical management protocols. The evaluation of the quality of the included studies will be carried out considering methodological rigor, clinical importance and timeliness, focusing on articles published between 2004 and 2024 to ensure that the information is relevant and current.

The analysis will be restricted to the specific terms and languages used in the searches, which may result in the exclusion of relevant studies that do not exactly match the defined keywords. This method ensures a concentrated and detailed analysis, which is essential to evaluate the impacts of urinary tract infections on pregnancy, with a view to continuously improving treatment protocols and, therefore, clinical outcomes.

Thus, the study is essential, since urinary tract infections in pregnancy are common and can lead to serious complications for both mother and fetus, including increased risk of preterm birth, low birth weight, and preeclampsia. Early diagnosis and proper management are essential to prevent these complications. Studies indicate that asymptomatic bacteriuria, if left untreated, can progress to pyelonephritis in pregnant women, highlighting the importance of rigorous screening and treatment



protocols. Improving diagnosis and management can significantly reduce associated risks and improve maternal and neonatal outcomes.

## RESULTS AND DISCUSSION

The predisposing factors for various health conditions during pregnancy are widely discussed in the medical literature. Among the most common are a history of urinary tract infections, gestational diabetes, and advanced maternal age.

Urinary tract infections are a frequent complication during pregnancy and can have serious implications for maternal and fetal health. Studies indicate that the prevalence of urinary tract infections (UTIs) in pregnant women is significant, with factors such as age and length of hospital stay being important predictors for the occurrence of these infections. The presence of microbiological agents such as *Klebsiella pneumoniae* and *Escherichia coli* are common in nosocomial infections, demonstrating the need for strict control and appropriate treatment to avoid further complications [1]. In addition, co-infection with genital infections, such as those caused by *Gardnerella vaginalis* and *Candida* spp., is also observed, increasing the complexity of clinical management [2].

Gestational diabetes mellitus (GDM) is a metabolic condition characterized by hyperglycemia that develops during pregnancy. Increased insulin resistance due to hormonal changes of pregnancy is a key factor in the development of DMG. Significant risk factors include overweight, obesity, advanced maternal age (usually over 35 years), and family history of diabetes. The prevalence of GDM can be as high as 25% in some populations, with rates higher in regions such as the Middle East and North Africa. In Brazil, the prevalence is estimated at up to 18% [3, 4, 5]. Early screening and appropriate management, including nutritional changes, physical activity, and, if necessary, the use of medications such as insulin or metformin, are crucial to reduce maternal-fetal complications associated with GDM [4, 6].

Advanced maternal age is another significant risk factor for complications during pregnancy. Women over the age of 35 are at increased risk of developing conditions such as gestational diabetes, gestational hypertension, and preeclampsia. Maternal mortality is also associated with factors such as advanced maternal age, direct obstetric complications (such as preeclampsia and postpartum hemorrhage), and unfavorable socioeconomic conditions [7, 8, 9]. Advanced age, combined with other risk factors such as obesity and a history of chronic diseases, increases the vulnerability of pregnant women, highlighting the importance of rigorous prenatal care and effective preventive interventions.

Urinary tract infections (UTI) are one of the most common clinical complications during pregnancy, due to the anatomical and physiological changes that occur during this period, facilitating



the development of these infections. The prevalence and incidence of UI in pregnant women vary significantly among different studies and regions, reflecting the diversity of risk factors and diagnostic and treatment practices.

A study carried out in nine Basic Health Units in Cascavel, Paraná, analyzed 798 medical records of pregnant women and found a prevalence of 33.08% of urinary tract infections, genital tract infections, or both. Specifically, 15.66% of pregnant women had episodes of urinary tract infections, 14.41% had some type of genital infection, and 3.01% were co-infected. Genital infections were predominantly caused by *Gardnerella vaginalis* (37.39%) and *Candida* sp. (29,57%) [10].

Another study, conducted in the municipality of Marechal Cândido Rondon, Paraná, evaluated the incidence of urinary tract infection in 34 pregnant women through urine culture. The results showed that 56% of the samples analyzed tested positive for urinary tract infection, with *Escherichia coli* being the most prevalent microorganism, present in 63.1% of the cases. The highest incidence of urinary tract infection was observed in the third trimester of pregnancy, with 71.4% of pregnant women affected [11].

In Rondonópolis, Mato Grosso, a cross-sectional study analyzed 300 medical records of pregnant women attending prenatal consultations and found a relative frequency of urinary tract infection of 16.0%. *Escherichia coli* was the most frequently identified uropathogen, present in 75.0% of cases, followed by *Enterococcus faecalis* (16.67%), *Streptococcus agalactiae* (6.25%) and *Klebsiella* sp. (2,08%) [12].

The importance of early diagnosis and appropriate treatment of urinary tract infections during pregnancy has been highlighted in several studies. The presence of asymptomatic urinary tract infection in pregnant women is common, which reinforces the need for regular urine culture examinations to avoid serious complications, such as premature birth, hypertension, and even the death of the baby or mother in cases of severe and generalized infection [11][13].

Globally, *Escherichia coli* is consistently identified as the leading causative agent of urinary tract infections in pregnant women, followed by other pathogens such as *Enterococcus faecalis* and *Streptococcus agalactiae*. The prevalence of urinary tract infections in pregnant women varies, but studies indicate that it can affect between 15% and 33% of pregnant women, depending on the population studied and the diagnostic methods used [10][12][13].

These data underscore the need for effective prevention and prophylaxis protocols, as well as the importance of a multidisciplinary approach to prenatal care to reduce the incidence and complications associated with urinary tract infections in pregnant women.

Diagnostic methods for identifying urinary tract infections (UTIs) are varied and include urinalysis, urine culture, and rapid tests. Each of these methods has its particularities, advantages,



and limitations, and are often used together to ensure an accurate diagnosis and appropriate treatment.

Urinalysis is an initial screening test that is widely used to detect urinary tract infections. This test involves physical, chemical, and microscopic analysis of the urine. Parameters such as the presence of nitrites and leukocyte esterase are evaluated, and the presence of nitrites has a high specificity (99%) for UTI, while leukocyte esterase has high sensitivity (90%) [14]. However, urinalysis alone may not be sufficient for a definitive diagnosis, especially in cases of asymptomatic infections or in pediatric patients, where sensitivity and specificity may vary [14].

Urine culture, or urine culture, is considered the gold standard for diagnosing UTIs. This method involves incubating urine in specific culture media to allow growth and identification of the microorganisms causing the infection. Urine culture not only confirms the presence of bacteria, but also allows for quantification and the performance of an antibiogram, which is essential for determining the pathogen's sensitivity to antimicrobials [15]. However, the main limitation of urine culture is the time required to obtain the results, which can be more than 24 hours [15].

Rapid urine tests, such as immunochromatographic tests, offer a faster alternative for detecting UTIs. These tests are based on detecting specific antigens or antibodies present in the urine and can provide results within minutes. Although they are less accurate than urine culture, rapid tests are useful in situations where an immediate diagnosis is needed to start treatment [16]. The sensitivity and specificity of these tests can vary, but they are generally considered suitable for initial screening [16].

The diagnosis of asymptomatic bacteriuria in pregnant women presents several specific challenges that impact both maternal and fetal health. Asymptomatic bacteriuria is defined by the presence of microorganisms in the urine without clinical symptoms of urinary tract infection. The prevalence of this condition in pregnant women varies between 2% and 10%, and may reach 40% in some studies[17]. Proper identification and treatment are crucial to prevent serious complications such as pyelonephritis, preterm birth, and low birth weight[18].

One of the main challenges in diagnosis is the differentiation between significant and negligible colonization of the urinary tract. Urine culture is considered the gold standard for the diagnosis of bacteriuria, but the interpretation of the results can be complex due to the presence of contaminants and the variability in the definition of uropathogens[17]. In addition, asymptomatic bacteriuria may not be a permanent condition and may resolve spontaneously, which further complicates the decision on the optimal time for screening and treatment[17].

Another significant challenge is antibiotic resistance. Studies show that *Escherichia coli* is the most prevalent uropathogen in pregnant women with asymptomatic bacteriuria, but there is growing resistance to common antibiotics such as ampicillin[19]. The choice of antibiotic should consider



safety for both mother and fetus, which limits the therapeutic options available[20]. Antimicrobial resistance can lead to treatment failures and increase the risk of complications[19].

Proper collection of urine samples is another critical aspect. Contamination during collection can lead to false positive results, while improper collection can result in false negatives. Educating pregnant women about the correct urine collection technique is essential to ensure the accuracy of the results[21].

In addition, there are challenges related to implementing screening and treatment protocols in different health settings. In rural regions and indigenous communities, for example, the quality of prenatal care can be compromised by a lack of resources and adequate infrastructure[22]. Adherence to screening and treatment guidelines may be low, and lack of adequate follow-up may result in late diagnosis and inadequate management[22].

Pharmacological therapies during pregnancy require careful evaluation to ensure the safety of both mother and fetus. Among the frequently used medications, antibiotics play a crucial role in treating bacterial infections, which can have serious consequences if not treated properly.

The most prescribed antibiotics during pregnancy include amoxicillin, cephalexin, nitrofurantoin, and gentamicin. Amoxicillin is widely used due to its safety profile and efficacy against a variety of bacterial infections. Cephalexin, an antibiotic in the cephalosporin class, is also often prescribed and is effective against urinary tract infections (UTIs) and other common bacterial infections. Nitrofurantoin is particularly effective in the treatment of UTIs, especially in cases of asymptomatic bacteriuria, which can lead to complications if left untreated. Gentamicin, an aminoglycoside, is used in more severe cases of infection, although its use is limited due to the potential for renal and auditory toxicity.

The safety of antibiotics during pregnancy is a critical consideration. Amoxicillin and cephalexin are generally considered safe, with a low risk of adverse effects to the fetus. Studies indicate that nitrofurantoin is safe for use during pregnancy, especially in the second and third trimesters, although its use in the first trimester should be cautious due to reports of possible fetal malformations [23]. Gentamicin, although effective, should be used with caution due to the risk of ototoxicity and nephrotoxicity, which can affect both mother and fetus [24].

The choice of antibiotic should be based on culture results and sensitivity to ensure the efficacy of treatment and minimize the risk of bacterial resistance. *Escherichia coli* (*E. coli*) is the most common pathogen in UTIs during pregnancy, and nitrofurantoin and cephalexin have shown high efficacy against this pathogen [23, 24]. However, antimicrobial resistance is a growing concern, and the choice of antibiotic should consider local patterns of resistance [25].

Urinary tract infections (UTIs) are common during pregnancy and can lead to significant complications such as preeclampsia, preterm birth, and low birth weight. Therefore, the



implementation of effective clinical protocols for the treatment and prevention of these infections is crucial for maternal and fetal health.

The diagnosis of UTIs in pregnant women usually involves screening for asymptomatic bacteriuria by urine culture, as well as history and physical examination to identify cystitis and pyelonephritis. Urine culture is essential for the identification of the causative agent, especially in cases of resistant bacteria [26]. Asymptomatic bacteriuria, if left untreated, can progress to more serious symptomatic infections, such as pyelonephritis, which is associated with an increased risk of obstetric complications [27].

Clinical protocols recommend the use of safe and effective antimicrobials for the treatment of UTIs in pregnant women. Antibiotics frequently indicated include nitrofurantoin, cephalosporins, fosfomycin, and amoxicillin. The choice of antimicrobial and the duration of treatment depend on the type of infection and the sensitivity of the pathogen identified [26, 28]. Nitrofurantoin, for example, is widely used due to its efficacy and safety during pregnancy, except at the end of the third trimester due to the risk of neonatal hemolysis [26].

In addition to treatment, prevention of UTIs in pregnant women is critical. Periodic urine cultures are recommended, usually every trimester, to monitor for the presence of asymptomatic bacteriuria and initiate early treatment when necessary [27]. Educating pregnant women about preventive measures, such as adequate fluid intake, frequent urination, and proper hygiene, is also an important part of management protocols [26].

In cases of pyelonephritis, which is a serious kidney infection, treatment usually requires hospitalization and administration of intravenous antibiotics. Continuous monitoring of the mother and fetus is essential to prevent serious complications [26].

Urinary tract infections (UTIs) during pregnancy are a significant concern due to their potential adverse impacts on maternal health. Among the most serious complications associated with UTIs are pyelonephritis and preeclampsia, both of which have serious consequences for both mother and fetus.

Pyelonephritis, a kidney infection, is one of the most common and serious complications of UTIs during pregnancy. This condition can lead to severe symptoms such as high fever, low back pain, nausea, and vomiting, and can develop into sepsis if not treated properly. Pyelonephritis is associated with an increased risk of preterm birth and low birth weight, as well as maternal complications such as acute renal failure and systemic inflammatory response syndrome (SIRS) [29]. Early diagnosis and appropriate treatment with antimicrobials are essential to prevent these complications. Studies indicate that asymptomatic bacteriuria, if left untreated, can progress to pyelonephritis in up to 40% of cases, highlighting the importance of screening and early treatment during prenatal care [30].



Preeclampsia, a pregnancy-specific hypertensive syndrome, can also be exacerbated by urinary tract infections. Preeclampsia is characterized by hypertension and proteinuria after the 20th week of gestation and can lead to serious complications such as eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count), placental abruption, and fetal growth restriction [31]. The presence of urinary tract infections, especially those that are untreated or recurrent, can increase the risk of developing preeclampsia. The inflammation and immune response triggered by infection may contribute to the endothelial dysfunction and antiangiogenic status seen in preeclampsia [32].

In addition, the association between urinary tract infections and preeclampsia may be mediated by common risk factors such as obesity, diabetes, and a history of hypertension. Women with recurrent urinary tract infections during pregnancy have an increased risk of developing preeclampsia, which reinforces the need for close monitoring and preventive interventions [33]. Early identification and appropriate management of UTIs are crucial to reduce the risk of maternal complications and improve pregnancy outcomes.

Fetal health is profoundly influenced by several factors during pregnancy, including maternal nutrition, medical conditions, and lifestyle habits. Maternal nutrition, in particular, plays a crucial role in fetal development and neonatal health. A balanced diet rich in essential nutrients, such as vitamins, minerals, protein, and omega-3 fatty acids, can significantly reduce the risk of neonatal complications such as low birth weight, preterm birth, and birth defects. In addition, proper nutrition during pregnancy contributes to a stronger immune system in the newborn and healthy neurological development. On the other hand, nutritional deficiencies can result in serious complications, including intrauterine growth retardation and impaired cognitive development [34].

Prematurity and low birth weight are often interrelated conditions and are considered the main determinants of the risk of death in the neonatal period, in addition to being associated with developmental problems in childhood. High blood pressure during pregnancy, for example, is a condition that can lead to these complications, increasing the likelihood of various diseases in adulthood [35]. Studies show that the prevalence of prematurity and low birth weight has increased over the years, despite improvements in antenatal care and maternal health conditions [36].

In addition to nutritional and medical factors, maternal lifestyle, including the consumption of alcohol, tobacco, and illicit drugs, can also negatively affect fetal health. The use of these substances during pregnancy is associated with a number of complications, such as fetal abstinence, premature placental displacement, and maternal cognitive and emotional impairment, which can result in prematurity and low birth weight [37].

Early breastfeeding, which begins in the first hour of life, has been highlighted as a crucial practice for neonatal development. Breast milk not only provides essential nutrition, but it also



contains immune-boosting properties that protect the baby against infection and disease, as well as promote a strong emotional bond between mother and child. Exclusive breastfeeding in the first months of life is associated with a significant reduction in the risk of developing chronic diseases in adulthood, such as obesity, type 2 diabetes, and cardiovascular disease [38].

Finally, continuity of post-discharge care for premature or low birth weight newborns is critical to ensure healthy development. Strategies such as home visits by nurses and ongoing support through telephone contacts are essential to monitor the health of the newborn and support parents in the transition to home care [39].

## CONCLUSION

This literature review highlighted the importance of predisposing factors for complications during pregnancy, with a focus on urinary infections, gestational diabetes and advanced maternal age. Urinary infections, which are frequent in pregnant women, demonstrate the need for strict control and appropriate treatment, especially due to the prevalence of pathogens such as *Escherichia coli*. Gestational diabetes, associated with factors such as overweight and maternal age, requires monitoring and appropriate management to avoid complications. In addition, advanced maternal age increases the risk of conditions such as gestational hypertension and pre-eclampsia, reinforcing the importance of prenatal care. Screening and treatment protocols, education on preventive measures and a multidisciplinary approach are essential to improve maternal and neonatal health outcomes. Thus, it is crucial to implement effective prevention and treatment protocols to ensure maternal and fetal health. It is clear, therefore, that continued research in this area is essential to improve treatment strategies, ensure the safety and efficacy of procedures and improve maternal and fetal health outcomes.



## REFERENCES

1. Da Silva, A. C., Martins, D. L., & Galvão, B. H. (2024). INFECÇÕES URINÁRIAS E PROCESSO DO CUIDADO: PERFIL ETIOLÓGICO E DE SENSIBILIDADE NO SETOR DE CLÍNICA MÉDICA DE UM HOSPITAL PÚBLICO DA PARAÍBA. \*Arquivos de Ciências da Saúde da UNIPAR\*.
2. Santos, C. C., Madeira, H. S., Silva, C. M., Teixeira, J. J., & Peder, L. D. (2019). Prevalência de infecções urinárias e do trato genital em gestantes atendidas em Unidades Básicas de Saúde. \*Revista de Ciências Médicas\*.
3. Andrade, M. M., Souza, T. R., Faria, C. P., Silva, V. S., & Costa, L. F. (2023). FATORES DE RISCO PARA DIABETES GESTACIONAL: UMA REVISÃO DE LITERATURA. \*Revista Ibero-Americana de Humanidades, Ciências e Educação\*.
4. Godinho, B. V., Parma, I. T., Ferraz, N. D., Borges, M. S., Rocha, T. A., Nascimento, M. E., De Vasconcelos, G. M., Barros, J. L., Sant'Anna, V. S., & Campos, E. C. (2023). Diabetes Mellitus Gestacional: Fisiopatologia, fatores de risco e manejo terapêutico. \*Revista Brasileira de Desenvolvimento\*.
5. Gontijo, A. S., & Silva, C. C. (2024). FATORES DE RISCO PARA O DIABETES MELLITUS GESTACIONAL. \*REVISTA FOCO\*.
6. Garcia, Y. S., Rabelo, L. M., Speggiorini, G. R., & Santos, I. C. (2024). DIABETES GESTACIONAL: FATORES DE RISCO, DIAGNÓSTICO E MANEJO. \*Anais do II Congresso Nacional de Saúde da Família On-line\*.
7. Medeiros, L., De Souza, M. R., & Lopes, G. D. (2023). CARACTERÍSTICAS CLÍNICAS E FATORES DE RISCO PARA A MORTALIDADE MATERNA: UMA REVISÃO INTEGRATIVA. \*Revista Contemporânea\*.
8. Mesquita, C. L., Souza, A. P., Lage, B. M., Martins, D. A., Murta, L. D., Murta, I. D., Carvalho, G. G., Carvalho, I. L., & Borém, L. V. (2022). Pré-eclâmpsia e mortalidade materna: relação entre fatores de risco, diagnóstico precoce e prevenção. \*Revista Eletrônica Acervo Saúde\*.
9. Silva, D. D., & De Paiva, F. F. (2023). FATORES ASSOCIADOS E DE RISCO PARA SINDROMES HIPERTENSIVAS GESTACIONAIS NO BRASIL: UMA REVISÃO INTEGRATIVA. \*Revista Contemporânea\*.
10. Santos, C. C., Madeira, H. S., Silva, C. M., Teixeira, J. J., & Peder, L. D. (2019). Prevalência de infecções urinárias e do trato genital em gestantes atendidas em Unidades Básicas de Saúde. \*Revista de Ciências Médicas\*.
11. Pagnonceli, J., Abegg, M. A., & Colacite, J. (2010). AVALIAÇÃO DE INFECÇÃO URINÁRIA EM GESTANTES DO MUNICÍPIO DE MARECHAL CÂNDIDO RONDON - PR.
12. Siqueira, M. L., Silva, R. A., Mendes, S. D., Aquino, L. M., Alves, S. M., & Medeiros, M. O. (2018). AVALIAÇÃO DE INFECÇÃO URINÁRIA EM GESTANTES ATENDIDAS PELA UNIDADE MUNICIPAL DE SAÚDE DE RONDONÓPOLIS, MT.
13. Araújo, C. S., Lelis, A. E., Souza, V. P., & Machado, C. J. (2023). Atualizações sobre o tratamento de infecções urinárias durante a gestação. \*Pesquisa, Sociedade e Desenvolvimento\*.



14. Cassamo, S., Ribeiro, M., Carneiro, L. G., Castanhinha, S. I., & Sá, G. A. (2021). Avaliação do desempenho do teste rápido de urina no diagnóstico da infecção urinária em idade pediátrica.
15. Costa, G. P., & Silva, D. P. (2022). PRINCIPAIS MICROORGANISMOS ENCONTRADOS EM PACIENTES COM INFECÇÕES DO TRATO URINÁRIO (ITU) E MÉTODOS DE DIAGNÓSTICOS UTILIZADOS. \*Anais do II Congresso Nacional de Microbiologia Clínica On-line\*.
16. Resende, I. V., Campbell, L. M., Carrijo, D. M., Alves, Y. R., Borges, K. I., & Paula, E. M. (2018). TESTES RÁPIDOS NO DIAGNÓSTICO DE ENFERMIDADES EM CÃES.
17. Schneeberger, C., & Kazemier, B. M. (2018). Bacteriúria assintomática na gravidez – Ainda é necessário rastrear e tratar?
18. Meshram, P. S., Kubde, A. R., Kothalkar, V. S., & Giri, A. B. (2023). Bacteriúria assintomática na triagem da gravidez, fatores de risco, diagnóstico e tratamento. \*Revista Internacional de Pesquisa em Ciências Médicas\*.
19. Salloum Filho, E., Ramalho de Araújo Lemos Vieira, H., & Fernandes dos Santos Castro, F. (2022). Perfil bacteriano e resistência a antibióticos padrões em gestantes com bacteriúria sintomática e assintomática no Distrito Federal. \*Programa de Iniciação Científica - PIC/UniCEUB - Relatórios de Pesquisa\*.
20. Matuszkiewicz-Rowińska, J., Małyszko, J., & Wieliczko, M. (2015). Urinary tract infections in pregnancy: old and new unresolved diagnostic and therapeutic problems. \*Archives of medical science : AMS, 11\*(1), 67–77. <https://doi.org/10.5114/aoms.2013.39202>
21. Dias, V. C., De Castro, A. C., De Souza, L. L., De Souza, F. G., & Da Cunha, D. D. (2023). Perspectiva atual das infecções do trato urinário: diagnóstico e terapêutico na prática clínica. \*Revista Brasileira de Revisão de Saúde\*.
22. Bookallil, M., Chalmers, E., & Andrew, B. (2005). Challenges in preventing pyelonephritis in pregnant women in Indigenous communities. \*Rural and remote health, 5\*(3), 395.
23. Cunha, J. G., Lopes, I. H., Phebo, A. D., Tristão, M. F., Amaral, J. E., & Margulies, G. S. (2023). Antibióticos de escolha no tratamento de bacteriúria assintomática em gestantes: revisão sistematizada. \*Jornal Brasileiro de Ginecologia\*.
24. Santos, T. K., Sanches, I. T., Pittner, E., & Sanches, H. F. (2013). IDENTIFICAÇÃO E PERFIL ANTIMICROBIANO DE BACTÉRIAS ISOLADAS DE URINA DE GESTANTES ATENDIDAS NA IRMANDADE DA SANTA CASA DE MISERICÓRDIA DE PRUDENTÓPOLIS, PARANÁ. \*Perspectiva Contemporânea das Ciências da Saúde (2a Edição)\*.
25. Bezerra, M. E., Melo, R. D., & Montenegro, F. V. (2021). Resistência às bactérias de uso oral a partir de isolados de urina de pacientes não hospitalizados. \*Avanços em Medicina\*.
26. Araújo, C. S., Lelis, A. E., Souza, V. P., & Machado, C. J. (2023). Atualizações sobre o tratamento de infecções urinárias durante a gestação. \*Pesquisa, Sociedade e Desenvolvimento\*.
27. Reis, G. S., Castro, M. R., & Silva, T. B. (2018). INFECÇÃO URINÁRIA E PIELONEFRITE NO 1º TRIMESTRE DA GRAVIDEZ.



28. Cunha, J. G., Lopes, I. H., Phebo, A. D., Tristão, M. F., Amaral, J. E., & Margulies, G. S. (2023). Antibióticos de escolha no tratamento de bacteriúria assintomática em gestantes: revisão sistematizada. *\*Jornal Brasileiro de Ginecologia\**.
29. Dutra Brasil, G., Almeida, T. E., Rodrigues, J. C., Souza, J. P., Marinho, R. S., Porto, L. R., Moraes, R. P., Nilsen, L. G., Lima, S. D., Martins, A. E., Neto, H. L., Silva, J. A., Viana, M. O., & Cunha, F. L. (2024). Impacto da pré-eclâmpsia grave na saúde materna e fetal. *\*Revista Brasileira de Implantologia e Ciências da Saúde\**.
30. Araújo, C. S., Lelis, A. E., Souza, V. P., & Machado, C. J. (2023). Atualizações sobre o tratamento de infecções urinárias durante a gestação. *\*Pesquisa, Sociedade e Desenvolvimento\**.
31. Campanha, A. L., Barros, A. C., & Gervasio, A. P. (2023). DEPRESSÃO PÓS-PARTO: IMPACTOS NA SAÚDE MATERNA E INFANTIL NA ATENÇÃO PRIMÁRIA. *\*Anais do I Congresso Nacional On-line de Atenção Primária à Saúde\**.
32. Henriques da Silva, L., Carvalho Leite, C., & Ferreira Cordeiro, K. (2023). Prevalência elevada de pré-eclâmpsia em gestantes atendidas em maternidade de alto risco em Campos dos Goytacazes, RJ. *\*Anais da Semana Científica da Faculdade de Medicina de Campos\**.
33. Baiotto, C. S., Cavinatto, A. W., Ahlert, E. R., Molin, G. T., & Haas, L. M. (2011). Pré-eclâmpsia E Eclâmpsia: Fatores De Risco, Complicações E Diagnóstico Médico.
34. Gomes do Amaral, A., De Barros Rezende, L., Almeida Ramos Jaegge, N., Pinesso Huang, J., & Yumi Pena Ogata, R. (2024). Os Efeitos da Nutrição Materna na Saúde Fetal e no Desenvolvimento Neonatal: Uma Revisão Abrangente. *\*Revista Brasileira de Implantologia e Ciências da Saúde\**.
35. Prado, I. F. (2017). Associação da hipertensão arterial durante a gravidez com prematuridade e baixo peso ao nascer: repercussões para o desenvolvimento na infância.
36. Barros, F. C., Victora, C. G., Matijasevich, A., Santos, I. S., Horta, B. L., Silveira, M. F., & Barros, A. J. (2008). Prematuridade, baixo peso ao nascer e restrição do crescimento intrauterino em três coortes de nascimentos no Sul do Brasil: 1982, 1993 e 2004. *\*Cadernos De Saude Publica, 24\**.
37. Monte, M. G. (2018). EFEITOS DO USO DE DROGAS ILÍCITAS DURANTE A GRAVIDEZ.
38. Sousa, E. K., Borges, L. P., Veloso, H. M., Nogueira, V. O., Lima, M. M., Oliveira, J. D., Batista, J. A., Medeiros, H. M., Siqueira, L. B., Júnior, J. L., Lopes, P. H., Santos, S. R., Jesus, M. L., & Reis, T. A. (2024). O PAPEL CRUCIAL DA AMAMENTAÇÃO NA PRIMEIRA HORA DE VIDA: IMPACTO NA SAÚDE E DESENVOLVIMENTO NEONATAL. *\*Revista Brasileira de Implantologia e Ciências da Saúde\**.
39. Engenheiro, O. B. (2020). ESTRATÉGIAS NA CONTINUIDADE DO CUIDADO PÓS-ALTA A RECÉM-NASCIDOS PREMATUROS OU DE BAIXO PESO. *\*RIASE, 6\**, 2100-2116.