

Factors associated with vaginal candidiasis in pregnant women: What the publications exhibit

RESUMO | Objetivo: analisar os fatores associados a candidíase vaginal em gestantes. Método: Trata-se de uma revisão integrativa de literatura realizado na PubMed. Utilizou-se os descritores: “pregnant women”, pregnancy, candidiasis, “candidiasis, vulvovaginal”. Foram selecionados ao final 07 estudos e o período de busca aconteceu entre os meses de novembro a dezembro de 2021. Resultados: a candidíase vulvovaginal teve uma média da prevalência geral de candidíase foi de 51,71% dos casos mencionados nos estudos. Dentre as manifestações clínicas da candidíase, destaca-se o corrimento alterado, prurido intenso, disúria, irritação ou queimação e dor pélvica. Conclusão: A *Candida albicans* foi a cepa de levedura mais frequentemente identificada, mas, outras espécies também foram descritas, como a *C. krusei*, *C. glabrata*, *Candida parapsilosis* e *C. tropicalis*. A candidíase não é letal, mas os sintomas podem definir o diagnóstico clínico da candidíase, na gestação o diagnóstico precoce norteia o tratamento eficiente e contribui para a melhora do prognóstico da gestante.

Descritores: Candidíase; Gestação; Prevalência; Fatores de risco.

ABSTRACT | Objective: to analyze the factors associated with vaginal candidiasis in pregnant women. Method: This is an integrative literature review carried out at PubMed. The descriptors were used: “pregnant women”, pregnancy, candidiasis, “candidiasis, vulvovaginal”. At the end, 07 studies were selected and the search period took place between the months of November and December 2021. Results: vulvovaginal candidiasis had an average general prevalence of candidiasis of 51.71% of the cases mentioned in the studies. Among the clinical manifestations of candidiasis, there is an altered discharge, intense itching, dysuria, irritation or burning and pelvic pain. Conclusion: *Candida albicans* was the most frequently identified yeast strain, but other species were also described, such as *C. krusei*, *C. glabrata*, *Candida parapsilosis* and *C. tropicalis*. Candidiasis is not lethal, but the symptoms can define the clinical diagnosis of candidiasis, in pregnancy, early diagnosis guides efficient treatment and contributes to improving the prognosis of the pregnant woman. Keywords: Candidiasis; Gestation; Prevalence; Risk factors.

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RESUMEN | Objetivo: analizar los factores asociados a la candidiasis vaginal en gestantes. Métodos: Esta es una revisión integradora de la literatura realizada en PubMed. Fueron utilizados los descriptores: “embarazadas”, embarazo, candidiasis, “candidiasis, vulvovaginal”, al final fueron seleccionados 07 estudios. Resultados: la candidiasis vulvovaginal tuvo una prevalencia general promedio de candidiasis del 51,71% de los casos mencionados en los estudios. Entre las manifestaciones clínicas de la candidiasis se encuentran secreción alterada, prurito intenso, disuria, irritación o ardor y dolor pélvico. Conclusión: *Candida albicans* fue la cepa de levadura más frecuentemente identificada, pero también se han descrito otras especies, como *C. krusei*, *C. glabrata*, *Candida parapsilosis* y *C. tropicalis*. Se infiere que la VVC no es letal, pero los síntomas pueden definir el diagnóstico clínico de candidiasis, en el embarazo, el diagnóstico precoz orienta un tratamiento eficaz y contribuye a mejorar el pronóstico de la gestante.

Palabras claves: Candidiasis; Gestación; Predominio; factores de riesgo.

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Recebido em: 10/05/2022
Aprovado em: 09/06/2022

INTRODUCTION

The prevalence of vaginal candidiasis in pregnant women is high and is caused by a wide variety of *Candida* species. The lack of early diagnosis

and adequate treatment during prenatal care can have serious implications.¹ Performing a search in indexed databases, a scarcity of integrative reviews related to the theme was identified, which aroused our interest in investigating the diversity of non-albicans and albicans *Candida* in this clientele.

It is common in the gestational period to cause changes in internal and external factors, which contribute to the appearance of bacterial vaginosis and vaginal fungal infections. These changes culminate in colonization by microorganisms that may be linked to complications during pregnancy, childbirth and the puerperium.¹

In the gestational period, women have high levels of estrogen, which lasts throughout pregnancy, as well as an abundance of glycogen in the vaginal mucosa, which culminates in fungal growth, obtaining an accentuated reserve of usable sugars for the nutrition of pathogens.^{1,2}

In the female genital tract, several agents are related to the microbiota, such as *Candida albicans*; *Trichomonas vaginalis*; *Gardnerella vaginalis*; *Chlamydia trachomatis*, being among the vaginites the most mentioned by pregnant women as complaints in prenatal care. The *Candida* is normally found in the human microbiota, this fungus maintains a commensal relationship with the individual. However, as a consequence of an imbalance of the microbiota or an inefficiency of the immune system, they can become opportunistic agents. Fungi of the *Candida albicans* genus have high prevalence in pregnant women.³

Pregnancy provides the woman with a series of physiological, hormonal and emotional changes enabling the development of fungal infections such as vulvovaginal candidiasis (VVC). Its prevalence is between 28% and 38%. The predisposition of pregnant women is higher than that of the general population, caused by the increase in cervi-

covaginal secretions with a decrease in the local response, associated with the progestogenic action on T lymphocytes and the anti-activity of polymorphonuclear cells.⁴

VVC is an opportunistic infection of the vaginal mucosa, considered the second most frequent vaginal infection that affects women of reproductive age. Approximately 75% of women at least once in their lives develop candidiasis, and 50% of them also experience a single recurrence.³

In Brazil, the prevalence of candidiasis during pregnancy ranged from 11.8%, while in Argentine women it was 28%, in Turkish women it was 37.4%. In India it was 38% where 27% were symptomatic and 11% were asymptomatic. Approximately 50% of the asymptomatic patients evaluated presented some state of vaginal dysfunction and close to 30% of the symptomatic ones did not show any morphological alteration of the vaginal contents.⁴

The presence of this infection is related to the appearance of complications in pregnant women such as: premature rupture of membranes, premature labor, chorioamnionitis and congenital cutaneous candidiasis. It is noteworthy that the most common symptoms of vaginal candidiasis in pregnant women are: vaginal discharge similar to cottage cheese, vulvar swelling, itching, pain, irritation, burning sensation on urination, dyspareunia and dysuria.⁶ Thus, in view of the above, the question that

guided the construction of the article was which factors are associated with vaginal candidiasis in pregnant women? The present study aims to analyze the factors associated with vaginal candidiasis in pregnant women.

METHOD

It is characterized as an integrative review. This procedure was selected because it allows the synthesis and analysis of scientific knowledge already produced on the subject. From the chosen theme, it determined the construction of the PICOT strategy where it was selected: POT that represents Problem (P), outcome (O), and (T) types of studies, in which it was used to generate the guiding question of this integrative literature review: what factors are associated with vaginal candidiasis in pregnant women?

To locate the relevant studies that answered the research question, descriptors in English were used, as shown in Table 1.

The following descriptors were used: "Pregnant Women", "Pregnancy", "Candidiasis", "Candidiasis, Vulvovaginal", these being indexed in the Health Sciences Descriptors system (DeCS). The descriptors were combined using the Boolean operator AND and OR.

They were examined using the descriptors in the PubMed database of the National Library of Medicine. The analysis for the selection of studies was carried out according to the inclusion

Table 1 – Elements of the PI strategy, descriptors used – Caxias, MA, Brasil, 2022.

Elements	DECS
P	"Pregnant Women" Pregnancy
O	Prevalence
T	Candidiasis "Candidiasis, Vulvovaginal"

Source: DECS research, 2022.

and exclusion criteria and the second was according to the operation and search strategies of the database.

In PUBMED, 4,352 studies were identified, applying the full text filter available with 819 articles, followed by the last 5 years of publication a total of 191, in Portuguese and English, 189 articles and, research carried out with females with 163 articles, of which the titles and abstracts were analyzed in detail and had as a final result 07 studies and as shown in figure 1. The search period was carried out between the months of November to December 2021.

RESULTS

The articles analyzed used cross-sectional methods. Among the microorganisms identified, Candida albicans was the most prevalent microorganism in all studies, followed by other non-albicans Candida species. From the sample of articles, a total of 2020 pregnant women were obtained, with an average of 288.5 participants per study. (Table 01 and 02).

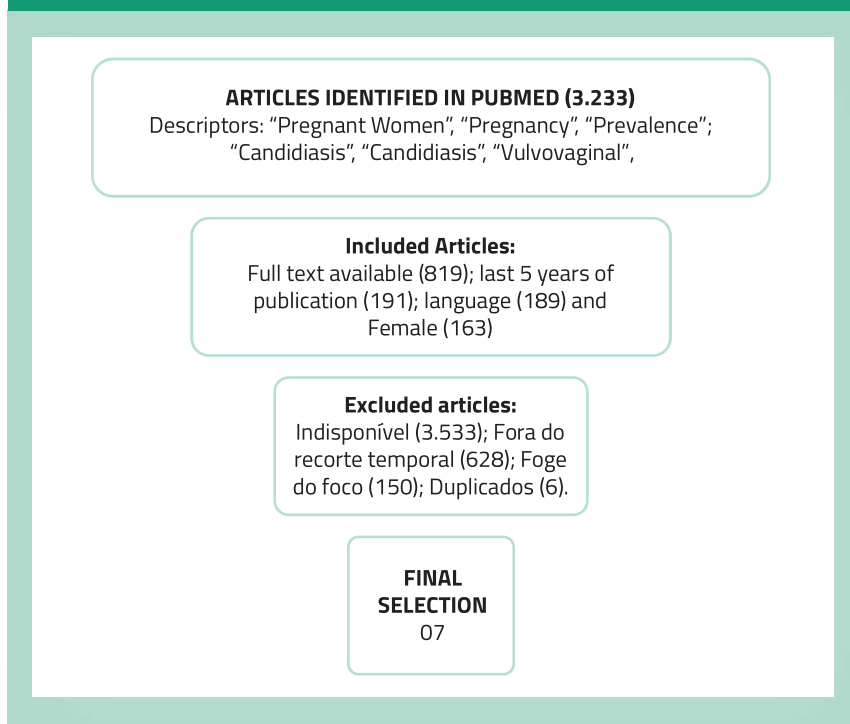
The data obtained from this study were organized in the form of a table and made it possible to analyze the prevalence, symptoms, complications during pregnancy and risk factors. Table 02 addresses the articles selected to assist in the construction of this study.

Vulvovaginal candidiasis had an average overall prevalence of candidiasis of 51.71% of the cases mentioned in the studies. The clinical diagnosis of candidiasis is made from the symptoms of the pregnant woman, among the clinical manifestations of candidiasis, there is an altered discharge, intense itching, dysuria, irritation or burning and pelvic pain.^{3,4,7,8,9,10,11}

DISCUSSION

The prevalence of vulvovaginitis among pregnant women is higher,

Figure 1 - Flowchart of the selection process in PubMed databases. Caxias, Maranh6o – Brazil. 2022.



SOURCE: Author's PubMed Search, 2022.

Table 01. Distribution of articles according to objective, type of study and sample. Caxias, Maranh6o – Brazil. 2022.

Author	Objective	Type of study	Sample
KONADU et al., 2019	To determine the prevalence of vaginal infection and its associated risk factors.	Cross-sectional study	589 pregnant women
GHADDAR et al., 2019	To determine the prevalence of VVC and other vaginal colonizations among Lebanese pregnant women, as well as the frequency of species distribution	Cross-sectional study	221 pregnant women
MUSHI et al., 2019	Determine patterns of Candida spp. causing vaginitis and associated factors among pregnant women	Cross-sectional study	300 pregnant women
TSEGA et al., 2019	To determine the prevalence, possible risk factors and antifungal susceptibility profile of Candida species in pregnant women	Cross-sectional study	384 pregnant women
GHADDAR et al., 2020	Explore whether Candida species predict pregnancy complications and adverse neonatal outcomes.	Cross-sectional study	258 pregnant women
FREITAS et al., 2020	To determine the prevalence of microorganisms in vaginal secretions of high-risk pregnant women	Analytical, cross-sectional study	92 high risk pregnant women
WAIKHOM et al., 2020	Determine the prevalence of VVC, identify the most recent and most occurring species of Candida, and determine the most effective antifungal drug for treatment.	Prospective cross-sectional study	176 pregnant women

Source: Prepared by the authors, 2022.

about 30% when compared to the general public of women. Bacterial vaginosis has a frequency of (30.9%) and trichomoniasis (1.4%). Together, the microbiota comprised a prevalence of 56.4%.⁷

Among the vulnerability factors, the low level of education, which is correlated with poor hygiene conditions and low economic level, make pregnant women even more exposed to developing infectious processes caused by candidiasis. Pregnant women with low purchasing power, elementary school and in the third trimester, are more likely to trigger this infection.⁵

Another determining factor for clinical worsening during pregnancy was resistance to azole antifungals, the antifungal with the highest resistance rate was fluconazole (48.1%), followed by voriconazole (37%) and nystatin (9.3%).⁽⁵⁾ *C.albicans* species were shown to be susceptible to most of the antifungal agents used, compared to *C.krusei*, which was the most reported species in the literature with high rates of fluconazole resistance.⁹

Although *C. albicans* is a fungus belonging to the normal vaginal microbiota, this yeast may be associated with the various cases of candidiasis in women, especially when they have some degree of immunosuppression.¹¹

Candidiasis is frequently identified in pregnant women, constituting one of the main reported gynecological problems. Studies carried out by Bonfanti and Gonçalves 2010, there was a prevalence of 33.75% during the analysis of reports of cytopathological exams of pregnant women in Rio Grande do Sul, Brazil. Lower rates were found in Argentina (28%), Nigeria (25%),⁶ in Malaysia (17,20%)¹³, and in India (4,13%).¹⁴

The fungal species *Candida albicans* has a higher prevalence of infection, as they have an estrogen-binding protein in their morphology, which causes a greater interaction between them.

Quadro 02 – Associação de aspectos clínicos, complicações e fatores de riscos da candidíase vaginal em gestantes. Caxias, Maranhão – Brasil. 2022.

Author / year	General Prevalence	Variety Prevalence	Related Symptomatology	Pregnancy complications	Risk factors
Konadu, 2019 ⁷	Symptomatic VVC was 36.5%	-	Abdominal pain (18.92%), Pruritus (23.65%), Bad odor 16.89%, Dysuria 7.43%, Altered discharge (29.05%)	There were no complications associated with <i>C.albicans</i> infection.	Multiple partners, Multiparous, Prolonged antibiotic therapy
Ghaddar, 2019 ¹¹	Symptomatic VVC was detected in 82%	<i>C. glabrata</i> (44,4%), <i>C. albicans</i> (43,4%), <i>C.krusei</i> 12,1%, <i>C. albicans</i> e <i>C. glabrata</i> (2%)	Altered discharge, Itching, bad odor	Abortion	Prolonged antibiotic therapy; Low level of education; Low income
Mushi, 2019 ⁹	65.7% of pregnant women	<i>C. albicans</i> 63,4%, <i>C. tropicalis</i> (17,8%), <i>C. glabrata</i> 16,8%, <i>C. krusei</i> (1,5%), <i>Candida parapsilosis</i> (0,5%)	Altered discharge (60.4%), Vaginal itching (51%), Pelvic pain (38%)	-	Low level of education; Low income; Shower practice; Prior antibiotic therapy.
Tsega, 2019 ¹⁰	25% were positive for <i>Candida</i> species	<i>Candida albicans</i> (56,25%) followed by <i>C.krusei</i> (21,9%), <i>C.glabrata</i> (17,7%), <i>C. tropicalis</i> (1%), Other / unidentified (3,1%)	Itching (32%), Dyspareunia (12.3%), Altered discharge (40%)	-	HIV; Diabetes; Frequent use of contraceptives; Prolonged use of antibiotics; Number of pregnancies; gestational period.
Ghaddar, 2020 ³	39% were positive for <i>Candida</i> species	<i>C. albicans</i> was isolated in 42%, <i>C. non-albicans</i> (58%), <i>C. glabrata</i> (71%, N = 41), <i>C. krusei</i> (29%, N = 17).	Discharge changed 34%, Itching 20.5%, Abdominal pelvic pain 5.3%	Premature birth; Induced labor; Recurrent infections in the urinary tract	Low level of education; Low income
Freitas, 2020 ⁸	Symptomatic VVC was detected in 62.07%	<i>Candida spp.</i> (31,52%)	Vaginal discharge (44.83%), Genital itching 27.59, Dyspareunia 24.14%	Pelvic discomfort	Diabetes; Immunosuppression; Use of antibiotics

Source: Prepared by the authors, 2021.

¹⁵ Numerous studies report that *C. albicans* (80-90%) is the most frequent yeast species identified in cases of vulvovaginal candidiasis. However, in recent years, an increase of 10 to 20% has been observed in the frequency of non-*C. albicans* species, mainly *C. gla-*

brata, *C. krusei*, *C. tropicalis*, *C. pseudotropicalis*, *C. parapsilosis*, *C.lusitanae* and *C. guilliermondii*, indicating a trend of change in the pathological agent of candidiasis. The problem lies in the fact that these other species are more resistant to antifungal agents.¹⁶

Another important finding was the discomfort and complaints caused by the infection, common during the pregnancy period. Among the complaints, women report burning and pain during intercourse, intense odor and/or itching and leucorrhoea. In contrast, vulvovaginal infections are often associated with complications during pregnancy.¹⁷

Other authors bring a wide range of consequences caused by candidiasis, which affects both the physical and psychological aspects of several women annually, and may interfere with affective and sexual relationships, thus, harming the work performance of a significant number of the economically active population, it constitutes an important public health problem in the world.¹⁸

In general, the most frequent clinical features associated with vaginal candidiasis infection were whitish, lumpy discharge, vaginal itching, pain or burning in the pelvic region, and pain during intercourse.¹⁹ From the data obtained from other studies, the significant association of candidiasis with intense vaginal itching among pregnant women is consistent when evaluating vaginal complaints, which suggests a higher probability of intense vaginal itching among patients with candidiasis, followed by whitish discharge.²⁰

The manifestations frequently identified in candidiasis infections are intense vaginal itching, whitish plaques and whitish discharge with or without a characteristic odor, or without odor, patients report pain during sexual intercourse and in the pelvic region.²¹ The diagnosis is based on the clinical picture of the pregnant woman, early and adequate treatment prevents future complications, such as infections of the newborn, premature birth, vulvar discomfort, frequently reported during consultations and may also be related to increased susceptibility to HIV infection.²²

The most important factors that lead



Pregnancy provides the woman with a series of physiological, hormonal and emotional changes enabling the development of fungal infections such as vulvovaginal candidiasis (VVC).



to the triggering of candidiasis are: diabetes, diet, carbohydrate and sugar intake, pregnancy, use of antibiotics and corticosteroids, as they degrade the vaginal microbiota and suppress the immune system, multiple sexual partners. Another important factor that increases the risks of pregnant women is the lack of interest and care and interest in seeking medical help.²³

Regarding, it can be a pathology commonly identified in the vaginal microbiota of the female population, it still needs more attention, mainly by the nurse, as a member of the health team and responsible for comprehensive care. During the nursing consultation, the professional must identify all the needs of the pregnant woman, taking a holistic view, acting in the best management of the pathology and in educational interventions, paying attention to the complexity of this infection.²⁵

CONCLUSION

Candida albicans was the most frequently identified yeast strain, but other species were also described, such as *C. krusei*, *C. glabrata*, *Candida parapsilosis* and *C. tropicalis*. Candidiasis is not lethal and the diagnosis is clinically presumed, based on the pregnant woman's symptoms. Among the clinical manifestations of candidiasis, there are altered discharge, intense itching, dysuria, irritation or burning and pelvic pain. In pregnancy, early diagnosis guides efficient treatment, contributes to the improvement of the prognosis of the pregnant woman and will guarantee therapeutic success.

More research on this topic is suggested in order to expand findings. It is necessary to enhance efforts regarding preventive practices and forms of treatment for vulvovaginal infections caused by the genus *Candida* during the gestational period, minimizing discomforts and complications in pregnant women. 🌱

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