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## Factors Affecting The Success Of Vaginitis Treatment In Pregnant Women; A Prospective Cohort Study

## Gebelerde Vajinit Tedavisinin Başarısını Etkileyen Faktörler; Prospektif Kohort Çalışması

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## ÖZ

**Amaç:** Kadın genital sisteminin anatomisi, fizyolojisi ve florası gebeliğe bağlı hormonal, metabolik, endokrinolojik ve immünojik nedenlerle değişir. Disbiyoz, fetoplasental üniteye asendan veya hematogen yolla enfeksiyonlara neden olarak kronik inflamatuvar süreçlerle spontan erken doğum riskini artırır. Çalışmamızın amacı vajinitli gebelerde vajinite zemin hazırlayan, tedaviye direnç oluşturan ve nükslere neden olan kötü kişisel alışkanlık ve uygulamaları ortaya çıkarmaktır.

**Gereçler ve Yöntem:** Tanımlayıcı çalışmamız etik kurul onayı ile Aralık 2021 - Nisan 2022 tarihleri arasında Kadın Hastalıkları ve Doğum Kliniğine başvuran hasta grubu ile yapılmıştır. Çalışma grubumuz, okuma yazma bilen, işbirlikçi, anketteki tüm soruları yanıtlamaya gönüllü 18 yaş üstü 178 gebeden oluşmaktadır.

**Bulgular:** Katılımcıların %71,9'unda (128 kişi) vajinal duş, %67,4'ünde (120 kişi) iç çamaşırını hiç ütölememekte, %66,9'unda (119 kişi) perineyi arkadan öne doğru temizleme, %41,2'sinde günlük ped kullanımı (73 kişi), %41'inin (73 kişi) sentetik çamaşır kullanımı, %16,3'ünün (29 kişi) genital temizlik ürünü kullanımı, %7,3'ünün (13 kişi) iç çamaşırını elde yıkama, %5,6'sı (10 kişi) sık cinsel ilişki davranışı sergilemiştir. Genital bölge temizliği ile ilgili olarak hastaların %11,2'si (20 kişi) beyaz sirke kullanmayı, %3,4'ü (6 kişi) asidik karışım kullanmayı biliyordu. Katılımcıların %6,7'si (12 kişi) vajinal probiyotik kullanımını biliyordu.

**Sonuç:** Çalışmamızın sonuçları dikkate alındığında özellikle sosyo-ekonomik ve kültürel düzeyi düşük olan kadınlarda genital hijyen konusunda yanlış uygulamaların alışkanlık vasfı kazandığı söylenebilir. Bu doğrultuda kadınların genital hijyenle ilgili uygulamada yaptıkları hatalar ve tekrarlayan enfeksiyon olasılığı nedeniyle önleyici tedbir olarak genital hijyen konusunda eğitime ihtiyaç duydukları sonucuna varılmıştır. Çalışmamız ile kadınlarda genital enfeksiyonların ortaya çıkmasındaki en önemli eksikliğin eğitim eksikliği olduğu sonucu ile birinci basamakta çalışan tüm sağlık profesyonellerinin bunu önlemeye yönelik bir eğitim planı geliştirmeleri önerilmektedir.

## ABSTRACT

**Introduction:** Anatomy, physiology, and flora of the female genital system change due to pregnancy-related hormonal, metabolic, endocrinological, and immunological reasons. Dysbiosis increases the risk of spontaneous preterm birth with chronic inflammatory processes by causing infections in the fetoplacental unit by the ascending or hematogenous route. Our study aimed to reveal the bad personal habits and practices predispose to vaginitis, create resistance to treatment, and cause recurrences in pregnant women with vaginitis.

**Material-Methods:** Our descriptive study was conducted on a group of patients who applied to the Department of Obstetrics and Gynecology, between December 2021 and April 2022, with the ethics committee's approval. Our study group consists of 178 pregnant women over 18 who are literate, cooperative, and volunteered to answer all the questions in the questionnaire.

**Results:** Vaginal douching in 71.9% (128 people) of the participants, not ironing their underwear at all in 67.4% (120 people), cleaning the perineum from back to front in 66.9% (119 people), 61.2% daily pad use in 61.2% (109 people), synthetic laundry use in 41% (73 people), use of genital cleaning products in 16.3% (29 people), hand washing underwear in 7.3% (13 people) and 5.6% (10 people) had frequent sexual intercourse behavior. Regarding genital area cleaning, 11.2% (20 people) of the patients knew about using white vinegar, and 3.4% (6 people) used the acidic mixture. 6.7% (12 people) of the participants knew the use of vaginal probiotics.

**Conclusion:** Considering the results of our study, it can be said that wrong practices regarding genital hygiene continue, especially in women from low socio-economic and cultural levels. In this respect, the women need training on genital hygiene as a preventive measure due to the mistakes they make in practice related to genital hygiene and the possibility of experiencing a genital infection in a significant part of them. In conclusion, considering that the most significant deficiency in the occurrence of genital infections in women is the lack of education, it is recommended that all health professionals develop a training plan to prevent genital infections and apply it to women in the regions they work.

**Keywords:** Vaginitis, probiotics, pregnancy, life modification, recurrence, Treatment failure

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## INTRODUCTION

Vaginitis is a general expression given secondary to infection, inflammation, or changes in the normal vaginal flora in the vagina. The most common underlying pathology is nonspecific vaginitis, with a 40-50% rate. While 20-30% of candidiasis is detected, Trichomoniasis is observed in the remaining patient group<sup>1</sup>. Symptoms include vaginal discharge, odor, itching, burning, dysuria, dyspareunia, and irritation-discomfort. Along with these complaints, vaginitis is among the most common reasons women apply to the gynecology outpatient clinic.

Bacterial vaginosis (BV) is a polymicrobial clinical condition that occurs when anaerobic bacteria in the vaginal tissue replace lactobacilli. Clinical diagnosis can be made with the Nugent microbiological scoring method. The Nugent Score is gram stain scoring system for vaginal swabs to diagnose bacterial vaginosis. The Nugent score is calculated by assessing the decrease in *Lactobacillus* scoring as 0 to 4, *Gardnerella vaginalis* morphotypes scoring as 0 to 4 and *Mobiluncus* spp. morphotypes scoring as 0 to 2. A total score of 7 is consistent with bacterial vaginosis without culture. The Nugent score is not preferred in today's clinical practice because of its time-consuming nature and the necessity of expert microscopist\*.

In addition, the diagnosis can be made by at least three Amsel criteria, including a sticky, milky white appearance in vaginal discharge, pH greater than 4.5, positive Whiff test (amine) with 10% KOH, and 'clue cell' evaluations in microscopic examination<sup>2</sup>.

The community located on the skin and mucous membranes of the human body and creates a critical defense mechanism by preventing the proliferation of pathogenic microorganisms under normal conditions is called flora. Maintaining the vaginal floral balance will prevent infections in the fetomaternal compartment and vaginal infections. It will help in the process of maintaining the pregnancy to a sufficient week.

Anatomy, physiology, and flora of the female genital system change due to pregnancy-related hormonal, metabolic, endocrinological, and immunological reasons<sup>3</sup>. The microbiome, differentiated by these changes during pregnancy, facilitates the emergence of urogenital infections. Dysbiosis increases the risk of spontaneous preterm birth with chronic inflammatory processes by causing infections in the fetoplacental unit by the ascending or hematogenous route. Preterm labor is associated with vaginal dysbiosis<sup>29</sup>.

Repetitive treatment requirement in pregnant patients with vaginitis is due to the restrictions on drug therapy. There are several important factors why we are unable to relieve symptoms in some pregnant women such as frequent sexual activity, systemic disease (such as diabetes mellitus), sexually transmitted diseases, antibiotic use, as well as vaginal douching habits, irritant and wrong personal practices such as the use of allergen products (genital washing products) and hygiene disorders.

The aim of our study was for pregnant women with vaginitis who applied to our obstetrics clinic in Kars province; it is to reveal the bad personal habits and practices that predispose to vaginitis, create resistance to treatment and cause recurrences. With our study, we aim to report our experiences about the

results by conducting a survey that will raise awareness about perineal health.

## MATERIAL AND METHODS

Our descriptive study was conducted on a group of patients who applied to the Department of Obstetrics and Gynecology, between December 2021 and April 2022, with the ethics committee's approval. Our study group consists of 178 pregnant women over 18 years old who are literate, cooperative, and volunteered to answer all the questions in the questionnaire. The questionnaire method was used as a data collection tool. Patients under 18 years old who could not cooperate or had a disease that limited self-care were excluded from the study. In addition, the study did not include patients with severe systemic diseases like cancer or immunodeficiency, a history of immunosuppressive drug use, or those who received prior vaginitis treatment for the last three months. The patients filled out the questionnaire on their own in the waiting room after filling out their informed consent under the physician's supervision after the diagnosis was made and their prescriptions were prepared. With the delivery of the questionnaires, the patient was informed in detail about their wrong attitudes. Our questionnaire consisted of 25 questions in five groups in which socio-demographic characteristics, complaints, risk factors, risky behaviors, and knowledge about treatment practices were questioned. While creating our survey questions in our study, we have benefited from Dalbudak et al (13), Yağmur Y. et al (19), Hacıoğlu N. et al (23), Karaer A. et al (25), and Ünsal A. et al's (27) studies as well as developing the questions in line with our current observations and experiences in our practice.

Our study complies with the Declaration of Helsinki, the principles of Good Clinic Practice, and does not conflict with the ethical rules of the subject research.

Statistical analyzes of the study were carried out in the SPSS 21.0 package program. Categorical variables were represented by number and percentage, and continuous numerical variables were represented by center and prevalence measures such as mean, standard deviation, minimum and maximum values. The conformity of the variables to the normal distribution was checked with Kolmogorov Smirnov and Shapiro Wilk tests. Pearson Chi-square test was used to compare categorical variables between groups. As the statistical significance level, a p-value below 0.05 was accepted as the limit.

## RESULTS

178 pregnant women were included in the study, and the mean age was  $26.13 \pm 4.47$  years.

51.1% (91 people) of the participants were 26 years old, and over, 34.3% (61 people) had primary school or lower education level, and 87.1% (155 people) were not working.

**Table 1.** Socio-demographic characteristics of the patients

|                          | n          | %            |
|--------------------------|------------|--------------|
| <b>Age</b>               |            |              |
| 18-25                    | 87         | 48,9         |
| 26 and above             | 91         | 51,1         |
| <b>Education Status</b>  |            |              |
| Primary school and below | 61         | 34,3         |
| Middle school            | 52         | 29,2         |
| High school              | 58         | 32,6         |
| University               | 7          | 3,9          |
| <b>Working Status</b>    |            |              |
| Working                  | 23         | 12,9         |
| Not working              | 155        | 87,1         |
| <b>Total</b>             | <b>178</b> | <b>100,0</b> |

89.9% (160 persons) of the pregnant women had discharge complaints; this discharge was described as white cheese cut by 58.4% (104 persons). 59.6% of the patients (106 people) had similar complaints before.

There was a systemic disease in 9.6% (17 individuals) of the pregnant women. 39.3% (70 people) of the patients had used antibiotics last month, and 28.1% (50 people) had genital complaints in their spouses.

**Table 2.** Complaints and characteristics of patients

|                                      | n   | %    |
|--------------------------------------|-----|------|
| <b>Complaints</b>                    |     |      |
| Vaginal discharge                    | 160 | 89,9 |
| Itching                              | 118 | 66,3 |
| Combustion                           | 105 | 59,0 |
| Bad smell                            | 100 | 56,2 |
| Dyspareunia                          | 80  | 44,9 |
| <b>Features of vaginal discharge</b> |     |      |
| In the form of cuts of white cheese  | 104 | 58,4 |
| Yellow                               | 46  | 25,8 |
| Transparent                          | 17  | 9,6  |
| Sparkling green                      | 11  | 6,2  |
| <b>Similar complaints before</b>     |     |      |
| Yes                                  | 106 | 59,6 |
| No                                   | 72  | 40,4 |

There was no significant difference between the presence of systemic disease and age, education and employment status of the patient ( $p>0.05$ ). There was no significant difference between antibiotic use of pregnant women education and age, employment status ( $p>0.05$ ).

**Table 3a.** Risk factors in patients

|                                 | n  | %    |
|---------------------------------|----|------|
| Systemic disease                | 17 | 9,6  |
| Antibiotic use                  | 70 | 39,3 |
| The genital complaint in spouse | 50 | 28,1 |

Regarding genital area cleaning, 11.2% (20 people) of the patients knew about using white vinegar, and 3.4% (6 people) used the acidic mixture. 6.7% (12 people) of the participants knew the use of vaginal probiotics.

A significant difference was found between the education status of the patients and the behavior of not using any iron ( $p=0.003$ ). It was determined that the non-ironing behavior of those with high school or higher education was lower than the other groups.

A significant difference was found between the working status of the pregnant women and the behaviors of cleaning the perineum from back to front and using daily pads ( $p=0.028$ ) ( $p=0.005$ ). While cleaning the perineum from the back to the front was more common in the working group, daily pad use was more in the non-working group.

A significant difference was found between the age groups of the participants and the behavior of using genital cleaning products and washing underwear by hand ( $p=0.036$ ) ( $p=0.001$ ). While the behavior of using genital cleaning products is higher in the group aged 26 and over, the behavior of washing underwear by hand is lower than the other group.

## DISCUSSION

Every year, approximately one million women worldwide are exposed to urogenital tract infections such as non-sexually transmitted urinary tract infections and bacterial vaginosis, and at least 75% of women have a history of genital infection 4. The most common clinical form of genital tract infections in women is vulvovaginitis. Vaginal discharge is the most common reason for women to apply to gynecology outpatient clinics, and almost all women face discharge from time to time throughout their lives 5 6 7. Vaginitis, an inflammation of the vagina, is characterized by a foul odor, burning, painful sexual intercourse, dysuria, and itching, most commonly causing vaginal discharge 5. Vaginal infections; cause problems such as negative body image effects, increased vaginal symptoms or odor, fear of sexually transmitted disease or cancer, avoidance of sexual activity due to pain, physical exhaustion, and psychological problems. At the same time, it causes economic loss, time, and loss of workforce 5 7 8. Patients may be isolated from society, their self-confidence may decrease, and their social and quality of life may be adversely affected.

During pregnancy, especially in the early stages, the vaginal microbiome changes. Shifts in Lactobacillus subtypes can only stabilize the vaginal microbiome. The immune system of the pregnant is weakened to prevent the rejection of the fetus. However, the abundance of lactobacilli, especially in early pregnancy, will cause an increase in acidic secretions, which is a natural barrier against pathogenic microorganisms, with low vaginal Ph. while lactobacilli diversity increases in the following

weeks of gestation and postpartum, a numerical return to the baseline and enrichment of other bacterial associations will be observed.

Bacteria have been shown to cross intact maternal-fetal membranes in pregnant women and isolated in the amniotic fluid and placenta of healthy pregnant women 9. Studies have suggested that genital system dysbiosis results from asymptomatic infections such as chronic endometritis before pregnancy, and some obstetric and neonatal complications are associated with maternal reproductive system dysbiosis 10 11.

Dysbiosis or microbiome changes can be caused by many physiological and pathological conditions, diet, weight gain, hormonal environment, and environmental conditions 3. Immunological, endocrinological, and metabolic changes can thus cause significant changes in the microbiome 12, and in this way, it can cause infections in the fetoplacental unit by the ascending or hematogenous route. The low virulence infection state here may initiate chronic inflammatory processes that may cause adverse maternal or neonatal outcomes. Although it should be sterile, the isolation of microorganisms in the amniotic fluid or placenta of women who gave birth preterm excludes the concept of 'contamination is unlikely.'

While the most common factors among the reasons why vaginitis symptoms cannot be alleviated are misdiagnoses and re-contamination with frequent sexual intercourse, non-sexual relapses such as immune depression, drug resistance, and bad personal habits can be observed.

Incorrect and inadequate genital hygiene practices increase the risk of vaginal infection. During pregnancy, people often make treatment difficult, delay or cause disease recurrence with wrong personal attitudes. Despite successful antibiotic treatments today, it is clear that these bad personal habits will reduce the effectiveness of the treatment applied.

Dalbudak et al. 13 reported that some wrong and inadequate genital hygiene behaviors, such as vaginal douching, increase the risk of vaginal infection. Researchers have stated that the most critical risk factor for bacterial vaginosis is vaginal douching for cleansing 14, 15. In our country, 16, 17, 18, 19, 20, and abroad, 15,21,22 studies have shown that vaginal douching is widespread among women. Studies have shown that women who douche have a higher rate of genital tract infections than those who do not 18,23. In the study of Nansel et al. 24, it was reported that the incidence of bacterial vaginosis is 1.80 times higher in women who douche more than once a week. In Karaer et al. 25's study, it has been reported that approximately 60% of the participants do vaginal douching, and more than 90% apply this application weekly or more frequently. In their study, Karaer et al. 25 reported that vaginal douching is a strong etiological reason for preterm labor, and it was noted that it might cause many secondary effects such as pelvic inflammatory disease, ectopic pregnancy, and sexually transmitted diseases, as well as causing an increase in the risk of BV.

Considering the hygiene behaviors of the participants in our study, we found vaginal douching habits in 71.9% of them. Although the result we obtained supports the literature, considering the socio-demographic characteristics of Kars province, we have determined that although it is compatible with the education level and socio-economic level, it is higher than the literature data rates.

Dalbudak et al. 13 reported daily pad use at 52% in the case group and 45% in the control group. In addition, it was determined that women who use daily pads have a 1.3 times higher risk of getting a vaginal infection than those who do not ( $p>0.05$ ). In the study of Patel et al. 26, two times more in women who use daily pads, in the study of Kisa and Taşkın 18, it is stated that the risk of getting a vaginal infection is 2.34 times more in those who use daily pads. In her study of Flood, she said that about half of the women use daily pads and emphasized that this issue should be noted. In our study, we interpreted the fact that we determined the rate of using daily pads as 61.2%, which is higher than the literature, as the more widespread use of social media and advertising tools, making it accessible to more people and making daily pads attractive with marketing techniques such as using smart slogans as 'organic products'. We attributed the use rate of genital cleansing products to 16.3%, contrary to daily pads, to the fact that these products were not popular enough and did not find enough space in the advertising sector.

Karatay et al. 16 determined that 79.2% used cotton underwear, and the remaining 15.5% used synthetic underwear. Synthetic underwear keeps the perineal area moist, increasing the possibility of genital infection. With the introduction of technology into homes, the frequency of washing clothes with washing machines at high temperatures has increased. Although the studies do not make enough determinations about the underwear choices of the patients and the underwear cleaning methods, they agree that the underwear selection and the ways of cleaning the laundry are factors in the development of vaginal infections. In our study, the rate of using synthetic underwear was determined as 41% with our survey questions, and 7.3% of the participants stated that they washed their underwear by hand, while 67.4% indicated that they used underwear without ironing.

Karatay et al. 16 also found that 36.9% of the participants cleaned the genital area from front to back, and the vast majority did this inaccurately. When the genital area is cleaned from back to front rather than from front to back, or when it is cleaned randomly, microorganisms such as E.coli are transported from the anal region to the vagina and urethra, causing infections. In our study results, this rate was much higher with 66.9% compared to Karatay et al.

Yagmur et al. 19 applied a questionnaire to 914 pregnant women in their study to reveal the relationship between genital hygiene and practices of pregnant women and genital tract infections. While 57.2% of the participants took a vaginal shower every other day, 48.1% achieved results by changing their underwear every other day. They determined that there were inadequacies and mistakes in pregnant women's hygiene habits in developing genital infections, which they defined as 17.4% in their study. As a result, it was emphasized that the attention of health personnel working in primary health care institutions and women's health and obstetrics units should be drawn to this issue. They also pointed out that health professionals should inform women about the importance of hygiene during preconception or pregnancy and the negative situations that may arise from lack of hygiene.

One of the most important components of preventive health services is health education given to women. Prevention of genital tract infections and early diagnosis and treatment are pos-

sible with planned and effective health education. In the study of Ünsal et al. 27, it was determined that 40.1% of women had received information about genital hygiene before, while 59.9% of them did not. Karatay et al. 16, in their studies, stated that only 13.2% of women received information about genital hygiene. These results show that the rate of informing women about protection from genital tract infections, genital hygiene, and what to do in case of genital tract infection is low in our country.

It has been revealed that the wrong and inadequate genital hygiene behaviors of women who do not receive adequate information increase the risk of vaginal infection. In our study, the knowledge levels of pregnant women about protective behaviors and attitudes were found to be low in line with the literature. Those who knew about white vinegar were 11.2%, and those who knew about vaginal probiotics were 6.7%. When genital infections are not treated, they can progress and cause pelvic inflammatory disease and even female genital organ cancers, affecting women's fertility. At the same time, it negatively affects women's sexual and family life, reducing their quality of life 28. From these perspectives, knowing the risk factors that cause genital infections in women is crucial.

The factors that cause genital infection in women are very diverse; Since these risks can be partially controlled with personal practices, personal factors gain more importance when we look at the dangers individually in terms of genital infection. It is seen that there are risks such as lack of hygiene, improper cleaning of the genital area after the toilet, lack of hand washing habits, not using appropriate underwear, and not paying enough attention to menstrual hygiene 18. It is clear that women need education on this subject, but health care providers often neglect this education.

In the literature review, changing underwear every day, wearing cotton underwear, changing pads frequently enough during periods when the amount of bleeding is low and heavy during menstruation, not using daily pads, avoiding vaginal douche, carefully monitoring the genital area for signs of disease, paying attention to genital hygiene is commonly suggested. Among the common suggestions of all literature reviews; are providing education and counseling to women on these issues, having information brochures prepared on correct genital hygiene practices and protection from genital infections for every woman who applies to health institutions, and supporting women with audio-visual means on the subjects they are conscious of, and informing them about their inadequacy.

Vaginitis is the most frequently detected disease among obstetrics outpatient clinic applications, and its recurrences can force the physicians. The medical treatment agents which can be used in pregnant women are limited. Although pregnancy is predisposed to vaginitis, it may accompany pregnancy complications if not treated. Maintaining the vaginal floral balance will prevent infections in the fetomaternal compartment as well as vaginal infections and will help in the process of maintaining the pregnancy to a sufficient week.

Genital hygiene is the most crucial step in preventing genital infections. In addition to the limited prescription treatments, especially in recurrent cases, genital cleansing with white vinegar instead of vaginal douching, recommending mixtures prepared with acidic fruit juices into fermented yogurt cost-effectively provide the acidic pH and flora of the vagina, or promoting the use

of oral/vaginal probiotics. We foresee that it will be helpful.

Patients should be advised to use cotton underwear instead of synthetic underwear, to wash their clothes separately from the underwear of the people they live within a high temperature and washing machine, to dry the washed laundry in a home environment, and to wear it by ironing, not to remove clean the pubic hair thoroughly, that the genital hair is necessary for the health of the genital area. We have a prediction that not wearing underwear at some time intervals during the day will be beneficial for it will provide aeration, reduce humidity, the patients' complaints will decrease, recurrence rates will decrease, and positive results can be obtained without the need for serious medical treatments.

Not preferring genital cleaning products, avoiding vaginal douching, avoiding alkaline soap-like cleaning products, choosing the right and correct perineal cleaning methods, and avoiding daily pads are among the suggestions that we believe will yield successful results. In order to support our claim, comparing the results of randomized controlled studies with known and accepted treatment methods and the recommendations we mentioned may be the subject of future studies.

## CONCLUSION

Despite the limited number of patients, we believe that our study will help with the general hygiene understanding of the population, the determination of the general mistakes accepted as accurate in their daily lives, and the factors that can increase the success of treatment in a clinic, as well as emphasizing the importance of primary care preventive medicine studies.

Limitations of medical treatment in pregnant patients can cause repetitive infections that can be hard to take under control. So, as a result, correcting the wrong personal practices and hygiene habits can help prevent such genital infections disease and facilitate treatment.

Considering the results of our study, wrong attitudes regarding genital hygiene appear to be common, especially in women from low socio-economic and cultural levels. In this respect, it has been concluded that women need training on genital hygiene as a preventive measure due to the mistakes they make in daily practice related to genital hygiene and the possibility of experiencing a genital infection in a significant part of them.

At the end of this study, considering that the most significant deficiency in the occurrence of genital infections in women is the lack of education, it is recommended that all health professionals, especially the ones working in primary care, should develop a training plan to prevent genital infections and apply it to women in the regions they work. Hoping our study will contribute to the literature, we believe that studies on feedback on life, behavior, and attitude changes in forwarding planning will complement the existing literature.

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