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SYMPTOMS OF ANXIETY AND DEPRESSION IN SUSPECTED/CONFIRMED CASES OF COVID-19 IN PREGNANT AND PUERPERAL WOMEN

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ABSTRACT

This study aimed to estimate the occurrence of signs and symptoms of anxiety and depression in women with confirmed and/or suspected diagnosis of COVID-19 and the associated sociodemographic and clinical characteristics. This is a cross-sectional study conducted on 49 women admitted to a reference maternity hospital in Fortaleza, state of Ceará, Brazil between May and June 2020. Two instruments were applied: a sociodemographic questionnaire and the anxiety and depression scale. It was estimated that 28.57% of women had symptoms of anxiety and 38.77% had symptoms of depression. There was a statistically significant association regarding the presence of anxiety in cases in which the patient had dyspnea (p=0.037; odds ratio=2.85; CI=0.76-14.55), anosmia (p=0.039; odds ratio=3.25; CI=0.75-24.80), and myalgia (p=0.024; odds ratio=5.02; CI=0.86-130.70). It is concluded that women are exposed to symptoms of anxiety and depression, with depression symptoms being more prevalent in pregnant women. Conversely, anxiety was related to women having symptoms such as dyspnea, anosmia, and myalgia.

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INTRODUCTION

Coronaviruses belong to a family of viruses that can cause symptoms ranging from a common cold to more severe respiratory, enteric, liver, and neurological symptoms such as pneumonia, fever, breathing difficulties, and lung infection. The World Health Organization (WHO) used the term "COVID-19" to refer to the New Coronavirus Disease 2019, a type of coronavirus that affects the lower respiratory tract of patients with pneumonia, being declared a public health emergency of international interest and pandemic character (Adhikari *et al*., 2020). In Brazil, 4,123,000 cases of COVID-19 were confirmed until September 5, 2020, with 126,203 deaths and a mortality coefficient of 600 deaths/1 million inhabitants (Ministério da Saúde, 2020). In the state of Ceará, by mid-September, 694,241 cases were confirmed, with a total of 8,689 deaths and a case fatality rate of 3.8, with Fortaleza being the city with the largest number of confirmed cases (47,880) (Secretaria da Saúde do Estado do Ceará, 2020). The current pandemic is exerting numerous economic, social, and psychological impacts. Widespread outbreaks of infectious diseases, such as COVID-19, are associated with greater psychological distress. Among other factors, this fact is due to the widely disseminated information, sometimes in an appealing way, by the media, such as television, Internet, radio and newspapers, causing panic, anger, fear of contamination, prognosis, and death in the population (Lei *et al*., 2020). Therefore, the fear of the unknown and the uncertainties caused by possible contamination can lead to the development of mental disorders, especially anxiety and depression (Ozamiz-Etxebarria *et al*., 2020; Rajkumar, 2020). Pregnant and puerperal women are among the groups susceptible to emotional changes during the pandemic. Physiologically, this period of the reproductive cycle is characterized by hormonal imbalances and mood swings that generate feelings of fear, anxiety, and insecurity. In addition, there is the fear of being contaminated by the virus and of having some aggravation in relation to pregnancy. This is explained by fear itself, which is an emotional response to a real or perceived threat, unlike anxiety, which behaves as an anticipation of a future threat such as undergoing treatment for COVID-19 infection, risk of preterm labor, and possible infection of the newborn with the virus (Almeida *et al*., 2020). Thus, perceiving how stress and anxiety occur between pregnant and puerperal women during the period of confrontation of the COVID-19 pandemic will allow outlining strategies for preventing and coping with the appearance of psychological distress, providing the nursing team with support for direct action and excellence in the field of mental health from the gestational period to puerperium, interfering in the specificities experienced in the face of this pandemic. The aim of the present study is to estimate the prevalence of signs and symptoms of anxiety and depression in pregnant and puerperal women with

confirmed and/or suspected diagnosis of COVID-19 and the associated sociodemographic and clinical characteristics.

MATERIALS AND METHODS

This research was approved by the Research Ethics Committee of Universidade Federal do Ceará.

Study design, period, and location: This is a cross-sectional study, conducted from May to June 2020, in a reference maternity hospital in Fortaleza, State of Ceará, Brazil. The guidelines for Observational Studies in Epidemiology (STROBE) were observed (Malta *et al*., 2010).

Sample, inclusion and exclusion criteria: The sample consisted of 49 women, being 16 pregnant and 33 puerperal. For the selection of participants, the convenience sampling technique was used, in which participants were invited to participate in the study as they were admitted to the hospital for health follow-up. The inclusion criteria were: women, aged 18 years or older, admitted to the maternity hospital, with suspected or confirmed diagnosis of COVID-19. People imprisoned in prisons and shelter homes and those with any cognitive impairment that prevented data collection were excluded.

Measures: Data collection took place through interviews in a private environment, with an average duration of 40 minutes. Two instruments were used: the Sociodemographic and Clinical Form and the Hospital Anxiety and Depression Scale (HAD) (Malta *et al*., 2010). The Sociodemographic and Clinical Form comprised the following variables: age, skin color, education level, marital status, sexual orientation, living or not with a partner, religion, occupational status, monthly family income, use of alcohol and illicit drugs, comorbidities, history of sexual and reproductive health, hygiene habits, in addition to data related to illness due to COVID-19 such as symptoms, diagnostic tests, complications of hospitalization, and adopted treatment. HAD is an instrument adapted to the Brazilian population, composed of 14 items, which assesses signs and symptoms of anxiety and depression individually and jointly, with half of the items related to anxiety and the other half, to depression. The scale has four answer options, in such a way that participants must choose the one that corresponds to the way they felt in the previous week. Each item of the instrument is evaluated on a Likert scale that ranges from 0 to 3, allowing a score spectrum from 0 to 21, in each subscale (Botega *et al*., 1995). The HAD scale was used as the outcome variable, with its subdivisions: anxiety and depression. Each of the subscales was transformed into a specific outcome considering eight as the cutoff point, i.e., values ≥8 were deemed as having anxiety or depression (Pais-Ribeiro *et al*., 2018).

Data analysis: For data analysis, description of the nominal variables was performed by means of simple and relative frequencies, and for numerical variables, the median and interquartile range were presented. Then, the predictor variables were compared with the presence or absence of depression or anxiety using the Chi-square test (for nominal variables) and the Wilcoxon test (for numerical variables), considering $p<0.05$ as significant.

RESULTS

Regarding the anxiety scale, a prevalence of 28.57% was estimated. As for sociodemographic variables, we observed a median age of 25 years (IQR75: 23-29); among pregnant women, 37.5% presented symptoms of anxiety; among puerperal women, 24.2% presented such symptoms; 81.6% were from Fortaleza, 67.3% self-reported being mixed-race, with a median of 11 years of education, and 69.4% were married. These women lived with a median of four people, 93.4% of the houses had a piped water system, 85.7% had a sewage system, and 87.8% had air intake. None of the sociodemographic variables showed difference regarding the presence of anxiety (Table 1). Concerning clinical characteristics, 12.2% of women reported some complication related to the gestational/puerperal condition (among which: Continuous use of vasoactive drugs, Transfusion, Ventilatory support, Intubation, Dialysis, Cerebral Vascular Accident [CVA], Heart attack, Cardiac arrest, Admission to the ICU, Sepsis or severe infection, Pulmonary embolism, Severe bleeding, and Asthma) and 38.8% presented history of pre-existing conditions (Hypertension, Diabetes, Arthrosis, Heart, Renal, Vascular, or Hematological disease, and Obesity).

Table 1. Association between sociodemographic characteristics and the occurrence of anxiety

		ANXIETY		
	Total (%)	Yes (%)	No (%)	P
Age (median)	25 (23-29)	25.5 (23-29)	25 (23-30)	0.894
Condition				0.335
Pregnant	16 (32.6)	6 (37.5)	10 (62.5)	
Puerperal	33 (67.4)	8 (24.2)	25 (75.8)	
Place of origin				
Fortaleza	40 (81.6)	11 (27.5)	29 (72.5)	0.276
Metropolitan region	6 (12.2)	3 (50.0)	3 (50.0)	
Countryside of the state	3 (6.1)	0 (0.0)	3 (100.0)	
Ethnicity/Skin color				0.712
White	9 (18.4)	3 (33.3)	6 (66.7)	
Black	4 (8.2)	1 (25.0)	3 (75.0)	
Asian	3 (6.1)	0 (0.0)	3 (100.0)	
Mixed-race	33 (67.3)	10 (30.3)	23 (69.7)	
Education level (median)	11 (10-12)	12 (11-12)	11 (9-12)	0.229
Marital status				0.758
Single	13 (26.5)	4 (30.8)	9 (69.2)	
Married	34 (69.4)	9 (26.5)	25 (73.5)	
Divorced	2 (4.1)	1 (50.0)	1 (50.0)	
Religion				0.3
Catholic	23 (47.0)	9 (39.1)	14 (60.9)	
Evangelical	19 (38.8)	3 (15.8)	16 (84.2)	
Other	1 (2.0)	0 (0.0)	1 (100.0)	
No religion	6 (12.2)	2 (33.3)	4 (66.7)	
Occupation				0.235
Employed	12 (24.5)	3 (25.0)	9 (75.0)	
Unemployed	34 (69.5)	9 (26.5)	25 (73.5)	
Retired	1 (2.0)	1 (100.0)	0 (0.0)	
Absent	1 (2.0)	1 (100.0)	0 (0.0)	
Other	1 (2.0)	0 (0.0)	1 (100.0)	
No. of people in the household (median)	4 (3-5)	3 (2-4)	4 (3-5)	0.078
Piped water				0.192
Yes	46 (93.9)	13 (28.3)	33 (71.7)	
No	2 (4.1)	0 (0.0)	2 (100.0)	
Other	1 (2.0)	1 (100.0)	0 (0.0)	
Sewage system				0.081
Yes	42 (85.7)	13 (31.0)	29 (69.0)	
No	6 (12.3)	0 (0.0)	6 (100.0)	
Other	1 (2.0)	1 (100.0)	0 (0.0)	
House with air intake				0.491
Yes	43 (87.8)	13 (30.2)	30 (69.8)	
No	6 (12.2)	1 (16.7)	5 (83.3)	
Income (median)	1045 (1045-2090)	1272.5 (1000-2090)	1045 (1045-2090)	0.777

As for the number of children, we observed a median of one child among women who had anxiety (IQR: 0-2) and two children among those without anxiety (IQR: 1-3), with p=0.045. Regarding the use of legal drugs, 28.6% of women reported using alcohol; 8.2%, tobacco; and 8.5%, illicit drugs. As for diagnostic tests, 70.5% of patients underwent a nasal swab test, with 78.1% of them testing positive. A total of 20.4% of women underwent the rapid test, with a positive result for COVID-19 in 12.2%. There was no significant association between variables related to diagnostic tests and the presence of anxiety. Regarding the presented symptoms, we verified a higher prevalence of fever (75.5%), cough (67.3%), and dyspnea (44.9%). There was a statistically significant association regarding the presence of anxiety in cases in which the patient had dyspnea (p=0.037; odds ratio=2.85; CI=0.76-14.55), anosmia (p=0.039; odds ratio=3.25; CI=0.75-24.80), and myalgia (p=0.024; odds ratio=5.02; CI=0.86-130.70) (Table 2). Finally, in relation to treatment for COVID-19, we identified that 28.6% of the participants only underwent clinical follow-up and observation of their evolution.

Table 2. Association between symptoms and the occurrence of anxiety

	ANXIETY			
	Total (%)	Yes (%)	No (%)	P
Cough				0.773
Yes	33 (67.3)	9 (27.3)	24 (73.7)	
No	16 (32.7)	5 (31.2)	11 (68.8)	
Fever				0.060
Yes	37 (75.5)	8 (21.6)	29 (78.4)	
No	12 (24.5)	6 (50.0)	6 (50.0)	
Dyspnea				0.037
Yes	22 (44.9)	3 (13.6)	19 (86.4)	
No	27 (55.1)	11 (40.7)	16 (59.3)	
Vomit				0.115
Yes	19 (38.8)	3 (15.8)	16 (84.2)	
No	30 (61.2)	11 (36.7)	19 (63.3)	
Diarrhea				0.199
Yes	9 (18.4)	1 (11.1)	8 (88.9)	
No	40 (81.6)	13 (32.5)	27 (67.5)	
Anosmia				0.039
Yes	18 (36.7)	2 (11.1)	16 (88.9)	
No	31 (63.3)	12 (38.7)	19 (61.3)	
Ageusia				0.058
Yes	17 (34.7)	2 (11.8)	15 (88.2)	
No	32 (65.3)	12 (37.5)	20 (62.5)	
Odynophagia				0.911
Yes	10 (20.4)	3 (30.0)	7 (70.0)	
No	39 (79.6)	11 (28.2)	28 (71.8)	
Nasal discharge				0.386
Yes	11 (22.4)	2 (18.2)	9 (81.8)	
No	38 (77.6)	12 (31.6)	26 (68.4)	
Myalgia				0.024
Yes	15 (30.6)	1 (6.7)	14 (93.3)	
No	34 (69.4)	13 (38.2)	21 (61.8)	
Headache				0.308
Yes	19 (38.8)	7 (36.8)	12 (63.2)	
No	30 (61.2)	7 (23.3)	23 (76.7)	
Others				0.851
Yes	3 (6.1)	1 (33.3)	2 (66.7)	
No	46 (93.9)	13 (28.3)	33 (71.7)	

As for drug treatment, oseltamivir (47%), azithromycin (42.9%), and clexane (40.8%) outstood among the most used medications. Noteworthily, 10.3% of the participants reported some adverse effect associated with the use of these drugs. We observed no statistically significant association in any type of treatment with the presence of anxiety. Concerning the depression scale, a prevalence of 38.77% was estimated. As for sociodemographic variables, we found a median age of 25 years (IQR75: 23-29); among pregnant women, 62.5% presented symptoms of depression; among puerperal women, 27.3% presented such symptoms; 81.6% were from Fortaleza, 67.3% self-reported being mixed-race, with a median of 11 years of education, and 69.4% were married. These women lived with a median of four people, 93.4% of the houses had a piped water system and 85.7% had a sewage system. Regarding the association between sociodemographic characteristics and the occurrence of depression, we found a significant difference in cases of depression regarding the obstetric condition: 62.5% pregnant women vs. 27.3% puerperal women (p=0.018; odds ratio=0.44; CI=0.14-1.32) (Table 3). Concerning clinical characteristics, 12.2% of women reported some complication related to the gestational/puerperal condition (among which: Continuous use of vasoactive drugs, Transfusion, Ventilatory support, Intubation, Dialysis, Cerebral Vascular Accident [CVA], Heart attack, Cardiac arrest, Admission to the ICU, Sepsis or severe infection, Pulmonary embolism, Severe bleeding, and Asthma) and 38.8% presented history of pre-existing conditions (Hypertension, Diabetes, Arthrosis, Heart, Renal, Vascular, or Hematological disease, and Obesity). As for the number of children, we observed that women who had depression had a median of one child (IQR: 0-2); and those without depression, two children (IQR: 1-3). Regarding the use of legal drugs, 28.6% of women reported using alcohol; 8.2%, tobacco; and 8.5%, illicit drugs. As for diagnostic tests, 70.5% of patients underwent a nasal swab test for the diagnosis of COVID-19, with 78.1% testing positive. Conversely, 20.4% women underwent the rapid test, with a positive result for COVID-19 in 12.2% of cases.

Table 3. Sociodemographic characteristics

	DEPRESSION			
	Total (%)	Yes (%)	No (%)	P
Age (median)	25 (23-29)	27 (23-30)	25 (23-29)	0.703
Condition				0.018
Pregnant	16 (32.6)	10 (62.5)	6 (37.5)	
Puerperal	33 (67.4)	9 (27.3)	24 (72.7)	
Place of origin				0.164
Fortaleza	40 (81.6)	13 (32.5)	27 (67.5)	
Metropolitan region	6 (12.2)	4 (66.7)	2 (33.3)	
Countryside of the state	3 (6.1)	2 (66.7)	1 (33.3)	
Ethnicity/Skin color				0.426
White	9 (18.4)	4 (44.4)	5 (55.6)	
Black	4 (8.2)	3 (75.0)	1 (25.0)	
Asian	3 (6.1)	1 (33.3)	2 (66.7)	
Mixed-race	33 (67.3)	11 (33.3)	22 (66.7)	
Education level (median)	11 (10-12)	11 (10-12)	11.5 (9-12)	0.603
Marital status				0.123
Single	13 (26.5)	8 (61.5)	5 (38.5)	
Married	34 (69.4)	10 (29.4)	24 (70.6)	
Divorced	2 (4.1)	1 (50.0)	1 (50.0)	
Religion				0.256
Catholic	23 (47.0)	6 (26.1)	17 (73.9)	
Evangelical	19 (38.8)	9 (47.4)	10 (52.6)	
Other	1 (2.0)	1 (100.0)	0 (0.0)	
No religion	6 (12.2)	3 (50.0)	3 (50.0)	
Occupation				0.154
Employed	12 (24.5)	2 (16.7)	10 (93.3)	
Unemployed	34 (69.5)	15 (44.1)	19 (55.9)	
Retired	1 (2.0)	1 (100.0)	0 (0.0)	
Absent	1 (2.0)	1 (100.0)	0 (0.0)	
Other	1 (2.0)	0 (0.0)	1 (100.0)	
No. of people in the household (median)	4 (3-5)	3 (2-5)	4 (3-5)	0.217
Piped water				0.481
Yes	46 (93.9)	17 (37.0)	29 (63.0)	
No	2 (4.1)	1 (50.0)	1 (50.0)	
Other	1 (2.0)	1 (0.0)	0 (0.0)	
Sewage system				0.131
Yes	42 (85.7)	14 (33.3)	28 (66.7)	
No	6 (12.3)	4 (66.7)	2 (33.3)	
Other	1 (2.0)	1 (100.0)	0 (0.0)	
House with air intake				
Yes	43 (87.8)	19 (44.2)	24 (55.8)	0.037
No	6 (12.2)	0 (0.0)	6 (100.0)	
Income (median)	1045(1045 -2090)	1045 (480-1500)	1272(1045-2090)	0.08

None of the results showed a significant association with the occurrence of depression. Concerning the presented symptoms, we verified a higher prevalence of fever (75.5%), cough (67.3%), and dyspnea (44.9%). None of the symptoms were associated with the presence of depression. Finally, in relation to treatment for COVID-19, we identified that 28.6% of the participants only underwent clinical follow-up and observation of their evolution. As for drug treatment, oseltamivir (47%), azithromycin (42.9%), and clexane (40.8%) outstood among the most used medications. Noteworthily, 10.3% of the participants reported some adverse effect associated with the use of these drugs. No treatment options showed a statistically significant association with depression.

DISCUSSION

The prevalence rates of anxiety and depression were approximately 28.57% and 38.77%, respectively. In a study conducted in China, the values were lower; the authors identified that 13.8% were considered to have mild depression; 12.2%, moderate depression; and 4.3%, severe and extremely severe depression. For the anxiety subscale, 7.5% were considered to be suffering from mild anxiety; 20.4%, moderate anxiety; and 8.4%, severe and extremely severe anxiety (Wang *et al*., 2020). The identified values were lower than those found in other situations of public health emergencies. For instance, 39% of people expressed anxiety about the bird flu in France (Saadatian-Elahi *et al*., 2010); 48% of the general public experienced symptoms of anxiety and depression after more than a year of the Ebola virus outbreak in Sierra Leone (Jalloh *et al*., 2018); 73% of individuals were in a bad mood and 57% had irritability during the outbreak of Severe Acute Respiratory Syndrome (SARS) in Hong Kong (Lee *et al*., 2005). As for depression, our study showed a prevalence rate of 38.77%. A study carried out in Bosnia–

Herzegovina found that the profile of most respondents with moderate to severe depressive symptoms were women (n=291, 85.3%), single (n=235, 68.9%), students (n=181, 53.1%), and residents of urban areas (n=290, 85.0%) (Šljivo *et al*., 2020). The rapid sharing of information about the epidemic stands out, increasing the population's panic (Ho *et al*., 2020). Moreover, it is observed that the level of education, with an adequate cognitive level concerning the knowledge of the disease in the face of an epidemic crisis (Saadatian-Elahi*et al*., 2010; Song &Karako, 2020)can also be a possibility. It is worth mentioning that psychological support by the interdisciplinary team contributes to alleviate these negative emotions. In addition, we observed that, although none of the sociodemographic variables showed differences regarding the presence of anxiety and depression, most women had more than 11 years of education. According to the literature, lower family income, lower education level, and marital status are associated with higher levels of anxiety and depression (Lei *et al*., 2020). Furthermore, in relation to clinical characteristics, women reported some complication or history of pre-existing conditions. This fact corroborates the study conducted by Chen *et al*. (2020), who stated that poor health condition is associated with a high level of anxiety and depression during the COVID-19 epidemic. Impaired health increases the likelihood of someone being infected with the virus and can result in symptoms such as fever, cough, and dyspnea (Song &Karako, 2020).

Thus, being part of the risk group for the new coronavirus, i.e., being pregnant, aged over 60 years, or having pre-existing diseases, such as diabetes and heart disease, means a greater risk of suffering psychological impact during the pandemic. The main symptoms identified in COVID-19 infection are fever, cough, and odynophagia; others are less common, such as anosmia and ageusia; and more severe symptoms such as SARS (Iser *et al*., 2020). In our study, some symptoms, such as dyspnea, anosmia, and myalgia, were related to a greater presence of anxiety in women. This may be related to the fear of the severity of the case, as dyspnea is present in more severe cases and anosmia is not one of the most common symptoms of the infection, causing concern in the patients. Regarding the postpartum period, a study carried out in Japan at the beginning of the pandemic states that pregnant women and puerperal women can be considered groups that are more vulnerable to psychiatric disorders such as anxiety and depression. This fact is evidenced by the worsening of depression symptoms about 3 to 4 months after delivery. In addition, the limitations imposed by coping with the virus can increase maternal mental disorders (Suzuki, 2020). Another factor of great impact experienced by women in the postpartum period is the mother/infant separation, which can imply a loss of early bonding, directly interfering with breastfeeding, factors that generate additional stress in the postpartum period (Poon *et al*., 2020).

Another issue worth discussing is that the rate of infection by COVID-19 was higher in pregnant women (62.5%) than in puerperal women (27.3%). There are few studies showing the impact of COVID-19 on maternal, fetal, and placental outcomes. Hence, it is still unknown why this rate is more prevalent in pregnant women than in puerperal ones, and further investigations should be conducted regarding possible intrauterine transmissions and the reason for pregnant women being more severely affected by the virus (Gonçalves, 2020). Among limitations of our study, we highlight the reduced number of participants, a fact that can be justified by the characteristics of the studied population, pregnant and puerperal women, considering that the maternity hospital is a reference in the state for complications in the gestational/puerperal condition and not for direct and specific assistance to COVID-19 cases. The cases identified in the study were due to the presence of flu-like symptoms during hospitalization. Another limitation was the period of data collection, in which the signs and symptoms were still being studied and screened to characterize the virus infection and there was a need to disseminate the findings of this health emergency. This finding may have contributed to the difficulty in associating the study variables with symptoms of anxiety and depression. Our study is very important for the area of public health because COVID-19 is a new infection with worldwide repercussions in different areas: political, social, economic, and psychological. In addition, there is lack of studies that assess the psychological condition of puerperal and pregnant women in the face of the SARS-COVID-19 pandemic. Moreover, it is a differentiated and vulnerable population that requires specific care and treatment. Thus, our findings will support health managers to better manage the cases of this population. Therefore, we suggest for future studies to be carried out on other profiles of women, in such a way that similarities and differences can be compared and their results may corroborate to highlight the specificities experienced by pregnant and puerperal women in facing COVID-19. We also recommend to apply the scale to pregnant and puerperal women who have already been treated and cured. This will enable to perceive the influence of the contamination uncertainty on the symptoms of anxiety and depression.

Conclusions

Taking this into consideration, we observed a 28.57% prevalence of anxiety among women with a median of one child and alcohol consumption. In addition, we verified a statistically significant association regarding the presence of anxiety and the presence of symptoms such as dyspnea, anosmia, and myalgia. Conversely, in relation to depression, a prevalence of 38.77% was estimated, with significantly different cases of depression between pregnant and puerperal women. Sociodemographic characteristics were predominantly similar in relation to anxiety and depression, for which the median age was 25 years, most women were from Fortaleza, self-reported to be mixed-race, and were married.

Conflict of interest: The authors report no conflicts of interest.

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