REVISTA DE ENFERMAGEM REFERÊNCIA
homepage: https://rr.esenfc.pt/rr/
ISSNe: 2182.2883

RESEARCH ARTICLE (ORIGINAL)

Preoperative nursing education: Impact on surgical patients' anxiety

Ensino pré-operatório de enfermagem: Impacto na ansiedade da pessoa submetida a cirurgia

Enseñanza preoperatoria de enfermería: Impacto en la ansiedad de las personas sometidas a cirugía

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Received: 16.10.23
Accepted: 22.05.24

Abstract
Background: Having to undergo surgery can cause anxiety. Nurses can play a leading role in improving health outcomes by implementing preoperative education plans.
Objectives: To understand the impact of preoperative nursing education on patients undergoing surgery; to assess the level of anxiety of patients undergoing surgery during pre- and postoperative periods; and to identify the influence of sociodemographic and clinical variables on postoperative anxiety levels.
Methodology: This was a correlational quasi-experimental study, in which the experimental group (n = 33) received preoperative nursing education, and the control group (n = 33) followed the procedures in place at the health institution.
Results: There was no reduction in anxiety after the implementation of the preoperative education plan. Nevertheless, patients felt better informed and highlighted the importance of education in meeting their information needs.
Conclusion: Several factors may influence anxiety in surgical patients. Preoperative education addresses patients' information needs and points to health benefits.

Keywords: preoperative health education; nursing; anxiety; surgery

Resumo
Enquadramento: Uma cirurgia pode desencadear manifestações de ansiedade. O enfermeiro, mediante a implementação do plano de ensino pré-operatório, poderá desempenhar um papel preponderante na melhoria das respostas de saúde.
Objetivos: Compreender o impacto do ensino de enfermagem pré-operatório, na pessoa submetida a cirurgia; avaliar o nível de ansiedade da pessoa submetida a cirurgia, nos períodos pré e pós-operatórios; identificar a influência de variáveis sociodemográficas e clínicas nos níveis de ansiedade no pós-operatório.
Metodologia: Estudo correlacional, quase experimental. O grupo experimental (n = 33) foi submetido a um plano de ensino pré-operatório de enfermagem e o de controlo (n = 33) seguiu os trâmites em vigor na instituição.
Resultados: Não se verificou diminuição da ansiedade após implementação do plano de ensino pré-operatório. Todavia os doentes sentiram-se melhor informados, enfatizando a importância do ensino na satisfação das suas necessidades informativas.
Conclusão: A ansiedade do doente cirúrgico pode ser influenciada por diversos fatores. O ensino pré-operatório responde às necessidades informativas do doente e indicia ganhos em saúde.

Palavras-chave: ensino pré-operatório; enfermagem; ansiedade; cirurgia

Resumen
Marco contextual: La cirugía puede desencadenar ansiedad. Mediante la aplicación de un plan de enseñanza preoperatoria, los enfermeros pueden desempeñar un papel protagonista en la mejora de las respuestas sanitarias.
Objetivos: Comprender el impacto de la enseñanza de enfermería preoperatoria en las personas sometidas a cirugía; evaluar el nivel de ansiedad de las personas sometidas a cirugía en los periodos pre y posoperatorio; identificar la influencia de las variables sociodemográficas y clínicas en los niveles de ansiedad en el periodo posoperatorio.
Metodología: Estudio correlacional, casiexperimental. El grupo experimental (n = 33) se sometió a un plan de enseñanza de enfermería preoperatoria y el grupo de control (n = 33) siguió los procedimientos en vigor en la institución.
Resultados: No se observó una disminución de la ansiedad tras la aplicación del plan de enseñanza preoperatoria. Sin embargo, los pacientes se sintieron mejor informados y destacaron la importancia de la enseñanza para satisfacer sus necesidades de información.
Conclusión: La ansiedad de los pacientes quirúrgicos puede verse influida por diversos factores. La enseñanza preoperatoria responde a las necesidades de información del paciente e indica beneficios para la salud.

Palabras clave: enseñanza preoperatoria; enfermería; ansiedad; cirugía

How to cite this article: Fernandes, D., Cerejo, M. N., & Gonçalves, M. A. (2024). Preoperative nursing education: Impact on surgical patients' anxiety. *Revista de Enfermagem Referência*, *6*(3), e33206. https://doi.org/10.12707/ RVI23.118.33206

Introduction

The global rate of surgical procedures has increased significantly, and according to the World Health Organization, more than 4 million people undergo some type of surgery each year. In addition, between 50 and 75% of surgical patients are expected to develop some level of anxiety (Medina-Garzón, 2019). Anxiety in people undergoing surgery varies and is influenced by several factors (Gonçalves et al., 2017). In the preoperative period, patients perceive the information and knowledge they have as low (idem). Therefore, the preoperative period is a crucial time for nurses to educate patients, provide them with the necessary information, and clarify doubts about their pathology, future procedures, and postoperative expectations. Nurses can also use this time to provide guidance to ensure treatment compliance by increasing patients' knowledge. This will promote patients' well-being and help them cope with their surgery (Monteiro, 2020, Wilson et al., 2016). Furthermore, a correct assessment of patients, taking into account their individuality and information needs, is essential to minimize the emotional impact generated by the changes resulting from surgery (Breda & Cerejo, 2021).

Our study aims to understand the impact of preoperative nursing education on patients undergoing surgery, to assess the level of anxiety of patients undergoing surgery during pre- and postoperative periods, and to identify the influence of sociodemographic and clinical variables on the levels of postoperative anxiety.

Background

Surgery is an adverse event in a person's life and is considered by many patients to represent the most threatening day of their lives (Aust et al., 2018). The change in the emotional state of patients awaiting surgery is undeniable as they perceive surgery not only as a critical and traumatic event but also as an unknown and frightening reality (Wilson et al., 2016; Stamenkovic et al., 2018). According to the American Psychological Association (2021), anxiety affects approximately 30% of the adult population at some point in their lives and is characterized as the anticipation of imminent danger, also described by Serra (1980) as "fear without an object". More specifically, surgical anxiety arises from an impending procedure (Wilson et al., 2016), appears weeks before the operation (if it is scheduled), and its symptoms intensify before the hospitalization, leading to the appearance of physiological and emotional effects with consequences in the postoperative period (Medina-Garzón, 2019). Health concerns, uncertainty about the future, fear of the unknown, type of surgery, previous surgical experience, anesthesia, postoperative discomfort, pain, disability, concerns about self-image, complications, the healing process, impact on professional life, and fear of dying emerge as factors that promote anxiety in the perioperative period (Aust et al, 2018; Gonçalves et al., 2018; Gonçalves et al., 2017; Hinkle & Cheever, 2020), together with the feeling of loss of control and the fear of being "at the mercy" of health professionals, among others (Ruiz-Hernández et al., 2021). Thus, anxiety may manifest as a response to a threat to the patient's role in life, the idea of permanent incapacity, or the loss of bodily integrity, counterbalanced by added burdens and responsibilities related to the patient's family or life (Hinkle & Cheever, 2020). Preoperative anxiety can affect anesthesia management, pain intensity, postoperative anxiety, and analgesia, as well as increase postoperative morbidity and mortality (Hinkle & Cheever, 2020; Stamenkovic et al., 2018). These manifestations vary from person to person, so levels of anxiety may be higher or lower depending on individual coping mechanisms, among other factors (Gonçalves et al., 2017; Ruiz-Hernández et al., 2021). When planning interventions to reduce anxiety in surgical patients, it is necessary to clearly define the concept of anxiety and use a valid and reliable tool to measure it (Wilson et al., 2016). Currently, there are a variety of options for making this assessment. Spielberger (1972) developed the State-Trait Anxiety Inventory (STAI), which assesses state anxiety (described as a temporary emotional state) and trait anxiety (defined as a characteristic of an individual's personality). The STAI is the most widely used tool for assessing anxiety in surgical procedures due to its ease of use, demonstrated validity, and reliability (Wilson et al., 2016). In addition, the techniques aimed at strengthening patients' efficacy mechanisms enhance their self-confidence, allowing them to disclose their fears and doubts and meet the needs that may arise from the surgical process (Ruiz-Hernández et al., 2021). Often, patients have very different information about the perioperative period, which can compromise the entire anesthetic and surgical process (Breda & Cerejo, 2021). Education is an essential part of the preoperative period. It is an important dimension of nursing and is crucial for building a partnership that facilitates communication between patients and nurses (Petterson et al., 2017). Therefore, educational plans should be developed after a correct patient assessment is carried out, taking into account patients' individuality and information needs. This will allow to reduce the emotional impact caused by the changes resulting from the surgery (Breda & Cerejo, 2021).

The current state of the art is inconsistent regarding the effectiveness of nursing education in reducing perioperative anxiety. Nevertheless, some studies point to its contribution to effectively reducing preoperative anxiety, pain, and postoperative complications, as well as promoting quality of life and personal empowerment (Cetkin & Tuna, 2019; Chang et al., 2020; Reaza-Alarcón & Rodríguez-Martín, 2019).

Research question/Hypotheses

How does preoperative nursing education affect surgical patients' anxiety?

The anxiety of patients undergoing surgery differs depending on whether or not they received preoperative nursing education; the type of surgery the patient is undergoing

influences the level of postoperative anxiety; previous surgical experience affects the level of postoperative anxiety; there is a relationship between age, sex, and marital status and surgical patients' levels of postoperative anxiety.

Methodology

A correlational quasi-experimental study was conducted using a control group and an experimental group. Patients were assigned to the two groups according to an odd-even criterion until a representative sample was obtained. The experimental group (n = 33) received preoperative nursing education on admission, and the control group (n = 33) followed the procedures in place at the health institution where the study was conducted. Inclusion criteria were to be 18 years of age or older, be able to read and write, and be awaiting elective surgery. Patients admitted to a surgical specialty service of an institution dedicated to the treatment of cancer patients and scheduled for elective surgery in March and April 2022 were included through non-probability convenience sampling (n = 66). In terms of the type of surgery, patients were scheduled to undergo gastrointestinal, thoracic, gynecologic, urologic, and head and neck surgery (major surgery was excluded due to its specificity and the ambivalence of patients' pre- and postoperative needs). Three patients were excluded because they did not complete their questionnaires in full, and four others were excluded because they did not complete the second part of the questionnaire within the specified timeframe.

The instrument used to assess anxiety was the Portuguese version of Spielberger's STAI (Form Y-1), translated in 1996 by Daniel and Ponciano (Spielberge, 1972). The first part of the questionnaire included the sociodemographic and clinical characterization of the participants (age, sex, marital status, previous surgical experience, and type of surgery) and the STAI (Form Y-1), which was administered upon admission to the service. The second part of the questionnaire, administered 48 hours after surgery, also included the STAI (Form Y-1) and the Preoperative Information Assessment Scale by Gonçalves and Cerejo (2020). These two scales were used to evaluate the information provided preoperatively. The Cronbach's alpha coefficients obtained for the preoperative administration of the STAI (Form Y-1) were all greater than 0.629, with an overall value of 0.656, which was considered adequate. Cronbach's alpha coefficients were similar for the postoperative administration of the STAI (Form Y-1). Concerning the Preoperative Information Assessment Scale, the value obtained was considered good, with a Cronbach's alpha coefficient of 0.783.

The data were statistically processed using the IBM SPSS statistical software program, version 26.0. Descriptive statistics were used to calculate absolute (n) and relative (%) frequencies, measures of central tendency (mean), and measures of dispersion - the standard deviation (SD) and the coefficient of variation (CV%). In terms of inferential statistics, since the normality assumption was not met for several factors of the dependent variable, non-parametric tests were used, namely the Mann-Whitney U test and the Kruskal-Wallis test. The significance level used was 5% - $p < 0.05$. All ethical and legal requirements for conducting our study were met. The free and informed consent of the participants was obtained and a favorable opinion was given by the Ethics Committee (opinion TI 39/2021) of the institution where our study was carried out.

Results

The results show that the participants had a minimum age of 38 and a maximum age of 87, with a mean age of 67.70 and a standard deviation of 10.80. Patients aged > 70 years predominated, with both groups having a similar distribution. Most patients in the sample were male (54.5%; n = 36) and married (65.2%; n = 43). The most common type of surgery was gastrointestinal (56.1%; n = 37). The distribution was similar in both groups as no statistically significant differences were found (X^2 = 0.372; p = 0.985). The remaining types of surgery also had a similar distribution. The majority of participants had previously undergone some type of surgery, with distribution being similar for both study groups. In the experimental group, 40.9% (n = 27) had previous surgical experience and 9.1% (n = 6) had none. The same percentage was obtained in the control group. Thus, no significant differences were found between the groups and previous surgeries (X^2 = 0.000; p = 1.000). Regarding whether or not the patients felt informed during their previous surgery, most answered yes. Of these, 35.2% (n = 19) belonged to the experimental group and 50.0% (n = 27) to the control group. The distribution by group was similar, but a statistically significant difference (X^2 = 9.391; p = 0.002) was observed as all those who said they were not informed were in the experimental group. The majority of patients denied the existence of surgical complications (87.0%; n = 47), with a similar distribution in both groups and no statistically significant differences observed (X^2 = 0.164; p = 0.685). Finally, regarding the importance of the information provided about the surgery, most participants considered it important (93.9%, n = 62). Of these, 50.0% (n = 33) belonged to the experimental group and 43.9% (n = 29) to the control group, with a similar distribution. Nevertheless, a statistically significant difference was found in the importance attributed to the information given at previous surgeries (X^2 = 4.258; p = 0.039) because some members of the control group felt that the information was not important. With regard to pre- and postoperative anxiety levels, our study noted that, on average, patients in the control group had lower levels of preoperative anxiety (44.42 points) than those in the experimental group (47.39 points). Concerning postoperative anxiety, the distribution was similar, with a mean of 43.33 points in the control group and 47.36 points in the experimental group. As for the assessment of the information provided by the educational plan, patients in the experimental group felt more informed (37.88 points) than those in the control group (30.73 points; Table 1).

Table 1

Statistical data on pre- and postoperative anxiety levels and assessment of the preoperative information

Anxiety level		*Min.*	*Max.*	*M*	*SD*	CV (%)
Preoperative anxiety	Experimental	32	59	47.39	6.85	14.45
	Control	32	57	44.42	5.54	12.47
	Total	32	59	45.91	6.36	13.85
Postoperative anxiety	Experimental	32	61	47.36	5.97	12.61
	Control	34	56	43.33	5.05	11.65
	Total	32	61	45.35	5.85	12.90
Assessment of preoperative information	Experimental	12	45	37.88	6.63	17.50
	Control	17	45	30.73	7.10	23.10
	Total	12	45	34.30	7.71	22.48

Note. Min. = Minimum; Max. = Maximum; *M* = Mean; *SD* = Standard-deviation; CV = Coefficient of variation.

Hypothesis 1: The anxiety of patients undergoing surgery differs depending on whether or not they received preoperative nursing education.
The mean ranks showed a higher level of pre- and postoperative anxiety in patients in the experimental group. However, the differences were statistically significant only for postoperative anxiety ($p = 0.002$). Patients' perceptions of the information provided were compared between the two groups to gain a more complete understanding of the importance of preoperative nursing education and to guide the subsequent discussion of the results. Our study observed that the experimental group received a higher level of information. Therefore, it is possible to recognize the existence of highly significant data ($p < 0.001$) regarding the information provided (Table 2).

Table 2

Results of the Mann-Whitney U test to examine Hypothesis 1 and compare patients' perceptions of the information provided

Group	Experimental	Control
	Mean rank	Mean rank
Preoperative anxiety	37.80	29.20
(p)	0.068	
Postoperative anxiety	40.70	26.30
(p)	0.002**	
Assessment of preoperative information	**43.21**	**23.79**
(p)	$p < 0.001$	

Note. *p* = Probability.

Hypothesis 2: The type of surgery the patient is undergoing influences the level of postoperative anxiety.
The mean ranks showed a higher level of anxiety in patients undergoing gastrointestinal surgery in the experimental group and in patients undergoing thoracic surgery in the control group. However, the analysis of the results indicated that these differences were not statistically significant ($p > 0.05$; Table 3).

Hypothesis 3: Previous surgical experience affects the level of postoperative anxiety.
Anxiety levels were higher in patients in the experimental group who had previously undergone surgery and in patients in the control group who had no previous surgical experience. However, the results obtained showed that there were no statistically significant differences. ($p > 0.05$; Table 3).

Table 3

Results of the Kruskal-Wallis test to examine Hypothesis 2 and results of the Mann-Whitney U test to examine Hypothesis 3

	Postoperative anxiety		
Group	**Experimental**	**Control**	**Test**
	Mean rank	Mean rank	
Type of surgery			
Gastrointestinal	19.00	16.47	*Kruskal-Wallis*
Thoracic	16.80	26.75	
Urological	14.00	12.42	
Gynecological	3.50	23.50	
Other surgeries	14.17	14.88	
(*p*)	0.472	0.187	
Previous surgical experience			
Yes	17.30	16.24	*Mann – Whitney U*
No	15.67	20.42	
(*p*)	0.733	0.348	

Note. p = Probability.

Hypothesis 4: There is a relationship between age, sex, and marital status and surgical patients' levels of postoperative anxiety.

The level of anxiety was higher in patients aged between 61 and 70 years in the experimental group and in those under 60 years in the control group. However, the difference was not statistically significant. There was a higher level of anxiety in the male participants of the experimental group and similar results in the control group. The results showed a higher level of anxiety in divorced and widowed patients from the experimental group and in single patients from the control group. Statistically significant results regarding marital status and postoperative anxiety were only observed in the experimental group (p = 0.030; Table 4).

Table 4

Results of the Mann-Whitney U and Kruskal-Wallis tests to examine Hypothesis 4

	Postoperative anxiety		
Group	**Experimental**	**Control**	**Test**
	Mean rank	Mean rank	
Age			
≤ 60 years	16.30	18.45	*Kruskal-Wallis*
61-70 years	17.73	17.61	
> 70 years	16.60	15.35	
(*p*)	0.938	0.715	
Sex			
Male	17.44	17.00	*Mann – Whitney* U
Female	16.53	17.00	
(*p*)	0.790	1.000	
Marital status			
Single	16.13	24.50	*Kruskal-Wallis*
Married/*De facto* union	13.83	17.18	
Divorced	25.75	16.00	
Widow/er	25.75	14.00	
(*p*)	0.030*	0.626	

Note. p = Probability.

Discussion

Regarding the type of surgery, gastrointestinal surgery was the most common in both groups, with a total of 56.1%. Most participants had undergone surgery before, 85.2% felt adequately informed, 87.0% had no surgical complications, and 93.9% felt that the information they received about the surgery was important. This last result is consistent with the results from the Preoperative Information Assessment Scale. The responses to this scale also showed that patients in the experimental group were better informed (37.88 points) than those in the control group (30.73 points). The information provided to patients through preoperative education is a fundamental element of their preparation for surgery, and its compliance is an important indicator of quality. It provides managers with data on patients' expectations regarding care, aiming to improve the quality of care and identify areas of failure (Meng et al., 2018). Regarding the level of preoperative anxiety, patients in the control group scored 44.42 points and patients in the experimental group scored 47.39 points. The result was similar for postoperative anxiety. Other studies have found identical anxiety scores using the same tool. In the study by Gürler et al. (2022), most of the participants (70.8%) had anxiety related to surgery and anesthesia, and about 46.4% had a moderate level of preoperative anxiety. Gonçalves et al. (2017) also found a moderate level of anxiety in the preoperative period. In both groups of this study, there was a decrease in anxiety scores from the pre- to postoperative period. In a study by Kumar et al. (2019), a significantly different total anxiety score was recorded throughout the surgical process, which may be related to the education received in the preoperative period. According to these authors, high levels of anxiety may also be associated with an altered neuroendocrine response, with potential implications for the postoperative period.

In our study, both pre- and postoperative anxiety levels were higher in patients in the experimental group, with evidence of a statistically significant difference ($p = 0.002$) in postoperative anxiety. Thus, it can be concluded that the anxiety of patients undergoing surgery differs depending on whether or not they receive preoperative nursing education. However, the effect observed was not the one expected at the beginning of the research (as the anxiety levels were higher in our study). These findings do not agree with other scientific evidence, according to which patients who receive structured preoperative nursing education have lower levels of anxiety than those who do not receive it (Cetkin & Tuna, 2019; Chang et al., 2020; Reaza-Alarcón & Rodríguez-Martín, 2019). Nevertheless, a possible explanation for the results obtained in our study may be the fact that overly detailed information

can increase anxiety, thus having the opposite effect than the one desired (Hinkle & Cheever, 2020). The fact that the data were collected in an oncology hospital may also have influenced our results. Although this criterion was not addressed in the characterization of the sample, it cannot be overlooked as it may be an influencing factor. The expectations and management of anxiety in cancer patients are different due to the threat to their physical and emotional integrity and the importance of the surgery, as many patients are treated with the prospect of a cure. Klaiber et al. (2018) also observed that preoperative education had no significant impact on anxiety levels compared to usual care. However, when assessing satisfaction, patients considered the implementation of the educational plan to be relevant, particularly considering postoperative recovery.

Regarding postoperative anxiety, a study by Chang et al. (2020) showed that the use of a pre- and postoperative education plan was associated with a significant reduction in symptoms of anxiety and depression, improved postoperative quality of life, and reduced pain. Reaza-Alarcón and Rodríguez-Martín (2019) noted that educational plans had a significant impact on reducing anxiety levels and enabling the person to perform activities of daily living. Cetkin and Tuna (2019) shared the same opinion, indicating a reduction in the levels of state anxiety in patients who received education through a pamphlet.

Patients in our experimental group felt better informed due to the information provided by the nurses, with statistically significant differences ($p < 0.001$). Gonçalves et al. (2017) and Breda and Cerejo (2021) also obtained similar results. Therefore, the provision of education is highly important for promoting well-being and raising awareness about the care provided and information needs.

Considering the presence of surgical complications, patients without complications in both groups showed higher levels of anxiety, but without statistically significant differences. Gonçalves et al. (2017) also found that this difference was not statistically significant although patients who had never undergone a surgical procedure were more anxious.

High levels of preoperative anxiety may influence postoperative anxiety. In a study by Kassahun et al. (2022), preoperative anxiety was associated with higher morbidity, which is a natural response to unpredictable and potentially threatening situations during the intraoperative period. Exposure to these levels of anxiety negatively impacts the surgical process.

In our study, male patients were the most anxious in both groups, but this difference was not statistically significant. Divorced and widowed patients in the experimental group and single patients in the control group also had higher levels of anxiety. However, the results were only statistically significant ($p = 0.030$) in the experimental group. In the vast majority of studies conducted, female participants were found to be more anxious about the surgical process (Gonçalves et al., 2017; Kumar et al., 2019; Gürler et al., 2022). However, the results of our study point in the opposite direction, which may be related to the fact that our participants were cancer patients.

Our study was limited by the lack of studies on this topic and the fact that the research process focused mostly on the preoperative visit. Another limitation was the size of the sample, which made it impossible to generalize the results.

Conclusion

The need for surgery is one of the standard procedures that can increase anxiety, which should be viewed as a health problem. Nurses have the skills to identify the needs of patients undergoing surgery and provide information through preoperative education. As a result, patients are better able to manage their health disease process, participate in decision-making, and visualize their entire surgical process, which leads to better responses. Based on the results and the current state of the art, although a slight increase in anxiety was observed with the implementation of the preoperative nursing education plan, the assessment of the information regarding the education provided showed significantly higher values. This suggests that the results could be more meaningful with a more significant sample and covering other hospital units. Furthermore, the results obtained allowed our study to establish the value of preoperative nursing education, mainly in terms of responding to the information needs of patients, clarifying their doubts, and contributing to their adherence to the therapeutic process. Hospitalization and subsequent surgical intervention are always factors that lead to emotional and psychosocial imbalances. Therefore, nurses must be able to provide information/education to patients in the preoperative period, making them feel like an integral part of the treatment process, prioritizing their individual needs, and providing efficient and comprehensive guidance. We suggest that our research should be replicated with a larger sample and extended to other hospitals not exclusively treating cancer patients, and recommend the addition of new variables to better understand the phenomenon. It would also be important to conduct a study of the anxiety profile of each patient (involving mental health nurses) so that educational plans can be as targeted as possible and respond to the real needs of each patient. Our study also recommends the use of other forms of information delivery and the development of other research studies aimed at surgical patient satisfaction with preoperative education and patient welcoming. As far as hospital institutions are concerned, it would be important to guarantee safe nurse staffing and the creation of protocols in health departments that allow nurses to have the conditions/ tools to perform the procedure correctly. This study contributes to the critical analysis of nursing practice and aims to raise awareness of the holistic assessment of surgical patients, thus promoting knowledge and strengthening the autonomous competencies of nurses.

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