



## Urinary Tract Infections and Nursing Care

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### Abstract

*This topic is taken up in the study for the fact that urinary tract infections, although among the most frequent and prone infections with a tendency to recur, there is still a need for awareness and information on their prevention. This paper will contain a detailed overview and studies on disease, urinary tract anatomy, epidemiology, pathophysiology of disease, classification, diagnostics, treatment and nursing management. The goal is to increase knowledge about urinary tract infections, knowledge of clinicians and risk factors for their prevention and nursing care.*

**Keywords:** Urinary Tract Infections, Nursing Care, information on their prevention

## 1. Introduction

### 1.1 Objectives

1. Identification of symptoms, causes and risk factors for urinary tract infections.
2. Improving nursing care in relation to these patients.
3. Continuous follow-up of these patients.
4. Increasing knowledge about the treatment and above all the prevention of urinary tract infections.

### 1.2 From this work I have come to some conclusions:

Urinary tract infections are highly common infections and are mainly women more likely to develop them.

It is important that the patient completes antibiotic therapy.

There is still a need for awareness and informing the population, as a large part of it often expresses resentment to present themselves to medical personnel, leading to some of these infections remain untreated or come to more advanced stages.

The importance of the nursing role in the care of patients with urinary tract infections is great not only in the application of therapy but also in counseling patients about symptoms, risk factors and explanation of procedures.

Urinary tract infections are among the most common bacterial infections that can affect any part of the urinary

system: the kidneys, ureters, bladder, and urethra. They are usually caused by bacteria from the rectum entering the urinary tract through the urethra.

UTIs are more common in women than men, with around 60% of women having a UTI in their lifetime and 20% - 40% of women having a recurrent infection due to the urethra shorter, hormonal changes and close distance to the anus.

The most common cause of infection is *E. coli*, although other bacteria or fungi can sometimes be the cause.

UTIs rank first as infections leading to an antibiotic prescription after a doctor's visit, although the symptoms of urinary tract infections are generally mild, inappropriate use of antibiotics can lead to antibiotic resistance, so it is important to establish appropriate criteria for treatment using narrow-spectrum antibiotics for the optimal duration.

## 2. Anatomy of the Urinary Tract

The urinary system consists of 4 main organs: 2 kidneys, 2 ureters, bladder and urethra. The urinary system is also called the excretory system, whose purpose is to eliminate waste from the body, regulate blood volume and blood pressure, control electrolyte and metabolite levels, and regulate blood pH.

According to their function, they are classified into:

- Secretory organs - kidneys
- Internal excretory channels - ureters
- Urine reservoir - urinary bladder
- External excretory channel – urethra

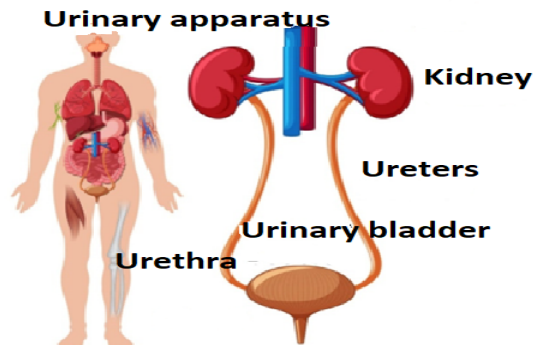


Fig 1. Urinary tract

## 3. Physiology of the Urinary Tract

The first process by which the kidneys produce urine is called glomerular filtration.

Blood enters the kidney from the renal artery and then into Bowman's capsule, the glomerulus. Filtration takes place in the glomerulus.

The thin walls of the glomerulus allow molecules, wastes and fluids, mainly water, to filter into the nephron while larger molecules, such as proteins and blood cells, remain in the blood vessels.

The filtered fluid is called ultrafiltrate and passes from Bowman's capsule to the proximal tubule.

The second process involves tubular reabsorption where the nephron restores nutrients and water back into the blood. This process occurs in the proximal tubule, the distal tubule, and the loop of Henle.

During this process, nutrients and water are removed from the filtrate and returned to the blood, while wastes not initially filtered by Bowman's capsule and excess fluid are removed from the blood in the distal tubule by a process called tubular secretion.

The end product of all this activity in the nephron is the formation of urine.

In a single day, your kidneys filter about 150 liters of blood. Only 1 to 2 liters become urine.

#### 4. Epidemiology

Urinary tract infections are very common bacterial infections encountered in women. Up to 60% of women experience at least one UTI in their lifetime. Sexually active women have the highest incidence and reinfections are more common.

The prevalence of UTIs in men is lower than in women and occurs mainly in men with structural urological abnormalities. It increases with age and occurs in 1 in 4 men over 70 years old.

#### 5. Etiology

The main causes of urinary tract infections are mainly gram negative aerobic bacteria.

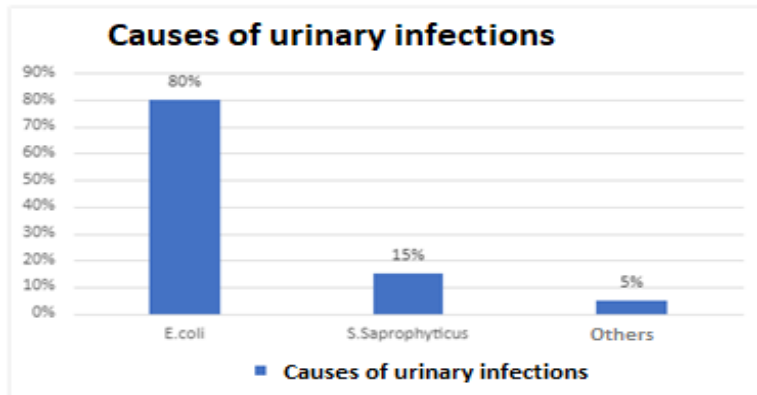
It can also be viruses, protozoa and fungi.

Escherichia coli is the most common cause of uncomplicated UTIs in women, accounting for more than 80% of cases.

The rest are enterobacteria such as Klebsiella or Proteus mirabilis and rarely Pseudomonas arginosa.

Staphylococcus saprophyticus is found in 15% of cases.

Enterococcus faecalis and Streptococcus agalactiae, which can be causative in uncomplicated cystitis, are less common.



Graph 1. Diagram showing the contribution of different pathogens to causing urinary tract infections

#### 6. Pathogenesis

The pathogenesis of UTIs refers to the interaction between the host and the microorganism that develops the infection in the urinary tract.

Pathogenesis generally proceeds by the pathogen's mode of entry, adherence, multiplication, and invasion into tissues or other organs of the host.

Bacteria can enter and spread within the urinary tract via three routes: infectious, hematogenous, and lymphatic.

Until now, most urinary tract infections result from the contagious route and rarely through the hematogenous and lymphatic routes.

Most pathogens originate from the rectal flora and enter the urinary tract via the urethra. This is known as the ascending path.

Pathogenic bacteria invade the urinary tract, produce colonies and cause UTI against the host's defense mechanism, urea concentration, various organic acids, etc.

After the introduction of the pathogen, the adhesion and colonization phase begins. The pathogen begins to colonize the urethra and moves to the bladder by the action of flagella and pili. In the bladder, epithelial receptors are recognized by the adhesive proteins of the bacterium and thus colonization begins. Colonized pathogens produce toxins and proteases that lyse the host cell and provide nutrients for the pathogen to survive. The pathogen is then resistant to

the host's immune system and migrates to the kidneys. With the help of adhesion and pili, the bacteria colonize the kidney and later it crosses the epithelial barrier and spreads into the bloodstream, leading to the state of bacteremia.

Conditions affecting pathogenesis:

- Changes in the host's natural defense mechanisms that may result from changes in the vaginal mucosa and decreased pH, comorbidity, urinary tract obstruction, and urine flow stasis.
- Anatomical and physiological factors contribute to a greater prevalence in women than in men, due to a shorter urethra, the proximity of the urethra to the anus, etc.
- In healthy women, intercourse, use of spermicides and pregnancy increase the predisposition to UTI

## 7. Risk Factors

Age and gender: it is more common in women. The risk of infection increases more after menopause in women and after the age of 50 in men.

Genetics

Sexually active life: women are more predisposed, irritation of the urethra and surrounding tissues during sexual intercourse can increase susceptibility to infection and bacteria are favored to go more easily to the bladder. The use of spermicide can also increase the risk in women by changing the normal flora in the vagina and many bacteria colonize the area.

Structural abnormalities or previous operations of the urinary system: the case of a previous history of urinary tract infection or a previous operation on the urinary tract.

Catheter use

Hormonal status: lack of estrogen changes the pH of the vagina, favoring colonization with more coliform bacteria and increasing the risk of UTIs.

Diabetes: persistently high blood sugar levels cause immunosuppression, which makes you more susceptible to urinary tract infections.

Weak immune system: A weak immune system may not be able to fight germs that can cause a urinary tract infection. The immune system can be weakened when there is a long-term illness, such as HIV or diabetes.

Urinary tract obstruction: kidney stones or an enlarged prostate can block urine in the bladder, stopping urine from flowing freely.

Personal hygiene: perineal contamination with feces increases the risk of coliform bacteria in the vagina and near the urethra increasing the possibility of developing a urinary tract infection.

Pregnancy: pregnancy leads to changes in the urinary tract making it more difficult to empty the bladder completely.

## 8. Clinic

Frequent urination in small amounts

- Dysuria
- Cloudy urine, with a strong unpleasant odor
- Hematuria.
- Pelvic pain in women.
- Back pain (prostate infection can cause lower back pain while kidney infection can cause lower back pain)
- Rectal pain in me

## 9. Complications

Complications of UTIs:

- Recurrent infections, meaning two or more UTIs within six months or three or more within a year. Women are particularly prone to recurrent infections.
- Permanent kidney damage due to an untreated UTI.
- UTI during pregnancy can cause a complication in the birth of a baby with low birth weight or premature birth.
- Recurrent urinary tract infections in men can cause a narrowing of the urethra.
- A very serious complication is also urosepsis, which can occur if the infection passes through the urinary tract

to the kidneys.

## 10. Prevention

- Ensuring good hygiene is very important for the prevention of UTIs, especially in women who have a higher risk of infection due to the shorter urethra and proximity to the anus. Bacteria can move from the anus to the urethra, which can be prevented by wiping from front to back after urinating or defecating. Also during the menstrual cycle, menstrual products must be changed constant
- Drinking plenty of fluids helps dilute the urine and necessarily leads to more frequent urination, allowing bacteria to be flushed from the urinary tract before infection begins.
- Urination immediately after sexual intercourse.
- Not using tight clothes that create a moist environment suitable for the development of bacteria and avoiding irritating products such as spray deodorants, powders, etc.
- Changing the birth control method. Diaphragms, unlubricated condoms, or condoms treated with spermicide can contribute to the growth of bacteria.

### 10.1 Classification of urinary tract infections

We classify urinary tract infections into:

- Uncomplicated infections
- Complicated infections

Uncomplicated infections: cystitis and pyelonephritis

They are community acquired infections and are more common in young women but do not recur.

They include cystitis and pyelonephritis that occur in premenopausal women, without structural abnormalities of the urinary tract, who are not pregnant and who do not have concomitant diseases that may increase the risk of complications.

Complicated infections: cystitis and pyelonephritis (when they do not meet the criteria for uncomplicated infection; in people with urological abnormalities, after surgical procedures or catheterizations)

They involve both sexes at any age and often require hospitalization.

In anatomical terms, urinary tract infections are divided into two categories:

- Upper tract infections: acute and chronic pyelonephritis, interstitial nephritis and renal nephritis.
- Lower tract infections: cystitis, prostatitis and urethritis.

**Table 1.** List of uncomplicated and complicated ITUs

Cystitis	Cystitis
Pyelonephritis	Pyelonephritis
	Prostatitis
	UTI during pregnancy
	ITU in diabetic or immunocompromised Patients
	Recurrent urinary tract infections

## 11. Nursing Care

The process of nursing care is a procedure that is built by the patient himself and implemented by the nurse and the care team.

The nursing process is a process that works according to an individualized and patient-centered nursing care using the patient's strengths.

The goal of the nursing care process is to provide care to help the patient and meet his needs to maintain and improve his health and restore his well-being.

➤ Five steps of the nursing care process are:

- 1) Initial assessment
- 2) Diagnosis

- 3) Planning
- 4) Implementation
- 5) Assessment of achievements

1) The initial assessment involves the systematic collection of objective and subjective data relating to past, present and potential problems.

2) Diagnosis or diagnoses is the result of analyzing and interpreting the information collected about the patient. The term nursing diagnosis is defined as a formulation that describes the client's actual reactions to a health problem that the nurse is competent to treat.

3) Planning is the sequence of movements in which the nurse and the patient define priorities, goals or predictions and establish a plan of care that seeks to minimize the client's problems.

4) Implementation involves putting the care plan into action to assist the client in carrying out their care plan.

5) The assessment of achievements is defined as the judgment of the effectiveness of nursing care in meeting certain goals, this assessment is based on the client's response.

## **12. Nursing Assessment**

### *12.1 Health history*

Nursing assessment of patients with UTI consists initially of taking a detailed history about signs and symptoms including dysuria, frequency of urination, and urgency to urinate.

In women it is important to distinguish whether the discomfort is internal or external as a vaginal inflammation can also cause dysuria.

In elderly patients, one of the main symptoms of urinary tract infection can be changes in mental state.

We also assess the time when the symptoms started, their duration and frequency.

We ask the patient if he has pain and the degree of pain; if he has had a urinary tract infection before and if so what treatment he received; for concomitant diseases and if he is allergic to any medication.

If the patient is male we also ask if there is a history of prostate enlargement which can cause urinary retention and increase the risk of a urinary infection.

### *12.2 Physical examination*

In the physical examination, the nurse assesses vital signs, specifically for temperature, fever, tachypnea and tachycardia.

We evaluate the abdomen by palpation, mainly the suprapubic region for sensitivity to pain (tenderness).

We monitor the hydration status based on skin turgor, intake and output of fluids, we also evaluate the characteristics of urine such as color, concentration, odor, presence of blood, etc.

### *12.3 Nursing diagnoses*

1. Acute pain associated with urinary tract infection evidenced by the patient's complaints of burning sensation during urination and suprapubic pain.
2. Hyperthermia as a result of the infectious process.
3. Disturbance in urinary elimination associated with urinary tract infection as evidenced by patient reports of dysuria, urinary urgency, and urinary incontinence.
4. Disorders in sleeping habits as a result of frequent urination, nocturia and pain.
5. Lack of knowledge about diagnosis, predisposing factors and disease prevention.
6. State of anxiety and fear related to the continuity of the disease.

### *12.4 Nursing planning*

Nursing planning includes:

1. Pain reduction.
2. Lowering and maintaining normal temperature.

3. Normalization of urinary elimination.
4. Normalization of sleeping habits.
5. Acquiring knowledge about disease prevention and management.
6. Reduction of anxiety and fear.

### 13. Nursing Intervention

#### 13.1 Pain reduction

We administer analgesics such as AIJS, antibiotics and antispasmodics according to the doctor's prescription to relieve pain and spasms. We also use non-pharmacological pain relief techniques such as hot compresses, relaxation, massage or distraction which can reduce pain and provide comfort to the patient. We provide rest and reduction of physical activities. We reassess the pain level after the nursing intervention to determine the effectiveness of the interventions.

Lowering and maintaining normal temperature

We administer the therapy with antibiotics and antipyretics which help to reduce the temperature quickly according to the doctor's prescription.

We encourage the patient to drink fluids to prevent dehydration from fever and to reduce the risk of repeated infections.

We can also use non-pharmacological methods to reduce the temperature, such as advising the patient to reduce activity and rest in bed to reduce metabolic demands; cold compresses; room temperature regulation; removing excess clothing, blankets, etc.

Normalization of urinary elimination

Assess the patient's current urination pattern. We encourage the patient to complete the antibiotic therapy and in cases where some of the symptoms have been cured, also to increase oral fluid intake; 2 to 3 liters per day to promote blood flow to the kidneys, facilitate urine production and remove bacteria from the urinary system.

Normalization of sleeping habits

We assess the patient's current sleep pattern and compare it to previous sleep habits. In addition to the administration of antibiotics and analgesics for pain relief, we advise the patient to limit fluid intake to prevent the need to urinate at night and to avoid caffeine consumption. We provide a quiet, noise-free environment to increase the quality of sleep.

Acquiring knowledge about disease prevention and management

We inform the patient about the diagnosis, risk factors, prevention and treatment, avoiding medical terms and using simple words understandable to the patient.

It should be emphasized the importance of lifestyle changes in taking as much fluid as possible to improve diuresis and frequent urination that helps prevent recurrent infections. We advise the patient to maintain perineal and sexual hygiene, especially women who are more predisposed due to the shorter urethra, which makes it easier for the uropathogen to invade the urinary tract.

We encourage not avoiding the need to urinate and frequent emptying of the bladder. We instruct the patient to avoid tight, non-cotton clothing that can create a moist environment suitable for bacteria.

Reduction of anxiety and fear

We assess the patient's anxiety level and provide emotional support.

We explain the procedures, the examinations and the reasons for performing them, as well as accompany him during the various examinations.

We create a relationship of trust by listening to the patient, provide a calm environment and answer all questions briefly and accurately. We allow the client to talk about feelings of anxiety and teach relaxation methods such as deep breathing, etc.

Assessment of achievements

- The patient demonstrates a reduction in pain and a decrease in temperature as a result of pharmacological and non-pharmacological therapy.
- We manage to normalize urinary elimination.
- The patient has clearly understood the importance of ending antibiotic therapy and taking 2-3 liters of fluids per day.
- With the relief of pain and the normalization of urinary elimination, the patient experiences more restful sleep

- at night.
- The patient receives a clear and understandable explanation about the diagnosis, the first symptoms of the disease, risk factors and prevention.
- The patient reports a decrease in anxiety and is able to express his feelings about the course of the disease.

#### 14. Material and Methodology

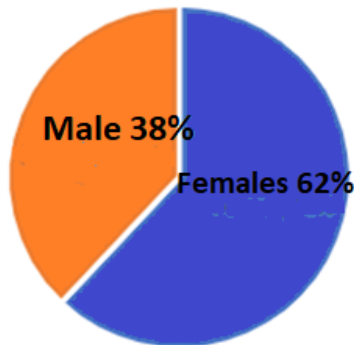
The study was conducted in the period 2020-2023, in the Tirana hospital where we had 300 patients with urinary tract infections. These patients are grouped by year and gender and are presented in the tables below.

In 2020, 110 patients were presented, among which 65 are women and 45 are men.

**Table 2.** Number of cases affected by ITU in 2020, divided by gender

<b>Year 2020</b>	
<b>Female</b>	65
<b>Male</b>	45
<b>Total</b>	110

#### Presentation of the percentage of cases affected by ITU in 2020, divided by gender



**Graph 2.** Percentage of cases affected by ITU in 2020, divided by gender

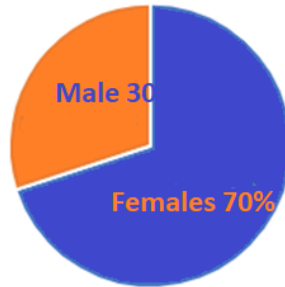
In 2021, 90 patients were presented, among which 60 are women and 30 are men.

**Table 3.** Number of cases affected by ITU in 2021, divided by gender

<b>Year 2021</b>	
<b>Female</b>	60
<b>Male</b>	30
<b>Total</b>	90



**Presentation of the percentage of cases affected by ITU in 2021, divided by gender**



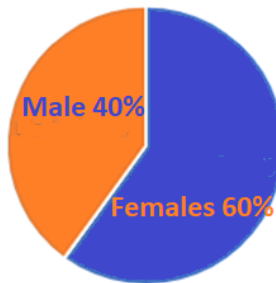
**Graph 3.** Percentage of cases affected by ITU in 2021, divided by gender

In 2022, 110 patients were presented, among which 65 are women and 35 are men

**Table 4.** Number of cases affected by ITU in 2022, divided by gender

Year 2022	
Female	65
Male	35
Total	100

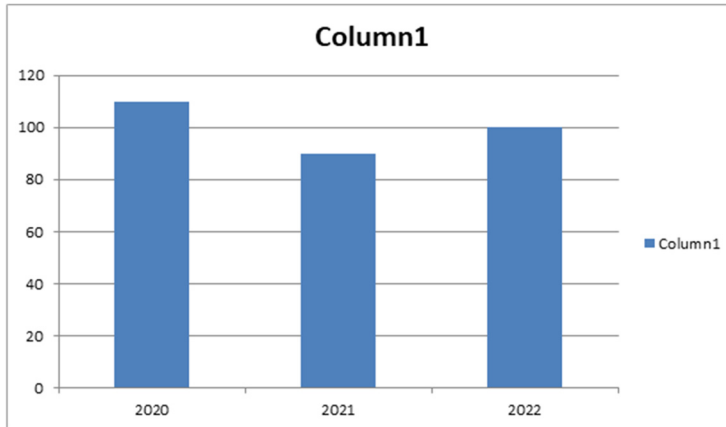
**Presentation of the percentage of cases affected by ITU in 2022, divided by gender**



**Graph 4.** Percentage of cases affected by ITU in 2022, divided by gender

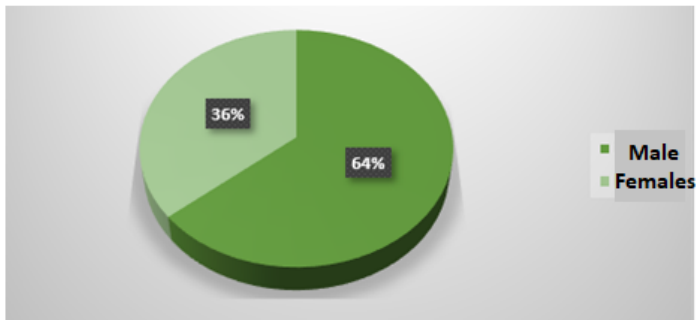
**Table 5.** Number of cases presented with ITU during the years 2020-2022

	Nr of patients
Year 2020	110
Year 2021	90
Year 2022	100
Total	300 patients



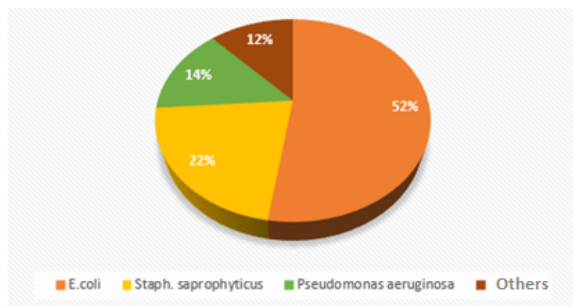
Graph 5. Graph presentation of the number of patients during the years 2020-2022

### Data for patients during years 2020-2022



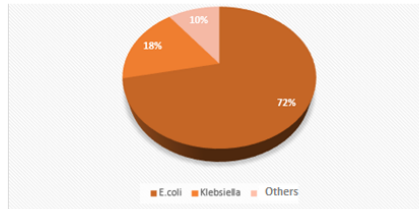
Graph 6. Representation in percentage of women and men affected by ITU during the years 2020-2022

### Year 2020



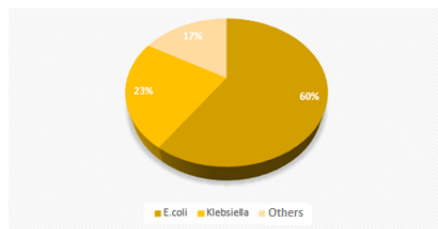
Graph 7: Presents the percentage of pathogens causing urinary infections in patients during the years 2020-2022

**Year 2021**



**Graph 8:** Presents the percentage of pathogens causing urinary infections in patients during the years 2020-2022

**Year 2022**



**Graph 9:** Presents the percentage of pathogens causing urinary infections in patients during the years 2020-2022

## 15. Conclusions

During the period 2020-2022, we had 300 patients with ITU.

In 2020, 110 cases were presented and divided by gender, 65 were women and 45 were men.

In 2021, 90 cases were presented, where 60 were women and 30 were men.

In 2022, there were 110 cases, 65 women and 35 men.

In conclusion of these statistics, we can say that the number of patients affected by ITU has been increasing. A higher increase is observed from 2020 to 2021, where the conditions that have had an impact have undoubtedly been covid-19, where in 2020 it was still very present and people are often reluctant to present themselves at health centers.

Throughout these 3 years, we find that women have been more affected than men, and also e.coli is the most frequent causative pathogen of these infections.

However, in every bad there is a good and in this case we can say that this increase in cases is attributed to the increase in awareness and the reduction of wrong thoughts about ITUs, pushing patients to turn to specialized centers to get proper treatment and not neglect that can lead to even more serious complications.

The nursing role remains very important since ITUs occupy a good part of the cases and their care is special as it requires not only the treatment but also the understanding of the patient's feelings, non-prejudice on the part of the medical care staff and informing precisely for their prevention.

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