

# URINE LEUCOCYTES IN PREGNANT WOMEN

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## ABSTRACT

**Background:** Hormonal changes in pregnant women are a process of preparation for the birth of a baby, pregnant women are very sensitive to infections from various microorganisms. Urinary tract infection is the most common bacterial infection in pregnancy, increasing the risk of maternal and newborn morbidity and mortality. A white blood cell count of more than 15,000/mm<sup>3</sup> is an indication of infection in pregnant women. It is caused by viral, bacterial, and protozoan infections. Infections in pregnant women must be detected early, in order to prevent premature delivery. One of the tests that can be done is by counting the number of erythrocytes and leukocytes. This study was conducted to identify the overview of erythrocyte and leukocyte results in pregnant women.

**Subjects and Method:** This was a descriptive study conducted at Surabaya Hospital, Surabaya, East Java. A sample of 60 pregnant women were selected for this study. The data were collected from the medical record of pregnant women patients at Surabaya Hospital from January to June 2022. The data were described in percentage.

**Results:** Urine leukocytes appeared to be negative in 28 (47%) women, 1 positive in 20 (33%) women, 2 positives in 9 (15%) women, and 3 positives in 3(5%) women.

**Conclusion:** 47% of pregnant women have negative results, and 53% have positive results. Pregnant women to know more about the risk factors that may occur in pregnancy, it is hoped that pregnant women can carry out a complete urinalysis screening early on and carry out routine health monitoring during pregnancy.

**Keywords:** urine, leukocytes, pregnant women.

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## BACKGROUND

Pregnancy is a series of events that begins with conception and will develop until it becomes a term fetus and ends with the birth process. Pregnancy is divided into 3 trimesters, namely the first trimester from conception to 3 months, the second trimester from the fourth month to 6 months, and the third trimester from the seventh month to 9 months. During the pregnancy process, there

are physical and psychological changes that will be experienced by a mother. These changes can cause discomfort, especially in the third trimester, such as dyspnea, insomnia, gingivitis and epulsion, frequent urination, pressure and discomfort in the perineum, back pain, constipation, varicose veins, fatigue, Braxton hicks contractions, leg cramps, ankle edema, and mood changes, as well as increased anxiety (Rahmawati and Wulandari, 2019).

The World Health Organization (WHO) in 2017 in Hardaniyati et al. (2021) stated that the mortality rate for pregnant women in the world was 810 deaths per 100,000 live births per day, and data on maternal mortality in ASEAN shows that Indonesia ranks second highest. The 2018 Indonesia Health Profile shows the results of data from the 2017 Indonesian Demographic Health Survey (IDHS) that the general maternal mortality rate decreased during the 1991-2015 period from 390 to 305 per 100,000 live births. Even though there was a reduction in the mortality rate for pregnant women, it failed to achieve the MDGs target which had to be achieved, which was 102 per 100,000 live births in 2015. Reports from WHO cause 75% of maternal deaths due to bleeding, infection, and high blood pressure in mothers during pregnancy.

According to Hotmauli et al. (2021) During pregnancy, changes in the urinary system can occur in the kidneys and ureters. Changes in the kidneys can be caused by the hormones estrogen and progesterone, a suppression that arises due to intestinal enlargement and increased blood volume. In late pregnancy, there is pressure on the bladder due to the descent of the fetal head so the frequency of urination increases.

The urine of pregnant women contains higher nutrients than those of non-pregnant women. The nutrients contained can be in the form of water-soluble B vitamins and vitamin C, amino acids, and glucose which can be factors supporting the growth of bacteria. A low renal threshold for excreting glucose and amino acids as well as

decreased renal concentrating function can cause urine to become less acidic during pregnancy. This is very good for the proliferation of microorganisms in the ureter so that bacteria are found in urine specimens (bacteriuria) and the occurrence of bacterial infections (Urinary Tract Infection) (Guyton AC, Hall, 2014). Bacterial infection or Urinary Tract Infection (UTI) can cause an increase in the number of leukocytes in the urine specimen. Women tend to have a higher urine leukocyte count than men due to vaginal contamination (Hotmauli et al., 2021).

Examination of urine is an analytical effort needed to detect diseases of the urinary system, both caused by abnormalities in kidney function and structural abnormalities. The dominant leukocytes in the urine are neutrophil cell types whereas leukocyte examination is an indirect test to detect urinary tract infections such as nitrites (Santoso, 2019). This study aims to describe the levels of leukocytes in the urinary tract in pregnant women.

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## **SUBJECTS AND METHOD**

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### **1. Design Study**

This study was descriptive research, namely to obtain an overview of urine leukocyte examination in pregnant women at Surabaya Hospital.

### **2. Population and Sample**

The population in this study was laboratory data for all pregnant women who underwent a complete urine examination at the Surabaya Hospital from January to June 2022, namely 60 patients. Meanwhile, the sample in this study was laboratory data for all pregnant women who

carried out a complete urine examination at the Surabaya Hospital for the period from January to June 2022, namely 60 patients. The data collection technique in this study was total sampling. The location of this research was installed in the Surabaya Hospital laboratory. The time of research was carried out from January to June 2022. With the time for carrying out data collection from June to July 2022.

### 3. Study Variables

The variable of this study was the value of urine leukocytes in pregnant women at Surabaya Hospital.

### 4. Definition Operational of Variables

**Pregnant women** were pregnant women who carry out a complete urine examination from January to June 2022.

**Urinary leukocytes** were the number of leukocytes in the urine examined using the dip-stick method in units of leu/ $\mu$ L.

### 5. Study Instrument

The study used the inspection method with strip dip (direct).

### 6. Data Analysis

Data analysis was performed using univariate analysis to get an overview. The presentation of data is done by narrating by combining the results of observations.

### 7. Ethic Clearance

Research ethics which includes consent, anonymity, and data confidentiality No. 070/86/03.2/2022.

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## RESULTS

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Based on data obtained from the Surabaya Hospital through a review of

laboratory data of pregnant women who had complete urine examinations from January 2022 to June 2022, a total of 60 data.

### 1. Urine Leukocyte Examination Results in Pregnant Women Based on Positive and Negative

Table 1 shows that out of 60 patients, 28 (47%) patients gave negative results and 32 (53%) patients gave positive results.

### 2. Urine Leukocyte Examination Results in Pregnant Women Based on Age

Table 2 shows that of the 60 samples, based on the age group of 17-20, 1 patient (2%) had a negative result, 1 (2%) patient had a positive result, aged 21-25 years had a negative result, 7 (12%) patients, who had positive results 3 (5%) patients, ages 26-30 who had negative results 7 (12%) patients, who had positive results 6 (10%) patients, ages 31-34 who had a negative result 5 (8%) patients, who had a positive result 10 (17%) patients, ages 35-38 who had a negative result 4 (7%) patients, who had a positive result 6 (10%) patients, ages 39-42 who had a negative result in 3 (5%) patients, who had a positive result in 6 (10%) patients, and ages 43-46 who had a negative result in 1 (2%) patients, who had a negative result positive 0 (0%) patients.

### 3. Urine Leukocyte Examination Results in Pregnant Women

Table 3 shows that of the 60 samples, 28 (47%) patients had negative results, 20 (33%) 1st positive results, 9 (15%) 2nd positive results, and 3 positive results in 3 (5%) patients.

**Table 1. Results of urine leukocyte examination in pregnant women based on positive and negative**

Check-up result	Frequency (n)	Percentage (%)
Negative	28	47
Positive	32	53
Total	60	100

**Table 2. Results of urine leukocyte examination in pregnant women by age**

Age (Years)	Urine Leukocyte Results (+/-)	Frequency (n)	Percentage (%)
17-20	Negative	1	2
	Positive	1	2
21-25	Negative	7	12
	Positive	3	5
26-30	Negative	7	12
	Positive	6	10
31-34	Negative	5	8
	Positive	10	17
35-38	Negative	4	7
	Positive	6	10
39-42	Negative	3	5
	Positive	6	10
43-46	Negative	1	2
	Positive	0	0
Total		60	100

**Table 3. Urine Leukocyte Examination Results in Pregnant Women**

Check-up result	Frequency (n)	Percentage (%)
Negative	28	47
Positive 1 (+)	20	33
Positive 2 (++)	9	15
Positive 3 (+++)	3	5
Total	60	100

## DISCUSSION

Based on the results of collecting urine leukocyte examination data in pregnant women at the hospital, data were obtained for 60 patients. The overall results of these data obtained negative results in 28 (47%) patients, and as many as 32 (53%) patients gave positive results.

Table 1 shows that positive urine leukocytes can be caused by microorganisms in the urine. Leukocyte esterase is a condition in which some

leukocytes secrete the esterase enzyme which can be caused by the presence of bacteria belonging to the Enterobacteriaceae group (Sabriani et al., 2021). A positive result for urine leukocytes is because there are bacteria in the urinary tract causing infection and triggering the release of urinary leukocytes so that when urinating the leukocytes come out with auri-nexia or are in the body of a patient who has an infection in the urinary tract (Syarif et al., 2020).

Leukocytes secreting esterases can be chemically detected. Positive leukocyte examination results indicate the presence of leukocyte cells either in whole or in part as lysed cells. Leukocytes have many types, in this case, they show objects they recognize as foreign bodies. However, in general, an increase in the number of leukocytes above normal limits is a sign (Syarif et al., 2020).

In a study conducted by Maizah (2018) in the Batu-marmar sub-district of Pamekasan Madura, it was shown that there was an increase in the number of 60% of subjects, and was supported by research conducted by Dzulfikar which stated that the number of urinary leukocytes in pregnant women can increase gradually, accompanied by an increase in gestational age. Leukocytes during pregnancy change hemotactic function of the polymorphonuclear adhesion which will decrease at the beginning of the trimester and can last throughout the pregnancy. The number of urinary leukocytes in pregnant women can also increase due to physiological stress induced by pregnancy (Santoso, 2019).

Based on the age group, 10 (17%) patients had the most positive results at the age of 31-34 years and 0 (0%) patients had the lowest positive results at the ages of 43-46 years. Age greatly determines maternal health, there are 2 age categories, namely the age of the mother who is not at risk (age 20-35 years), and women aged 20-35 years are considered ideal for undergoing pregnancy and childbirth. In this age range, the physical condition of women is in prime condition.

The uterus is ready and able to provide maximum protection or conditions for pregnancy. And high-risk age (age <20 and <35 years). At the age of <20 years, the mother's emotions are not stable and the mother is easily tense, while birth defects can arise due to tension in the womb (Hikmah, 2017).

Urine leukocyte results in pregnant women from 60 patients, negative results were obtained in 28 (47%) patients, 1 positive result in 20 (33%) patients, 2 positive results in 9 (15%) patients, and 3 positive results in 3 (5%) patients. The dominant leukocytes found in the urine are types of neutrophil cells whereas leukocyte examination is an indirect examination to determine urinary tract infections such as nitrites (Santoso, 2019). In this study, the examination of urine leukocytes was to determine the presence or absence of leukocytes in the urine of pregnant women at Surabaya Hospital by collecting data from 60 samples that had been captured in laboratory data at Surabaya Hospital.

Interpretation of the results of the urine leukocyte examination by the strip dip method resulted in a color change from light brown to purple. A negative (-) result on the indicator paper shows a cream color, a positive 1 (+) on the indicator paper shows a light brown color (70 leu/ $\mu$ L), a positive 2 (++) on the indicator paper shows a light purple color (125 leu/ $\mu$ L), and a positive 3 (+++) on the indicator paper shows a dark purple color (500 leu/ $\mu$ L) (Natsir et al., 2022).

In the dipstick examination, leukocyte esterase is used as an indication of the presence of leukocyte cells

in the urine. A positive result of leukocyte esterase has a significant relationship to the number of neutrophil cells, both in intact and lysed states. Clinically, a UTI accompanied by positive results on nitrite and esterase leukocyte examination can confirm a urinary tract infection, but if the leukocyte esterase examination shows a negative result, UTI cannot be ruled out (Miftahurrahmah et al., 2021).

This study concluded that the results of leukocyte examination of pregnant women with normal results were obtained in 28 (47%) pregnant women patients and abnormal results in 32 (53%) pregnant women patients. Based on the age group, 10 patients (17%) had the most positive results at the age of 31-34 years and 0 patients (0%) had the lowest positive results at the ages of 43-46 years. Based on the age group, 10 (17%) pregnant women had the most positive results at the age of 31-34 years and 0 (0%) pregnant women had the lowest positive results at the ages of 43-46 years. Urinary leukocyte results in 60 pregnant women, negative results were obtained in 28 (47%) pregnant women, 1 positive result in 20 (33%) pregnant women, 2 positive results in 9 (15%) pregnant women, and 3 positive results in 3 (5%) pregnant women.

#### **AUTHOR CONTRIBUTION**

Nur Vita Purwaningsih, Rahma Widayastuti, Ellies Tunjung Sari conceived and designed the study; Firdausi Nuzula collected and analyzed the data and prepare the manuscript; Ainutajriani Reviewed the first draft of the paper; All authors have read

and approved the final version of the manuscript.

#### **CONFLICT OF INTEREST**

There is no conflict of interest in this study.

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