COMPARISON OF THE URINE PROTEIN EXAMINATION RESULTS USING THE DIPSTICK METHOD AND THE EWITZ METHOD AT KABILA HEALTH CENTER

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ABSTRACT

This study aims to determine the differences in the results of urine protein examination in pregnant women using the dipstick method and the ewitz method at the Kabila Health Center, Bone Bolango district. The method used in this research is analytic observational by looking for the relationship between variables through an analysis of the data from observations in the laboratory or through observation of the analytical process. From the results of the study of 28 samples of pregnant women, it was found that there was no significant difference from the comparison of the results of urine protein examination using the dipstick method and the Ewitz method, where the p value was 1,000.

Keywords: Urine Protein, Dipstick Method, Ewitz Method.

INTRODUCTION

The National Health Development Strategy is an effort to realize an increase in health status. Indicators of public health status are closely related to health conditions during pregnancy. Pregnancy is a process of forming life. Normal pregnancy lasts about 9 months from the first day of the last menstrual period until delivery. Every pregnancy has a high risk due to the condition of a pregnant woman who was initially fine slowly changing [14].

One of the risks that can occur in pregnant women is an increase in urine protein. This increase is caused by excess protein levels in the body that are filtered with low molecular weights. This condition usually results in death [13]. According to WHO, an increase in blood pressure and urine protein is the leading cause of death in pregnant women in the world. Both are related to each other if there is preeclampsia/eclampsia. Therefore, early detection is important to reduce the incidence from year to year [19].

Based on the report of the Basic Health Research, the highest prevalence of pregnant women in Indonesia in the age range of 10-54 years occurred in Southeast Sulawesi with a total of 2,091 people (6.2%) while the lowest was in Papua with 2,648 people at 3.0%. The prevalence of pregnant women in Indonesia is quite high, as well as the risk of death and the proportion of birth disorders, which mostly occur in the age range of 10-54 years. The type of laboratory examination (gluco-protein urine) used by pregnant women in rural and urban areas has different percentages, namely in urban areas as many as 43,650 people (38.7%) while in rural areas it only reached 36,998 people (28.5%). It shows that pregnant women in urban areas are

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more dominant in conducting examinations than in rural areas [6].

Based on the report of Gorontalo Province in 2018, the prevalence of pregnant women in Gorontalo Province reached 980 people (4.03%), where Bone Bolango district contributed the highest pregnancy rate reaching 304 people (3.6%). The proportion of disorders/complications (pre-eclampsia) experienced during pregnancy in women aged 10-54 years differs between urban and rural areas where the percentage is lower in rural areas. Therefore, it can be concluded that rural communities are more susceptible to increased urine protein than people in urban areas [6].

Kabila Health Center is one of 20 health centers located in Bone Bolango district with an area of 193.45 km². Kabila District consists of 5 sub-districts and 7 villages, namely Pauwo Village, Tumbihe Village, Oluhuta Village, North Oluhuta Village, Padengo Village, Tanggilingo Village, Dutohe Village, West Dutohe Village, Poowo Village, West Poowo Village, South Toto Village, Talango Village. The administrative boundaries of the sub-districts are as follows: in the west it is bordered by Gorontalo City, in the east by Suwawa sub-district, in the south by Botupingge sub-district, in the north by Tilongkabila sub-district.

Based on data at the Kabila Health Center, Bone Bolango district (2021), of 421 pregnant women, 47% of them are pregnant women in the 1st and 2nd trimesters. To see the presence of protein in urine, it is necessary to have an early examination at 0-26 weeks of gestation. In addition, this protein is a marker of kidney damage, a marker of cardiovascular mortality risk, and a predictor of progression of kidney disease. The amount of protein excreted in the urine correlates with the magnitude of the decrease.

The dipstick method, acetic acid, and sulfosalicylic acid are several methods of examining urine protein that can be carried out which need to estimate the accuracy of the diagnosis. In the dipstick method, the strip is dipped into the urine to see the indicator parameters, while the Sulfosalicylate method is used to test urine as a determinant of the presence or absence of protein in the urine.

There was a previous study (Kurniawan, 2016) that measured the accuracy of the results of urine protein examination using three methods, namely the dipstick method, 6% acetic acid method, and 20% sulfosalicylic acid method on 45 urine samples. From each method, 7 samples (15.6%) had negative results, 18 samples (40.0%) had positive 1 results; 14 samples (31.1%) had positive 2 results; 5 samples (11.1%) had positive 3 results; and 1 sample (2.2%) had positive 4 result so that the p value obtained was 1.000, which means that there was no difference in the test results [7].

Research conducted by Indranila & Lukitaning (2012) showed that the results of the sensitivity and specificity examination where the dipstick method had a negative result but the sulfosalicylic acid method which was used as the gold standard of examination had positive results even though both methods used the same urine sample. Disadvantages of the dipstick method are that its use requires great care and the strip used must be placed in a tightly closed container in a cold environment and protected from moisture, light, and chemical vapors [5].

Pregnancy is a series of events that occur when the ovum is fertilized and then the ovum develops into an aterm fetus [12]. Pregnancy is a process that starts from conception when a sperm meets an ovum. The cell will be divided then followed by nidation or implantation of the zygote on the wall of the reproductive tract (womb) so that the growth and

development of the zygote becomes an embryo until a fetus is formed. In 40 days the semen that has been fused gradually becomes a clot of blood. A womb is a safe and secure place, the temperature inside is balanced between hot and cold, and is also sturdy so that the fetus is maintained until the time of birth arrives [16]. During the chain of conception (fertilization), implantation (nidation), spiritual and physical changes in pregnant women occur due to the release of specific hormones that cause symptoms and signs of pregnancy as a sign of suspected pregnancy, a sign of possible pregnancy, and a sign of definite pregnancy [20].

Pregnancy in the first trimester occurs at 0-13 weeks of gestation. In this trimester, the growth and development of the fertilized egg occurs in three phases, namely the ovum phase, the embryonic phase, and the fetal phase. Pregnancy in the second trimester occurs at the gestational age of 14-26 weeks. In this trimester there is a rapid growth in which the renal venous pressure also increases so that in this trimester it is recommended to carry out laboratory tests to determine the possibility of diseases that are harmful to the growth process. The third trimester of pregnancy occurs at 27-40 weeks of gestation. In this trimester, there has been an improvement in the organs and forms of the growing fetus that is ready to be born. During this trimester, various anatomical and physiological changes occur in the body of a pregnant woman. The third trimester is often referred to as the waiting and alert period for pregnant women for the birth of their baby [21].

Pre-eclampsia is a complication that occurs in the first and second trimesters of gestation. It is a medical condition in which hypertension occurs at 20 weeks of gestation accompanied by protein in the urine of pregnant women. Symptoms that arise include an increase in blood pressure > 140/90 mmHg and protein content is found in the urine (Ni'mah, 2017). Proteinuria is an indication of pre-eclampsia so that during antenatal care visits, pregnant women are recommended to do urine protein examination in the laboratory.

The content of urine consists of mostly water (96%) and a small amount of dissolved substances (4%) which are produced by the kidneys and stored temporarily in the bladder and then excreted from the body through the lower urinary tract. The dissolved substances consist of urea, uric acid, creatinine and organic matter. The specific density of urine in the morning is around 1.015–1.025 and is around 1.003 for random urine [3].

Protein urine is a condition in which there is protein in the urine in large quantities resulting from kidney damage [12]. Proteinuria is a manifestation of many kidney disorders and is an indicator of worsening kidney function. The kidneys maintain salt balance and control extracellular fluid osmolarity by maintaining fluid balance [8]. The finding of proteinuria in pregnant women indicates the possibility of an increase in blood pressure or experiencing edema which will continue to pre-eclampsia. If this incident is not handled properly, it can cause death for both mother and fetus [11].

Proteinuria is a condition where protein is found in human urine that exceeds the normal value, namely > 150 mg/day or in children > 140 mg/m2. In general, proteinuria will be said to be pathological if the level has exceeded 200 mg / day on several examinations at different times. It is called persistent proteinuria if the urine protein has persisted for 3 months or more even though the amount is usually only slightly above the normal value [2].

Proteinuria is a prerequisite for the diagnosis of pre-eclampsia although

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proteinuria generally develops late in pregnancy. In certain conditions, such as if the fetus has been born earlier, a pre-eclampsia can be found without proteinuria [12]. A large amount of protein found on a routine urine examination, both asymptomatic and symptomatic, can be an early sign and may be evidence of serious kidney disease. In fact, kidney disease rarely occurs without proteinuria. Most cases of proteinuria are usually transient, unimportant or non-progressive kidney disease. Although the amount of protein excreted in the urine varies and is small, it is directly responsible for serious metabolic disorders. The presence of protein in the urine is very important to note and requires further research to determine a cause/disease. The prevalence of proteinuria found during routine screening examinations in healthy people is around 3.5%. Proteinuria is not always a manifestation of kidney disease. Usually, proteinuria is said to be pathological when its levels are above 200 mg/day on several examinations at different times. Some opinions state that proteinuria is persistent if urine protein has persisted for 3 months or more and the amount is usually only slightly above normal values. It is said to be massive proteinuria if there is protein in the urine exceeding 3500 mg/day and usually the majority consists of albumin [5].

Proteinuria may increase due to several conditions including changes in glomerular permeability following increased filtration of normal plasma proteins, especially albumin; failure of the tubules to reabsorb small amounts of protein that are normally filtered; glomerular filtration of the circulation is abnormal; low molecular weight protein (LMWP) in an amount that exceeds the tubular reabsorption capacity; and increased secretion of urothelial maculoprotein and IgA (Imunoglobulin A)

secretion as the inflammatory response [11].

One of the factors that affect urine protein is a state of stress which can also trigger hypertension. This is caused by the performance of creatinine as a regulator of urine protein levels to be unstable, resulting in difficulty for kidney function to neutralize urine protein. Stress itself can be avoided by sharing with a trusted friend or closest people [5]. Other factors that trigger the appearance of urinary protein are complications in pregnancy which are characterized by high blood pressure and the use of drugs that can interfere with kidney function such as aminoglycoside drug toxicity and chemical toxicity [11].

An examination of protein in the urine aims to determine the complications of pre-eclampsia in pregnant women which often cause problems in pregnancy and childbirth. These complications sometimes cause illness and even death for the mother and baby if not immediately anticipated.

Urine protein examination is an examination of protein using several methods including the dipstick method by using colored strips of paper dipped in urine and then seeing the results on the indicator parameters [10]. Previous research by Citra (2018) showed the accuracy of the dipstick method reached 89.28%. This method uses tetra bromosulfophthalein (buffer) so that when there is protein content it will form a light green to dark green compound. Another method is to use sulfosalicylic acid. Besides being cheaper and can be done quickly, sulfosalicylic acid is considered sensitive in detecting proteinuria. This method can use random urine samples and only requires urine and sulfosalicylic acid. The results were assessed based on the turbidity of the urine and recorded by manual inspection [10]. [10].

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Proteinuria affects the walls of blood vessels and the surrounding tissue structure [11].

RESEARCH METHOD

This study used a quantitative approach which emphasizes more on information in the form of numbers which can represent a variable [9]. This type of research was structured based on an analytical observational research approach, a study that seeks the relationship between variables by conducting an analysis of the collected data and then conducting observations in the laboratory to observe the analytical process [17]. A population is all objects that meet the predetermined criteria [9]. The population of this study were all pregnant women at the Kabila Health Center, Bone Bolango district.

Variables are factors that play a role in events and become objects of research. There are two types of variables used in this study, namely the independent variables in the form of urine examination using the 20% sulfosalicylic acid method and urine examination using the dipstick method; and the dependent variable was the results of urine protein examination.

The sampling technique used in this research was purposive sampling to determine criteria or comparisons with the variables used. Data analysis was carried out by testing the normality and homogeneity of the data using the Shapiro-Wilk test in advance because respondents <50. If the results show that the data is normally distributed, the test used is the Difference Test or t' test using the Statistical Package for the Social Sciences (SPSS) application.

SPSS application (Statistical package for social science) is a computer program that is useful for making various types of statistical analysis. The application used in this research is SPSS version 16.0. After all the data is processed, then the presentation of the data is carried out. The data is presented in tabular form along with narration to describe the comparison of the results of urine protein examination in pregnant women using the dipstick method and the Ewitz method at the Kabila Health Center, Bone Bolango district.

RESULTS

Based on urine protein examination using the dipstick method, 23 samples showed negative results with a percentage of 82.1%, 4 samples showed positive results + with a percentage of 14.3%, and 1 sample showed positive results + + with a percentage of 3.6%.

Table 1. Distribution of Gestational Age at the Kabila Health Center

Gestational age	Frequency	
	N (Total)	%
0-13 Weeks (Trimester 1)	23	82.1
14-26 Weeks (2nd Trimester)	5	17.9
Total	28	100.0

Source: Primary Data, 2021

Table 1 shows that of the 28 sample respondents, the first trimester group was more than the other age groups, which amounted to 23 people with a percentage of 82.1%. The second trimester group consisted of 5 people with a percentage of 17.9%. The presence of urine protein in pregnant women can indicate abnormalities in the kidneys. This is in line with Tandra's theory [18] that at the age of 3 months (first trimester) one of the symptoms of abnormalities in the kidneys is the discharge of urine protein of more than 3 grams per day.

The sample with the 2nd trimester gestational age group was 5 people with a percentage of 17.9%. Examination of

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protein in the urine of pregnant women is carried out in the second trimester to determine any indications of pregnancy disorders.

Table 2. Distribution of respondents based on blood pressure during pregnancy

Increased Blood Pressure During Pregnancy	Frequency	
	N (Total)	%
Yes	16	57.1
Normal	12	42.9
Total	28	100.0

Source: Primary Data, 2021

Table 2 shows that pregnant women who experience increased blood pressure (hypertension) during pregnancy are 16 people with a percentage of 57.1% while the normal blood pressure group is 12 people with a percentage of 42.9%. Women who have hypertension during pregnancy have a higher risk of developing hypertension in their next pregnancy. Chronic hypertension in pregnancy is indicated by blood pressure results of 140/90 mmHg which can occur before pregnancy or be found before 20 weeks of gestation.

Table 3. Distribution of respondents based on urine protein examination

Have checked urine protein	Frequency	
	N (Total)	%
Once	2	7.1
Never	26	92.9
Total	28	100.0

Source: Primary Data, 2021

Table 3 shows that the pregnant women who did urine protein examination are as many as 2 people with a percentage of 7.1%, while those who have never done urine protein examination are 26 people with a percentage of 92.9%.

Table 4. Distribution of respondents based on the results of urine protein examination

Urine Protein Examination Results	Frequency	
	N (Total)	%
Positive 1-4	1	3.6
Unknown	27	96.4
Total	28	100.0

Source: Primary Data, 2021

Table 4 shows that of the 28 pregnant women, the group who knew the results of the urine protein examination they did at that time amounted to 1 person with a percentage of 3.6%, while the group who did not know the results of the examination was 27 people with a percentage of 96.4%..

Table 5. Distribution of urine protein examination results using dipstick method

Urine Protein Examination Results Using Dipstick Method	Frequency	
	N (Total)	%
Negative	23	82.1
Positive 1	4	14.3
Positive 2	1	3.6
Positive 3	0	0

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Positive 4	0	0		1,000	0,05	Insignific ant
Total	28	100.0				

Source: Primary Data, 2021

Source: Primary Data, 2021

Based on the results of urine protein examination using the dipstick method, 23 people were negative with a percentage of 82.1%, 4 people were positive 1 with a percentage of 14.3%, and 1 person was positive 2 with a percentage of 3.6%.

Table 6. Distribution of urine protein examination results using Ewitz method

Urine Protein Examination Results Using Ewitz Method	Frequency	
	N (Total)	%
Negative	23	82.1
Positive 1	4	14.3
Positive 2	1	3.6
Positive 3	0	0
Positive 4	0	0
Total	28	100.0

Source: Primary Data, 2021

Based on the results of urine protein examination using the Ewitz method, 23 people were negative with a percentage of 82.1%, 4 people were positive 1 with a percentage of 14.3%, and 1 person was positive 2 with a percentage of 3.6%.

Table 7. The results of the SPSS Mann Whitney test on urine protein examination using the dipstick method and the Ewitz method

Urine Protein Examinat ion	Signific ant (2-Tailed)	Signific ant Rate	Descripti on

Based on the table above, the results of the comparative analysis on urine protein examination using the dipstick method and the Ewitz method are 1,000 > 0.05, thus the null hypothesis (H0) is accepted and the alternative hypothesis is rejected.

The normality analysis of the data was carried out before the frequency distribution test was carried out using the Shapiro-Wilk test. However, at the time of testing, the results obtained were not significant, so it can be concluded that the data were not normally distributed. Therefore, a non-parametric test was carried out with the Mann Whitney test.

DISCUSSION

Table 1 shows that of the 28 sample respondents, the first trimester group was more than the other age groups, which amounted to 23 people with a percentage of 82.1%. The second trimester group consisted of 5 people with a percentage of 17.9%. The presence of urine protein in pregnant women can indicate abnormalities in the kidneys. This is in line with Tandra's theory [18] that at the age of 3 months (first trimester) one of the symptoms of abnormalities in the kidneys is the discharge of urine protein of more than 3 grams per day. The sample with the 2nd trimester gestational age group was 5 people with a percentage of 17.9%. Examination of protein in the urine of pregnant women is carried out in the second trimester to determine any indications of pregnancy disorders.

Based on the results of the study presented in table 2, which is about the characteristics of respondents based on blood pressure during pregnancy, the group of pregnant women who

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experienced an increase in their blood pressure was 16 people with a percentage of 57.1% while the group with normal blood pressure was 12 people with a percentage of 42.9%. Women who have hypertension during pregnancy are at risk of developing hypertension again in their next pregnancy. Hypertension is said to be chronic if the blood pressure is 140/90 mmHg which can occur before pregnancy or is found before 20 weeks of gestation.

Hypertension or increased blood pressure during pregnancy is a sign of the occurrence of protein in the urine. This is in line with Wantania's theory that high blood pressure contributes 5-10% of pregnancy complications and is one of the most common causes of death. Pre-eclampsia is characterized by systolic blood pressure above 140 mmHg or diastolic blood pressure above 90 mmHg after 20 weeks of gestation without a history of previous hypertension or found proteinuria of 35 grams or more per liter in 24 hours [19].

The results of the study presented in Table 3 show the distribution of characteristics of respondents who have had urine protein examination. From these results, information was obtained that a total of 26 pregnant women had never done urine protein examination with a percentage of 92.9%, a total of 2 people had done a urine examination once with a percentage of 7.1%. This relates to the knowledge of respondents about the importance of urine protein examination. Based on these results, it can be seen that there are still many pregnant women who do not know the importance of urine protein examination during pregnancy and some have never had urine protein examination during pregnancy..

It should have become a tradition to have knowledge about early detection of urine protein which is very important for every pregnant woman to know. The purpose of this examination is to determine whether the physical condition and the fetus in the body are in fine and healthy states. This is in line with Ni'mah's theory that it is important to check urine protein in order to find out the complications of pre-eclampsia in pregnant women, which in fact often causes problems in pregnancy and childbirth and sometimes causes death of the mother and baby if the incident is not immediately followed up [11].

The results of the study presented in table 4 show the distribution of the characteristics of the respondents based on the results of the urine protein examination that had been done previously. From the results, it was found that as many as 1 person knew the results of their urine protein examination were in the positive 1 category with a percentage of 3.6% and as many as 27 people did not know the results of the examination with a percentage of 96.4%. This is because there are still many of these respondents who have never done urine protein examination so that they do not know the state of urine protein in their bodies.

Based on the results of the study presented in table 5, it shows that as many as 23 people had negative urine protein results with a percentage of 82.1%; as many as 4 people had a positive result 1 with a percentage of 14.3%; and 1 person had 2 positive results with a percentage of 3.6%. The examination was carried out using the dipstick method which utilizes cellulose paper. On the cellulose paper, a strip of reagent is placed to be used in detecting protein in the urine.

The blue indicator of tetrabromophenol is used as a dye strip in detecting protein in urine. The test focuses on the pH of the urine and the result will cause a color change from yellow to green to dark green depending on how much protein is in the urine. The degree of discoloration is determined by the protein content in the liquid so that the color

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change becomes a semi-quantitative measure of proteinuria. Although there is a drawback to the dipstick examination, which must be read immediately after dipping in the urine because if it is delayed it will cause false positive results, but this method also has the advantage that the examination results can be obtained in a short time.

Based on the results of the study presented in Table 6, it shows that in the examination of urine protein using the Ewitz method there were 23 people who had the negative urine protein results with a percentage of 82.1%; as many as 4 people had the positive 1 result with a percentage of 14.3%; and 1 person had the positive 2 result with a percentage of 3.6%. In the negative test result, there was no turbidity, while positive 1 had mild turbidity, and positive 2 had higher turbidity making it easy to see.

The working principle of the Ewitz method is to see the presence of protein in the urine using the addition of acid. If there is turbidity in the urine being examined, then the result is declared positive. Through the examination of urine protein using the Ewitz method and the dipstick method on 28 pregnant women with the first and second trimesters of pregnancy, which were carried out at the Kabila Health Center, Bone Bolango district using one time urine collection, it was obtained a semi-quantitative result.

This examination uses two methods, namely the dipstick method by dipping the strip into the urine and then removing it and placing it on a dry tissue until the urine is absorbed and then reading the results immediately; and the Ewitz method using two tubes containing 4 ml of urine each, then the second tube with 8 drops of 20% Sulfosalicylic Acid reagent then homogenized. After being homogenized, it was seen whether there was turbidity or not. If there is turbidity,

then the stage is continued to the heating process until the urine boils. According to Kurniawan's [7] that the heating process aims to see the protein in a denatured and precipitated state. The addition of sulfosalicylic acid was carried out with the aim of reaching the isoelectric point of the protein. The precipitation process is assisted by the salts contained in the urine.

According to Ginting [1] the determination of the isoelectric point can be done by adding an acid pH and seeing the amount of sediment and turbidity produced by each pH. At this isoelectric point, the solubility of the protein decreases and reaches the lowest number so that the protein will precipitate and agglomerate.

If the turbidity persists, it means that the urine is positive and contains protein, but if the turbidity disappears, it indicates the presence of other substances in the urine. This is in line with Gandasoebrata's theory [4] that when the addition of 20% sulfosalicylic acid then the turbidity disappears, the turbidity is caused by calcium phosphate. If the turbidity disappears but then gas is formed, then the turbidity is caused by calcium carbonate. However, if the turbidity persists or increases with the addition of 20% sulfosalicylic acid, then the urine is positive and contains protein.

In this study, from the comparison between urine examination using the dipstick method and the Ewitz method on 28 samples of pregnant women, 23 samples (82.1%) had negative results, 4 samples (14.3%) had positive 1 results, and 1 sample (3.6). %) had positive 2 results using either the dipstick method or the Ewitz method. This indicates that from the two methods of examining urine protein, a p value of 1,000 was found, meaning that there was no significant difference between the results issued by the dipstick method and the Ewitz method.

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This is in line with Kurniawan's research [4] who examined urine protein using three methods, namely the dipstick method, 6% acetic acid method, and 20% sulfosalicylic acid method on 45 urine samples. From each method, it was found that 7 samples (15.6%) had negative results for urine protein; 18 samples (40.0%) had positive 1 results; 14 samples (31.1%) had positive 2 results; 5 samples (11.1%) had positive 3 results; and 1 sample (2.2%) had positive 4 result.

According to Sriwidadi [15], the basis for making decisions to accept or reject the hypothesis is using the Maan Whitney test with the Exact.Sig column. (2-tailed)/significance is the result of a two-sided test or probability > 0.05 indicating H0 is accepted, which means there is no difference.

CONCLUSION

From the results of the research carried out on 28 urine samples, it can be concluded as follows:

1. Based on the urine examination using the dipstick method on 28 samples of pregnant women, 23 samples (82.1%) had negative results, 4 samples (14.3%) had positive 1 results, and 1 sample (3.6). %) had a positive 2.

2. Based on the urine examination using the Ewitz method on 28 samples of pregnant women, 23 samples (82.1%) had negative results, 4 samples (14.3%) had positive 1 results, and 1 sample (3.6). %) had a positive 2.

3. From the comparison between urine examination using the dipstick method and the Ewitz method on 28 samples of pregnant women, found the p value of 1,000, meaning that there was no significant difference between the results issued by the dipstick method and the Ewitz method.

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