

**Correlation Between Leukocyturia, Bacteriuria And Glucosuria In Diabetes Mellitus
(DM) patients.**

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ABSTRACT

Diabetes mellitus are increasing in globally in the world every year and its cause many complications. DM causes several abnormalities of immune system and it might result in a higher risk of certain infections, including Urinary Tract Infection (UTI). Glucose, leucocyte and bacteria finding in the urine are suggestive in the urine of diabetic patient with UTI. This study was aim to find the prevalence and the correlation between glucose, leucocyte and bacteri in the urine of diabetic patients of Hospital dr. Kariadi Semarang in Semarang. Cross –seccrional study desain was conducted on patients with DM. Among that 30 sample in the age of > 20 years. And Saphiro-Wilk tests, Spearman and regresi linier analysis were used to analyze the data, p value of < 0,05 was considered statistically significant, with the confidence interval of 95 %.

Keywords: glucose, urinalysis, diabetes mellitus, leucocyturia, bacteriuria.

INTRODUCTION :

Diabetes mellitus in the world increased faster in the last decade, it is about 30 million cases in 1985 to 177 cases in 2000 and is forecast to be 360 million cases in 2030. 1.) Diabetes mellitus is not only a well known as a metabolic disease characterized by hyperglycemia as the resulting from defects in insulin secretion and / or insulin action. 2) Diabetes Is also a associated with increased levels of sensitive marker of subclinical systemic inflammation. Several DM causes abnormalities of the immune system and it might result in higher risk as Urinary tract infection Infection (UTI) 3) Urinary tract infection (UTI) is one of the most common disease, and is a major cause of sepsis in hospitalized patients. 4) Glucose, leukocytes and bacteria in the urine finding in diabetes patients with UTI and urinalysis are important for an early detection biomarkers, in order to prevented complications and severity of UTI.5)

METHODS:

Research conducted at the hospital dr. Kariadi Semarang in the period of October to December 2016. The target population is people with Type 2 diabetes regardless of ethnic differences. The samples studied were 30 people who have agreed to participation. This study aim was to find the prevalence and the correlation between glucose, leukocyte and bacteria in the urine of diabetic patients . Cross -seccrional design study was conducted on patients with DM. Among that 30 samples in the age of> 20 years, were taken blood and urine to be examined blood glucose, urine glucose, urine leukocyte and urine bacteriuria. Test were assessed using chemistry automatic analyzer and automatic analyzer. Spearman tests and regressi linier test were used to analyze the data, the p value of <0.05 was considered statistically significant, with the confidence interval of 95%.

Benchmark equity includes patients with a diagnosis of type 2 diabetes by a clinicians. Random blood sugar levels were between 70-200 mg / dL . Patients agree and approved to participate in research; Fresh urine samples were collected and was not contaminated. Blood sugar take as a blood sugar on the spot. Patient is not included when: non-diabetic patients with kidney disease, patients with anemia, patients with a history of blood transfusion last 3 months, consumed antibiotics. Blood glucose tests and urinalysis examinations using the automatic analyzer and automatic urine chemistry analyzer.

RESULTS AND DISCUSSION:

The data of the basic characteristics of the 30 study subjects is shown in Table 1. The result is the basic characteristic of the study subjects with a mean age of 55.83, consists of men 13,3 (43.3%) and women 17(56 , 7%).

Table 1. Table of frequency of sex and age.

Variable	Mean	Standard deviation	Median	N (%)
Age (years)	55,83	13,45	54	
Gender				
Male				13(43,3)
Female				17(56,7)
Random Blood sugar	201,2	721,95	210	30

(GDS)				
Glucosa urin	116,67	108.16	00	30
Lekosituri	278,43	721,95	47,90	30
Bakteri uri	2491,65	4655,26	189,10	30

Results of the study in DM patients, with random blood glucose (GDS) was 11.67 ± 721.95 , , whereas the mean urinary glucose levels was 116 ± 108.16 , the mean leukocyte uri 278.43 ± 721.95 , the average bacteriuri is 2491.65 ± 4655.26 . Results data, testing normality premises with Shapiro-Wilk test because the sample size of 30. Results scattered all data is not normal, statistical analysis used was Spearman Rho correlation analysis followed by linear regression analysis to analyze the relationship between GDS levels, urine glucose, lekosituri and bacteriuria at UTI.5) See Table 2.

Table 2. Descriptif dan Normality of Data

Variable	F (%)	Mean \pm SD	Median (min – max)	P
Gender				
Male	13 (43,3)			
Female	17 (56,7)			
Age (years)		$55,83 \pm 13,46$	54 (33 – 81)	0,408
GDS		$201,2 \pm 108,16$	210 (50 – 460)	0,051
Glucose urin		$116,67 \pm 231,31$	0 (0 – 1000)	0,000
Lekocyte		$278,43 \pm 721,95$	47,9 (4,1 – 3723,4)	0,000
Bacteri		$2491,7 \pm 4655,3$	189,1 (14,5 – 18468)	0,000

BLOOD GLUCOSE AND URINE GLUCOSE

Correlation between blood glucose and urine glucose ($p = 0.000$; $r = 0.717$), correlated were significant, strong positive. Diabetic patient usually controlled with principles based on examination of urinary glucose levels with dip strip or with automatic urine analysis. The usefulness of urinary glucose in the management of diabetes depends on its accuracy in the reflecting the blood glucose concentration. This correlation will be influenced by the urine volume, the renal threshold for glucose, and the peak blood glucose

levels between bladder reached voidings. These factors may alter from day-to -Day because of variations in the patient's activity, fluid intake, and general health, and qualitative change in the carbohydrate eaten. 6)

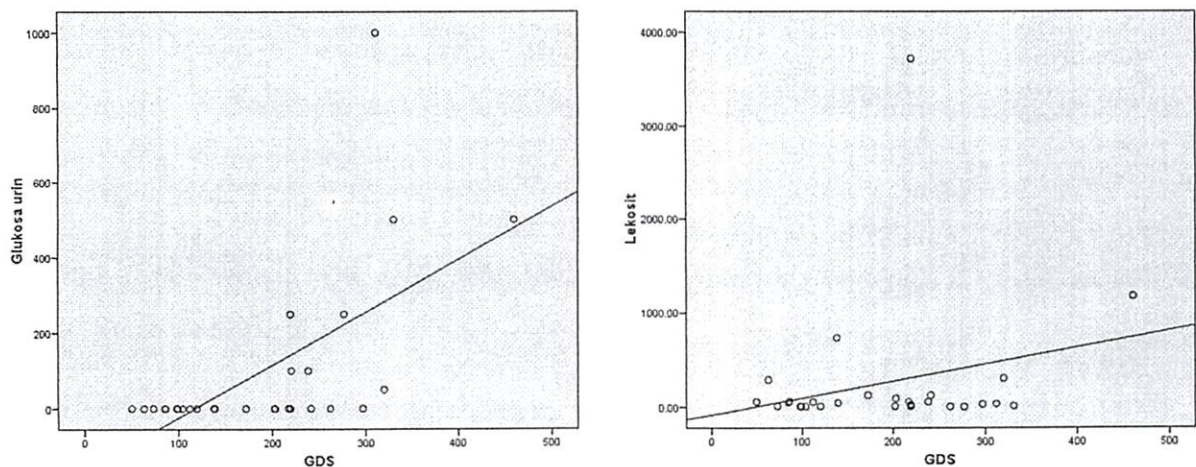


Figure 1. Regressi linier between blood glucose and urine glucose, leucocyte urine

BLOOD GLUCOSE AND LEUCOCYTE

Correlation between blood glucose(GDS) and leucocyte ($p=0,393;r=0,162$) shown not significant. Urinary tract infection (UTI) are more prevalent in diabetic patient and may evolve to complications and/or serious manifestations. The main risk factors for UTI in diabetic patient are : inadequate glycemic control, duration of Dm, diabetic microangopathy, Impaired leucocyte function, recurrent vaginitis, and anatomical and functional abnormalities of the urinary tract. (7). see. Fig1

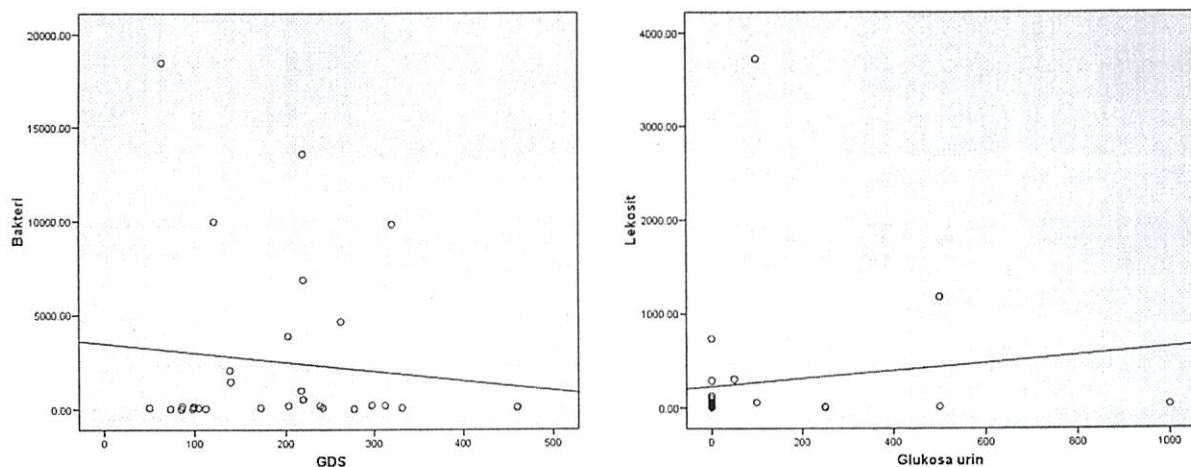


Figure 2. regresi linier between blood glucose, bakteriuri and Leukocyturi

BLOOD GLUCOSE AND BACTERIURIA

Correlation between blood glucose (GDS) and bacteri (p=0,527;r=0,120), shown not significant. Although women with Diabetes mellitus have greater prevalence of asymptomatic bacteria, the data on the natural history of this condition in women with DM are conflicting. Some studies reported progression to pyelonephritis. Whereas other suggested that this does not lead to serious complications. 8,9.acute pyelonephritis is 4-5 times more common in individuals with DM, with most infections are caused by Escherichia coli or Proteus Sp. 10) see fig.2

Tabel 3. Tabel Hasil Uji Korelasi Spearman's

Variable		P	R	Explanation
GDS	glucose urin	0,000	0,717	Signifikant, strong positive
	Lecocytece	0,393	0,162	Not significant
	Bacteri	0,527	0,120	Not signifikan
Glucose urin	Lecocyte	0,462	0,139	Not signifikan
	Bacteri	0,781	-0,053	Not signifikan
Leucocyte	Bacteri	0,376	0,168	Not signifikan

GLUCOSE URIN AND LEUCOCYTE

Correlation between glucose urin and leucocyte (p=0,462;r=0,139)were not significant. Diabetes affects many systems that protect against infection in general, and against urinary tract infections specifically. Poor circulation in diabetes reduces the ability of infection-fighting white blood cells to get where they need to go. When they do get there, they are less able to ingest the offending bacteria and kill them than normal white blood cells. Many people with dabetes also have dysfunctional bladders that contract poorly. This allows urine to remain in static pools for long periods of time, providing luxurious ponds for bacteria to grow in.11) see fig.2

GLUCOSE URIN AND BACTERIURI

Correlation between glucose urin and bakteri ($p=0,781; r= - 0,053$) were not significant. Women with diabetes are about two or three times more likely to have bacteria in their bladders than women without diabetes. Interestingly, the same does not appear to be true for men. There also seems to be an increased risk of the infection spreading upwards into the kidneys in diabetic patients, and diabetic women with urinary tract infections are also more likely to require hospitalization than non-diabetic women. 12) see fig.3

LEUCOCYTE URIN AND BACTERI URINE

Correlation between leucocyte urin dan bakteri urin ($p= 0,376; r=0,168$) were not significant. Lecocyturia (LU) is defined as the presence of leucocytes in urine. LU may be due to urinary infections or non-infectious factors. Bacteriuria (BU) without LU can be countered especially in some conditions such as chronic renal failure, heart failure, and diabetes mellitus. LU associated with urinary tract infection (UTI) is considered to be significant when it is $\geq 10/mm^3$ in women, $5-10 \geq$ leucocyte/in men. 13 kucukbayrak). Studies have shown that LU is predictive value for BU. BU is the presence of bacterium in urine in person without symptoms of urinary system. BU is significant is the presence of $\geq 10^5$ cfu/ml of bacteria at mid-stream urine sample. BU is common in all age groups. However, it is more common in individuals with advanced age. 13) see fig.3

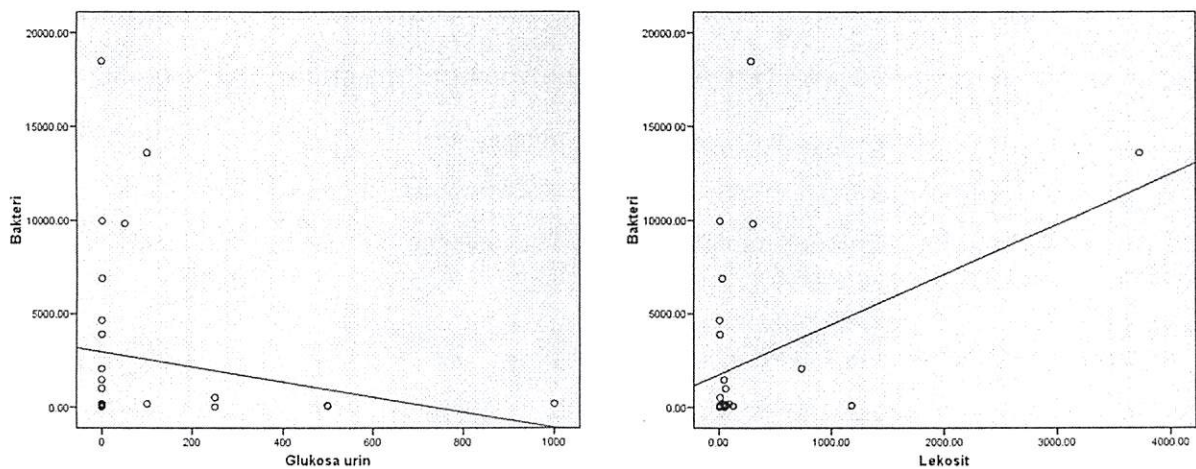


Fig.3. Regressi linier between glucose urin, Bacteriuri and leukocyturi

CONCLUSIONS AND SUGGESTIONS:

Based on this carefully results situations it can be concluded that with a 95% confidence interval, that there are a significant relationship between: 1) blood sugar and glucose urine in patients with DM. Rrelationship without significantcy exists between:

1) blood sugar and leucocyte uri; 2) blood sugar and bacteria uri; 3) glucose urin and leucocyte uri; 4) Glucose urine and bacteriuria; 5) bacteriuria and leucocyte uri.

Based on this situations, researchers believe there is a need to be investigated further with a different design, a large number of samples patients, and samples were divided into 3 groups with normal blood sugar group, prediabetic group, diabetic group. Normal patients, prediabetic, and diabetic, to be examined the risk of UTI. Thus will be seen clear whether there is any significance of diabetes and urinalysis or UTI.

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