

## **Infectious disease in diabetic and non-diabetic patients In Jalalabad Nangarhar, Afghanistan**

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### **Abstract:**

Diabetes is a clinical syndrome caused by either lack of insulin or lack tissue response to insulin resulting in disorder of metabolism of different nutrients and affecting any system of body including immune system.

Aim of research was to find out the incidence of different infectious disease in diabetic and non-diabetic patients and comparison between the infectious disease in both Diabetic and non-diabetic groups. The study design was cross sectional. And was carried out in Nangarhar University Teaching Hospital from 2018 February to 2019 March on 200 diabetic and non-diabetic Afghani patients, 75(37.5%) diabetic and 125(62.5%) were non –diabetic. The age range of cases were 15 to 80 years. Among non-diabetic patients 72(57.6%) was male and 53(42.4%) female, while in diabetic patients 30(40%) was male and 45(60%) female

In the study we found that prevalence of urinary tract infection and COPD exacerbation were high in diabetic patient's .COPD exacerbation was 17% in diabetic patients, in non-diabetic patients 4%,urinary tract infection was 46.7% in diabetic patients and 24% in non-diabetic patients, acute gastro enteritis in diabetic group were 13.4% while in non-diabetic group were 38.4%.The common cause or urinary tract infection in both groups was E coli, and the Sensitive drugs were amikacin clindamycin, imepenu, and gentamycin.

**Key words:** Urinary tract infections, chronic obstructive pulmonary disease, Lower respiratory tract infection, acute gastro enteritis.

### **Introduction:**

Diabetes mellitus is a clinical syndrome associated with deficiency of insulin secretion or Action. It is considered one of the largest emerging threat to health in the 21<sup>th</sup> century. It is Estimated there will be 380 million persons with diabetes at 2025(1).Besides the classical Complication of disease, D M has been associated with reduced response of T cells, Neutrophil functions, and disorder of hum oral immunity (5, 10). Consequently, D M increase Susceptibility to infections (10).Such infection in addition to the repercussion associated with its infectivity, may trigger D M complications such as hypoglycemia and ketoacidosis. The Article aims to describe the mechanisms with the more susceptibility of diabetic patients for Developing infectious diseases and describe main infectious disease Associated with this metabolic disorder, and also compare infectious disease of diabetic and Non-diabetic patients' D M is associated with increased risk of morbidity and mortality Caused by infectious disease(1-12).Studies mechanistically ,it is plausible in addition to

diabetes mellitus hyperglycemia itself increase risk of infection, hyperglycemia has been Shown to impair important component of immunity which are described below:

#### Complement system:

The complement system consists of approximately 20 proteins that are present in Normal human (and other animal) serum. The term *complement* refers to the ability Of these proteins to complement (i.e., augment) the effects of other components of the Immune system (e.g., antibody). Complement is an important component of our innate Host defenses.

There are three main effects of complement: (1) lysis of cells such as bacteria, Allografts, and tumor cells; (2) generation of mediators that participate in Inflammation and attract neutrophils; and (3) Opsonization (i.e., enhancement of Phagocytosis). Complement proteins are synthesized mainly by the liver Although some studies have detected a deficiency of the C4 component in DM, (12,4), this reduction of C4 is probably with polymorph nuclear dysfunction and reduced cytokine response (5,12).

#### Polymorph nuclear and mono nuclear leukocytes:

Hyperglycemia cause decreased Chemo taxis, decreased mobilization of Polymorph nuclear leukocytes, and phagocytic activity (10-9-14) Hyperglycemia increase apoptosis of Polymorph nuclear leukocyte and inhibit their antimicrobial activity by inhibiting glucose 6 phosphate dehydrogenase (10).

Major infections in diabetic patients:

#### Respiratory tract infections:

Streptococcus pneumonia and influenza virus are common cause of respiratory infections in diabetic patients (9.2).Diabetic patients need more six times hospitalization during influenza Epidemics than non-diabetic patients (10) .Diabetic patients are also at high risk of tuberculosis than non-diabetic patients(11,7).Chance of treatment failure and multi drug resistant tuberculosis is more frequently in individual with diabetes mellitus(23).

#### Urinary tract infections

Urinary tract infections are more prevalent in diabetic patients and may evolve to serious complications (6, 8) the main risk factors for UTI in diabetic patients are: inadequate glycemic control, duration of D M, anatomical abnormalities of urinary tract, impaired leukocytes function, recurrent vaginitis, impaired emptying of bladder due to neuropathy. In D M patient's bacterial pyelonephritis, emphysematous pyelonephritis, asymptomatic Bacteriuria, are more than non-diabetic patients (7)

#### Gastrointestinal infections

Chronic hyperglycemia contribute to increase risk of gastrointestinal infections (13).Salmonella species, Campylobacter, are more frequent in diabetic patients.

### Material and Method

The study design was cross sectional. And was carried out in Nangarhar University Teaching Hospital from 2018 February to 2019 March on 200 diabetic and non-diabetic Afghani patients, 75(37.5%) diabetic and 125(62.5%) was non –diabetic. The age range of cases was 15 to 80 years. Among non-diabetic patients 72(57.6%) was male and 53(42.4%) female, while in diabetic patients 30(40%) was male and 45(60%) female. The source population for this study include patents with at least one of these infectious disease such as respiratory infection (lower respiratory tract infection, Pneumonia, Bronchitis).

COPD exacerbation, gastrointestinal infection (diarrhea, dysentery) Urinary tract infection (Cystitis, acute pyelonephritis,). Information available includes patient demographics (e.g., age, sex), physiological data (e.g., blood pressure) and laboratory data (e.g., fasting glucose, Blood routine examination, Microscopic urine examination for glucose and pus cells, Urine culture and antibiogram for patients with urinary tract infection), Radiological data (chest -x-ray), physician diagnoses. .

Result:

The current study was carried out in Nangarhar University Teaching Hospital from 2018 February to March on 200 diabetic and non-diabetic Afghani patients, 75(37.5%) diabetic and 125(62.5%) was non –diabetic. The age range of cases was 15 to 80 years. Among non-diabetic patients 72(57.6%) was male and 53(42.4%) female, while in diabetic patients 30(40%) was male and 45(60%) were female. According to the table1, 17(22.6%) of diabetic patients were Suffering from LRTI, 10(13.3%) from AGE, 13(17.3%) from COPD exacerbation and 35(46.7%) from UTI. Among these cases UTI and COPD were significantly higher in diabetic patient which is significant. According to the table2, 30(24%) of non-diabetic patients were Suffering from UTI, 48(38.4%) from AGE, 5(4%) from COPD exacerbation. Table4 show the comparison of infectious disease in diabetic and non-diabetic patients, COPD exacerbation and UTI were high in diabetic patients which is significant, while AGE was high in non-diabetic patients but it is not significant. Common bacteria isolate from both group in UTI was E coli (Table3).

**TABLE1:** Distribution of infectious disease in 75 diabetic patient's .Data are reported as Number of Patients and percentages of infectious disease

Kind of infectious diseases	Numbers	Percentage
UTI	35	46.7%
LRTI	17	22.6%
AGE	10	13.3%
COPD exacerbation	13	17.3%
Total	75	100%

**TABLE2:** Distribution of infectious disease in 125non-diabetic patient's .Data are reported as Number of Patients and percentages of infectious disease

Kind of infectious diseases	Numbers	Percentage
UTI	30	24%
LRTI	38	30.4%
AGE	48	38.4%
COPD exacerbation	5	4%
UTI+LRTI	4	3.2%
Total	125	100%

**TALE3:** Distribution of bacterial isolates from urine samples in diabetic and non –diabetic patients. Data are reported as number of isolates and percentages of total.

Infectious agents	Percentages and isolates from	Percentages and isolates from
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	diabetic patients	non- diabetic patients
E Coli	18,60%	16,53.3%
Staph	6,20%	14,46.9%
Pseudomonas	2,6.7%	
No growth	4,13.3%	
Total	30,100%	30,100%

Table4: Comparison of infectious agent isolates from diabetic and non-diabetic patients

Kind of infectious diseases	Numbers of diabetic patients	Percentage	Number of Non diabetic patients	Percentage
UTI	35	46.7%	30	24%
LRTI	17	22.6%	38	30.4%
COPD exacerbation	13	17.3%	5	4%
AGE	10	13.3%	48	38.4%
UTI+LRTI			4	3.2%
Total	75	37.5%	125	62.51%

## Conclusion

Our study support a significant relation between diabetes mellitus and infectious diseases of gastrointestinal, genitourinary and respiratory infections, especially urinary tract infections and COPD exacerbation were more in diabetic patients. Antibigram shows that important cause of urinary tract infection is E coli and choice drugs are amikacin, and Clindamycin. The implications of glucose control via diabetic medications on the risk of these infections remains to be determined.

## Discussion

In the current study we found that, patients with diabetes mellitus had high risk of infections .The strong magnitude of associations was found between diabetes and UTI and COPD exacerbation. Whens compared our result with other studies that examined this relations in a Hospital they were consistent with most author who have found increase rates of inactions in patients with diabetes mellitus compared to patients without diabetes mellitus. For example in the united states of America a study which was carried out by (Muller et al) for relation of infectious disease and diabetes mellitus they found that COPD exacerbation was 0.3% in diabetic patients while 0.2% in non –diabetic patients, UTI was 15.5% in diabetic patients and 10.2% in non-diabetic patients.in our study percentage of COPD exacerbation And UTI were higher than that study which was carried out by (Muller et al) in America it may be related to poor diabetic control, environmental pollution , lack of health education, and absence of modern diabetic centers.

## Suggestions and Recommendations

- 1: Good control of diabetes mellitus, especially during infections.
- 2: Doctors should be attentive to the infections of diabetic patients.

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