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TO COMPARE PULMONARY FUNCTION TEST IN CONTROLLED AND UNCONTROLLED DIABETIC PATIENTS IN PAKISTAN

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Abstract:
Introduction: Pulmonary complications of diabetes mellitus (DM) have been poorly characterized. Some authors have reported normal pulmonary functions and even concluded that spirometry is not at all necessary in diabetic patients. Objective: Compare Pulmonary function test in controlled and uncontrolled type 2 diabetes mellitus patients.
Data Collection: This cross sectional study was conducted in Bahawalpur Victoria Hospital during 2018 to 2019. All patients and controls who fulfill selection criteria were enrolled in the study. Informed consent was obtained from each patient. Demographic profile (name, age, sex, contact no.) was also be taken. Only those patients whose fasting blood sugar were >126 mg/dl or random blood sugar >200 mg/dl were selected. The HbA1c was also estimated in order to differentiate between controlled (<7) and uncontrolled diabetes (>7).
Results: In this study no statistically significant difference was seen between mean ranks for FVC [Group-A:86.91, Group-B: 74.00 & Group-C: 83.59], FEV1 [Group-A:88.44, Group-B: 80.56 & Group-C: 75.50] and FEF(25-75) [Group-A:87.53, Group-B: 80.73 & Group-C:76.23] among the study group. However for FEV/FVC significantly differ across the groups. i.e. [Group-A:98.18, Group-B: 109.41 & Group-C: 36.91]. Multiple comparison test showed that not statistically difference was seen for FEV/FVC between Group-A and in Group-B patients. However between Group-A and Group-C and Group-B and Group-C statistically significant difference was seen.
Conclusion: Results of this study showed that uncontrolled diabetes adversely effects pulmonary function and causes significant lung function impairment.

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INTRODUCTION:

There is a large impact on society and burden due to Diabetes mellitus which is the most common chronic endocrine disorder, affecting people of industrialized Western countries, Africa, Asia, South America and Central America. Diabetes mellitus is a huge health problem in world with its rising prevalence with more than 18,000,000 people all over the world and would be 36,600,000 people with DM by the year 2030. Type 2 diabetes mellitus (T2DM) is associated with significant mortality and morbidity in underdeveloped and developing countries [1].

Diabetes mellitus is a debilitating and chronic disease. Its complications give rise to macro and microvascular diseases which affect heart, blood vesseles, eyes, kidney, nerves and also pulmonary system. There may be a relationship between reduced lung function and DM [2].

Pulmonary complications of diabetes mellitus (DM) characterized poorly. Few authors have reported normal pulmonary functions and concluded that spirometry is not significant in diabetic patients. Some studies have shown abnormal spirometric parameters in patients of DM. Moreover, the DM duration and blood glycemic control have variety of impact on the pulmonary functions [3].

The rationale of this study is to see impact of diabetes mellitus in on lung function as no local study is available and we have planned to take diabetic patients with controlled and un-controlled diabetes and these two groups will be compared with aged and gender matched healthy controls as well [4]. Moreover we will also see impact of duration of diabetes mellitus and BMI.

Objective:
The objective of this study is to
- Compare pulmonary function test in controlled and uncontrolled type 2 diabetes mellitus patients.

MATERIAL AND METHODS:
This cross sectional study was conducted in Bahawalpur Victoria Hospital during 2018 to 2019.
Cases: Were divided into 2 groups
Group-A
Patients with controlled diabetes mellitus

RESULTS:

Group-B
Patients with uncontrolled diabetes mellitus
Control group
Group-C
Healthy age and gender matched individuals that were taken from attendants from patients enrolled in Group-A and Group-B

Inclusion criteria:
- Patients of both genders having age range of 18-40 years with confirmed diabetes mellitus type II (BSF>126mg/dl and BSR>200mg/dl).

Exclusion criteria:
- Patients having complaints of cough, sputum, or dyspnoea.
- Smokers and patients who already had history of CAD or cerebrovascular accident (CVA)
- Diabetic patients having other chronic systemic or metabolic disorder will not be included in the study.

Data collection procedure:
All 162 patients/ controls (54 n each groups) that fulfill selection criteria were enrolled in the study. Informed consent was obtained from each patient. Demographic profile (name, age, sex, contact no.) was also taken. Only those patients whose fasting blood sugar wa>126 mg/dl or random blood sugar >200 mg/dl will be selected. The HbA1c was also estimated in order to differentiate between controlled (<7) and uncontrolled diabetes (>7).

For all these parameters percentage of predicted values for the respective age, height, and weight was taken into consideration. All data was collected on predefined proforma (attached) by researcher herself.

Data analysis:
Data was entered and analyzed through Statistical package for social science (SPSS) version 21. Quantitative variables like age, weight, height, BMI, FVC, FEV1, FEV1/FVC, FEF25-75and PEFR was presented in form of mean ± S.D. Qualitative data like gender.

Table-1: Age distribution of cases & Controls

	Group-A	Group-B	Group-C
N	54	54	54
Mean	37.17	37.31	38.00
SD	3.457	3.928	1.780
Min	30	26	31
Max	47	55	39

Group-A: Patients with controlled diabetes mellitus
Group-B: Patients with uncontrolled diabetes mellitus
Group-C: Healthy age and gender matched individuals

Mean age of patients in Group-A and in Group-B was 37.17±3.45 and 37.31±3.92 year. While in Group-C mean age of participants was 38.00±1.78 years respectively.

Table-2: Gender distribution of cases & Controls

	Group-A	Group-B	Group-C
Male	41(75.9%)	26(48.1%)	35(64.8%)
Female	13(24.1%)	28(51.9%)	19(35.2%)
Total	54	54	54

Group-A: Patients with controlled diabetes mellitus
Group-B: Patients with uncontrolled diabetes mellitus
Group-C: Healthy age and gender matched individuals

In Group-A 41(75.9%) male and 13(24.1%) female patients were included while in Group-B 26(48.1%) male and 28(51.9%)females patients were included. In Group-C there were 35(64.8%) male and 19(35.2%) female participants were included. Mean duration of disease in Group-A and in Group-B patients was 6.20±4.37 and 10.59±6.95 respectively.

Table-3: Descriptive statistics for FEV/FVC

	FEV/FVC		
	Group-A	Group-B	Group-C
N	52	55	52
Mean	0.89	0.92	0.79
SD	0.079	0.046	0.006
Mean Rank	98.18	109.41	36.91
Min	0.79	0.79	0.775
Max	0.97	0.99	0.800
p-value[a]	0.000	0.000	0.000
p-value[b]		0.000	

Note: (a): p-values were calculated for normality testing with
         Kolmogorov Smirnov Test
     (b): p-value was calculated with Kruskal Wallis Test

Group-A: Patients with controlled diabetes mellitus
Group-B: Patients with uncontrolled diabetes mellitus
Group-C: Healthy age and gender matched individuals

DISCUSSION:

Diabetes mellitus is a noteworthy, quickly developing general social insurance issue. Its occurrence is increasing, and carries with it long haul complications. Constant hyperglycaemia of diabetes mellitus is related with proceeding harm, dysfunction, and lack of different organs working, particularly the eyes, kidneys, nerves, heart, lungs and veins. Diabetes mellitus is a hopeless long lasting sickness, including

various frameworks, and with wrecking complexities which wind up in serious inabilities and death [5].

Spirometry is a basic, dependable, legitimate and capable apparatus that can be utilized to observe, separate, manage and oversee patients with respiratory issue. Diabetes mellitus is a noteworthy general social insurance issue with expanding occurrence and long haul entanglements and is a main source of disease and death. Diabetes mellitus is related with proceeding with harm, dysfunction and lack of different organs function, including the lungs [6]. Consequently, when the subject of the administration of diabetes mellitus emerges, doctors ought to know about the span of the issue of respiratory intricacies, and must consider the lung as being as genuine as different complications of diabetes mellitus [7].

The impaired lung capacities (FVC and FEV1) mirrors a causative role by the lungs in creating diabetes, then streamlining the patency of the lungs through stoping of smoking , shirking of aggravations and lethal introduction, control of basic airway irritation and the advancement of physical action appear justified [8,9]. Undoubtedly, it appears time to add the spirometer to the apparatuses accessible for checking diabetes mellitus and its critical sequelae. Besides, doctors should completely use Spirometry in the administration of diabetes mellitus [10].

CONCLUSION:

Results of this study showed that uncontrolled diabetes adversely effects pulmonary function and causes significant lung function impairment. S0 it is important that diabetic patients should be periodically advised for Spirometer tests to see the impairment in lung function and its severity. By doing this lung damage can be prevented at its initial phase which ultimately contributes to minimize the mortality and morbidity among type 2 diabetic patients.

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