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ANALYSIS OF COMPARISON OF PULMONARY FUNCTION TEST IN CONTROLLED AND UNCONTROLLED TYPE 2 DIABETES MELLITUS

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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 Basic Health Unit Malikpur District Narowal during March 2019 to September 2019. All patients and controls who fulfil selection criteria were enrolled in the study. Informed consent was obtained from each patient. Demographic profile 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. [1, 2]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. [3]Type 2 diabetes mellitus (T2DM) is associated with significant mortality and morbidity in underdeveloped and developing countries.[4]

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.[5]

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.[6]

According to a study significant difference in FVC in control (89.36 ± 9.71) and diabetic subject (77.97 ± 12.99), p-value < 0.005. FEV1 was also statistically higher in control subjects (88.03 ± 6.69) if compared with diabetic patients (78.98. ± 14.09). It is reported insignificant difference between FEV1 / FVC (111.36 ± 10.62) in controls and 112.83 ± 9.35 in diabetic patients, p-value > 0.005. However other spirometric parameters (PEFR, PEF, $_{25, 50, 75, 25-75}$) were also significantly different in diabetic patients and controls, p-value < 0.05. [6]

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 Basic Health Unit Malikpur District Narowal during March 2019 to September 2019.

Were divided into 2 groups

- **Group-A**
  Patients with controlled diabetes mellitus
- **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

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).

PFTs of all patients as well as of the controls was done. The controls and patients undergone spirometric evaluation as follows.

Spirometric parameters will contain

- Forced vital capacity (FVC) in liters,
- Forced expiratory volume in 1 second (FEV1) in litters
- FEV1/FVC in percentage (%),
- Forced expiratory flow during 25% of FVC (FEF25), 50% of FVC (FEF50) and FVC 75% of FVC (FEF75) and Peak expiratory flow rate (PEFR).

Data analysis procedure

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,

RESULTS:

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.

Table-3: Weight & Height of Cases & Controls

	Height (Cm)			Weight (Kg)		
	Group-A	**Group-B**	**Group-C**	**Group-A**	**Group-B**	**Group-C**
N	**54**	**54**	**54**	**54**	**54**	**54**
Mean	153.96	159.77	136.72	66.07	75.04	54.26
SD	16.76	10.94	9.53	13.48	15.12	9.22
Min	129	129	129	39	47	47
Max	177	178	177	85	102	91

Group-A: Patients with controlled diabetes mellitus
Group-B: Patients with uncontrolled diabetes mellitus
Group-C: Healthy age and gender matched individuals
Mean height of patients in Group-A and in Group-B was 153.96±16.76 and 159.77±10.94 cm. Mean weight of patients in Group-A and in Group-B was 66.07±13.48 and 75.04±15.12 kg. While mean height and weight of participants in Group-C was 136.72±9.53 cm and 54.26±9.22 kg respectively.

DISCUSSION:

Diabetes mellitus is a noteworthy, quickly developing general social insurance issue. Its occurrence is increasing, and carries with it long haul complications. Constant hyperglycemia 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[7].

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[8]. Diabetes mellitus is related with proceeding with harm, dysfunction and lack of different organs function, including the lungs. 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[9].

CONCLUSION:

Results of this study showed that uncontrolled diabetes adversely effects pulmonary function and causessignificant lung function impairment. 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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