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Research Article

**FREQUENCY OF DIASTOLIC DYSFUNCTION IN CASES OF  
DIABETES MELLITUS**Dr Muhammad Umar Waheed<sup>1</sup>, Dr. SYED MOHSIN ALI<sup>2</sup>, Dr. Bushra Batool<sup>3</sup><sup>2</sup>School of Medicine and Nursing, Dezhou University, Shandong, China<sup>1</sup>Sheikh Zayed Hospital, Rahim Yar Khan, Pakistan

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**Abstract:**

**Objective:** Frequency of diastolic dysfunction in cases of Diabetes Mellitus. **Methodology;** This cross-sectional study was conducted during July 2019 to December 2019 at department of cardiology and Medicine. Hundred cases of diabetes mellitus of both gender i.e. male/female with age more than 40 years and duration of DM of at least 2 years and of type II DM were included. The cases with previous history of acute coronary syndrome, valvular disease, liver or renal disease were excluded. The cases were labelled as Diastolic dysfunction where E/A ratio was <0.8 assessed on transthoracic echocardiography. **Results;** In this study, out of 100 cases there were 61 (61%) males and 39 (39%) females with mean age of 54.34±9.41 years. There were 36 (36%) cases had HTN. Diastolic dysfunction was observed in 49 (49%) of cases. There was no significant difference in terms of gender in both groups with p= 0.79. Diastolic dysfunction was more in cases that had HTN where it was seen in 25 (69.44%) of cases with p= 0.001. There was significant difference in cases that had BMI more than 30 where it was seen in 30 (62.50%) of cases with p= 0.001.

**Conclusion:** Diastolic dysfunction is seen in almost half of the cases with DM and it is significantly high in cases that had HTN and BMI more than 30.

**Key words:** Diastolic dysfunction, Diabetes Mellitus

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**INTRODUCTION:**

Diabetes Mellitus (DM) is a syndrome of clinical symptoms, who is widely prevalence all across the globe and is considered as one of the most important and prevalent controllable entity. It can be classified into type I and type II where the former is present at childhood and the latter one develops at later ages. Insulin deficiency and resistance are the two major types to lead to its development.<sup>1</sup>

DM can lead to wide range of complications as it is a systemic syndrome and can virtually involve any organ of the body. The side effects are usually sub classified into micro and macro vascular complications for which there is complex underlying pathophysiology. Chronic hyperglycemic level and formation of atherosclerotic plaques are common modalities that are faced.<sup>2-3</sup>

Heart failure especially diastolic dysfunction is one of the major concern in recent times that is being focused as compared to systolic dysfunctions. According to a study more than 70% of the cases with diabetes mellitus due to a cardiovascular disease. Electrocardiogram is the initial and the echocardiography is the investigation of choice to label diastolic dysfunction.<sup>4-5</sup>

Multiple studies have been done in the recent past to look for this functions and have revealed its incidence from 30 to 80% of the cases. Sharavanan TKV et al, in their study found this prevalence in 55% of cases.<sup>6</sup> Dikshit et al and Srifevi et al showed that the diastolic dysfunction was seen in 66-79% of the cases in their studies respectively.<sup>5</sup>

**Objective;**

Frequency of diastolic dysfunction in cases of Diabetes Mellitus.

**MATERIALS AND METHODS:**

This cross sectional study was conducted during July 2019 to December 2019 at department of cardiology and Medicine.

**Sampling technique;**

Non probability consecutive sampling  
Hundred cases of diabetes mellitus of both gender i.e. male/female with age more than 40 years and duration of DM of at least 2 years and of type II DM were included. The cases with previous history of acute coronary syndrome, valvular disease, liver or renal disease were excluded. The cases were labelled as Diastolic dysfunction where E/A ratio was <0.8 assessed on transthoracic echocardiography.

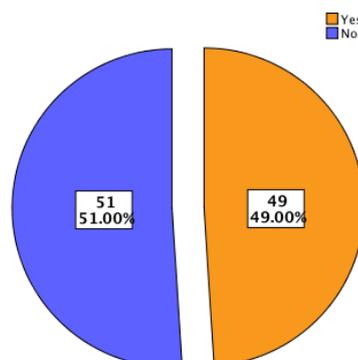
**Statistical analysis;**

The data was assessed by the help of SPSS version 23. After stratification of confounders stratification chi square test was applied taking p value < 0.05 as significant.

**RESULTS:**

In this study, out of 100cases there were 61 (61%) males and 39 (39%) females with mean age of  $54.34 \pm 9.41$  years. There were 36 (36%) cases had HTN. Diastolic dysfunction was observed in 49 (49%) of cases as in figure 1. There was no significant difference in terms of gender in both groups with  $p= 0.79$  (table 01). Diastolic dysfunction was more in cases that had HTN where it was seen in 25 (69.44%) of cases with  $p= 0.001$  as in table 2. Table 03 reveals significant difference in cases that had BMI more than 30 where it was seen in 30 (62.50%) of cases with  $p= 0.001$ .

**Figure 01. Diastolic dysfunction**



**Table 1. Diastolic dysfunction in study subjects vs Gender**

Gender	Diastolic dysfunction		Total	p value
	Yes	No		
Male	32 (52.46%)	29 (47.54%)	61 (100%)	0.79
Female	17 (43.59%)	22 (56.41%)	39 (100%)	
<b>Total</b>	<b>49 (49%)</b>	<b>51 (51%)</b>	<b>100 (100%)</b>	

**Table 2. Diastolic dysfunction in study subjects vs HTN**

Hypertension	Diastolic dysfunction		Total	p value
	Yes	No		
Yes	25 (69.44%)	11 (30.56%)	36 (100%)	0.001
No	24 (37.50%)	40 (62.50%)	64 (100%)	
<b>Total</b>	<b>49 (49%)</b>	<b>51 (51%)</b>	<b>100 (100%)</b>	

**Table 3. Diastolic dysfunction in study subjects vs BMI**

BMI	Diastolic dysfunction		Total	p value
	Yes	No		
More than 30	30 (62.50%)	18 (37.50%)	48 (100%)	0.001
30 or less	19 (36.54%)	33 (63.46%)	52 (100%)	
<b>Total</b>	<b>49 (49%)</b>	<b>51 (51%)</b>	<b>100 (100%)</b>	

**DISCUSSION:**

The incidence of Diabetes mellitus is increasing globally and so are developing its various complications due to poor control; as it is also found in high number in developing countries. Cardiac complications like diastolic dysfunction can add to over all morbidity in such cases and warrant early diagnosis and management.

Diastolic dysfunction was seen in 49 (49%) of the cases in this study with DM. This finding was close the studies done in the past. Sharanavan et al, carried out a study on cases of DM and it was seen that diastolic dysfunction was observed in 66 (55%) of cases in their study.<sup>6</sup> Similar was seen in the study of Patil et al, were this was observed in 54.33% of the wit DM.<sup>8</sup>

There was significant difference of DM with Diastolic dysfunction with respect to BMI more than 30 where it was seen in 30 (62.5%) of the cases with p values of 0.001. In the past it was well studies that obesity was found as a single predictor associated with diastolic dysfunction. Alfried et al, conducted a case control study and it was seen that this dysfunction was significantly higher in diabetes as

compared to non diabetic with  $p < 0.05$ .<sup>9-10</sup> Russo, et al, looked for correlation of diastolic dysfunction and DM and it was also found to be a liner correlation.<sup>10</sup> There was also significant difference in cases that had HTN where it was seen in 25 (69.44%) of cases with  $p = 0.001$ . The results of the studied done by Abhay Kumar et, also revealed that the HTN revealed significant association of HTN with diastolic dysfunction with  $p = 0.03$ .<sup>11</sup>

**CONCLUSION:**

Diastolic dysfunction is seen in almost half of the cases with DM and it is significantly high in cases that had HTN and BMI more than 30.

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