

# Assessment of Pancreatic Size in Diabetic Patients Using Ultrasonography

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**Abstract:** *Diabetic commonly affects the pancreatic size. Ultrasonography (U/S) of pancreas is a common imaging study performed for diagnosis the pancreatic disease. This Study was performed to assess the pancreatic size of diabetic patients using ultrasonography and to determine whether there was an association between the size of the pancreas and the duration of diabetes. Ultrasonography of the pancreas was performed on 35 diabetic patients and 35 non-diabetic subjects. The data collected from three hospitals in Khartoum state from January 2016 to July 2016. The patients were examined with the own department protocol using ultrasound machines. The study founded that the pancreatic size in diabetic patients was markedly smaller than the pancreatic size in non-diabetic subjects. Pancreatic size in diabetic patients was related to duration of diabetes mellitus, patients with long duration of diabetes mellitus having small pancreatic size than patients with short duration of diabetes mellitus. Pancreatic size did not correlate with age, body mass index or the types of diabetes. We conclude that the pancreatic size is a smaller in subjects with diabetes mellitus than normal subjects and its decrease with increase duration of the diabetes mellitus.*

**Keywords:** Pancreas, Diabetes Mallets, Insulin, Ultrasonography

## 1. Introduction

Evaluation of pancreatic size is very important in every physical examination of the abdomen by a physician a. Diabetes mellitus (DM) comprises a group of common metabolic disorders that share the phenotype of hyperglycemia. The worldwide prevalence of DM has risen dramatically over the past two decades [1].

The pancreas is one of the juices and enzymes production organ located deep in the abdomen and situated behind the stomach. The enzymes produced by the pancreas help in digesting fat, protein, and carbohydrates before being absorbed by the intestine. The pancreas also produces insulin, which is important in regulating the glucose concentration in the blood. Any system dysfunction or irregularity occurs to the pancreas may lead to several diseases such as diabetes mellitus, acute pancreatitis, chronic pancreatitis, pancreatic enzyme deficiency as well as pancreas tumor[2].

There are two types of diabetes mallets (DM): type I which is an autoimmune disorder with infiltration of inflammatory cells in Islets of Langerhans and distraction of pancreatic beta cells [3] and type II which is characterized with disturbance in insulin secretion, peripheral resistance to insulin and overproduction of glucose by liver [4].

Pancreas as the insulin-producing gland is changed and destroyed in the process that leads to diabetes. Pancreatic markers in type I diabetic patients are infiltration of inflammatory cells in islets showing chronic inflammation and production of new beta cells [5]

The ultrasound is a non- invasive imaging tool that sends the sound and receives the echoes to visualize in great detail organs. The location of the pancreas in the abdomen makes it well suited for ultrasound examination. However, the complex anatomy of the organ and surrounding tissues make evaluation a demanding task, and the ultrasound echo of even the normal pancreas varies widely from patient to patient [2].

## 2. Materials and Methods

The data used in this study were collected from cases admitted to Noreen diabetic center in Khartoum state during the period from June 2015 to October 2016, 70 cases of abdomen have been studied.

Ultrasound examinations are done by using ultrasound machine Toshiba- Xario100 transabdominal convex transducer with frequency of 3.5 MHz.

**Inclusion criteria** - The study included all patients above 20 years old, who they had diabetes mallets.

**Exclusion criteria** - Patients of pediatric age group and had any pancreatic abnormalities. Cases selection was done in the criteria of history, clinical examination and ultrasound examination.

Study was conducted under the following parameters:

- History taking
- Clinical examination
- Ultrasound examination

**Data Collection and analysis**

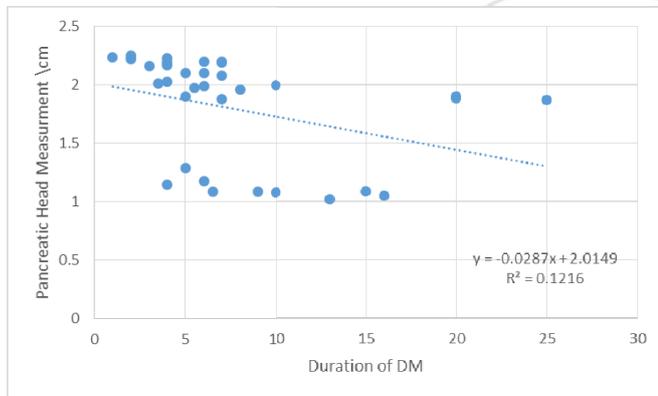
Data were collected by using a sheet for all patients in order to maintain consistency of the information from display. The data collection sheet was designed to obtain patient gender, age, duration of Diabetes mellitus, head of pancreas measurement, body of pancreas measurement, tail of pancreas measurement.

Microsoft Excel program version 2013 were used to analyze the data of this study.

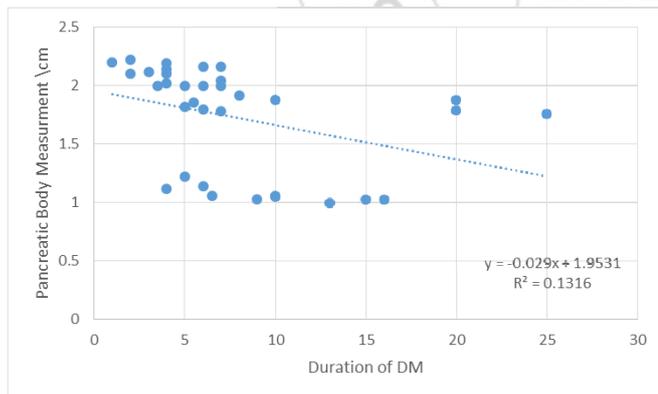
**3. Results**

**Table 1:** Mean ± Std. Deviation for Normal control group and diabetic group related variables

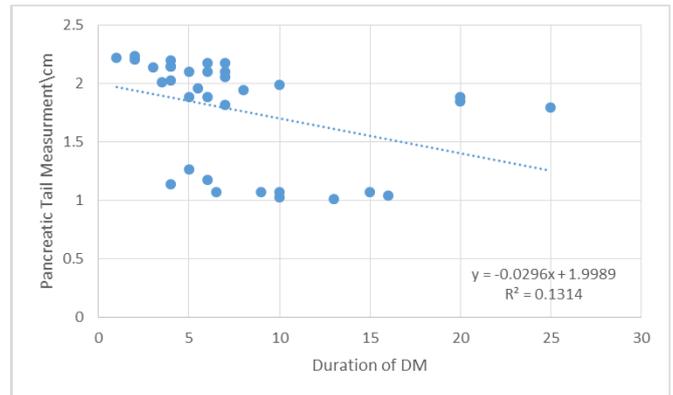
Variable	Mean ± Std. Deviation
Age of the patient (yrs.)	35.5±11.8
Duration of Diabetic (yrs.)	7.9±5.5
Age of control group (yrs.)	29.4±8.6



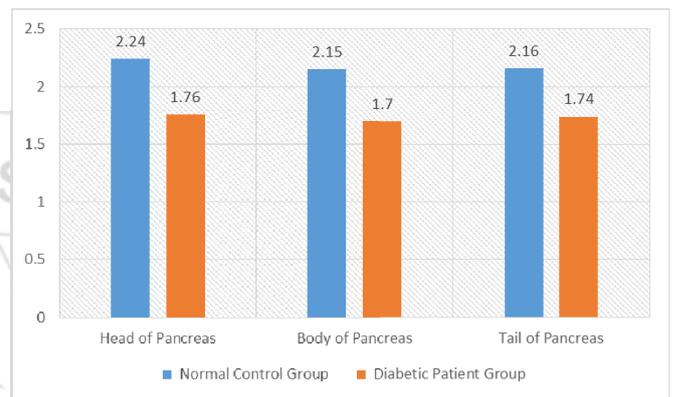
**Figure 1:** shows the correlation of the pancreatic Measurement and Duration of DM



**Figure 2:** shows the correlation of the pancreatic Body Measurement and Duration of DM



**Figure 3:** Shows the correlation of the pancreatic Tail Measurement and Duration of DM



**Figure 4:** Shows the Average of the measurement of the pancreases in both Normal control group and Diabetic group

**4. Discussion**

In this study the age and gender related random sample of 70 patients, the Age of the subjects included in this study ranged between 20 to 70 years, The average age of the diabetic group was 35.5±11.8 years and Normal control group was 29.4±8.6 years. Also the average of diabetes mellitus was 7.9±5.5 (Table 1).

A linear correlation was done in order to assess these relationship between the pancreatic size (head, body and tail) and duration of diabetes mellitus in order to investigate the effect of these duration on the size of pancreas and the results shows significant strong inverse relationship between the pancreatic size (head, body and tail) and the duration of diabetes mellitus (*Head*  $y = -0.0287x + 2.01$ ,  $R^2 = 0.12$ ), (*Body*  $y = -0.029x + 1.95$ ,  $R^2 = 0.13$ ), (*Tail*  $y = -0.0296x + 1.99$ ,  $R^2 = 0.13$ ) (figures 1, 2, 3). Also the results shows the pancreatic size in diabetic Group smaller than Normal control group (figure 4)

**5. Conclusion**

This study found that there inverted relation between the size of pancreas and duration of diabetes mellitus. Also the pancreatic size is a smaller in subjects with diabetes mellitus than normal subjects.

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