



## LIVER FUNCTION TESTS VARIATIONS AMONG DIABETIC PATIENTS TREATED IN OUT CLINICS AT ROYAL MEDICAL SERVICES, JORDAN

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**Submitted on: 16.06.19;**

**Revised on: 09.07.19;**

**Accepted on: 16.07.19**

### ABSTRACT:

**Introduction:** Liver function tests are used to assess liver injury status that may be induced by diabetes.

**Study Objectives:** The main objective of the present study was to investigate the impact of gender on liver function tests among diabetic patients.

**Methods and Subjects:** This was a retrospective study conducted in out clinics at Royal Medical Services, Jordan. Study sample included 62 files of diabetic patients. Study variables included age, gender, and liver function tests. A working excel sheet was created to extract raw data that was further analyzed using SPSS version 21. Data representation involves the use of means, standard deviations, frequencies, and percentages. The relationships between study variables were computed using independent T test. Significance was considered at  $\alpha \leq 0.05$ .

**Results:** Liver function tests in this study reflected liver injury among diabetic patients. No significant variations in all liver function tests could be attributed to gender on the basis of results obtained.

**Conclusion:** The results showed that deteriorations in liver function are likely to exist among diabetic patients, and these deteriorations are associated with glycemic conditions.

**KEYWORDS:** Diabetes, Liver injury, Liver function tests, AST, ALT, gender.

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**Indian Research Journal of Pharmacy and Science; 21(2019)1901-1904;**

**Journal Home Page:** <https://www.irjps.in>

**DOI:** 10.21276/irjps.2019.6.2.11

## INTRODUCTION

Diabetes mellitus is one of the main serious diseases affecting human health in this century (Takhelmayum). According to the statistics of the World Health Organization (WHO), about 135 million diabetics were recorded in 1995, and this is expected to increase more to reach 300 million by 2025<sup>1</sup>.

Liver is the main player of carbohydrate metabolism, and the glucose is being used and stored in liver as glycogen. It has the ability to produce glucose from non-carbohydrates<sup>2</sup>. Due to the vital functions of liver, it is likely to be under the risk of developing diseases, particularly among persons with diabetes<sup>3</sup>. Liver disease is reflected by increased levels of liver enzymes activities such as aspartate aminotransferase (AST), alanine aminotransferase (ALT) and  $\gamma$ glutamyltranspeptidase (GGT). It has been indicated that insulin resistance to be significantly associated with elevated levels of liver enzymes<sup>4</sup>, and type 2 diabetes<sup>5-8</sup>. The study of Erbey et al<sup>9</sup> found an association between liver injury and diabetes.

Increased serum activity of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) is considered the most commonly used measures reflecting liver disease and are more likely to be increased among diabetics compared with the general population<sup>10</sup>.

### Study objectives:

The main objective of the present study was to investigate the impact of gender on liver function tests among diabetic patients.

## SUBJECTS AND METHODS:

### Study design and setting:

The most appropriate design for this study was retrospective design to collect data from files of diabetic patients, and conducted in Royal Medical Services, out clinics.

### Study sample:

A total of 62 diabetic patients were included in this study.

### Study variables:

Study variables included age, gender, and liver function tests.

### Study procedure:

Files of diabetic patients were reviewed. Files included required variables were selected to be analyzed. A working excel sheet was created to make raw data. After completing of entering data into excel sheet, the analysis of data was accomplished using the software, SPSS 21. Data presentation took various styles as means and standard deviations, frequency and percentages. The relationships between variables were investigated using independent T test. Significance was considered at  $\alpha \leq 0.05$ .

## RESULTS

As shown in table 1, study sample included 62 patients, of whom about 53% were males. Mean age was  $56.95 \pm 11.97$  years. Glucose mean was  $238.88 \pm 84.95$  mg/dl. Mean ALT was  $97.53 \pm 26.26$  U/L. Mean ALP was  $23.04 \pm 13.83$  U/L. Mean AST was  $19.07 \pm 11.53$  U/L. The mean of TP was  $8.17 \pm 0.47$  g/dl.

**Table 1: General characteristics of participants**

Variable	Description
<b>Gender (N, %):</b>	
- Males	33 (53.2%)
- Females	29 (46.8%)
<b>Age (M<math>\pm</math>SD) years</b>	<b>56.95<math>\pm</math>11.97</b>
<b>Glucose (M<math>\pm</math>SD) mg/dl</b>	<b>238.88<math>\pm</math>84.95</b>
<b>ALT (M<math>\pm</math>SD) U/L</b>	<b>97.53<math>\pm</math>26.26</b>
<b>ALP (M<math>\pm</math>SD) U/L</b>	<b>23.04<math>\pm</math>13.83</b>
<b>AST (M<math>\pm</math>SD) U/L</b>	<b>19.07<math>\pm</math>11.53</b>
<b>TP (M<math>\pm</math>SD) g/dl</b>	<b>8.17<math>\pm</math>0.47</b>

We studied variations in biochemical findings among study participants with diabetes by gender using independent T test. As seen in table 2, no significant differences in the means of glucose levels according to gender ( $p=0.959$ ). The same trend was shown for the remaining variables listed in table 2.

**Table 2: The relationship between liver function tests according to gender using independent t test**

Variable	Male		Female		P value
	M	SD	M	SD	
Glucose	238.37	76.7	239.48	94.84	0.959
ALT	101.84	29.56	92.85	20.85	0.168
ALP	25.78	14.28	19.68	12.74	0.096
AST	19.56	11.39	18.44	11.92	0.719
TP	8.15	0.49	8.19	0.45	0.736

## DISCUSSION

The present study was conducted to investigate the variations of liver function tests by gender among a sample of diabetic patients. Liver function tests are important to assess the magnitude of liver injury<sup>3</sup>. Diabetes is considered as an injury of liver and increased liver enzyme activities among diabetics are commonly encountered<sup>5, 6, 8</sup>.

The results of this study showed that the mean glucose level among study participants was 238.88±84.95 mg/dl, which confirms that patients had high glucose level as diabetics compared with general population<sup>11</sup>.

The results of this study showed that the glucose level and other liver function tests are not affected by gender since no significant variations in the levels of means of study variables among males and females ( $p>0.05$ ). However, other studies reported different findings in which gender significantly impacted the means of liver function tests<sup>12-15</sup>.

We think that the main difference in our study and the previous studies is mainly the sample size. The other studies led to results based on large sample, while our study was limited by simple size. It was also interesting to find the main features of impacts of diabetes on liver are likely to be retained

## CONCLUSION

The results showed that deteriorations in liver function are likely to exist among diabetic patients, and these deteriorations are associated with glycemic conditions.

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CONFLICT OF INTEREST REPORTED: NIL ;

SOURCE OF FUNDING: NONE REPORTED