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Research Article

**LEVEL OF HEMOCYSTEINE IN PATIENTS OF TYPE-2  
DIABETES AND ITS ASSOCIATION WITH BLOOD  
PRESSURE, LEVELS OF HbA1c AND DIABETES DURATION**<sup>1</sup>Dr Adnan Abbas Nizami, <sup>2</sup>Dr Bilal Ahsan, <sup>3</sup>Dr Usama Ahmed Bakhtiari<sup>1</sup>Medical officer, RHC Daud Khel Mianwali<sup>2</sup>Medical Officer Neurosurgery, Sheikh Zayed Hospital, Rahim Yar Khan<sup>3</sup>Medical Officer, BHU Bakhtiari, Tehsil Ahmad Pur East, District Bahawalpur**Abstract:**

**Objective:** The aim of this study research work aimed to find out the levels of homocysteine in the patients of Tpe-2 diabetes and its association with the levels of HbA1, body mass index, Blood Pressure and total diabetes duration.

**Methodology:** This was a transverse research work carried out in DHQ Hospital Mianwali in a period of seven months from August 2018 to February 2019. We collected the data and used SPSS V.20 for the analysis of the collected information for the statistical analysis of that data. Correlation test of Bivariate Pearson was in use for the determination of the comparison between homocysteine and body mass index, systolic blood pressure and diabetes duration.

**Results:** There were total 125 patients in this research work in which 68.0% were female and 32.0% were male patients with an average age of  $51.450 \pm 8.37$  years of age. The average body mass index of the patients was  $28.71 \pm 4.75$ , average systolic BP was  $130.0 \pm 20.98$  mmHg, the average diastolic BP was  $83.360 \pm 11.280$  mmHg and the average diabetes duration of the patients was  $7.01 \pm 6.180$  years. We found a strong association between the systolic BP and diabetes duration with the level of homocysteine. There was no significant association of the level of homocysteine with the body mass index and HbA1c. **Conclusion:** There was a positive association of systolic BP and diabetes duration with the level of homocysteine. There was no strong association between homocysteine with the level of HbA1c and there is need of further research works on large size of samples and for greater duration to reach an assertive conclusion about the association between these 2 variables.

**Keywords:** Cardiovascular, Homocysteine, Body Mass Index, Diabetes, Hba1c, Insulin, Diastolic.

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**INTRODUCTION:**

Diabetes is a one type of metabolic disorder because of the abnormal insulin secretion. According to WHO, thirty million people were the victim of diabetes in 1985 in the whole world and this proportion reached to two hundred and seventeen million in the year of 2005 and it will touch 366 million in 2030. Pakistan will reach to the fourth position with high occurrence of diabetes in 2025. Approximately 7.20 million patients were suffering from this very disease in 2012. This rate of occurrence reached to 7.90% in our country in 2015. In some other countries of Asia, there was much variation of diabetes in 2014, Mauritius was present with incidence of 14.80%, and India was present with 9.10%, Sri Lanka had 7.60%, Bangladesh with 6.30%, Bhutan had 5.80%, Nepal had 4.90% and Maldives was present with 4.80%. Homocysteine (Hcy) is an amino acid with sulfur containing. Methionine can be obtained from diet which is an essential amino acid. HHcy (Hyperhomocysteinemia) is an important risk factor for the atherosclerosis. It has the ability to promote many other risk factors.

Various research works have displayed a strong association of the heart diseases and stroke with the high level of homocysteine. Boushey displayed that increasing levels of homocysteine 5.0  $\mu\text{mol/L}$  above the normal value enhances the danger of cardiovascular complications from 1.60 to 1.80 times. A survey conducted in 2005 discovered that 25.0% rise in the total homocysteine has association with 10.0% increased dangers of cardiovascular incidents and 20.0% advanced stroke danger. There are many endothelial malfunctions due to the HHcy. There is very low research on this very topic in this region of the world. So, we carried out this case work to find out the levels of homocysteine in the patients suffering from Type-2 diabetes and its association with the levels of HbA1c, body mass index, BP and diabetes duration.

**METHODOLOGY:**

This transverse research work carried out in DHQ Hospital Mianwali in a period of seven months from

August 2018 to February 2019. The diagnosed patients with Type-2 diabetes from both genders having age from 40 to 60 years were the part of this research work with no complication of severe nature. All the patients suffering from Type-1 diabetes or anemia of taking any supplements and females on breastfeeding were not the part of this research work. Total 125 patients were the part of this research work by screening 37.0% with high incidence of homocysteine level in Tpe-2 diabetes. We recorded the data about the demography, past clinical history and physical examination of all the patients. BMI calculation carried out with standard formula. We recorded the BP in sitting position of all the patients with the use of mercury sphygmomanometer and the stethoscope of Littman. We took the samples of blood to measure the level of HbA1c with the utilization of the immunoassay procedure. We separated the plasma and froze it at  $-80.0^{\circ}\text{C}$  for the analysis of homocysteine level with the use of CMIA (Chemiluminescent microparticle Immuno-assay). SPSS V.20 was in use for the analysis of the collected information. We calculated the averages and standard deviations for all numerical variables. Correlation test of Bivariate Pearson was in use for the determination of the association between the homocysteine and body mass index, systolic blood pressure and diabetes duration.

**RESULTS:**

Total 125 patients were the part of this research work in which 68.0% (n: 85) were female and 32.0% (n: 40) were male patients with an average age of  $51.450 \pm 8.370$  years. The average body mass index of the patients was  $28.710 \pm 4.760$ , 16.0% (n: 20) patients were with normal body mass index, 48.0% (n: 60) patients were overweight and 36.0% (n: 45) patients were present with obesity. Out of twenty patients present with normal body mass index, 60.0% (n: 12) were women and 40.0% (n: 8) patients were men, among sixty overweight patients 58.32% (n: 35) patients were women and 41.65% (n: 25) patients were men and thirty-eight females and seven males were present with obesity.

**Table-I: Demography and Vital Signs**

Variables	Mean	SD
Age (years)	51.450	8.370
BMI ( $\text{kg/m}^2$ )	28.710	4.760
Systolic blood pressure (mmHg)	130.000	20.980
Diastolic blood pressure (mmHg)	83.360	11.280
Duration of diabetes (years)	7.018	6.180

The good glycemic control is displayed by  $HbA1c \leq 7.0\%$  and adverse glycemic control is displayed by the  $HbA1c > 7.0\%$ . The average body mass index was  $28.710 \pm 4.760$ , average systolic BP was  $130.0 \pm 20.980$  mmHg, average diastolic BP was  $83.360 \pm 11.280$  mmHg and the average diabetes duration was  $7.01 \pm 6.180$  years. There was a strong association of systolic BP and diabetes duration with the homocysteine. But the association between homocysteine with the HbA1c and body mass index was not much significant. Figure-1 displays the significant association of homocysteine and systolic BP. Figure-2 shows the association of the diabetes duration and homocysteine.

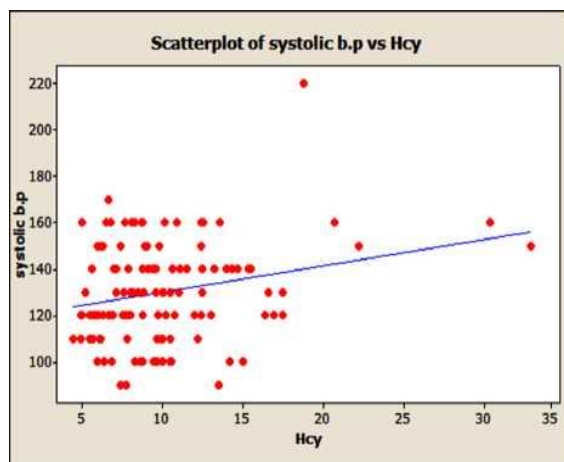


Figure 1

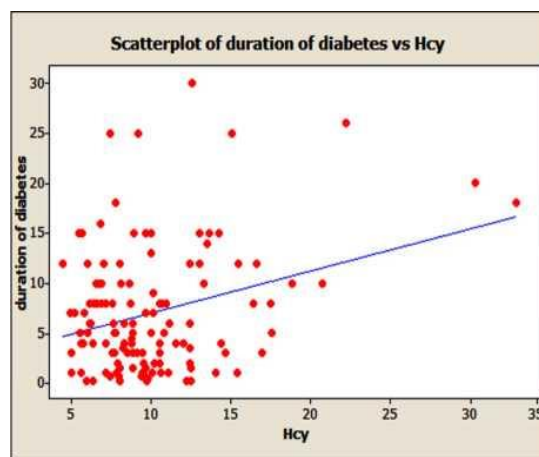


Figure 2

Table-II: Pearson Correlation of Variables with Hcy.

Variables	Hcy Correlation (r)	p- value
HbA1c	-0.0520	0.5760
Systolic blood pressure	0.2390	0.0070
Duration of diabetes	0.3020	0.0010
BMI	-0.1010	0.2610

### DISCUSSION:

The current research work discovered no association of homocysteine and level of HbA1c. This finding is very much similar to the finding of one other research work conducted in Iran. Some other researchers as Hoogeven was also not able to discover any correlation between the homocysteine and glycemic control. In one research work in which Agha Mohammadi examined the association of homocysteine and HbA1c in seventy patients suffering from diabetes stated no important correlation between these variables. Pouwels investigated the impact of the enhanced glycemic control and sensitivity of insulin on levels of homocysteine and he also gave confirmation that levels of HbA1c have no impact on homocysteine. A research work performed on Kenyan Type-2 diabetes patients with no cardiovascular complication also discovered no impact on the levels of HbA1c on

homocysteine. According to this research work, there was no association of homocysteine with body mass index. This result is similar to the findings of two other case works which showed no association among the patients with cardiovascular disease. One case-control research work conducted in Gaza in which correlation of homocysteine and body mass index of the patients of Type-2 diabetes compared with the healthy controls and there was a strong association as an outcome.

There was a strong correlation of systolic blood pressure with the homocysteine among the patients of this research work, which is consistent with the findings of Passaro. But there was no important association among these two variables in one research work conducted in Kenya on the patients of Type-2 diabetes. Current research work discovered a strong association of diabetes duration and levels of

homocysteine. Sonkar also presented the same results. A research work conducted on the patients having diabetic retinopathy also displayed a strong association of the diabetes duration with the homocysteine. Another research work also presented the same result which was performed to evaluate the levels of plasma Hcy in the patients of Type-2 diabetes which showed the increase in the levels of homocysteine with the increase in the diabetes duration.

### CONCLUSION:

There is a positive association between systolic BP and diabetes duration with the level of homocysteine. There was no strong association between homocysteine and HbA1c; there is a need of further research works on large sample size for a long duration to reach at an assertive conclusion about these variables.

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