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A STUDY TO DETERMINE THE CORRELATION OF DIABETES MILETUS (DM) PATIENTS WITH FAMILY HISTORY OF DIABETIC PATIENTS

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Abstract:

Objectives: *The aim of our study was to determine Correlation of Diabetes Miletus (DM) patients with family history of Diabetic patients.*

Study design: *A cross sectional study.*

Place and duration: *This study was conducted at Tertiary Care Hospitals of Twin Cities of Pakistan Rawalpindi and Islamabad for the duration of Six months starting from 1st February 2020 to 30th July 2020.*

Methodology: *In our study we screened 55,080 people and their age was 25 and above. Blood glucose level test was used for discrimination of diabetes. The people having BSR level less than 200mg/dl were considered as normal and those who were having more than or equal to 200mg/dl were considered as positive for diabetes. We took family history of all participants having diabetes of any family member. In this family history only, those relatives were included who were having blood relation with the patients. SPSS version 20 was used for the analysis of data. Family history of diabetes, screening for diabetes, gender and age were calculated as frequency and percentage. Association among family history and diabetes was calculated by using chi square test and found significant.*

Results: *In our study we tested 55,080 people and their age was 25 and above for diabetes. The average age of selected patients was 43±12.61 years. Out of 55,080 people 2,855 were found positive for diabetes. Among these selected patients, quantity of males was 32% and number of females were 68%. According to our study 90.3% people had no family history of diabetes in their family while 9.7% reported positive family history. History of diabetes in family among positive cases was reported by 35.3% patients where as 64.7% did not reported any history of diabetes in their families. Statistically significant relation was found among diabetes and family history.*

Conclusion: *At the end of our study, we concluded that there is a positive association among diabetes and family history of diabetic patients. For effective control and to ensure prevention from complications early discrimination should be carried out in diabetic patients.*

Keywords: *Family History, Diabetes, Early Detection, Genetics.*

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INTRODUCTION:

Diabetes Mellitus (DM), referred commonly to as simply diabetes, is a chronic and debilitating disease that occurs due to autoimmune destruction of pancreatic beta cells (Type-I diabetes), or when the body cannot produce sufficient insulin for its requirements (Type-II Diabetes) [1]. This leads to metabolic and cardiovascular disorders due to consistently high blood sugar levels for prolonged time periods [2]. The International Diabetes Federation (IDF) guidelines classify individuals with glucose values between 100 and 199 mg/dl (5.6–11.0 mmol/L) as prediabetics and beyond 200mg/dl as diabetics. Symptoms of consistently high BSR include recurrent urination, intensified thirst and hunger. If left un-treated, diabetes may lead to development of micro-vascular and macro-vascular disorders. Acute complications include diabetic ketoacidosis, hyperosmolar hyperglycemic state, or death [3]. Serious long-term complications include CVDs, nephrosis, foot ulcers, neuromuscular disorders and loss of vision [4,5]. Since 1980s, the number of diabetics has increased from 108 million (4.7%) to 382 million in 2013 and this figure is estimated to rise up to 592 million by the year 2035 [6]. In 2012, diabetes was responsible for approximately 13.5 million deaths directly whereas 2.2 million deaths were indirectly associated with high blood sugar levels. The World Health Organization estimates that the7th leading cause of death in 2030 shall be attributable to diabetes alone. According to The Diabetic Association of Pakistan, the prevalence of Type-II Diabetes (T2DM) above the age of 25 years is more than 10%. Diabetes Mellitus is associated with a number of environmental factors and genetic influences. Environmental risk factors having an impact on development of diabetes include stress, obesity and imbalanced nutrition [7]. Multiple genes have been identified responsible for development of diabetes indicating a polygenic origin of Type-II diabetes. Maturity onset diabetes of the young (MODY) is ascertained to mutations in more than 6 identified genes encoding the glucose sensor enzyme glucokinase and transcription factors [8].

The genetic influence on the onset of diabetes is undeniable from strong historical evidence of patterns of diabetes inheritance in families [9]. Inheritance pattern of diseases and susceptibility of specific ethnic groups towards diabetes is well documented [10,11]. Population based research indicate genetic transmission of T2Diabetic mellitus ranging between 20% - 80%. Evidence for genetic tendency is derived from a multitude of population based, family, and twin sibling's studies [12]. The relative risk of developing T2Diabetic mellitus is approximately 3 if person is related to one affected parent or brother/sister in comparison to the general population, and this rises up to ~6 when both the parents are affected [13]. The results, however, show variation between ethnicity, geographic and environmental factors. Outcome of medical interventions for management of diabetes mellitus is dependent on earliest diagnosis and prevention of commencing complications. Familial and genetic patterns may predispose a person to early onset of diabetes without their awareness. Current state of knowledge is not complete and scientific basis for most of the inherited risk is limited due to lack of availability of data over diverse ethnic and geographic regions. A holistic approach is required to identify a linkage between the genetic tendencies which leads to diabetes.

The objective of the study was to identify association of diabetes in screened positive people (BSR>199mg/dl) with family history of diabetes in public sector healthcare facilities in Lahore.

METHODOLOGY:

This cross-sectional study was conducted at Tertiary Care Hospitals of Twin Cities of Pakistan Rawalpindi and Islamabad for the duration of Six months starting from 1st February 2020 to 30th July 2020. All members of the population aged ≥ 25 years screened for BSR. The average age of selected patients was 43±12.61 years. Out of 55,080 people 2,855 were found positive for diabetes. Among these selected patients, quantity of males was 32% and number of females were 68%.

Data was recorded from interviews of the selected cases if any member of their family had any diagnosed and confirmed cases of diabetes. According to our study 90.3% people had no family history of diabetes in their family while 9.7% reported positive family history. History of diabetes in family among positive cases was reported by 35.3% patients where as 64.7% did not reported any history of diabetes in their families. Statistically significant relation was found among diabetes and family history.

RESULTS:

In the study 55,080 people were screened for diabetes. Among these selected patients, quantity of males was 32.01% and number of females were 68%. Mean age of the population (limited to 25 years age) was 43±12.61 years. The people having BSR level less than 200mg/dl were considered as normal and those who were having more than or equal to 200mg/dl were considered as positive for diabetes.

Table No 01: Gender Distribution

Gender	Qty	% Age
Female	1941	67.99%
Male	914	32.01%
Total	2855	100%

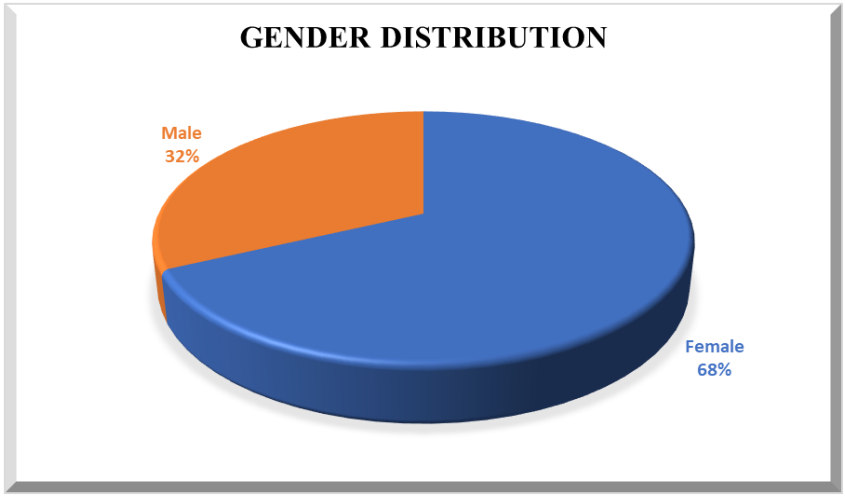


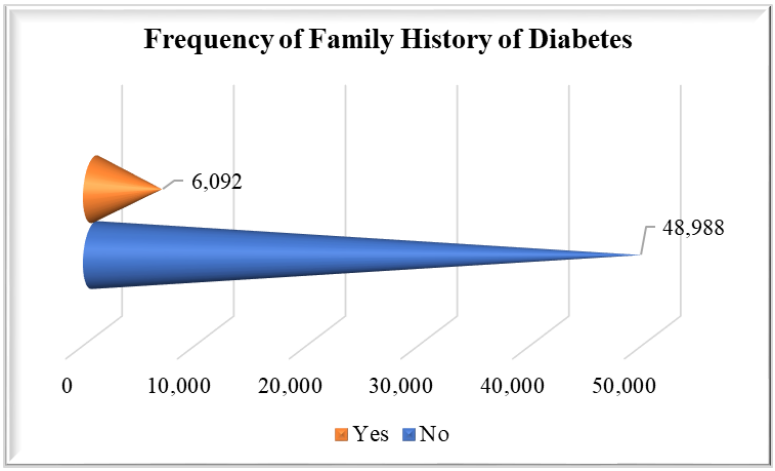
Table No 02: Frequency Distribution of Screened Positive for Diabetes in Study Population

Diabetes	Frequency	Percentage
Normal	52,225	94.8%
Positive for diabetes	2,855	5.2%
Total	**55,080**	**100%**

Family history of the sample population was taken, where the respondents reported if any member of their immediate blood relations had a confirmed case of diabetes. Only mother, father, brother, sister and grandparents were included in the selectable options to ensure genetic relationship. The answer was recorded in Yes or No.

Table No 03: Frequency of Family History of Diabetes in Study Population

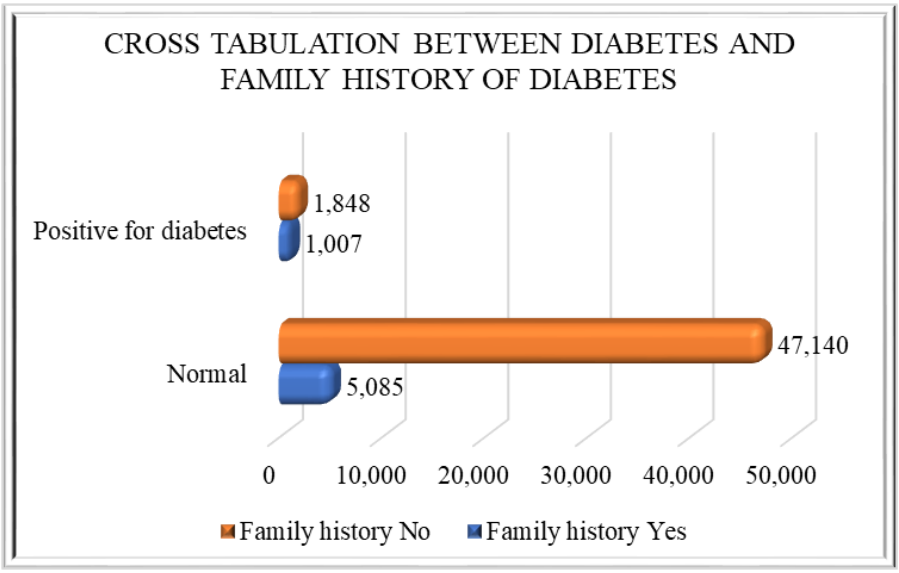
Family History of diabetes	Frequency	Percentage
No	48,988	88.9%
Yes	6,092	11.1%
Total	**55,080**	**100%**



In the group categorized as Normal, 90.3% people had no family history of any diabetics in their family while 9.7% reported having at least one diabetic family member. In the group categorized as screened positive for diabetes, 64.7% people did not report any history of diabetes in their family whereas 35.3% reported having at least one diabetic member in their family.

Table No 04: Cross Tabulation Between Diabetes and Family History of Diabetes

Screening for Diabetes	Family history				Total
	Yes	Percentage	No	Percentage	
Normal	5,085	9.7%	47,140	90.3%	52,225
Positive for diabetes	1,007	35.3%	1,848	64.7%	2,855
Total	6,092		48,988		55,080



In Holy Family Hospital, 89.1% of the Normal Category reported no family history of diabetes while 10.1% reported a positive family history of diabetes. In the screened positive category, 61.7% of the people responded No for any diabetic family history whereas 38.3% of the people reported Yes for at least having one diabetic family member.

Table No 05: Hospital Wise Distribution of Diabetes and Family History of Diabetes in Study Population

Hospital	Screened study population	Family history				Total
		Yes	**percentage**	**No**	**Percentage**	
Services	**Normal**	4,441	10.9%	36,142	89.1%	**40,583**
	Positive for diabetes	838	38.3%	1,352	61.7%	**2,190**
Mayo	**Normal**	644	5.5%	10,998	94.5%	**11,642**
	Positive for diabetes	169	25.4%	496	74.6%	**665**

The association of screened positive suspected diabetes with family history of diabetes was highly significant with a Pearson's chi square value of 0.000 in PIMS and Holy Family Hospital.

DISCUSSION:

Type-II Diabetes is a major global health risk and is often related with genetic inheritance of diabetes. Diabetes is an emerging global epidemic of the 21st century. It is a debilitating disease with a high prevalence. Complications of diabetes are not only incapacitating to the patient, but also a high economic burden on the society and the healthcare system. Similar to cancers and hypertension, diabetes has a strong genetic component. A large study sample was selected for the study to identify the association between diabetes in screened positive people and their family history of any family member who was a diagnosed case of Type-II diabetes. Cases were selected on the criteria having BSR ≥200mg/dl. The global guideline state that the people with random BSR between 140mg/dl and 199mg/dl are also suspected diabetics (pre-diabetes). However, the sample population criteria were set for BSR ≥200mg/dl to ensure the relatively high susceptibility of diabetes in the study population and generalizability of the results. Our study showed that a significant pattern in people who were screened positive for diabetes also had a family history of at least one family member with diabetes. This coincides with study by Kral et.al who discovered the relationship of family history and risk of Type-II diabetes by ancestry [14]. In a study conducted in immigrants to western countries, it was seen that individuals with three or more siblings and parents with diabetes presented with the lowest levels of insulin secretion in body [15]. Our study showed that risk of development of diabetes is directly associated with a positive family history of diabetes.

In a study conducted in Tehran, the Iranian population family tree was mapped for evaluation to identify pattern of transmission of diabetes in suspected cases aged 20 and above. The methodology was similar to the current study. The results showed that there was predominantly familial transmission of diabetes in 53% among siblings and 44% among offspring [16].

CONCLUSION:

With the rising burden of diabetes and imminent increase in risk of developing complications due to late detection, understanding the familial pattern of diabetes is important to ensure that people who are at high risk should be screened regularly for prevention and control of diabetes. Further research and hereditary investigations are required to improve genetic counselling, proper treatment and familial risk assessment for individuals with diabetes.

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