Open Access

Pak J Med Res
Vol. 61, No. 4, 2022

Original Article

To Assess the Frequency and Risk Factors of Type 2 Diabetes Mellitus in Adult Population of District Peshawar Pakistan

Romana Ayub, Adeela Mustafa, Junaid Ahsan, Manal Gohar Qureshi, Shahid Ali, Mahnoor Inamullah, Fatima Afaq
Department of Community Medicine, Khyber Medical College, Peshawar.

Abstract

Background: The prevalence of type 2 diabetes in Pakistan is 17.1% reported in National survey conducted in 2017-2018 exposing the people to high risk of complications.
Objective: To find frequency of type 2 diabetes mellitus and its risk factors, in adults >30 years of district Peshawar and to identify risk factors.
Study type, settings & duration: A cross-sectional descriptive study was conducted in 04 areas of district Peshawar (Palosi Village, Hayatabad, Tehkal and Shaheen Town) from January 2019 to December 2019.
Methodology: A cross-sectional descriptive study design was used to survey adult population (aged 30+ years) of district Peshawar. Data was collected from Tehkal, Shaheen town, Palosi and Hayatabad. Random blood sugar of 123 participants was checked through digital glucometer. Weight and height of participants were checked for BMI calculation. Questions were asked from participants to find risk factors of type 2 diabetes mellitus.
Results: The frequency of type 2 diabetes mellitus was found to be 13.0%. Among 123 participants, 13 were pre diabetic, 16 diabetic and 94 people were non-diabetic. The result showed that frequency of type 2 diabetes increased with age, 62.5% of diabetic people were above 50 years. Results also showed positive relation of BMI with the diabetes, 87.5% of diabetic people had BMI more than 25. 62.5% diabetic people had positive family history. Hypertension had positive influence on type 2 diabetes mellitus, 56.25% people among diabetics were hypertensive. Among diabetics, about 60% were male and 40% were females. Physical inactivity had positive relation with type 2 diabetes, 62% of diabetic had no physical activity.
Conclusion: We found some other factors which also affected type 2 diabetes mellitus, like sedentary life style, taking mixed meal and polycystic ovary syndrome. The study results also showed no difference in DM prevalence if someone is on medications for other diseases.
Key words: Diabetes mellitus type 1 & 2, polycystic ovarian syndrome, body mass index, Insulin dependent & non-insulin dependent diabetes mellitus.

Introduction

Pakistan is a developing country where majority of the population lives in rural areas, increase in urbanization is affecting most of developing countries both economically & epidemiologically. The prevalence of DM in Pakistan is 17.1%[1] exposing the people to high risk of complications so the word diabetes mellitus is derived from two words Diabetes Greek word meaning “Siphon” which means to pass through. Mellitus Latin word which means honey or sweet.[2]

The main presenting symptom Diabetes Mellitus raised blood sugar levels for long period of time, due to lack of secretion or insulin or its impaired action. Prevalence of diabetes is increasing around the globe and rate of complications is also on rise[3] it is affecting all the age groups and is common both in males and females although both basic and clinical medical sciences are working their best but still it’s not a

Corresponding Author:
Adeela Mustafa
Department of Community Medicine
Khyber Medical College, Peshawar.
Email: adeelaamir17@gmail.com

Received: 04 July 2021, **Accepted:** 17 May 2022,
Published: 09 January 2023

Authors Contribution

RA, AM & JA conceptualized the project. MGQ, SA, MI & FA did the data collection and literature search. AM, MGQ & SA performed the statistical analysis. Drafting, revision & writing of manuscript were done by RA, AM, JA, MI & FA.

Copyright © 2022 The Author(s). This is an Open Access article under the CC BY-NC 4.0 license.

curable disease.[2]

The two types of DM are chronic diseases which affects the regulation of blood sugar or glucose by our body. In type 2 DM or non-insulin dependent DM, insulin resistance occurs so the body cells fail to respond to insulin accurately, this is taken as adult-onset disease. The disease present with more urination, thirstiness, loss of weight, increased appetite, visual changes, numbness hands and feet, fatigue and dryness of skin.[4] The risk factors of diabetes include increase body weight, raised blood pressure, family history, no physical activity, raised fat and lipids, increased age, polycystic ovarian syndrome (PCOS)

Studies showED that from the total 8.5% prevalence of DM, it was seen that men were affected more (9.4%) as compared to females which was (8.0%).[5] High glucose levels results in affecting all the organs of the body such as heart, vessels, eyes, kidneys, teeth and nerves.[6] Study in Karachi showed that presence eye and kidney complications was more in patients having HbA1C of more than 7% than having less than 7. The longer duration of DM, hypertension, and improper control of glucose had a strong association with the occurrence of complications.[7]

The rate of T2DM is increasing at a very fast pace, almost 90-95% of diabetics are this type with an expected increase to 439 million by the year 2030.[8] The reports of Pakistan in same year showed a prevalence of 6.9% with an expected increase to 8.5% by 2045 in same age groups.[9] The prevalence of T2DM in urban areas of Pakistan is 14.81% and 10.34% in rural areas which can be a possible effect of increased pollution in urban areas.[10] Studies reports of different provinces of Pakistan showed that Baluchistan has a prevalence of 13.3% males & 6.9% in females, KPK has a ratio of 9.2% males and 11.60% in females, Sindh has 16.2% prevalence in males and 11.70% in females while in Punjab province it is 12.14% and 9.83%.[11]

This study is important to get a picture of the risk factors involved in type 2 diabetes mellitus. The main aim of the study was to assess the risk factors of T2DM in rural and urban areas of district Peshawar. This study will help us to cover the various aspect of this condition and to determine certain population groups who are at risk of developing T2DM so that we can get measures to control this chronic condition. The study results helped us to identify the flaws in our health system and its policies regarding the management of Diabetes Mellitus.

Methodology

A cross-sectional descriptive study was to assess the frequency and risk factors of type 2 Diabetes Mellitus in 04 areas of district Peshawar. Study area included 04 different areas of district Peshawar of Khyber Pakhtunkhwa including Palosi Village, Hayatabad, Tehkal and Shaheen Town.

Total duration of the study was 01 year which includes data collection, data analysis. A total of 123 samples were collected using non-probability convenient sampling technique.

Adults of age 30 and above were included in the study sample while mentally disabled people excluded because there would be communication and ethical problems while interviewing them. They have no understanding of the various things like diet, physical activity etc. Hospitalized patients were also excluded.

A semi structured questionnaire was used for data collection & data analysis was done using SPSS where the qualitative variables are presented in the form of frequency and percentages & quantitative variables are presented as mean + SD. All the data was analyzed in the form of tables and graphs. Data was presented through frequency diagrams, charts and graphs.

The Ethical approval was obtained from Institutional Review Ethical Board of Khyber Medical College, Peshawar.

Results

The mean age of the participant was 47.34 years with Std. deviation of 12.35 while minimum age was 32 years and maximum was 85 year with range of 53. Figure-1 shows that 13% of the participants were diabetic while 11% were having RBS in range of pre diabetics"

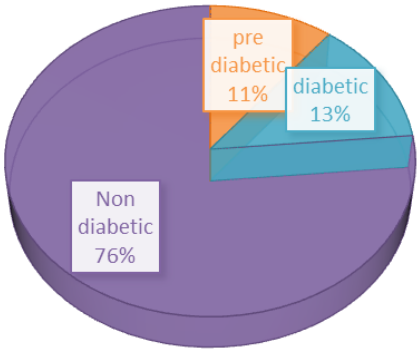


Figure 1: Frequency of type 2 DM patients.

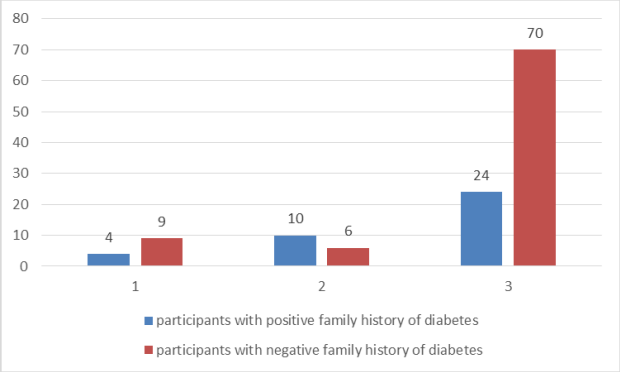


Figure 2: Relation of family history with type 2 DM.

The study result shows that chances of type 2 diabetes mellitus increase with old age especially after 40 years of age also the study results show that diabetes mellitus is not gender specific it affects both the genders equally. The relation between occupation and type 2 diabetes mellitus shows that people related to occupations with less physical activities were more prone to type 2 diabetes than those who jobs are more of a physical nature. The labors doing work were less affected as compared working in office & not working with sedentary life style. BMI of more than 25 was another factor found to be related to type 2 DM which means type 2 DM is also related to obesity. The ratio of having BMI from 25- 29.9 is 9 & 8 respectively from a total of 37 while below 18 were only two diabetics & those between 18.5 & 24.9 are 5 diabetics from a total of 34 sample. Mixed diet has also strong correlation with DM incidence. Those using mix diet were 79 among them 62 were non diabetic, 10 were diabetic & 07 were pre diabetic, while those on carb diet were 07 amongst which 06 were not diabetic 01 was diabetic similarly those taking meat were 09 amongst which 07 were normal & 01 diabetic & also same no in pre diabetics. Figure-2 shows the relation of type 2 diabetes mellitus with family history.

The above table reveals that chi-square test of independence showed insignificant association between Diabetes mellitus and exercise with χ^2 = 0.1191, *p* =0.94. On the other hand, chi-square test of independence showed insignificant association between Diabetes mellitus and Stress with $\chi 2^2$ = 0.1872, *p* =0.91 (Table).

Similarly, the study also looked for diabetes relation to hypertension & smoking the results showed that who smoke are 25.3% more prone to DM & similarly hypertensive were 24.1 % more prone to type 2 diabetes. Another correlation was with that of polycystic ovarian disease & type 2 DM where it was found that in pre diabetics ratio was found to 9.7% with PCO & in Diabetics with PCOs it was 12.19 % which was quite high.

Table: Relation of exercise and stress with type 2 DM.

		Pre Diabetic	*Diabetic*	*Non diabetic*	χ^2	*p*
		n (%)	*n (%)*	*n (%)*		
Exercise	Y	5 (10.0)	6 (12.0)	39 (78.0)	0.1191	0.94
	N	8 (10.9)	10 (13.7)	55 (75.3)		
Stress	Y	3 (13.0)	3 (13.0)	17 (74.0)	0.1872	0.91
	N	10 (10.0)	13 (13.0)	77 (77.0)		

Discussion

We found significant association of diabetes with Body Mass Index BMI, i.e. obesity greatly increases the risk of developing diabetes. We found in our study that 87.5% of the people have a BMI over 25 which show a great influence. Similar results were obtained from a study carried out in China. This study showed the risk of incident diabetes increased proportionally with increasing baseline BMI values. Strong relationship was found between raised BMI and diabetes in all age groups, but same was seen in younger age as well.[11] A study results states that being overweight or obese was the most important reason of getting diabetes.[12] Results of a clinical trial state that even a 5% weight reduction can help to prevent people having more weight with compromised glucose tolerance from risk of developing type 2 diabetes.[13] Another study results also suggest a strong relationship between the two.[14] Studies showed that excess visceral fat creates metabolic disorder that raises the chance of insulin resistance and beta cell dysfunction in people who cannot tolerate increased insulin secretion which results in occurrence of type 2 diabetes.[15] the findings of all these studies suggest that increased weight & being obese is individually connected with a higher chance of getting diabetes in young people.

The results of this study showed positive association of diabetes with raised blood pressure, 56.25% of the diabetics were also hypertensive. Studies have shown that a proper control of blood pressure in type 2 diabetics results in reduction of deaths due to diabetes, and its complication on different organs.[16]

Another study ratifies that insulin resistance in type 2 diabetes is associated with either hypertension or albuminuria or with both.[17] it is concluded from results of different studies and the

present study that hypertension is a risk factor associated with type 2 diabetes. Studies confirm that family history has a strong relationship with risk of type 2 diabetes in first degree relatives, but not much research on the same is present in case of distant relatives. The result of this study found an association of 62.5% between type 2 DM and positive family history. A study conducted in Mexico on various relatives of patients with type 2 DM was carried out where the association was found to be 97.4%.[18] This study showed that persons having a family history of diabetes were more susceptible to early onset of diabetes and also have a risk of getting complications which confirms the role of positive family history in development of diabetes.[17]

Our study results showed that 62% of the people who had diabetes had no history of any physical activity in their routine. We found these results are consistent with similar studies done. A study showed that the insulin glucose ratio at 0 and 120 min during the OGTT was significantly higher in the obese unfit as compared to the obese fit subjects thus suggesting an influence of moderate leisure time physical activity on glucose tolerance.[19] Studies proved that regular exercise or mild physical activities such as walk, gardening and household work helps in glycemic control. It is proven from studies that regular physical activity and slight weight loss can reduce the chance of type 2 diabetes in people with impaired glucose levels.[20,21] When a person uses antidepressant medication to treat the symptoms then its clinical depression. This study found no relation of depression with diabetes which is not consistent with other studies carried out from 1950 through 2007 which show depression is related with a 60% increased chance of developing Type 2 DM.[22] Findings of another study suggested that depressed adults have a 37% more chance of developing type 2 DM.[23]

According to our study cigarette smoking has influence on occurrence of type 2 diabetes. Out of 16 diabetics in our study 03 were smokers for many years while 13 were non-smokers. It is in consistent with other similar study[24] The chance getting diabetes was twice more in heavy smokers (more than 20 cigarettes/day) than for light smokers and also lower for former smokers compared with active smokers.[25] Cessation of smoking with control in weight should be promoted as an essential public health practice for the prevention of diabetes.[26]

Increasing age has a more probability of getting type 2 DM, in a study health examination of men at 60 years was carried out which showed that most were found to have type 2 diabetes, all were healthy 10 years earlier.[27] According to our study subjects taking mixed diet (vegetables, meat, and carbohydrates) have increased incidence of type 2 diabetes. Studies suggest that an increased use of polyunsaturated fatty acids and a low fat diet may have beneficial effects in the management of Type 2 diabetes.[28] Study was done only in 04 areas of district Peshawar due to limited time frame and financial resources.

Lack of education in significant number of people led to confusing answers to some questions.

People in some areas were not so cooperative so we had limitations in the form of social and ethical problems.

Conflict of interest: None declared.

References

1. Aamir AH, Ul-Haq Z, Mahar SA, Qureshi FM, Ahmad I, Jawa A, et al. Diabetes Prevalence Survey of Pakistan (DPS-PAK): prevalence of type 2 diabetes mellitus and prediabetes using HbA1c:a population-based survey from Pakistan. BMJ Open 2019; 9: e025300.
2. Kerner W, Brückel J. Definition, classification and diagnosis of diabetes mellitus. Exp Clin Endocrinol Diabetes 2014; 122(7): 384-6.
3. Meo SA, Zia I, Bukhari IA, Arain SA. Type 2 diabetes mellitus in Pakistan: Current prevalence and future forecast. J Pak Med Assoc 2016; 66(12): 1637-42.
4. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care 2014; 37(Suppl-1): S81-90.
5. Rahman MM, Rahim MA, Nahar Q. Prevalence and risk factors of Type 2 diabetes in an urbanizing rural community of Bangladesh. Bangladesh Med Res Counc Bull 2007; 33(2): 48-54.
6. Joseph J, Svartberg J, Njølstad I, Schirmer H. Incidence of and risk factors for type-2 DM in a general population: the Tromsø Study. Scandinav J Pub Health 2010; 38(7): 768-75.
7. Asher Fawwad NM, Zafar AB, Khalid M. Incidence of microvascular complications of type 2 diabetes: A 12 year longitudinal study from Karachi-Pakistan. PakJ Med Sci 2018; 34(5): 1058.
8. Wu Y, Ding Y, Tanaka Y, Zhang W. Risk factors contributing to type 2 diabetes and recent advances in the treatment and prevention. Int J Med Sci 2014; 11(11): 1185.
9. International Diabetes Federation. (Accessed on 12th December 2018) Available from URL: https://www.google.com/urlQJSG
10. Meo SA, Zia I, Bukhari IA, Arain SA. Type 2 diabetes mellitus in Pakistan: Current prevalence and future forecast. J Pak Med Assoc 2016; 66(12): 1637-42.
11. Chen Y, Zhang XP, Yuan J, Cai B, Wang XL, Wu XL, et al. Association of body mass index and age with incident diabetes in Chinese adults: a population-based cohort study. BMJ Open 2018; 8(9): e021768.
12. Geetha A, Gopalakrishnan S, Umadevi R. Study on the impact of family history of diabetes among type 2

diabetes mellitus patients in an urban area of Kancheepuram district, Tamil Nadu. Int J Comm Med Public Health 2017; 4(11): 4151.
13. Chorne-Navia R. Prevalence of family history of diabetes in type 2 diabetes patients in Coahuila, Mexico. Hispanic Health Care Int 2008; 6(1): 5.
14. Skarfors ET, Wegener TA, Lithell H, Selinus I. Physical training as treatment for type 2 (non-insulin-dependent) diabetes in elderly men. A feasibility study over 2 years. Diabetologia 1987; 30(12): 930-3.
15. Lindgärde F, Saltin B. Daily physical activity, work capacity and glucose tolerance in lean and obese normoglycaemic middle-aged men. Diabetologia 1981; 20(2): 1348.
16. Sigal RJ, Kenny GP, Wasserman DH, Castaneda-Sceppa C, White RD. Physical activity/exercise and type 2 diabetes: a consensus statement from the American Diabetes Association. Diabetes Care 2006; 29(6): 1433-8
17. Laaksonen DE, Lindström J, Lakka TA, Eriksson JG, Niskanen L, Wikström K, et al. Physical activity in the prevention of type 2 diabetes: the Finnish diabetes prevention study. Diabetes 2005; 54(1): 158-65.
18. Vessby B, Karlström B, Boberg M, Lithell H, Berne C. Polyunsaturated fatty acids may impair blood glucose control in type 2 diabetic patients. Diabetic Med 1992; 9(2): 126-33.
19. Astrup A, Finer N. Redefining type 2 diabetes:'diabesity'or 'obesity dependent diabetes mellitus'?. Obes Rev 2000; 1(2): 57-9.
20. Steppan CM, Bailey ST, Bhat S, Brown EJ, Banerjee RR, Wright CM, et al. The hormone resistin links obesity to diabetes. Nature 2001; 409(6818): 307.
21. Day C, Bailey CJ. Obesity in the pathogenesis of type 2 diabetes. British J Diabetes Vascular Dis 2011; 11(2): 55-61.
22. UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. British Med J 1998; 317(7160): 703.
23. Groop L, Ekstrand A, Forsblom C, Widen E, Groop PH, Teppo AM, et al. Insulin resistance, hypertension and microalbuminuria in patients with type 2 (non-insulin-dependent) diabetes mellitus. Diabetologia 1993; 36(7): 642-7.
24. Fawad H, Maqsood M, Abbas A. The association between type-II diabetes mellitus and hypertension: A case report. Iny J Allied Med Sci Clin Res 2014; 2(3): 182-5.
25. Mezuk B, Eaton WW, Albrecht S, Golden SH. Depression and type 2 diabetes over the lifespan: a meta-analysis. Diabetes Care 2008;31(12): 2383-90.
26. Knol MJ, Twisk JW, Beekman AT, Heine RJ, Snoek FJ, Pouwer F. Depression as a risk factor for the onset of type 2 diabetes mellitus. A meta-analysis. Diabetologia 2006; 49(5): 837
27. Maddatu J, Anderson-Baucum E, Evans-Molina C. Smoking and the Risk of Type 2 Diabetes. Transl R 2017; 184: 101-7.
28. Willi C, Bodenmann P, Ghali WA, Faris PD, Cornuz J. Active smoking and the risk of type 2 diabetes: a systematic review and meta-analysis. JAMA 2007; 298(22): 2654-64.