Risk Factors Increasing Prevalence of Type 2 Diabetes Under The Age of 40 Years Attending Al-Diwanyia Teaching Hospital

Hassan Raji Jallab[1], Zahraa Abdul Ameer Kadhim[1]

[1]Department of Community and Family medicine, University of Al-Qadisiyah, College of Medicine, Iraq

Abstract

The present case control study of Iraqi people living in Aldiwanyia city to identify the attributable risk factors that leads to type 2 diabetes in younger age groups and the correlation of the most prevalence risk for developing diabetes. The study was designed to be a case control study includes 315 individuals, 150 is the number of controls, and the rest of the participants are patients that have been diagnosed by diabetes mellitus type 2 before or at age of 40 years .All these participants attended outpatient clinics at Al- Aldiwanyia teaching hospital in Al-Dewaniyah province/ Iraq. The beginning of data collection was dated on the January 2019 and ended on June 2019. Mean age of patients with diabetes mellitus was significantly higher than that of control subjects There was highly significant difference in the frequency distribution according to marital status, occupation, residency, level of education,economic status in patients and controls groups .It appears that the rate of overweight and obesity is comparable in patient and control group.

Key wards: *diabetes mellitus; risk factors; prevalence; Iraq ;young age*

Introduction

Type 2 diabetes mellitus (T2DM) is a complicated disease ,the starting age of subjects is as early as 15 years old.2Diabetes is widespread among people , ages and regions of the sphere due to changes in standard of standards of living , inheritance and environmental factors which all together in the disorder [1] .Type 2 diabetes is a serious chronic disease resulting from a complex inheritance environment interaction along with different risk factors such as high BMI and sedentary lifestyle. Type 2 DM and its complications comprise a major worldwide public health trouble, affecting populations in both developed and developing countries with high rates of diabetes related morbidity and mortality [2] Diabetes mellitus is a clinical syndrome characterized by hyperglycemia caused by absolute or relative shortage of insulin. Lack of insulin affects the metabolism of carbohydrate, protein and fat, and can cause considerable disturbance of water and electrolyte homeostasis; fatality may result from acute metabolic decompensation. Long-standing metabolic derangement is associated with functional and structural changes in numerous organs, predominantly those of the vascular system, which guide to the clinical 'complications' of diabetesIn both of the common types of diabetes, environmental factors interrelate with genetic vulnerability to establish which group develop the clinical syndrome ,and its onset. However, the fundamental genes, precipitating environmental factors and path physiology vary considerably between type 1 and type 2 diabetes[1]. The prevalence of diabetes is rising in epidemic magnitude on a global basis. In the USA alone, it has been estimated that there are around 16 million people diagnosed with DM , representing about 6% of the population[3].Diabetes mellitus is becoming progressively more prevalent in developing countries, possibly due in part to alter in dietetic habits ,diminished physical activity, and increase BMI [4].

The worldwide prevalence of DM has risen considerably over the Last two decades, from an estimated 30 million cases in 1985 to 415 million in 2017 Based on current trends, the IDF projects that 642 million individuals will have diabetes by the year 2040 [5] .It is estimated that the greater part of patients with diabetes obtain their care from a family doctor [6]. The complexity and chronicity of diabetes presents special challenges for family physicians, whose chief responsibility is the screening and avoidance of diabetes-related complications [6].

Patient and Method

The type of the design used in this study was a case control .This study was done in the Republic of Iraq ,Aldiwanyia governorate , in aldiwanyia general teaching hospital .Patient selected randomly throughout their attendance to outpatient clinic of diabetes in the former hospital .The study included period from January 2019 to July 2019.The patient introduce to this study were in the age under 40 years old or has been diagnosed with diabetes below 40 of age ,and the study is only for type 2 DM .An arranged questionnaire was prepared by collecting any possible risk factors and Verbal consent was obtained from participant in the study . All diabetic patient with type two who were under the age of 40 or have been diagnosed with DM before that age.we exclude patient that have been dignosed after the age of 40 years and the patient with type 1 DM. The ethical approval of this study include the following

- Acceptance of Scientific Committee of Community and Family medicine department in collage of medicine /university of Al-Qadisiyah and acceptance of Committee of Ethical Scientific Researches in the collage
- Verbal consent of individual participated in the study

Results

The Distribution of diabetic patients and control subjects according to age and gender is shown in table 1. Mean age of patients with diabetes mellitus was significantly higher than that of control subjects, 49.93 ±9.95 years versus 34.68 ±12.56 years, respectively (P <0.001). No diabetic patient was under 20, 5 (3.1 %) were between 20-29 years, 15 (9.3 %) were between 30-39 years, 51 (31.5 %) were between 40-49 years, 32 (19.8 %) were between 60-69 years and 4 (2.5 %) were between 70-79 years, table 1. The mean age at diagnosis was 36.85 ± 4.48 years with a range of 20- 40 years.

Table1: Distribution of diabetic patients and control subjects according to age and gender

Age (years)	**Control group n = 149**	**DM n = 162**	**P**
<20	4 (2.7 %)	0 (0.0 %)	
20-29, n (%)	61 (40.9 %)	5 (3.1 %)	
30-39, n (%)	40 (26.8 %)	15 (9.3 %)	
40-49, n (%)	22 (14.8 %)	51 (31.5 %)	
50-59, n (%)	14 (9.4 %)	55 (34.0 %)	
60-69, n (%)	4 (2.7 %)	32 (19.8 %)	
70-79, n (%)	4 (2.7 %)	4 (2.5 %)	
Mean ±SD	34.68 ±12.56	49.93 ±9.95	<0.001 † HS
Range	17 – 78	23 - 72	
Gender			
Male, n (%)	57 (38.3 %)	77 (51.7 %)	0.099 ¥ NS
Female, n (%)	92 (61.7 %)	85 (57.0 %)	

n: number of cases; SD: standard deviation; †: independent samples t-test; ¥: Chi-square test; HS: highly significant difference at $P \leq 0.01$; NS: not significant at $P \leq 0.05$

There was also highly significant difference in the frequency distribution according to occupation between patients and control groups (P <0.001) in such a way that employee was less frequent in patients than in control group, 32.2 % versus 51.7 %, respectively, whereas the frequency of housewives and retired was more in patients than in control group, 45 % versus 32.9 % and 16.8 % versus 4%, respectively.

In addition, there was highly significant difference in the frequency distribution according to residency between patients and control groups (P = 0.005) in such a way that rural residency is more frequent in patients than in control group, 29.5 % versus 14.1 %.

Moreover, there was highly significant difference in the frequency distribution according to level of education between patients and control groups (P = 0.001) in such a way that illiterate and primary and secondary levels were more in patients than in control group, 32.9 % and 28.2 % versus 16.8 % and 16.1 %, respectively.Regarding economic status, there was also highly significant difference in the frequency distribution between patients and control groups (P <0.001) in such a way that very poor and poor categories were more frequent in patients than in control group, 13.4 % and 45 % versus 1.3 % and 14.8 %, respectively. The comparison of body mass index (BMI) and waste circumference between diabetic and control groups is shown in table 3. Patients and control subjects were categorized into underweight (< 18.5), normal (18.5 -24.9), Overweight (25-29.9), class I obesity (30-34.9), class II obesity (35-39.9) and class III obesity (≥40 kg/m2), as shown in table 3. It appears that the rate of overweight and obesity is comparable in patient and control group; in addition, there was no significant difference in mean BMI between patients and control groups, 27.02 ±2.83 kg/m2 and 28.01 ±6.85 kg/m2, respectively (P = 0.091); however, mean waste circumference was significantly higher in diabetic patients than in control group, 105.85 ±14.26 cm versus 99.21 ±16.62, respectively (P <0.001).

Table 2: Body mass index and waste circumference of diabetic patients and control subjects

Characteristic	**Control group n = 149**	**DM n = 162**	**P**
BMI (kg/m2)			
Underweight (< 18.5)	1 (0.7 %)	0 (0.0 %)	
Normal (18.5 -24.9)	28 (18.8 %)	34 (22.8 %)	
Overweight (25-29.9)	81 (54.4 %)	99 (66.4 %)	
Class I obesity (30-34.9)	33 (22.1 %)	27 (18.1 %)	
Class II obesity (35-39.9)	4 (2.7 %)	2 (1.3 %)	
Class III obesity (≥40 kg/m2)	2 (1.3 %)	0 (0.0 %)	
Mean ±SD	28.01 ±6.85	27.02 ±2.83	0.091 † NS
Range	17 - 78	21 – 35	
Waste circumference			
Mean ±SD	99.21 ±16.62	105.85 ±14.26	<0.001 † HS
Range	23 - 150	78 – 150	

n: number of cases; SD: standard deviation; †: independent samples t-test; HS: highly significant difference at $P \leq 0.01$; NS: not significant at $P \leq 0.05$

Prevalence rate of smokers was significantly higher in patients with DM in comparison with control subjects, 19.5 % versus 12.1 %, respectively ($P = 0.048$). However, there was no significant difference in prevalence rate of alcoholism between the two groups (P = 0.171), as shown in table 3.

Sedentary life style and low activity are significantly more prevalent in patients with diabetes than in control subjects ($P = 0.002$); in addition, with respect to physical activity, bed ridden prevalence was significantly higher in DM patients than in control group, 24.2 % versus 2.7 %, respectively ($P < 0.001$), as shown in table 4.

Table 3: Bad habits in diabetic patients and control subjects

Characteristic	**Control group** ***n*** **= 149**	**DM** ***n*** **= 162**	***P***
Smoking			
No smoker	120 (80.5 %)	111 (74.5 %)	0.048 ¥ S
Ex-smoker	11 (7.4 %)	22 (14.8 %)	
Smoker	18 (12.1 %)	29 (19.5 %)	
Ethanol			
Not alcoholic	145 (97.3 %)	160 (107.4 %)	0.171 ¥ NS
Ex-Alcoholic	1 (0.7 %)	2 (1.3 %)	
Alcoholic	3 (2.0 %)	0 (0.0 %)	

n: number of cases; ¥: Chi-square test; S: significant difference at $P \leq 0.05$; NS: not significant at $P \leq 0.05$

Table 4: Life style and physical activity in patients with DM and control subjects

Characteristic	**Control group** **n = 149**	**DM** **n = 162**	**P**
Life style			
Sedentary	4 (2.7 %)	20 (13.4 %)	0.002 ¥ HS
Low active	117 (78.5 %)	124 (83.2 %)	
Active	28 (18.8 %)	18 (12.1 %)	
Physical activity			
Bed ridden	4 (2.7 %)	36 (24.2 %)	<0.001 ¥ HS
Moderate	114 (76.5 %)	98 (65.8 %)	
Active	25 (16.8 %)	22 (14.8 %)	
Very active	6 (4.0 %)	6 (4.0 %)	

n: number of cases; ¥: Chi-square test; HS: highly significant difference at $P \leq 0.01$

Discussion

In the current study the mean age of patients with diabetes mellitus was significantly higher than that of control subjects, The mean age at diagnosis was 36.85 ± 4.48 years with a range of 20- 40 years, which indicate significant relationship between DM and aging .this result has been supported by many studies worldwide including study have been done in UK, which prove that type 2 diabetes is more common in the middle-aged and elderly. It affects 10% of the population over 65, and over 70% of all cases of diabetes occur after the age of 50 years [1] . Gender differences arise from sociocultural processes, such as different behaviors of women and men, exposition to specific influences of the environment, different forms of nutrition, life styles or stress, or attitudes towards treatments and prevention [7] . In this study there is no significant relationship between gender and DM ,the result have been supported by USA study that found no difference between male and female [8] ,study done in Pakistan revealed that there's no difference in prevalence of diabetes mellitus with the gender [9] .In Iran the prevelance of DM 12.1, with no significant difference between male and female [10] ,while the prevalence of diabetes in Saudi Arabia as demonstrated by Al-Nozhal show a higher ratio in females than in males, with 42%, and 37.2%, respectively [8] .There was highly significant difference in the frequency distribution according to marital status between patients and control groups in this study in such a way that the frequency of married is more in diabetic than control which may be attributed to alteration of habitual life style , Study was done throughout Iranian urban population found that marital status was not significantly related to diabetes mellitus[10] . in our study rural residency is more frequent in patients with DM, which has a similar result conducted from a cross sectional study using data from US centers for Disease and Prevention's (CDC·s)2008 Behavioral Risk Factor Surveillance, has found the increasing prevalence of DM in rural area more than urban that may be attributed to increasing poverty and lower education [11] . highly significant difference in the frequency distribution according to level of education between patients and control groups. A case-cohort study in eight Western European countries nested in the EPIC study ,demonstrates the inequalities in the risk of T2DM in Western European countries, with an inverse relationship between educational level and risk of T2DM that is only partially explained by variations in BMI [12] . Individuals within the middle socio-economic level, who are physically inactive and do not consume large amounts of fruit are at greatest risk of developing type 2 diabetes mellitus as explained by study has been done in Ghana Individuals within the middle socio-economic level, who are physically inactive and do not consume large amounts of fruit are at greatest risk of developing type 2 diabetes mellitus as explained by study has been done in Ghana as well as in this study.

Conclusion

this study has been focused on the most important risk factors for the development of type2 diabetes in young age patients and has assimilate other studies conducted throughout the world which puts the BMI, family history, lifestyle, hyperlpidemia ,hypertension, and psychological insults in the top of these risks which necessitates the screening for diabetes in earlier ages. other risk must have further evaluation

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Al-Qadisiyah, College of Medicine, Iraq and all experiments were carried out in accordance with approved guidelines.

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