
Sociological Risk Factors in the Development of Type II Diabetes for Adult Male Case-control Study

Dhafer B. AL-Youzbaki
MSc, Ph.D.

Abstract:

Background: Type 2 diabetes is the most common form of diabetes, accounting for the majority of diabetic cases. The disease mechanisms in type 2 diabetes are not wholly known. Type 2 diabetes usually developed after the age of 40, but it is now also increasing in children. The prevalence of chronic non-communicable diseases are showing an upward trend in most countries for several reasons, one of them is the life styles and behavioral patterns of people are changing rapidly in adopting western forms (obesity, heavy salt and alcohol intake, sedentary life and much more stresses). Developing countries are now warned to take appropriate steps to avoid the "epidemics" of chronic non-communicable diseases which they likely to come with socio-economic and health development.

Aim: To examine social risk factors in the development of type II diabetes in adult males.

Study design: Case-control study, where 120 adult males with type 2 diabetes were allocated as cases and another 120 adult males without type 2 diabetes as control. Matching is done for age \pm 5 years. Unpaired sampling technique had been used.

Study period: 1st February to 1st July 2006.

Questionnaire: Including, assessment of social factors in the development of type 2 diabetes as personal characteristics (social identity, personal habits and psychological make-up), life events (stress, social discontinuities and geographical mobility) and social context (economic factors, social integration, urbanization and social class). In addition, body mass index and waist to hip ratio were also estimated.

Results: Regarding *Personal Characteristics*; positive family history was found in this study to be highly associated with the development of type 2 diabetes (OR=2.50, 95%C.I. =1.43-4.83), as well as sedentary life (OR=8.25, 95%C.I. = 4.75-14.33), and unhealthy dietary behaviors (OR=4.53, 95%C.I. = 2.21-9.72). According to *Life Events*; stress was found to be associated with the occurrence of type 2 diabetes (OR=3.33, 95%C.I. = 1.98-5.61), as well as social discontinuities (OR=2.46, 95%C.I. = 1.33-4.54) and catastrophic events (OR=2.07, 95%C.I. = 1.07-4.02). In relation to *Social Context*; urbanization was found to be associated with type 2 diabetes (OR=2.85, 95%C.I. =3.64-12.93), and high crowding index also was found to be associated with the occurrence of type 2 diabetes (OR=2.29, 95%C.I. = 1.38-3.79). Population in the social class III were found to be more prone for the development of type 2 diabetes (OR=3.82, 95%C.I. = 2.25-6.49). Regarding *obesity*; men with body mass index > 25 were found to be at risk in developing type 2 diabetes (OR=1.88, 95%C.I. = 1.12-3.17) and men with central obesity (waist to hip ratio > 1) were also more prone to develop type 2 diabetes (OR=2.60, 95%C.I. = 1.42-4.74).

Conclusion: Positive family history, sedentary life, unhealthy dietary behavior, stress, social discontinuities, catastrophic events, urbanization, high crowding index, being in social class III and obesity, all are among the important sociological risk factors in the development of type 2 diabetes for adult males.

Key words: Sociological risk factors, type II diabetes, adult males.

Introduction:

Type 2 diabetes is the most common clinical form of diabetes worldwide; it accounts for about 90 per cent of all cases of diabetes globally, and an epidemic of type 2 diabetes is underway in both developed and developing countries. Globally, the number of people with diabetes is expected to rise from the current estimate of 150 million to 220 million in 2010 and 300 million in 2025, this rise is expected to be in virtually every country throughout the world with greatest expected increases in developing countries, particularly in Asia^[1-3]. This trend appears strongly related to life style and socio-economic changes to a degree that some researchers had called diabetes type 2 "the disease of affluence"². The frightening fact, that is, and as Williams and Pickup^[4] put it is that "as many as one half of cases in the population at any one time are undiagnosed". Thus, it is worth mentioning that type 2 diabetes has become one of the most important public health problems and one of the

main significant chronic non-communicable diseases.

The life style of people in most of the Arabian countries had been changing over the past 3 decades due to rapid urbanization and socio-economic development, such changes have led to an increase in the incidence of diabetes type 2 to that extent that diabetes type 2 is now considered as a growing public concern in several Arab countries^[5]. For example, in Egypt, the crude prevalence of diabetes was 9.3 per cent among adults⁶, in Bahrain the figure was 10 per cent⁷, in Sudan 10.4 per cent⁸, in Saudi Arabia 9.5 per cent^[9], in Yemen^[9,7] percent¹⁰ and lastly in Iraq, King³ reported that the estimated prevalence of diabetes is 6 per cent, but Mula-Abed and AL-Naemi in 2002^[11], estimated that 10.4 per cent of population of Mosul city in Iraq (aged more than 25 years) was complaining of diabetes.

Almost all the risk factors for developing type 2 diabetes are related to the socio-economic, life styles and behavioral factors, in addition, the

prevalence of type 2 diabetes increases with the increased age¹². Regarding the gender factor, there are paradoxical estimates in different countries^[10] but it seems that the gender role has no such a demonstrable effects in the development of type 2 diabetes. The high prevalence of the disease was found to be among the highest socio-economic classes^[13]. The obesity (measured by the body mass index "BMI") and the central obesity (measured by the waist to hip ratio "WHR"), were both significant predictors for the development of type II diabetes^[14]. Sedentary life styles were also found to be associated with the occurrence of type II diabetes^[15]. The Western's diet style (rich diets in animal saturated fats, refined sugar and high salts intake) was associated with a higher risk of types 2 diabetes¹⁶. Moreover, a positive association between smoking habits and alcohol consumption with the development of type 2 diabetes¹⁷. The urban residency is another risk factor that is found to be related to the occurrence of high incidence of type 2 diabetes^[14]. Lastly, the effect of migration on the development of type 2 diabetes among immigrants was significant in many studies^[18,19].

Subject & Methods:

In order to achieve the aim of the present study, a case-control study design was adopted. The study was conducted at Al-Hadbaa teaching primary health care center. 120 adult males with newly diagnosed type 2 diabetes were enrolled in this study according to the following inclusion criteria for every case was:

- The patient must be within the first 6 months of the diagnosis of type 2 diabetes, documented by a laboratory test and they must be on treatment.
- Each case should have a document booklet in receiving drugs for the treatment of type 2 diabetes (chronic diseases booklet).

Another 120 adult males were chosen as control for this study with the following inclusion criteria:

- Negative history of diabetes and negative history of recent poly urea and poly depsia.
- Negative history to any previous episode for elevated blood sugar.
- Proved by examination to have normal blood sugar (fasting serum glucose less than 120 mg/dl plus random blood glucose less than 180 mg/dl)^[2,4].

Un-paired sampling technique was used in this study, matching was done for age (± 5 years). Every person in this study was interviewed by the researcher and the following questions to participants were answered in addition to the specific anthropometric measurements such as, BMI, WHR.

Social factors in health and Disease²⁵:

I – Personal characteristics:

A- Social identity:

Not modifiable: age and heredity (family history of diabetes in primary relatives)

Modifiable as marital status, and occupation.

B- Personal habits: Lifestyle

Sedentary life style.

Smoking.

Alcohol consumption.

Fatty, calorie and salt rich diets (i.e. unhealthy diets), this is done by recalling the

Last dietary intake for every case and control.

C- Psychological make-up:

Personality type A

Personality type B

II – Life Events:

A- Stress

B- Social Discontinuities:

Death of spouse

Change in marital status (Divorce, Marriage)

Retirement and change in the job

Change of residence

The born of new baby

C- Geographical mobility:

- Rural to urban (urbanization)

D- Catastrophic events: such as terrorist events.

III – Social Context:

A- Economic factors:

- Unemployment.

- Very high employment

- Sudden job descend.

- Sudden loss of huge money.

B- Social integration

- Living alone, or with family

C- Urbanization:

- Urban or rural

- Crowding index

D- Occupational Social Class^[25]

Then the Odd ratio was then calculated for every risk factors of the concern in this study with its p-value. Statistical analysis was used to examine the effect for results in this study.

Results:

The mean age of the study sample was 47.3 years (± 2 SD). The results of examining social risk factors in the development of type 2 diabetes appeared as the following:

Table (1) shows the distribution of cases and controls according to personal characteristics and revealed (regarding social identity) that positive family history (which is one of unmodifiable risk factor) was associated with the development of type 2 DM (OR= 2.50, P-value= 0.001, 95%C.I. = 1.43-4.83), while the presence of abnormal marital status (as single, divorced and widowed) was not related for the development of type 2 DM. This table (regarding personal habits) also indicated that sedentary life was risky for persons in the development of type 2 DM (OR= 8.25, P-value=0.0001 and 95%C.I.= 4.75-14.33), the habit of cigarette smoking was not associated with occurrence of type 2 DM, Regarding unhealthy dietary habits (rich fatty, calorie and high salt

intake), this risky behavior appeared to be highly associated (OR= 4.53, P-value= 0.0001, 95%C.I.= 2.21-9.72) with the development of type 2 DM, but alcohol consumption appeared in this study to do nothing in the causation of this diseases. Finally regarding psychological make up, personality type A, appeared to be not associated with the occurrence of type 2 DM.

Table(2) indicates that stressful life events were highly associated with the development of type

2 DM (OR=3.33, p-value= 0.0001, 95%C.I.= 1.98-5.61), social discontinuities was also among the participating factors in the development of type 2 DM (OR=2.46, p-value= 0.004, 95%C.I.= 1.33-4.54), and catastrophic events was also associated with the development of type 2 DM (OR=2.07, p-value= 0.032, 95%C.I.= 1.07-4.02). The geographical mobility factor appears in this table to do nothing in the occurrence of type 2 DM.

Table (1): Distribution of the study sample according to personal characteristics

Factor	Cases		Controls		O R	P-value	95 % C.I.
	No.	%	No.	%			
positive family history	49	40.83	26	21.66	2.50	0.001	1.43-4.83
Abnormal marital state	14	11.66	16	13.33	0.86	0.696	0.40-1.84
Sedentary life	90	75	32	26.66	8.25	0.0001	4.75-14.33
Active smoking	48	40	51	42.5	0.90	0.694	0.53-1.52
Alcohol consumption	7	5.83	4	3.33	1.8	0.354	0.52-6.25
Unhealthy dietary habit	110	91.66	85	70.83	4.53	0.0001	2.21-9.72
Personality type A	88	73.33	83	69.16	1.23	0.476	0.70-2.17

Table (2): Distribution of the study sample according to life events

Factor	Cases		Controls		OR	P-value	95% C.I.
	No.	%	No.	%			
Stress	78	65	43	35.83	3.33	0.0001	1.98-5.61
Social discontinuities	38	31.66	19	15.83	2.46	0.004	1.33-4.54
Geographical mobility	22	18.33	17	14.16	1.36	0.382	0.68-2.71
catastrophe	29	24.16	16	13.33	2.07	0.032	1.07-4.02

Table(3) reveals the effect of social context in the occurrence of type 2 diabetes, where dramatic change in economic factor, appeared not to be

important for a person to have type 2 DM. Social integration if not perfect(as living alone) , appeared in this study to have no impact in the

causation process of type 2 DM . Urban citizens, in this study appeared to be more prone to develop type 2 DM than rural citizens (OR=2.85, P-value=0.020 and 95%C.I. = 1.18-6.89). Lastly, high

crowding index (> 8 persons/household) reveals significant effect in the development of type 2 DM in this study (OR=2.29, P-value=0.001 and 95%C.I.= 1.38-3.79).

Table (3): Distribution of the study sample according to social context

Factor	cases		controls		OR	P-value	95% C.I.
	No.	%	No.	%			
Unemployment, Very high Employment, Sudden job descend, sudden loss of huge money.	23	19.16	21	17.5	1.12	0.736	0.58-2.18
living alone	4	3.33	3	2.5	1.35	0.701	0.29-6.26
Urban	113	94.16	102	85	2.85	0.020	1.18-6.89
> 8 persons / household	77	64.87	57	47.5	2.29	0.001	1.38-3.79

Table (4) Shows that, and according to occupational social classification of both study groups, people in social class III (social class of manual skilled and non-manual skilled workers) were more prone to develop type 2 DM (OR=3.82, p-value= 0.0001, 95%C.I. = 2.25-6.49), while the people in social class II (class of semiprofessional

workers) appeared in this study to be protected against the development of type 2 DM.

Table (5) indicates that obesity (BMI > 25 OR=1.88, p-value=0.018, 95%C.I. = 1.12-3.17) in general and central obesity (WHR > 1 OR=2.60, p-value=0.002, 95 % C.I. = 1.42-4.74) both appeared to be among the highly significant risk factors for the development of type 2 DM.

Table (4): Distribution of the study sample according to occupational social classification

Social class 'occupation	Cases		Controls		O R	P-value	95 % C.I.
	No.	%	No.	%			
I	8	6.66	18	15	0.41	0.038	0.18-1.95
II	9	7.5	37	30.83	0.18	0.0001	0.09-0.37
III	71	59.16	33	27.5	3.82	0.0001	2.25-6.49
IV	22	18.33	19	15.83	1.19	0.607	0.61-2.31
V	10	8.33	13	10.83	0.75	0.511	0.32-1.77

Table (5): Distribution of the study sample according to anthropometric measures

Anthropometric measures	cases		controls		OR	P-value	95% C.I.
	No.	%	No.	%			
BMI > 25	81	67.5	63	52.5	1.88	0.018	1.12-3.17
WHR > 1	41	34.16	20	16.66	2.60	0.002	1.42-4.74

Discussion:

Diabetes is a common disease; it is associated with significant morbidity and premature mortality due to its complications. It forms a major burden to individuals and to society. Type 2 diabetes, is one of the most important chronic non-communicable diseases, highly related in its occurrences, prognosis and complications with sociological factors and health behaviors of individuals. Type 2 diabetes has become a public health epidemic ^[20], and approximately one-third of all people with diabetes may be undiagnosed. Moreover, it is frequently not diagnosed until its complications appear ^[21]. Thus, the investigations for the risk factors for this serious illness is very important from the public health point of view and because the exact etiology of this disease is not yet fully discovered, the sociological factors should be investigated promptly in every society in order to have key components in the mechanism of occurrence of such an important disease. The discussion for the results of this study can be summarized in the following points:

According to personal characteristics, several studies carried out in different countries showed that positive family history of diabetes type 2 was regarded as an independent risk factors for developing the disease ^[4,8]. In this study, the same finding was obtained, where family history appeared among the significant risk factors in the development of type 2 diabetes. Although this factor among the unmodifiable ones, but its presence is important in finding the most appropriate target population for the primary and primordial prevention of this serious illness. Sedentary life and physical inactivity are found in this work to be associated with the development of type 2 diabetes. Similar findings were also obtained from the study of Herman et al ^[15] and that of pan et al ^[18]. Several well known mechanisms could explain the benefit of physical activity in reducing risk of type 2 diabetes; that is, exercise can improve insulin sensitivity in both patients with pre-existing type 2 diabetes and non-diabetic individuals ^[17].

The western dietary habit (high fat, caloric and salt intake) is regarded world wide now as an

established undependable risk factor in the occurrence of type 2 diabetes ^[16]. In accordance with these results, the finding of this study revealed that the western dietary behavior is a significant risk factor in the occurrence of type 2 diabetes.

The results of this study showed that active smoking and alcohol consumption were not associated to the episode of type 2 diabetes. Parallel results were also gained by the study of Sairench et al ^[22]. Furthermore, Carlson et al ^[23], found that there was a negative association between alcohol intake and the development of type 2 diabetes. The effects of abnormal marital status and the effect of personality type A, both appeared in this study to be not significant in the occurrence of type 2 diabetes.

Regarding life events and its effects on the health of the individuals, this study revealed that the stress, social discontinuities and catastrophic events have major influence in the development of type 2 diabetes in our population, similar findings also were obtained by other researchers in developed countries as the finding of Burke et al ^[24] and in developing countries as the study of Sayeed et al ^[13].

The geographical mobility in this work appeared not significant in the development of type 2 diabetes; this was in contrast to the finding of Pan et al ^[18], who documented that migration is one of the significant factors in the occurrence of type 2 diabetes among immigrants. This discrepancy in the results may be due to that the study design of this work was not appropriate to examine this factors, where this factor alone, needs a single prospective cohort study to estimate its significance.

Concerning the social context, this study found that there was no association between economic status (or the sudden change in economic status) and the development of type 2 diabetes. Moreover, living alone, as a factor reflecting the social cohesion is found to do nothing in the occurrence of diabetes type 2. This may be partly due to the underestimation of the real size of social cohesion in this study, because oriental societies, unlike western societies, the social cohesion is very strong among their members due to many social, cultural and religious beliefs.

Data from developing countries¹⁵ as well as from developed countries^[14] indicated that the prevalence of type 2 diabetes is significantly higher in urban than in rural persons. The same results were obtained from this study, where urban population is found to be about 3 times more prone for the occurrence of type 2 diabetes than the rural population. In addition, in this work, overcrowding appeared to be strongly associated with development of type 2 diabetes.

The social classification (according to job) of the study population in this research revealed that people in social class II (Semiprofessional jobs) were found to be in protective statuses significantly against the development of type 2 diabetes in comparison with other social classes. While, the people in the social class III (both manual and non-manual skilled workers) were found to be at more risk in getting of type 2 diabetes than in the other social classes. Although, there are many criticisms on this social classification^[25], but it remains worldwide, the most applicable one.

Several population-based surveys were conducted in different countries in the world showed that body mass index as a general measure of obesity and the waist to hip ratio as a measure of central obesity, were both significant predictors for the development of type 2 diabetes^[13,14]. Similar figures have been shown in this study indicating the effect of obesity as an undependable risk factor in the occurrence of type 2 diabetes.

Social factors are very important in the development of any disease, and specifically in non-communicable ones, and in order to apply effective preventive measures (as primary and primordial types of prevention), social factors must be investigated enormously and seriously. Finally this study recommended further studies as cross-sectional and prospective cohort studies in order to be aware of important social risk factors that are connected in the causation of such an important diseases.

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