Prospective Study of Risk Factors for Development of Diabetes Mellitus

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Background:

Few epidemiological studies have investigated the relative importance of diabetic mellitus (NIDDM) in two sexes within the same study population. In particular it is not clear whether hypertension (HT), body mass index (BMI), hyperlipidemia and smoking carrier a similar risk of (NIDDM) in men and women.

Abstract:

The association between hypertension, serum lipids, smoking, obesity and fasting blood glucose (FBG). Were examined in population- based prospective study of (200) men and women aged (20-79) years old. The prevalence of diabetes (NIDDM) among men was (66.4%) and that of impaired glucose tolerance (IGT) was (26.56%); the corresponding values for women were (58.3%) and (20.83%) respectively. The age and sex–adjusted incidence of hyperlipidemia ($P<0.01$), hypertension ($P<0.01$) was significantly higher in subjects with (NIDDM) than in those with normal glucose tolerance (NGT). This study also show that the frequency of (NIDDM) and smokers was more than (IGT) and smokers or (NGT) ($P<0.01$) and also it was higher in the men diabetic comparing to women diabetic. Men with (IGT) or (NIDDM) more often had obese ($P<0.05$) than men with (NGT), and also was higher in men campaigning to women.

Conclusion: -

We found in this study that sex, hypertension, obesity and hyperlipidemia play an important role in the incidence of (NIDDM) and (IGT).

Keywords:-

Non-Insulin-Dependent Diabetes Mellitus, blood pressure, smoking hyperlipidemia, body mass index, sex , hypertension , obesity .

Introduction:

Diabetes mellitus is an old clinical syndrome characterized by hyperglycemia due to absolute or relative deficiency of insulin [1]. Lack of insulin affects the metabolism of carbohydrate, protein, fat and electrolytes [2], which may be leading to the death [3,4].

This syndrome classified into primary and secondary diabetes [5]. The main types of diabetes mellitus are type I (insulin dependent diabetes mellitus (IDDM)). It is prevalence in 1 of 300 person under the age of 20 years, the time when this disease is usually diagnosed. This type of diabetes is caused by insufficient insulin secretion. And type II (non insulin dependent diabetes mellitus (NIDDM)) has no correlation with the blood insulin levels. Onset is usually after the age of 40 years [6].

The etiology of this disease is still uncertain environmental factors interact with a genetic susceptibility to determine which of those with genetic predication actually develop the clinical syndrome and the timing of its onset [7].

Diabetes particular (NIDDM) is commonly associated with abnormalities in plasma lipid and lipoproteins levels. In particular NIDDM usually presents with concomitant elevations in triglyceride (TG) and reduction in the plasma high density lipoprotein–Cholesterol (HDL-C) [8] .The regulation of plasma (TG) and (HDL-C) concentration is extremely complex, numerous genes regulating the synthesis of apolipoprotein, lipid enzyme and receptors. The environment, particularly factors related to energy balance, has a major impact on lipoprotein metabolism as well. [9]

Hypertension is commonly associated with diabetes [10]. Patients with hypertension and diabetes mellitus are especially vulnerable to cardiovascular and renal compilations; therefore, the controls of hypertension and dyslipidaemia as well as cessation of smoking are particularly important. Hypertension should be detected early and treated aggressively it the contribution to increased morbidity and mortality in diabetes is to be avoided[11].

The present report describes the association of diabetes (NIDDM) and impaired glucose tolerance (IGT) with the incidence of hypertension (HT), body mass index (BMI), hyperlipidemia and smoking in different sexes.

Research Design And Methods :

The prospective population survey of diabetes and it is risk factors was initiated in December 2000 to November 2001 of Azadi general hospital in Kirkuk by clinical examination [12] consisted of a physical examination, a personal interview, a 12- lead resting electrocardiogram, an oral glucose tolerance test and measurements from blood samples.

In this survey (200) subjects aged (20-79) years. Consented to participate in a (75) g oral glucose tolerance test (OGTT) of these (200) subjects fasted for at least 12 hours before taking the test. Fasting blood glucose (FBG) [13], serum triglyceride [14], serum cholesterol [15] and serum HDL-C levels [16] were measured by using enzymatic method by using (Biomerieax Vitek,Inc.France) Kit.

After individual with previous history of myocardial infection or hypertension excluded (200) subjects (189 who under went an OGTT and 11 who were receiving insulin therapy were interred into the study)[17]. Were used in the classification of the subjects criteria are as follows: **1**.for diabetes fasting plasma glucose ≥ 7.8 mmol / l or 2- h venous plasma glucose ≥ 11.1 mmol / l in an OGTT; **2**. for IGT, fasting plasma glucose < 7.8 mmol / l and 2-h plasma glucose 7.8-11mmol / l; and **3**. for the normal glucose tolerance (NGT), fasting plasma glucose < 7.8 mmol / l and 2-h plasma glucose <7.8 mmol / l. All diabetic subjects, including those receiving insulin therapy, had NIDDM.

Statistical analysis of data are expressed as means $\pm$ SD. Comparisons between groups were performed using the students t-test statistical significance levels were ($P<0.05$) and were examined for statistical differences using Chi-square test ($\chi 2$).

Results:

Of the (200) men and women aged (20-79) years old participating in the baseline examination, 9 (7.03%) had NGT, 34 (26.56 %) had IGT and 85(66.4%) had NIDDM. The corresponding values for women include in the baseline study were 15 (20.83%), 15 (20.83 %) and 42 (58.3%) respectively.

Figure (1) gives the age-adjusted frequencies of baseline risk factors by sex and glucose tolerance. Men with IGT or NIDDM more often had hypertension and more obese than men with NGT. Men with NIDDM also more often had hyperlipidemia and more smoking. In the women the prevalence of hypertension, hyperlipidemia and obesity increased significantly with rising GTT levels. The frequency of cigarette smoking was lower in the women than in the men.
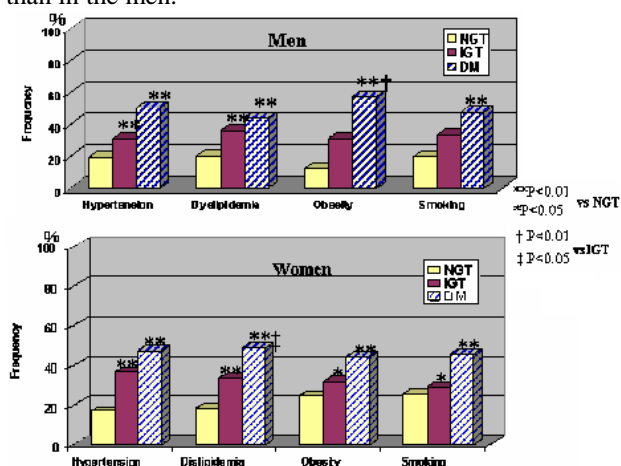

Figure (1) : Age-adjusted frequencies of risk factors by glucose tolerance. Hypertension (HT): systolic blood pressure $\geq$ 16 mmHg or diastolic blood pressure $\geq$95mmHg or taking antihypertensive agents. Dyslipidemia: total cholesterol $\geq$5.69 mmole/l, triglycerides in men $\geq$1.8 mmol/l, women$\geq$1.6mmol/l and HDL-C $\leq$ 0.9 mmol/l. Obesity: BMI $\geq$25.4Kg/m^2.

The distributions of sex and age among all groups of the subject studied were given in the Figure (2). It showed that the highest frequency (66.4 %) was recorded among the males while in the females (58.3 %). It was seen in both sexes that NIDDM was more obvious at the age (40-59) years .The highest frequency (56.5%) of NIDDM among the male was in age group (40-59) years and the lowest frequency (5.9%) in the age groups (20-39) years. While in the women the highest frequency (50%) was recorded in the age group (40-59) years and the lowest frequency (9.5%) was in the age groups (20-39) years.
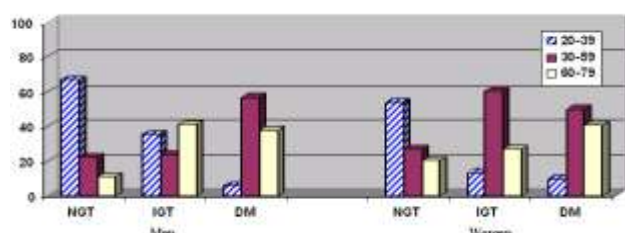

Figure (2): Age - and sex-adjusted incidence for IGT and diabetes compared with NGT.

Discussion:

During in this period, we found two- to three folds increase in the prevalence of glucose intolerance

concomitant with a marked increase of obesity and hyperlipidemia [18].

Although it has been commonly appreciated that subjects with type II diabetes have an increased prevalence of hypertension [19], there is also an increased incidence of type (II) diabetes (NIDDM) in the subject with hypertension [20,21]. The incidence of type (II) diabetes (NIDDM) was (50%) and in IGT in hypertensive was (30.95%) as compared to only (19.05%) in normaltensive subjects while in women (16.67%), (36.36%) and (46.96%) respectively (P<0.01).In comparison our study with the study of Morales et al. [22],we found that the values in our study were higher than that reported of Morales and et al. The increase risk of type (II) diabetes (NIDDM) could be to innate increased risk of type (II) diabetes (NIDDM) in the hypertensive subjects, due to increased obesity or insulin levels in hypertensive subjects [23]. An alternative or additional possibility is that certain anthypertensive agents might increase the risk of type (II) diabetes (NIDDM). Beta –blockers and thiazides, for instance have been reported to increased insulin resistance. [24]

Most studies infect, suggest that the subjects on ß-blockers and or / thiazides may have an increased risk of diabetes. [20-23]

Mylckänen et al. [21] found in their study subjects on ß-blockers and or / thiazides had a two fold increased risk of type (II) diabetes (NIDDM) relatively to other hypertensive subjects these effects were similar whether the subject had IGT or NGT at baseline. Hypertensive subjects on ß- blockers and or / thiazides also had increased insulin concentration at baseline. However in Morales et al [22] and Gurwitz et al. [25] studies, ß-blockers and or / thiazides use was not associated with an increased risk of type (II) diabetes (NIDDM). Because after the introduction of thiazides diuretics was soon found that their prolong use increased hyperglycemia in diabetics and later that they impaired glucose tolerance in some nondiabetics. Diazoxide causes hyperglycemia by inhibiting release of stored (but not of newly synthesized) insulin from β-islet cell; the hyperglycemia can be antagonized by a sulphonylureas. [26]

Barrett et al. [27] found in their studies the form of dyslipidemia that is most characteristic of type (II) diabetes (NIDDM) is increased triglycerides and HDL-C levels while in Wilson. et al. [28] Showed that dyslipidemia in type (II) diabetes (NIDDM) subject relative to non diabetic subjects is more sever in women than in men .In Framingham study [28] found that the prevalence of hypertriglyceridemia in type (II) diabetes (NIDDM) (>7.2 mmole) and non diabetic men was (19%) and (9%) respectively, while in our study was higher than that reported in Framingham study could be related to high fat intake by these individuals casing a state of preexisting lipaemia which increases its expression with advancement of age [29].

It is generally recognized that serum lipids and lipoproteins concentrations of diabetics are highly variable. This might be attributed to the heterogeneity of the disease and other associated factors such as metabolic control and the amount of body fat .In addition to that, the presence or absence of renal disease and different genetic or exogenous factors, normally influencing

plasma lipoprotein, also play a role in the dyslipidemia of diabetes [30]. However the elevation in triglycerides and reduction in HDL-C are among the common changes in serum lipids in type (II) diabetes both sexes. [32,33].

Conclusion:

In conclusion our study indicates that sex, hypertension, antihypertensive drugs, dyslipidemia and obesity play an important role in the incidence of type (II) diabetes (NIDDM) and IGT.
Glucose intolerance is an important public health problem.

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دراسة مستقبلية للعوامل المؤثرة في الإصابة بداء السكري غير المعتمد على الأنسولين

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الملخص:

الهدف من هذه الدراسة هو تحديد العوامل المستقبلية المؤثرة في الإصابة بداء السكري غير المعتمد على الأنسولين والتي تشمل قياس كل من نسبة كلوكوز الدم في حالة الصيام ، ضغط الدم ، مؤشر كتلة الجسم ، فرط الدهون و التدخين في كلا الجنسين .

اشتملت هذه الدراسة على (٢٠٠) عينة من الذكور و الإناث تتراوح أعمارهم بين (٢٠-٧٩)سنة تم سحب عينات من الدم لمعرفة نسبة كلوكوز الدم في حالة الصيام فقد تبين من هذه الدراسة ان (٦٦,٤%) من الذكور كانوا مصابين بداء السكري غير المعتمد و (٢٦,٦٥%) منهم يعانون من ضعف تحمل الكلوكوز الدم فحين ان النسبة في الإناث كانت (٥٨,٣%) و (٢٠,٨٣%) على التوالي.

كما أظهرت هذه الدراسة ارتفاعا" معنويا" (P<0.01) لكل من فرط الدهون و ارتفاع ضغط الدم لدى الأشخاص المصابين بداء السكري غير المعتمد على الأنسولين عند مقارنتهم مع الأشخاص طبيعي تحمل الكلوكوز الدم .

كما تبين من هذه الدراسة ايضا" ان نسبة المدخنين المصابين بداء السكري غير المعتمد على الأنسولين أعلى من نسبة المدنيين اللذين يعانون من

ضعف تحمل الكلوكوز الدم و الأشخاص طبيعي تحمل الكلوكوز الدم و كان الفرق بينهم معنوي إحصائيا"، و تبين ايضا" انه كان في الذكور المصابين من بداء السكري غير المعتمد على الأنسولين أعلى من الإناث المصابين بداء السكري غير المعتمد على الأنسولين .

و قد لوحظ من هذه الدراسة ان الذكور المصابين بضعف تحمل الكلوكوز الدم و المصابين بداء السكري غير المعتمد على الأنسولين كانوا من الاشخاص البدنين عند مقارنتهم مع الذكور طبيعي تحمل الكلوكوز الدم و كان الفرق بينهم معنوي احصائيا" و كانت عند الذكور اعلى منه عند الاناث.

و من الاستنتاجات التي تم التوصل اليه من هذه الدراسة بان لكل من الجنس ، ارتفاع ضغط الدم و السمنة و كذلك فرط الدهون يلعب دورا" مهما" في فرص الاصابة بداء السكري غير المعتمد على الأنسولين و علـــــــى ضـــــــعف تحمـــــــل الكلوكـــــــوز الـــــدم.