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Eight Years Incidence of Diabetes Mellitus in Gestational Diabetic Patients

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Objective: To evaluate eight years incidence of Gestational Diabetes Mellitus (GDM).

Design: A retrospective study.

Setting: Primary Healthcare, Bahrain.

Method: Five hundred sixty-two patients suffering from GDM were identified in 2002 and were traced in 2010 for laboratory diagnosis of diabetes.

Result: Two hundred one (36%) patients were found to be diabetic. One hundred one (18%) were normal, 33 (5.8%) had impaired glucose tolerance (IGT) and 227 (40.4%) were of undetermined status. There is a statistically significant relation between the development of diabetes and the age at diagnosis of GDM.

Conclusion: The long-term rate development of diabetes after GDM is high. Age and level of screening test at diagnosis are strong predictive factors.

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Gestational diabetes mellitus (GDM) or impaired glucose intolerance diagnosed during pregnancy affects about 5% to 13% of pregnancies in Bahrain according to two recent studies[1-4]. The prevalence of GDM depends on the population studied and the diagnostic criteria used. Increased prevalence of GDM is noted when less strict diagnostic criteria is used and in populations who have a high prevalence of type II diabetes[1].

History of previous GDM exposes the patient to increased risk of subsequent diabetes mellitus. About 50% of GDM women will have diabetes mellitus after 10 years[1-3]. Predictors for the development of diabetes include antenatal and maternal factors and recognition of these during screening of women with GDM may increase awareness about effective strategies for primary prevention of diabetes in the local populations[1].

Gestational Diabetes Mellitus (GDM) could have serious short and long-term consequences for the mother as well as the child. The consequences of GDM include the development of type II DM and increased risk of obesity and metabolic syndrome in the children. The risk depends on several factors including ethnicity, length of follow-up, selection criteria and types of tests for GDM and type II diabetes[1-5].

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Diagnosis of GDM was done through two steps. Initially, 50 gm sugar load was given to selected high risk pregnant ladies during their 24-28 weeks of gestation followed by one hour glucose measuring. This is known as the glucose challenge test (GCT). The threshold for abnormal screen is ≤140 mg/dL or 7.8 mmol/L. Women who screened positive on GCT, 100 gm three hour oral glucose tolerance test (OGTT) is performed. This is the diagnostic test for GDM. If the two readings out of the four were high, the lady will be labeled as GDM[4].

In Bahrain, the same method is used. For women who screened positive on GCT, 75 gm OGTT is performed with three hours diagnostic readings. If two out of three readings are high, the patient is considered GDM[4]. In 2002, GCT of 11 mmol/L for the diagnosis of GDM was suggested.

The aim of this study is to follow-up the 562 patients diagnosed as GDM in 2002 and to evaluate the 8 years incidence of diabetes in 2010[4].

METHOD

Five hundred sixty-two GDM patients were identified in 2002. The laboratory results of the patients were reviewed in 2010 to evaluate the development of diabetes. All GDM patients identified in 2002 were included in this study.

The laboratory results of the five hundred sixty-two GDM patients were examined in 2010. Fasting blood glucose (FBG), random blood glucose (RBG), HbA1c, or glucose challenge tests (GCT) were evaluated. If any of these results were positive according to American Diabetes Association (ADA) criteria for the diagnosis of diabetes, the patient was considered diabetic[6]. Patients with impaired glucose tolerance (IGT) results were labeled as IGT. Other than the previous, the patient was considered non-diabetic. If no results were found, the diabetes status is considered undetermined.

The mean age of the patients in the diabetic, IGT and non-diabetic groups were compared at time of diagnosis of GDM using the t-test. The means of the GCT results for the three groups were also compared using the t-test.

RESULT

Patients identified as diabetic was 201 (36%); patients identified as IGT was 33 (5.8%); patients identified as normal was 101 (18%) and patients with undetermined diabetes status was 227 (40.4%).

The mean age for the four groups at the time of diagnosis of GDM was 35.17 years for the DM group, 33.46 years for the normal group, 34 years for the IGT group, and 32 years for the undetermined group.

Figures 1 and 2 show the age distribution for both the DM and normal population respectively. The DM patients are older than others.

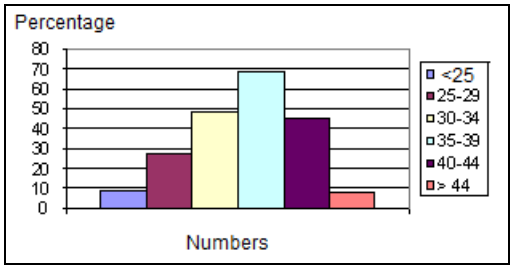

Figure 1: Age Distribution of DM Patients

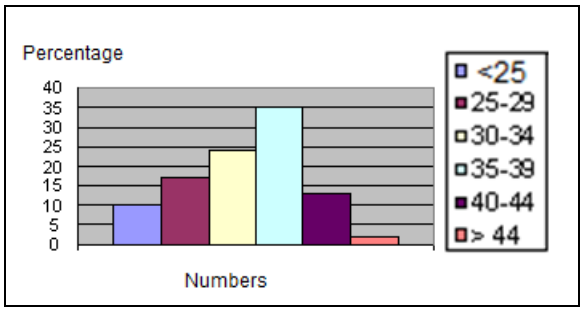

Figure 2: Age Distribution in Normal Patients

The mean GCT for the four groups at the time of diagnosis of GDM was 11.13 mmol/L for the DM group, 9.7 mmol/L for the normal group, 9.57 mmol/L for the IGT group and 9.84 mmol/L for the undetermined group.

Statistically significant relations were found between age at diagnosis of GDM and development of diabetes P=0.0179 or IGT P=0.0155.

DISCUSSION

In this study, the diabetes status of 40% of the patients could not be determined. This is a major drawback and could be attributed to several factors including patients' travel, patients' age, patients' unawareness and data loss. Nevertheless, the number of patients identified as DM after 8 years of GDM is considerably alarming.

Similar studies examined the risk for future diabetes in GDM patients[1]. Lack of consensus from these studies is due to the fact that each study used different criteria to diagnose GDM, had different durations of observation and examined different ethnic groups[1].

In a systemic review 2002, the cumulative incidence ranged from 2.6 to 70% depending on the population studied and the duration of diabetes[1].

The 8 years incidence of diabetes in our cohort was 36% and with the IGT patients, the incidence of glucose intolerance of any type after 8 years would be 42%. Because the prevalence of diabetes mellitus in the Bahraini population is high, this may be an underestimate of the future risk of diabetes.

A study revealed that diabetes developed in 36.9% of their GDM population over 7 years affecting South Asian (48.6%) more than Caucasian women (25.0%). This is comparable to the incidence in our study[5].

Our study has confirmed a statistically significant difference in the mean age at the time of diagnosis of GDM between the GDM and IGT group compared to the normal group. The association between the future risk for the development of diabetes and age at time of the diagnosis of GDM is well documented in other studies[7]. A multiethnic population study found that women developing diabetes were older and more hyperglycemic at diagnosis of GDM[5,7].

Our study has confirmed a statistically significant difference in the mean of GCT level at the time of diagnosis between the GDM and IGT compared to the normal group. Previous studies have suggested fasting blood sugar and HbA1c as predictors for the development of future diabetes[1,7].

Future diabetes was associated with and predicted by HbA1c taken at GDM diagnosis as well as by previously reported risk factors of increasing age at follow-up, pregnancy weight and increasing hyperglycaemia[1,5,7].

The main strength of the study is that it traced patients with GDM over a long period and addressed the relation between GDM and developing diabetes. The big number of patients is a strength for this study.

The limitation of this study is the missing list of patients' file in the database. The study would have been stronger if it was case control. Also, more variables could have been addressed if the study was not database oriented.

CONCLUSION

This study has demonstrated the alarming increase in diabetes mellitus after gestational diabetes mellitus. This mandates a thorough follow-up of patients with gestational diabetes mellitus to ensure prevention and early diagnosis. More public awareness about the hazards of gestational diabetes mellitus and its consequence is needed.

It is recommended that further case-control study is conducted to confirm our findings.

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