Original Article

Clinical Epidemiology of Gestational Diabetes in Kuwait

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Kuwait Medical Journal 2004, 36 (3):195-198

ABSTRACT

Objective: To study the clinical and epidemiological features of pregnant women with gestational diabetes mellitus (GDM) in Kuwait. The objectives of this study were to describe personal and clinical characteristics, prevalence of major risk factors for GDM, and the main causes and frequency of hospital admission required in these patients.

Patients and Methods: A prospective descriptive study of 76 patients, who fulfilled the standard diagnostic criteria for gestational diabetes, was conducted at Farwania hospital in Kuwait. On an average, expatriates were younger than Kuwaiti patients (median age 32, mean 33.5 ± 5.2 years versus median 34, mean 33.3 ± 6.1). Overall, 55% were in the younger age group. Younger age group was significantly associated with the presence of GDM as compared to the older group (94% versus 6%). Predominant clinical features for GDM patients included positive family history of diabetes (62%), past history of GDM in previous pregnancies (49%), obesity (49%), abortions (40%), glucosuria (38%), and macrosomia (30%).

Results: Features of hospital morbidity showed that 72% required admissions during the current pregnancy, at least once (78%). 86% required admission for control of blood sugar levels whereas 13% were admitted for checking their blood sugar profile. Normoglycemia was achieved using insulin therapy in most of the patients (51%).

Conclusion: This study showed that GDM is associated with younger age group, and is predominant among those with family history of diabetes, past history of GDM in previous pregnancies, and obesity. Such cases need to be treated properly to prevent or minimize complications.

KEYWORDS: body mass index, conception, gestational diabetes mellitus, oral glucose tolerance test

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as any abnormal glucose tolerance first diagnosed during pregnancy. The condition may have developed earlier, but remained undiagnosed prior to the onset of pregnancy. Thus, it may be diagnosed for the first time with the onset or progress of pregnancy. Insulin therapy may or may not be used. The condition may or may not persist after delivery[1].

The reported incidence of gestational diabetes varies enormously between populations. The overall incidence in the UK and most of Europe is about 1-2%[2]. The estimated incidence of GDM in Victoria (1996) was 3.6%[3]. The prevalence may range from 1-14% of all pregnancies depending on the population studied and the diagnostic tests employed[1].

GDM may develop at any time during pregnancy[2]. The test for GDM should be undertaken during the first antenatal visit[1]. High-risk groups include those with marked obesity[4], past history of GDM and high parity[5,6], family history of diabetes in first degree relatives[7], history of fetal macrosomia[8], stillbirth in previous pregnancies and the presence of glucosuria[9, 10].

Due to the high incidence of GDM among certain ethnic groups, ethnicity is considered as one of the risk factors during routine screening of GDM. It has been recommended that all pregnant women of Asian ethnicity should undergo screening for GDM[11].

In Kuwait, because of the high prevalence of diabetes[12] all pregnant women undergo screening for GDM during their first antenatal visit[13].

Management goals should aim for strict glycemic control. This can be achieved by close supervision of the diet and insulin therapy when needed, to reduce fetal and maternal morbidity[1].

PATIENTS AND METHODS

A prospective descriptive study was undertaken at the maternity department of Farwania hospital, Kuwait which included 76 women (38 Kuwaiti and 38 expatriate). Subjects were selected from consecutive cases coming to the specialty clinic and were entered into the study after taking their approval. All cases were diagnosed as pregnancy with GDM.

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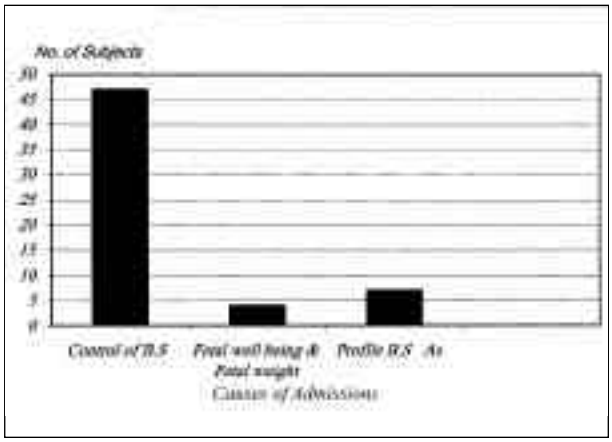

Fig. 1: Main causes of hospital admission for patients with GDM at the Farwania Hospital, Kuwait (2002)

Data were collected from selected cases through a questionnaire designed for this purpose by the study group and from the patients' medical records. The study period was from January-February 2002.

For the purpose of this study, GDM was diagnosed when any of the following were present: a fasting plasma glucose ≥7 mmol/ L or a casual plasma glucose ≥11.1 mmol/ L also confirmed on a subsequent day. If casual plasma glucose was between 7.8-11 mmol/ L, then a standard oral glucose tolerance test (OGTT) with 75 gms of glucose was performed. Pregnant women who met the diagnostic criteria for diabetes and impaired glucose test were classified as having GDM[14,15].

Based on the measurement of weight before pregnancy and height for each patient, body mass index (BMI) was calculated. BMI (kg / m^2) is defined as body weight (kg) divided by the square of height (m^2). Obese patients were those having BMI ≥ 30[16].

The level of education was defined at three levels: low, intermediate and high. Low level included the illiterate and primary grade. The intermediate level included intermediate and high school grades. The high level included university and higher grades. Fetal macrosomia was defined as fetal birth weight > 4 kg[8].

Data analysis was performed using the SPSS data analysis system with chi-square test to demonstrate the significance of different variables.

RESULTS

Personal and clinical characteristics of pregnant patients with GDM:

Table 1 shows the distribution of patients by age and nationality. Out of the 76 patients studied, 38 (50%) were Kuwaiti and 38 (50%) were expatriates. Among the Kuwaiti patients, the average age (± SD) was 33.3 ± 6.1 years (range 22-46 years); the median age was 34 years. Among the expatriate patients, the average age (± SD) was 33.5 ± 5.2 years (range 24-43 years); the median age was 32 years.

Table 1
Demographic and clinical characteristics of pregnant patients with GDM at the Farwania Hospital, Kuwait (2002)

	Kuwaiti (%)	Non-Kuwaiti (%)	All (n = 76)
Age			
≤ 40	19 (51.4)	23 (59.5)	42
> 40	18 (48.6)	16 (40.5)	34
Nationality	38 (50)	Arab 24 (31.6)	76
		Non-Arab 14 (18.4)	
Level of education			
Low	8 (21.0)	5 (13.2)	13
Intermediate	20 (52.6)	20 (52.6)	40
High	10 (26.3)	13 (34.2)	23
Body mass index (BMI)			
< 30	14 (35.1)	25 (65.8)	39
≥ 30	24 (64.9)	13 (34.2)	37

Table 2
Prevalence of other risk factors among GDM patients at the Farwania Hospital, Kuwait (2002)

Risk Factor	n (%)
Family history of DM in first degree relative	
Yes	47 (61.8)
No	29 (38.2)
Past history of GDM in previous pregnancy	
Yes	37 (49.3)
No	33 (44.0)
History of macrosomia in previous pregnancy	
Yes	23 (30.3)
No	53 (69.7)
Presence of glucosuria in current pregnancy	
Yes	28 (37.8)
No	46 (62.2)
History of stillbirth in previous pregnancy	
Yes	7 (9.2)
No	69 (90.8)
History of abortions in previous pregnancy	
Yes	30 (39.5)
No	46 (60.5)

Out of the 38 expatriate patients in the study, 31.6% (24/38) were of Arabic ethnicity (from Egypt, Syria, Iraq, Jordan, Morocco and Saudi Arabia) and 18.4% (14/38) were from South Asian ethnicity (from Iran, India, Pakistan and Bangladesh).

The level of education among the studied sample was as follows: 17.1% (13/76) had low level of education. Almost half of them 52.6% (40/76) were with intermediate level of education whereas 30.2% (23/76) had high level of education.

Among the Kuwaiti patients, 64.9% were obese and 35.1% were non-obese. However, the finding was opposite among the expatriate as 65.8% (25/38) were non-obese and 34.2% (13/38) were obese. In the study population, those with BMI ≥ 30% were 49.3% of the total.

Table 3
Association between various demographic and clinical characteristics among GDM patients at the Farwania Hospital, Kuwait (2002)

	n (%)	p-value
Age		
≤ 40	63(94.0)	< 0.05
> 40	4 (6.0)	
Level of education		
Low	11 (19.6)	< 0.1
Intermediate	32 (57.1)	
high	13 (23.2)	
Body mass index (BMI)		
< 30	25 (45.5)	NS
≥ 30	30 (54.5)	
Family history of diabetes		
Yes	34 (60.7)	NS
No	22 (39.3)	
Past history of GDM		
Yes	29 (55.8)	NS
No	32 (44.2)	
Stillbirth & abortion		
Yes	29 (51.8)	< 0.1
No	27 (48.2)	
Macrosomia		
Yes (> 4 kg)	20 (35.7)	< 0.1
No (≤4 kg)	36 (64.3)	
Glucosuria in current pregnancy		
Yes	18 (33.3)	NS
No	36 (66.7)	

Prevalence of other risk factors among GDM patients in Kuwait:

Table 2 shows the prevalence of selected risk factors other than obesity among GDM women in this study.

Positive family history of diabetes mellitus in first degree relative was found in 61.8% (47/76). Past history of GDM in previous pregnancy was positive in 49.3% (37/70) of patients. 39.5% (30/76) had a past history of abortion. During the current pregnancy, presence of glucosuria was found in 37.8% (28/74) before the diagnosis of GDM. In the study group, only 30.3% (23/76) had past history of macrosomia whereas, 9.2% (7/76) had history of stillbirths.

Associations between various personal and clinical characteristics with GDM are shown in Table 3. Significant positive association (p-value <0.05) was found in the younger age group (≤ 40 years). Marginal association (p-value <0.1) was found in patients having intermediate level of education, in patients with past history of stillbirth or abortion and in patients with past history of fetal macrosomia.

The main causes and frequency of hospital admission :

The clinical features of hospital morbidity for patients with GDM are shown in Table 4. 72.4% (55/76) required admission to hospital during the current pregnancy. Out of those who required hospital admission, 77.8% (42/55) were admitted only once whereas, 22.3% (12/54) required multiple admissions.

Table 4
Hospital morbidity features for GDM patients at the Farwania Hospital, Kuwait (2002)

	n (%)
Hospital admission during current pregnancy	
Yes	55 (72.4)
No	21 (27.6)
Frequency of hospital admission during current pregnancy	
Once	42 (77.8)
> once	12 (22.3)

Table 5
Treatment used to achieve normoglycemia at the Farwania Hospital, Kuwait (2002)

	n (%)
Diet alone	22 (28.9)
Required insulin therapy from the start	39 (51.3)
Shifted to insulin therapy after at least 2 weeks trial of diet therapy	15 (19.7)

Reasons for hospital admissions are shown in Fig. 1. 85.5% (47/55) were admitted for control of their blood sugar levels whereas 12.9% (7/54) were admitted for checking their blood sugar profile. Only 7.3% (4/54) were admitted for fetus-related causes.

Patients with GDM achieved normoglycemia by the management strategies shown in Table 5. Insulin was needed after diagnosis of GDM in 51.3% (39/76) cases. Normoglycemia was achieved by diet alone in 28.9% (22/76) whereas 19.7% (15/76) required insulin after a 2-week trial of diet therapy.

DISCUSSION

In this study, majority of our patients were young (≤ 40 years). Patients of Arab and South Asian ethnicity, who constitute a major proportion of the expatriates in Kuwait are at an increased risk of GDM. In most published studies, the predominant risk factors for GDM are obesity, past history of GDM, presence of glucosuria, family history of diabetes in first degree relatives and history of fetal macrosomia or stillbirth in previous pregnancies. In our study, young age was the most strongly associated condition. This could be attributed to the high prevalence of diabetes[12] and the increasing prevalence of obesity in Kuwait[17].

However, it is a fact that this age group is sexually more active, and therefore more likely to conceive. Thus, to attribute the younger age of subjects under study to factors such as high prevalence of diabetes may be true, but not entirely valid without ascertaining their sexual behavior and fertility patterns. More importantly, the influence of ethnicity in the incidence of GDM is being increasingly recognized. There are studies to indicate a five-fold higher risk of GDM in Asians as compared to Caucasians[18,19]. For women of different ethnic origins (South Asian, Arab), higher prevalence of GDM was related to parity gap, BMI and maternal age[18]. It was also reported that ethnic origin was the dominant influence on the prevalence of GDM. Women from ethnic groups (India, South East Asia, and Black) had a higher frequency of GDM than white women[19].

The importance of achieving normoglycemia during the whole pregnancy in order to reduce morbidity and mortality for both the mother and the fetus is well documented[1]. The majority of patients (72.4%) had been admitted to hospital mainly for the control of blood sugar and for checking blood sugar profile during pregnancy. These findings may reflect the high standard of health care at secondary and tertiary level provided in our country.

This study further points out that insulin therapy was needed for control of blood sugar in most patients, soon after diagnosis of GDM. This would explain and justify the need for hospital admission at diagnosis.

The authors recognize the strong need for a follow-up study to evaluate the influence of GDM on the mother and fetal outcome. Further long-term follow-up studies will be valuable in highlighting the role of various risk factors.

ACKNOWLEDGMENTS

We would like to express our thanks to Dr Abdul-Salaam F, Mrs Al-Olaimy N, and Mrs Al-Gallaf A, from the Kuwait University, for their excellent help in statistical analysis.

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