Original Article

Evaluation of prevalence and risk factors of gestational diabetes in a tertiary care hospital in Kerala

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A B S T R A C T

Aims: The prospective study was conducted with the aim to evaluate the prevalence and risk factors of gestational diabetes mellitus in a tertiary care referral hospital in Kerala.

Materials and Methods: A prospective observational study was conducted with the aim to study the prevalence, risk factors, complications, treatment pattern and cost analysis of GDM. The study was carried out in the Obstetrics & Gynecology dDepartment of Al Shifa hHospital located in northern Kerala.

Results: Over an eight-month period, 201 patients who met the inclusion criteria were enrolled for study from which prevalence of GDM was estimated at 15.9%. The study revealed higher prevalence of risk factors and complications such as age >25 years, BMI >26 kg/m^2, family history of DM, past history GDM, history of big baby, gestational hypertension, vaginal candidiasis, premature rupture of membranes and hyperbilirubinemia in GDM group as compared to non-GDM group. The study also demonstrated that modern life-style was a major influencing factor for development of diabetes in the study population.

Conclusion: The study reveals the necessity of proper screening diagnosis and management of GDM in pregnant women by the clinicians so as to prevent the future burden of type 2 diabetes.

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1. Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. The prevalence of GDM has increased over the past 20 years, reflecting an increasing frequency of type 2 diabetes in the underlying population. Despite having adverse consequences on the health of mother and fetus, GDM remains a neglected maternal health issue. It tends to occur around the 24th week of pregnancy as a result of blockage in the action of insulin, probably by hormones produced by the placenta.

Poorly managed blood glucose level during pregnancy can lead to a significantly larger than average baby (fetal macrosomia), which makes a normal birth difficult and risky. The newborn will be at risk for shoulder injury and breathing problems. In many cases, a cesarean section is necessitated, placing the mother's health at risk. There also exists the risk of preeclampsia, a condition where sudden high blood pressure threatens the health (and in some cases the life) of the mother and her baby [1].

Women who have had gestational diabetes are at higher risk of developing gestational diabetes in subsequent pregnancies and developing type 2 diabetes later in life. Babies born to mothers with gestational diabetes also have a higher lifetime risk of obesity and development of type 2 diabetes. Women with gestational diabetes or diabetes in pregnancy need to monitor and control their blood glucose levels to minimize risks to the baby. Normally, this can be done by taking up a healthy diet and moderate exercise, but in some cases insulin or oral medication may be needed as well [2].

There are some regional differences in the prevalence of hyperglycemia in pregnancy, with the South-East Asia Region having the highest prevalence at 25.0% compared to 10.4% in the North America and Caribbean Region. In India it is difficult to predict any uniform prevalence levels because of wide differences in living conditions, socio-economic levels and dietary habits. In a random survey performed in various cities in India in 2002–2003, an overall GDM prevalence of 16.55 per cent was observed [3]. Among ethnic groups in South Asian countries, Indian women have the highest frequency of GDM (15%), followed by

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Chinese (13.9%), Vietnam-born (7.8%) and Australian-born (4.3%). The prevalence of GDM was 2% in 1982 which increased to 7.62% in 1991, and doubled to 16.55% in 2002. The prevalence data published included pregnant women attending different health care providing centers spread in different parts of the country [4].

ADA recommends risk assessment for GDM to be undertaken at the first prenatal visit [5]. A fasting plasma glucose level >126 mg/dL (7.0 mmol/L) or a casual plasma glucose >200 mg/dL (11.1 mmol/L) meets the threshold for the diagnosis of diabetes, if confirmed on a subsequent day, and precludes the need for any glucose challenge. In the absence of this degree of hyperglycemia, evaluation for GDM in women with average or high-risk characteristics should follow one of two approaches:

a) **One-step approach**: Perform a diagnostic oral glucose tolerance test (OGTT) without prior plasma or serum glucose screening. The one-step approach may be cost-effective in high-risk patients or populations.
b) **Two-step approach**: Perform an initial screening by measuring the plasma or serum glucose concentration 1 h after a 50-g oral glucose load (glucose challenge test [GCT]) and perform a diagnostic OGTT on that subset of women exceeding the glucose threshold value on the GCT. With either approach, the diagnosis of GDM is based on an OGTT.

The importance of educating women with GDM (and their partners) about the condition and its management cannot be overemphasized. The compliance with the treatment plan depends on the patient's understanding of implications of GDM baby and herself and aspects of self-monitoring of blood glucose level and proper therapy. The current study was aimed at assessing the prevalence and risk factors of GDM along with pharmacoeconomic evaluation of management of GDM.

2. Methodology

The prospective observational study was implemented in the in-patient and out-patient setting of Al Shifa Hospital Pvt. Ltd, a private tertiary level hospital at the Malabar region of Kerala. The study spanned a period of 10 months commencing from January 2014 to October 2014. The study was approved by the institutional ethics committee (IEC) of the hospital and an ethical clearance letter was issued for the same. All pregnant women with gestational age of 24 weeks and above and having negative history of Diabetes Mellitus were enrolled in the study. Pregnant women with gestational age of less than 24 weeks and subjects not willing to participate were excluded from the study.

The study involved identification and documentation of risk factors and complications between GDM and non-GDM group. It also involved assessing the currently followed treatment practices and comparing it with standard guidelines. All the relevant information regarding the study was collected from the study subjects with the help of a specially designed data collection form and questionnaire. Prior to data collection, all subjects were informed about the purpose of the study and its various aspects. They were also informed regarding the sample collection procedure and an informed consent was obtained from them as approved by the IEC. Patients were thoroughly interviewed on economic aspect of treatment which included direct medical, direct non-medical and indirect non-medical costs in order to perform cost analysis in GDM.

All study subjects were administered a GCT and subjects with plasma glucose level ≥140 mg/dl were further subjected to OGTT.

The patients were stratified into GDM and non-GDM utilizing this result as per the WHO criteria. Medical record review and direct subject interview was performed to identify the prevalence of risk factors for GDM development and account for complications due to the same. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all patients for being included in the study.

The data obtained during the eight-month period were analyzed and compared among GDM and non GDM group. All the statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) Software version 16.0 for windows.

3. Results

Among the 201 subjects enrolled in the study, 32 (15.9%) were diagnosed to have GDM as per WHO criteria. The remaining 169 (84.1%) constituted the non-GDM group and using this data prevalence of GDM was estimated at 15.9% in the study population. As compared to non-GDM subjects, most of GDM patients were in the age group >25 years with the mean age 28.53 ± 4.76 years (p-value <0.05). Fig. 1 represents the age-wise distribution among GDM and non-GDM groups.

Among subjects with GDM 26 (81.3%) were residents from urban area and 6 (18.8%) subjects were from rural area. Whereas in non-GDM group, only 56 (33.7%) subjects were from urban area in contrast to 57 (66.3%) from rural area. The distribution of subjects residing in rural and urban areas was found to be statistically significant (p value <0.05) between the GDM and non-GDM group. Modified Kuppuswamy scale was used to stratify patients into various socio-economic classes and as per this scale, 28.1%, 31.2%, 18.7%, 15.6% and 6.2% of the subjects in GDM group were grouped under upper class, upper-middle class, lower-middle class, upper-lower class and lower class respectively. Similar grouping in non-GDM group lead to 13.6%, 17.7%, 14.7%, 21.8% and 31.9% subjects being grouped under upper class, upper-middle class, lower-middle class, upper-lower class and lower class respectively. Comparison between both the groups demonstrated that the prevalence of GDM was high in upper and upper middle class and the result was found to be statistically significant (p value <0.05).

The GDM group had 15 (46.9%) graduates, 5 post-graduates (15.6%), 7 (21.9%) primary-school literates and 5 (15.6%) illiterates whereas, non-GDM group had 56 (33.1%) graduates, 6 (3.6%) post-graduates, 29 (17.2%) secondary-school literates, 35 (20.7%) primary-school literates and 43 (25.4%) illiterates. The difference between the educational qualifications of subjects between the GDM and non-GDM group was found to be statistically significant (p = 0.004).
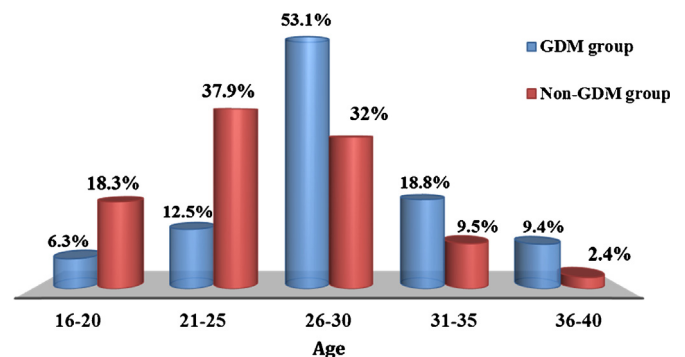

Fig. 1. Comparison of age distribution between GDM and non GDM group.