Introduction: Gestational diabetes mellitus (GDM) is a potentially serious and prevalent condition such as fetal growth abnormalities, shoulder dystocia, birth injury, prematurity and increased Caesarean section rate, which may lead to serious effects in mothers and neonates. Recently HbA1c used diagnostic criterion for diabetes (DM).

Objective: Diagnosis and Management of Gestational Diabetes with Oral Glucose Tolerance Test and Hba1c.

Methods: A total of 241 pregnant women recruited in the study. Pregnant women in prenatal care, without previous DM, were included to perform OGTT tests in the third trimester of pregnancy. written informed consent was obtained from all the patients.

Results: All the patients were between 23 and 35 years of age in the third trimester of pregnancy (gestational age = 27±5 weeks). In patients without GDM mean SBP was 110±11.8 and with GDM 119±12.6 (p <0.001). In cases without GDM mean DBP (Diastolic blood pressure) was 70±8.4 mmHg and with GDM 82±15.1 mmHg (p <0.001). In patients without GDM mean FBS (Fasting blood sugar) was 77.4±9.4 and with GDM 95.4±12.6 mg/dl. Mean 1hrs. Glucose was 120.6±12.4 in patients without GDM and with GDM it was 176.8±16.4. In patients without GDM mean 2HRS.Glucose was 115.2±11.4 and with GDM 147±15.4. In patients without GDM mean HbA1c was 5.2±0.3 and with GDM 5.9±0.6 (p <0.001). In patients without GDM mean Hb was 11.6±0.7 and with GDM 11.8±0.5 (p 0.022). In patients without GDM mean Cholesterol was 210±22.4 and with GDM 225±35.7 (p <0.001).

Conclusion: Different HbA1c cut-off points may be useful in a diagnostic tool for GDM in combination with OGTT. This will result in a considerable decrease in the research workload on both patients and the testing centre, employees and equipment.

Key Words: Gestational diabetes mellitus, GDM, HbA1c, Hb, Cholesterol, Blood glucose
than 2 h and have at least three venipunctures. Pregnant women are susceptible to nausea and vomiting from delayed emptying of the stomach. This may contribute to an invalid test result, combined with gestational oedema compromising venous access. Also, the recommendation for universal screening has greatly increased the research burden. HbA1c is the result of glucose’s irreversible non-enzymatic binding to plasma proteins, in particular haemoglobin. (Hb). HbA1c is a single, non-fasting blood test and reflects glucose levels over the previous 4 to 8 weeks.

Based on this study was carried out to analyse HbA1c test for detection of GDM based on OGTT as a reference test.

**MATERIAL AND METHODS**

The present study was carried out in the department of OBGY. A total of 241 pregnant women recruited in the study. Pregnant women in prenatal care, without previous DM, were included to perform OGTT tests in the third trimester of pregnancy. Written informed consent was obtained from all the patients. There have been records of the era, gestational age, obstetric background, smoking, family history of cardiovascular disease (CVD), DM, arterial hypertension (HT), alcohol intake, and drug usage. The weight and height of patients have also been reported and used to measure BMI (kg/m²) values.

Patients were excluded from the study if observed with the following conditions which are known to interfere with or lead to the misinterpretation of HbA1c results, anaemia, chronic renal disease and/or presence of haemoglobin variants. After an overnight fast, blood samples were taken to determine HbA1c levels, blood cell counts, lipid profile, creatinine and glucose concentrations. The OGTT was performed according to recommendations.

All data were entered in the Excel sheet. Data were expressed as mean and SD for normally distributed variables, and as median (range) for non-Gaussian variables. Student’s T-tests and kappa coefficients were used as appropriate.

**RESULTS**

A total of 241 pregnant women recruited in the study. Pregnant women in prenatal care, without previous DM, were included to perform OGTT tests in the third trimester of pregnancy and were assessed as to the presence or absence of GDM. All the patients were between 23 and 35 years of age in the third trimester of pregnancy (gestational age = 27±5 weeks) (Table 1).
DISCUSSION

Laboratory testing of HbA1c has been highly systematic and has evolved to be an easier, more reliable and automatic test to examine the importance of HbA1c for GDM diagnosis. As predicted, our data revealed that in pregnant women without GDM, HbA1c values were significantly lower than those seen in pregnant women with GDM. There was some overlap between the HbA1c values showed by participants in the two groups, however. These findings were in agreement with another study by Balaji et al. and Rajput et al. Differences in HbA1c values are more likely to be caused by other physiological causes during pregnancy. Anaemia could not describe these variations in our research, as women with and without GDM presented with similar levels of total haemoglobin. When we used the HbA1c cut-off point of (5.8 per cent) to detect participants with and without GDM, it was found that those identified as having the disorder were more likely to be older and had prior GDM and DM family history, as well as higher BMI, blood pressure (systolic and diastolic), glycemia (fasting, 1h and 2hG) and cholesterol levels. Due to these parameters, there is an increase chance of adverse outcome for both mother and child. A different GDM group from that diagnosed by glucose-based tests appears to be identified by the HbA1c test. The weak diagnostic agreement between tests corroborates this fact.

In our findings, it was found that 34.02% of GDM patients were diagnosed with the HbA1c cut-off point of around (5.8%) and that 6% of pregnant women were classified by the OGTT as GDM negative. A study in Australia found that a subgroup of pregnant women had a normal OGTT but elevated HbA1c, indicating that a clinically significant result is HbA1c > 40 mmol/mol (5.8 per cent) during pregnancy which is similar to our findings.

CONCLUSION

To conclude different HbA1c cut-off points may be useful in a diagnostic tool for GDM in combination with OGTT. This will result in a considerable decrease in the research workload on both patients and the testing centre, employees and equipment. Further investigations are needed to incorporate HbA1c with optimization of the cut-off value as a single non-fasting screening method for GDM.

ACKNOWLEDGMENT

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references to this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals, and books from which the literature for this article has been reviewed and discussed.

Conflict of Interest: Nil

Source of Funding: Nil

REFERENCES

1. Casey BM, Lucas MJ, McIntire DD. Pregnancy outcomes in women with gestational diabetes compared with the general obstetric population. Obstet Gynecol 1997;90:869–73.
2. World Health Organization. Definition, diagnosis and classification of diabetes mellitus and its complications: Report of a WHO consultation. Part 1: Diagnosis and Classification of Diabetes Mellitus. WHO/NCD/NCS/99 2 ed, Geneva 1999.
3. Hartling L, Dryden DM, Guthrie A, Muise M, Vandermeer B, Donovan L. Benefits and harms of treating gestational diabetes mellitus: a systematic review and meta-analysis for the U.S. Preventive Services Task Force and the National Institutes of Health Office of Medical Applications of Research. Ann Intern Med 2013; 159(2):123-9.
4. Buckley BS, Harreiter J, Damm P, Corcoy R, Chico A, Simmons D, Vellinga A, Dunne F, DALI Core Investigator Group. Gestational diabetes mellitus in Europe: prevalence, current screening practice and barriers to screening. A review. Diabet Med 2012 Jul; 29(7):844-54.
5. Farrar D, Duley L, Medley N, Lawlor DA. Different strategies for diagnosing gestational diabetes to improve maternal and infant health. Cochrane Database Syst Rev 2015; 1:CD007122.
6. American Diabetes Association. Classification and diagnosis of diabetes. Diabetes Care. 2015;38:S8-S16.
7. Cavagnolli G, Comerlato J, Comerlato C, Renz PB, Gross JL, Camargo JL. HbA1c measurement for the diagnosis of diabetes: is it enough? Diabet Med 2011; 28(1):31-5.
8. Sacks DB. A1C versus glucose testing: a comparison. Diabetes Care 2011; 34(2):518-23.
9. d’Emden M. Glycated haemoglobin for the diagnosis of diabetes. Aust Prescriber 2014;37:98–100.
10. Gillery P. A history of HbA1c through Clinical Chemistry and Laboratory Medicine. Clin Chem Lab Med 2013;51:65–74.
11. Balaji V, Madhuri BS, Ashalatha S, Sheela S, Suresh S, Seshiah V. A1C in gestational diabetes mellitus in Asian Indian women. Diabetes Care 2007; 30(7):1865-7.
12. Rajput R, Yogesh Yadav, Rajput M, Nanda S. Utility of HbA1c for diagnosis of gestational diabetes mellitus. Diabetes Res Clin Pract 2012; 98(1):104-7.
13. Hiramatsu Y, Shimizu I, Omori Y, Nakabayashi M, JGA (Japan Glycated Albumin) Study Group. Determination of reference intervals of glycated albumin and hemoglobin A1c in healthy pregnant Japanese women and analysis of their time courses and influencing factors during pregnancy. Endocr J 2012; 59(2):145-51.
14. HAPO Study Cooperative Research Group., Metzger BE, Lowe LP, Dyer AR, Trimble ER, Chaovarindr U, Coustan DR, Hadden DR, McCance DR, Hod M, McIntyre HD, Oats JJ, Persson B, Rogers MS, Sacks DA. Hyperglycemia and adverse pregnancy outcomes. N Engl J Med 2008; 358(19):1991-2002.
15. Rowan JA, Budden A, Sadler LC. Women with a nondiagnostic 75 g glucose tolerance test but elevated HbA1c in pregnancy: an additional group of women with gestational diabetes. Aust N Z J Obstet Gynaecol 2014; 54(2):177-80.