ORIGINAL ARTICLE

GESTATIONAL DIABETES IN ASSOCIATION WITH FAMILY HISTORY AND PARITY IN WOMEN OF KPK

Ambreen Ali[1], Ejaz Hassan[2], Asif Hussain Munir[3], Waqas Salam[4]

[1]Department of Chemical Pathology, Kabir Medical College, Peshawar - Pakistan

[2]Department of Chemical Pathology Khyber Medical College, Peshawar - Pakistan

[3]Department of Heamatology, Khyber Medical College, Peshawar - Pakistan

[4]Department of Histopathology, Kabir Medical College, Peshawar - Pakistan

ABSTRACT

Objective: To find out the relevance of parity and positive family history in development of diabetes mellitus.

Material & Methods: One hundred respondents (pregnant women) were inducted in the study from March 2015 to August 2015. The participants were selected for screening on the basis of positive family history, parity. All the patients were inducted from the Khyber Teaching Hospital, Peshawar. OGTT was performed and a proforma was filled accordingly.

Results: Out of hundred patients thirteen patients had plasma glucose (F) above 100 mg/dl. Ten participants of the study had plasma glucose (1Hr) level above 200 mg/dl. Similarly ten participants had plasma glucose (2Hr) level above 140 mg/dl. Thirteen participants had positive urine sugar.

Conclusion: Positive family history of diabetes mellitus especially on maternal side strongly increases the chances of developing gestational diabetes mellitus.

Key Words: Gestational,Diabetes Mellitus, Morbidity, Genetic, Trimester.

This article may be cited as: Ali A, Hassan E, Munir AH, Salam W. Gestational diabetes in association with family history and parity in women of KPK. J Med Sci 2016; 24: (3) 141-144.

INTRODUCTION

Diabetes mellitus (DM) is defined by the American College of Obstetrician and Gynecologists as "A condition of altered metabolism that is due to insulin resistance or Insulin deficiency and leads to hyperglycemia"[1]. Diabetes is also defined as "A group of metabolic diseases in which a person has high blood sugar, either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced"[2].

Gestational Diabetes Mellitus (GDM) is the most common metabolic disease in women. Gestational diabetes is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. GDM may or may not persist after pregnancy. It does not exclude the possibility that glucose intolerance may have started at an earlier stage or begun at the time of conception. It can be treated with dietary control and ideally with insulin therapy. The presence of GDM (uncontrolled) has implications for both mother and the child. GDM is associated with increased morbidity if untreated. Epidemiological data in developing countries are scarce. Therefore the health status of population in these countries is often unknown and health service planning is rarely practiced. Pakistan is a developing country with relative little data regarding gestational diabetes.

Pakistan makes the list of top six countries with high burden of diabetes in the population. Indonesia has 8.4 million people with diabetes where as Japan and Pakistan has 6.8 and 5.2 million people with diabetes respectively. The prevalence of gestational diabetes mellitus is almost seven percent, according to this percentage, the number of cases with gestational diabetes mellitus is more than 2 lacs every year. The range of the prevalence of gestational diabetes mellitus might be from 1-14% out of all the pregnancies, but it depends on the tests performed on the populations under study[3]. The risk of gestational diabetes mellitus

Dr. Ambreen Ali (Corresponding Author)
Assistant Professor
Department of Chemical Pathology,
Kabir medical College, Peshawar - Pakistan
Email: dr.ambreenali@gmail.com

Date Received: February 2, 2016
Date Revised: May 15, 2016
Date Accepted: August 5, 2016

is 2-3 times higher in the South East Asian population as compared to the population across the world[4]. The range of gestational diabetes mellitus in Pakistan is from 3.2-3.5%[5].

There are three main types of diabetes mellitus type 1 DM, type 2 Diabetes Mellitus and Gestational diabetes. In type 1 DM there is auto immune destruction of the pancreatic beta islet cells of langerhan which leads to absolute deficiency of insulin[3,4]. Whereas type 2 DM is caused by both defective secretion of insulin and resistance to the action of insulin[5]. Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy[6]. GDM is the most common metabolic disease in women[11]. GDM may or may not persist after pregnancy. It can be treated with dietary control and ideally with insulin therapy. The presence of GDM (uncontrolled) has implications for both mother and the child. GDM is associated with increased morbidity if untreated.

According to American Diabetic Association (ADA) study conducted in year 2003, 7% of all pregnancies are complicated due to GDM. The prevalence of GDM in US is 1-14%[2]. 5.5% of pregnant ladies had GDM in Sri Lankan study[7]. Incidence in an Iranian study was 4.5%[8]. In Iran another study done showed that one out of every 20 women will develop GDM[9]. In a study done in US mentioned that the prevalence of GDM is increasing throughout the world[10]. In another study done in China shows that 2.31% of the patients had GDM[11]. Keeping in view the increasing prevalence of GDM all pregnant women should be screened[12]. Screening for GDM is normally performed at around 28 weeks of pregnancy. Although with the 2 step diagnostic procedure, diagnosis and treatment of GDM can be delayed until 30-34 weeks of pregnancy[13].

Gestational diabetes mellitus typically develops in the second half of pregnancy among women. This can be due to genetic predisposition to diabetes, which becomes manifest with the metabolic stress of pregnancy[14], decreased insulin secretion, increased insulin resistance[15], or decreased insulin binding to receptors or a post-receptor defect.

MATERIAL AND METHODS

This study was conducted in Khyber Teaching Hospital and Pathology Department of Khyber Medical College, from March 2015 to August 2015 in which 100 patients were included. The population of interest for this study was patients with gestational age up till four weeks, positive family history of gestational diabetes, signs and symptoms of Gestational Diabetes. Patients in the last trimester of pregnancy, patients already on treatment for Gestational Diabetes Mellitus, known diabetics were not included in the study. A questionnaire was used to take a brief history of the patients included in the study. For diagnosing Gestational Diabetes among the suspected patients the test conducted was Oral Glucose Tolerance Test (OGTT).For interpretation of OGTT, British Criteria was followed. The OGTT is considered as a standard test recommended by World Health Organization (WHO) for the diagnosis of Gestational Diabetes Mellitus.

RESULTS

According to this study the percentage of age limits of the participants of the study is between 16-35 years. In this regard, the percentage of the participants between 16-20 years is seven, the percentage of 21-25 years participants is 60, and the frequency 26-30 years is 22 and the percentage of 31-35 is[11]. The maximum percentage of the participants is between the age 21-30 years which collectively comes up to 82%. This is the most fertile period of the reproductive age. The number of the participants between 16-20 years is the minimum which is seven percent.

We also have parity as a variable in the study. The frequency and percent of G1 is 29 out of 100, the frequency and percent of G2 is 25, the frequency and percent of G3 is 26, the frequency and percent of G4 is 14, the frequency and percent of G5 is five and the frequency and percent of G6 is only one. As we can see from the above mentioned results in Gravida 1, 2 and 3 the frequency and percentage is almost the same which is 29, 25 and 26 respectively. The maximum number of participants fall in these three groups. The reason behind this may be because of the fact that we did not include patients that were already diagnosed with diabetes. As the parity increases the chances of them being diagnosed also increases.

Out of the 100 participants 32 women did not have family history for diabetes. Whereas 68 women had family history for diabetes mellitus. Among the participants that had positive family history 51% had positive maternal history whereas 17% had positive paternal history for diabetes mellitus.

Plasma glucose (F) variation in this regard the frequency and percentage of pregnant women had plasma glucose (F) below 100 mg/dl was 87 out of the 100 participants. The frequency of plasma glucose (F) of the participants having plasma glucose (F) above 100 mg/dl is 13. The plasma glucose level (1Hr) of the participants is presented. In this regard the frequency of the study participants who have plasma glucose below 200 mg/dl is 90. The frequency of plasma level of the participants have plasma level above 200 mg/dl

is 10. The detail of plasma glucose (2Hr) of the study participants. In this regard the frequency of participants who present to have plasma glucose below 140 mg/dl is 90 and the frequency of plasma level of the participants having plasma level above 140 mg/dl is 10.

The validity and percentage of pregnant women who have high urine sugar. In this regard the frequency of women having no urine sugar is 87. The frequency of women who have abnormal amount of urine sugar is 13. Among the participants 38% belonged to poor socio-economic background, 55% were among moderate socio-economic background whereas seven percent belonged to good socio-economic background.

DISCUSSION

The result of the study revealed that GDM was more prevalent (29%) amongst primi-gravida than multi gravida, probably due to diagnosis of GDM during laboratory diagnosis in previous pregnancies. The range of the prevalence of gestational diabetes might be from one to 14% out of all the pregnancies, but it depends on the tests performed on the population under study[15]. The frequency of gestational diabetes is different among different ethnic groups[16]. A study done in Toronto found that prevalence of gestational diabetes mellitus in Caucasian women is seven percent[17]. The risk of gestational diabetes mellitus in Hispanic women is two to four times greater than non-Hispanic white women[18]. The risk of gestational diabetes is two to three times higher in the South East Asian population as compared to the population across the world[19]. In another study Ma et al emphasized that family history is an important factor to be observed for the development of gestational diabetes[20]. All the previously given examples presents the genetic involvement in prevalence of gestational diabetes.

Genetics play important role in the development of diabetes[21]. The results of the current study show that 68% of the participants had a positive family history either from the paternal or maternal side. The incidence of GDM in Iran is reported to be 4.8% - 7.4%[16]. An Iranian study reported that 76% of the study participants who had developed gestational diabetes mellitus had a positive family history of diabetes as compared to the 43% who did not have a positive family history[22].

The results of the current study presents that gestational diabetes mellitus is higher in our part of the world as compared to western countries. It could be higher in this population, as it is mentioned in a study done by Wild S, et al that Asia and Africa will have most of the patients with diabetes by the year 2030[23]. So the higher percentage of gestational diabetes mellitus could be because of the trends in this population. It could also be because of the rapid urbanization and life style changes. As Peshawar is the capital of the province so people from under developed cities and villages come to Peshawar in search of better living quality of life and better health facilities. People also tend to use the tertiary care hospitals in the capital of the province. So another reason of high prevalence in this area could be that people from far flung areas come to Khyber Teaching Hospital for medical care.

CONCLUSION

The positive family history of diabetes mellitus especially on the maternal side strongly increases the chances of developing gestational diabetes. Parity also plays an important role in the causation of gestational diabetes mellitus. This study has highlighted that the prevalence of gestational diabetes is high in Peshawar. Positive family history is an important risk factors of gestational diabetes.

REFERENCES

1. Griffith, J. and Conway, D.L., Care of diabetes in pregnancy. Obstetrics and gynecology clinics of North America, 2004. 31(2), 243-56.
2. Shobak, edited by David G. Gardner, Doloris Greenspan's Basic and Clinical Endocrinology (9th ed.). NY: McGraw-Hill Medical (2011). Chapter 17.
3. Oostdam, N., Van Poppel, M.N.M., Wouters, M.G.A.J., Eekhoff, E.M.W., et al. No effect of the Fit For 2 exercise programme on blood glucose, insulin sensitivity, and birth weight in pregnant women who were overweight and at risk for gestational diabetes: results of a randomised controlled trial. 2012. BJOG: An International Journal of Obstetrics & Gynaecology, 119(9), 1098-1107.
4. Nanditha A, Mahendra RC, Ramachandran A, Snehalatha C, Chan JC, Chia KS. et al. Diabetes in Asia and the Pacific: Implications for the global epidemic. Diabetes care, 2016. 39(3), 472-85.
5. Zaman N, Taj N, Nazir S, Ullah E, Fatima N, Gestational Diabetes Mellitus and Obesity: An experience at a teaching hospital in Bahawalpur, Pakistan. Rawal Med J, 2013. 38(2), 165-68.
6. American Diabetes Association, Diagnosis and classification of diabetes mellitus. Diabetes care, 2013. 36 (Supplement 1), 67-74.
7. Hedderson MM, Darbinian J, Havel PJ, Quesenberry CP, Sridhar S, Ehrlich S. et al. Alow prepregnancy adiponectin concentrations are associated with a marked increase in risk for development of gestational diabetes mellitus. Diabetes Care, 2013. 36(12), 3930-37.
8. Gaggini M, Morelli M, Buzzigoli E, DeFronzo RA, Bugianesi E. et al. Non-alcoholic fatty liver disease (NAFLD) and its connection with insulin resistance, dyslipidemia, atherosclerosis and coronary heart disease. Nutrients, 2013. 5(5), 1544-60.

9. Erem C, Kuzu UB, Deger O, Can G. Prevalence of gestational diabetes mellitus and associated risk factors in Turkish women: the Trabzon GDM Study. Archives of medical science: AMS, 2015. 11(4), 724.

10. Guariguata L, Linnenkamp U, Beagley J, Whiting DR, Cho NH. Global estimates of the prevalence of hyperglycaemia in pregnancy. Diabetes research and clinical practice, 2014 103(2), 176-85.

11. Feng N, Bowen W, Huazhi Y. The association between gestationa D.M and birth weight. Modern Hospital, 2013. 6, (1): 9-11.

12. Guariguata L, Linnenkamp U, Beagley J, Whiting DR, Cho NH. Global estimates of the prevalence of hyperglycaemia in pregnancy. Diabetes research and clinical practice, 2014. 103(2), 176-85.

13. Palatnik A, Mele L, Landon MB, Reddy UM, Ramin SM. Timing of treatment initiation for mild gestational diabetes mellitus and perinatal outcomes. American journal of obstetrics and gynecology, 2015. 213(4), 560-61.

14. Halban PA, Polonsky KS, Bowden DW, Hawkins MA, Ling C, Mather KJ, et al. β-cell failure in type 2 diabetes: postulated mechanisms and prospects for prevention and treatment. Diabetes Care, 2014. 37(6), 1751-58.

15. Tsatsoulis A, Mantzaris MD, Bellou S, Andrikoula M. Insulin resistance: an adaptive mechanism becomes maladaptive in the current environment — an evolutionary perspective. Metabolism, 2013 62(5), 622-33.

16. Bardenheier BH, Elixhauser A, Imperatore G, Devlin HM, Kuklina EV, Geiss LS et al. Variation in prevalence of gestational diabetes mellitus among hospital discharges for obstetric delivery across 23 states in the United States. Diabetes care, 2013. 36(5), 1209-14.

17. Hedderson M, Ehrlich S, Sridhar S, Darbinian J, Moore S, Ferrara, A. Racial/ethnic disparities in the prevalence of gestational diabetes mellitus by BMI. Diabetes Care, 2012. 35(7), 1492-98.

18. Rhee JJ, Mattei J, Hughes MD, Hu FB, Willett WC. Dietary diabetes risk reduction score, race and ethnicity, and risk of type 2 diabetes in women. Diabetes care, 2015. 38(4), 596-603.

19. Ramachandran A, Snehalatha C, Ma RCW. Diabetes in south-east Asia: An update. Diabetes research and clinical practice, 2014. 103(2), 231-37.

20. Koo BK, Kim SW, Yi KH, Park KS, Moon MK. Changing relative contribution of abdominal obesity and a family history of diabetes on prevalence of diabetes mellitus in Korean men and women aged 30-49 years from 2001 to 2010. Journal of diabetes, 2015.7(4), 465-72.

21. Forbes JM, Cooper ME. Mechanisms of diabetic complications. Physiological reviews, 2013. 93(1), 137-88.

22. Fukuoka Y, Choi J, Bender MS, Gonzalez P, Arai S. Family history and body mass index predict perceived risks of diabetes and heart attack among community-dwelling Caucasian, Filipino, Korean, and Latino Americans — DiLH Survey. Diabetes research and clinical practice, 2015. 109(1), 157-63.

23. Guariguata L, Whiting DR, Hambleton I, Beagley J, Linnenkamp U, Shaw JE. 2014. Global estimates of diabetes prevalence for and projections for 2035. Diabetes research and clinical practice, 2013. 103(2), 137-49.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Ali A: Research planner, author, data analysis.
Hassan E: Research supervisor, data analysis.
Munir AH: Data collection.
Salam W: Data collection.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.