ORIGINAL ARTICLE

FREQUENCY OF PRE-GESTATIONAL DIABETES MELLITUS AMONG PREGNANT WOMEN WITH MISCARRIAGE

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ABSTRACT

Background: In developing countries, miscarriage is one of the common and increasing problems of pregnancy. The objectives of this study were to determine the frequency of pre-gestational diabetes mellitus among pregnant women with miscarriage in our population.

Materials & Methods: This descriptive, cross-sectional study was conducted in the Department of Gynecology and Obstetrics, Khyber Teaching Hospital, Peshawar, Pakistan from 3rd November 2015 to 2nd May 2016. Sample size was 268 pregnant women with miscarriage selected through consecutive sampling technique. Inclusion criteria were all pregnant women with miscarriage. Exclusion criteria were molar pregnancy, ectopic pregnancy and diabetics. HbA1c levels of ≤6% was taken as normal, whereas a level >6 was taken as raised level or pre-gestational diabetes. Variables were age, pre-gestational diabetes mellitus, number of pregnancies and duration of pregnancy (≤24, >24). Mean and SD were calculated for quantitative while frequency and percentages for qualitative variables. Descriptive analysis was performed by using SPSS version 16.

Results: Mean age of the patients was 27.66 ±4.93 years. Out of 268 participants, 81(30.22%) were having pre-gestational diabetes mellitus and 187(69.78) were normal, 234(87.31%) were having first pregnancy whereas 34 were having >1 pregnancies, the pre-gestational age ≤24 weeks were 130(48.51%) and >24 weeks were 138(51.49%).

Conclusion: One third of the patients with miscarriage were having pre-gestational diabetes mellitus. Almost half of the patients were having gestational age of <24 weeks.

KEY WORDS: HbA1c; Miscarriage; Pre-gestational diabetes.

INTRODUCTION

Miscarriage is one of the commonest problems in early pregnancy which is increasing in developing countries. There are many causes of miscarriage like chromosomal abnormalities, infections, uterine & cervical abnormalities and endocrine disorders. Out of these many causes, pre-gestational diabetes and gestational diabetes are the two causes due to which women are at higher risk of miscarriage, preterm labor, hypertensive disorders and operative deliveries.¹,² The new born to a diabetic mother is mostly reported with an increased rate of complications such as congenital anomaly, growth disorder, birth trauma, and respiratory distress. Out of these hyperglycemia is the major cause which alters the fetal development.

Diabetes is one of the commonest chronic diseases in women of child bearing age. Pre-gestational diabetes complicates 0.5-1 % of all pregnancies. The prevalence of pre-gestational diabetes in Pakistan is about 7% in which population with reference. HbA1c test is used in the diagnosis of pre-gestational diabetes by highlighting information about blood sugar level of the last 8 to 10 weeks.³,⁴,⁵ This test is important as the increased level of HbA1c causes the problems like abortion, stillbirth and congenital abnormalities.⁶,⁷ There are many medical options for control of hyperglycemia in pregnancy like oral hypoglycemic agents and insulin. By early diagnosing pre-gestational diabetes we can control hyperglycemia and prevent future complications.
Controlling raised Hb1Ac decreases the rate of miscarriage. Precautions can be taken before pregnancy if higher levels more than 10% reference are diagnosed. Certain medications can also be proposed for early pregnancy diagnosed with higher levels of HbA1c in pregnant women.

The word abortion is taken from the Latin word “aboriri” which mean to miscarry. The World Health Organization defines abortion as pregnancy termination prior to 20 weeks gestation or fetus born weighing less than 500 grams. The estimated prevalence of spontaneous miscarriage which is the commonest early pregnancy complication occurs in approximately 15-20% of all pregnancies. About 80% of the miscarriages occur in the first twelve weeks of pregnancy. To an estimate almost 8, 90,000 cases of missed miscarriage or incomplete miscarriage occur in Pakistan each year with a miscarriage rate of 29/1000 women of age 15-49 years. Diabetes is one of the commonest chronic diseases in women of childbearing age. Pre-gestational diabetes complicates 0.5-1% of all pregnancies. According to The National Institute for Health and Clinical Excellence 2008, up to 5% of pregnancies are diagnosed with diabetes out of approximately 650,000 pregnancies in England and Wales each year. The pregnancies which are complicated due to diabetes are about 87.5% and are caused mainly by pre-gestational diabetes. Among those about 7.5% were due to type I diabetes and the 5% were due to type 2 diabetes. There is evidence supporting that pre-gestational diabetes increases the risk of spontaneous abortion, preterm labor, and hypertensive disorder as well as cesarean section/ forceps Deliveries. The objectives of this study were to determine the frequency of pre-gestational diabetes mellitus among pregnant women with miscarriage in our population.

MATERIALS AND METHODS
This descriptive, cross-sectional study was conducted in the Department of Gynecology and Obstetrics, Khyber Teaching Hospital, Peshawar, Pakistan from 3rd November 2015 to 2nd May 2016. Sample size was 268 pregnant women with miscarriage selected through consecutive sampling technique, using online sample size calculator, Raosoft, with margin of error of 4.99%, confidence level of 90%, estimated population size of 20,000/ and response distribution of 50%. Inclusion criteria were all pregnant women with diagnosis of miscarriage. Exclusion criteria were molar pregnancy, ectopic pregnancy and diabetics.

The study was approved by Research and Ethics review board of the hospital. Data collection sites were OPD, ward and emergency of DHQ Teaching Hospital. Diagnosis of miscarriage was made by detailed history, examination, urine pregnancy test and ultrasound and recorded on Performa. Blood sample collections was made for Hba1c assessments on all patients HbA1c levels of ≤6% was taken as normal, whereas a level >6 was taken as raised level or pre-gestational diabetes. Variables were age in years, pre-gestational diabetes mellitus (yes, no), number of pregnancies (first pregnancy, >1 pregnancies) and duration of pregnancy in weeks (<24, >24). Means and standard deviation were calculated for quantitative variable while frequency and percentages were calculated for qualitative variables. Descriptive analysis was performed by using SPSS version 16.

RESULTS
Mean age of the patients was 27.66 ± 4.93 years. Out of 268 participants, 81 (30.22%) were having pre-gestational diabetes mellitus and 187 (69.78) were normal. Out of 268 patients, 234 (87.31%) were having first pregnancy whereas 34 (12.69%) were having >1 pregnancies as shown in Table 1 & 2. Out of 268 patients, the pre-gestational age of ≤24 weeks was 130 (48.51%) and >24 weeks was 138 (51.49%). Table 3

| Pre-gestational diabetes mellitus | Frequency | Percentage | 95% CI for proportion |
|---------------------------------|-----------|------------|-----------------------|
| Yes                             | 81        | 30.22      | 25.03-35.97           |
| No                              | 187       | 69.78      | 64.03-74.97           |
| Total                           | 268       | 100.0      |                       |

| Number of Pregnancy | Frequency | Percentage | 95% CI for proportion |
|---------------------|-----------|------------|-----------------------|
| Patients having 1st pregnancy | 234     | 87.31      | 82.97-90.77           |
| Patients having >1 pregnancy | 34      | 12.69      | 09.23-17.21           |
| Total               | 268       | 100.0      |                       |

Table 1: Frequency of pre-gestational diabetes mellitus in patients with miscarriage in KTH, Peshawar, Pakistan (n=268)

Table 2: Number of pregnancies among patients with miscarriage in KTH, Peshawar, Pakistan (n=268)
Table 3: Pregnancy duration in patients with miscarriage in KTH, Peshawar, Pakistan (n=268)

| Duration of Pregnancy | Frequency | Percentage | 95% CI for proportion |
|-----------------------|-----------|------------|-----------------------|
| Pregnancy duration ≤ 24 weeks | 130 | 48.51% | 42.89-54.47 |
| Pregnancy duration of more than 24 weeks | 138 | 51.49% | 45.34-57.59 |

**DISCUSSION**

A study in Poland in 2013 concluded that suboptimal metabolic control predisposes to first-trimester loss with pre-gestational diabetes. Maternal hyperglycemia remains the major risk factor and the most widely studied factor altering fetal development but other maternal factors might also have adverse effects. Adverse pregnancy outcome, namely, complications in early pregnancy such as first-trimester loss and maternal hyperglycemia are contributing factors reinforcing the fact that diabetes is attributable to a significant proportion of pregnancy loss. A review on poor glycated hemoglobin control and adverse pregnancy outcomes in both types of diabetes mellitus shows that the risk of miscarriage was mainly due to poor glycemic control with ratio of 3.23 (95% CI, 1.64-6.36).

The diabetes mellitus has an impact on the embryo and fetus during pregnancy and increases the risk of spontaneous miscarriages, premature births, malformations, fetal and neonatal complications. However, intensive glycaemic control and pre-conceptual care have been shown to decrease the rate of fetal demise and malformations. The preexisting diabetes mellitus complicates the pregnancy and are related to high rate of miscarriages, preterm delivery, preeclampsia, perinatal mortality and congenital malformations. Hemoglobin Ale (HbA1c) was higher in the miscarriage group compared with the good outcome group (8.2% ±1.9% vs. 7.2% ±1.8%; P <0.001). The increasing age and metabolic control are the most common risk factors for miscarriages in first-trimesters of pregnancy. Therefore, it is increasingly being recognized that the apparent increased risk of miscarriages is preventable. Nonetheless, limited evidence exists in resource-poor population settings, such as Pakistan. Simple and clinically feasible cost-effective strategy to identify at-risk maternal pregnancies such as measuring HbA1c levels is easily accessible even in resource-poor health care settings.

**CONCLUSION**

One third of the patients with miscarriage were having pre-gestational diabetes mellitus. Almost half of the patients were having gestational age of <24 weeks.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.

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AUTHORS’ CONTRIBUTION
The following authors have made substantial contributions to the manuscript as under:

Conception or Design: MG, NF

Acquisition, Analysis or Interpretation of Data: MG, NF, FK, AG, FA, QI

Manuscript Writing & Approval: MG, NF, FK, AG, FA, QI

All the 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.

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