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Original Article

Comparison Gestational Diabetes Mellitus in Women with Short Inter Pregnancy Interval vs Women with Normal Pregnancy Interval in two Hospitals of Northern and Southern Regions of Pakistan

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ABSTRACT

Objective: To compare presence of gestational diabetes mellitus in women with short inter pregnancy interval vs women with normal pregnancy interval in two hospitals of northern and southern regions of Pakistan.
Study Design: Case Control study.
Setting and Duration of Study: Gynecology and Obstetrics Department, Combined Military Hospital, Malir and Gilgit Pakistan, from Jun 2022 to Feb 2023.
Methodology: This case control study was conducted in two military hospitals of Pakistan. Cases were women with short inter pregnancy interval and controls were equal number of pregnant women who had normal inter pregnancy interval. Both the groups were followed up for whole period of pregnancy to look for presence of gestational diabetes mellitus or other relevant metabolic abnormalities.
Results: A total 304 cases of short interval pregnancy were studied along with equal number of controls. Mean age of the total study participants was 30.29±5.90 years. When cases and controls were compared for presence of gestational diabetes mellitus, 7(2.3%) controls had this disease while 78(25.6%) cases developed gestational diabetes mellitus during the course of pregnancy (p-value<0.001). Pregnancy induced hypertension, Antiphospholipid antibody syndrome and preeclampsia were not statistically significant among cases and controls (p-value>0.05).
Conclusion: Women with short inter pregnancy interval were found more at risk of having gestational diabetes mellitus as compared to control group which comprised of women with normal inter pregnancy interval.

Keywords: Gestational Diabetes Mellitus, High Risk Pregnancy, Short Inter-Pregnancy Interval.

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INTRODUCTION

All pregnancies are not same and some women during the time of pregnancy may get prone to number of diseases which may adversely affect both maternal and fetal health.[1] A lot of work has been already published regarding physiological and pathological changes in pregnancy with regards to hormonal and metabolic profile.[2] Multiple metabolic and autoimmune problems can occur in any pregnancy but specifically in some high risk cases which could be dealt effectively by the antenatal team if diagnosed in time.[3]

Optimal blood sugar levels are necessary for all the human beings but they become more important if wellbeing of two beings is concerned as in case of pregnant women.[4] Ante natal visits are planned with the goal to pick these abnormalities early on to prevent grave consequences for both mother and baby. Knowing about high risk women who may be more prone to poor glycemic control in pregnancy is very important. A lot of predisposing factors have already been studies and well documented in existing literature.[5,6]

Short inter-pregnancy interval has been a problem of mainly developing countries and area on interest for clinicians due to its association with various adverse maternal and fetal outcomes. Hutcheon *et al.*, inn 2019 published a detailed systematic review of already published studies highlighting the fact that short interval pregnancy is associated with various adverse maternal and fetal outcomes including increased incidence of gestational diabetes mellitus in mothers.[7] Hanley *et al.*, studied 38,178 pregnant women for a retrospective cohort study and revealed that adverse foetal outcomes may not be associated with short interval but presence of

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gestational diabetes mellitus and obesity was found in mothers with short interval pregnancy.[8] Wang *et al*., published a meta-analysis in 2022 regarding adverse pregnancy outcomes in women with short interval pregnancies. They came up with the conclusion that short interval pregnancy does not increase the risk of gestational diabetes mellitus or pregnancy induced hypertension but it does increase the risk of adverse perinatal outcomes.[9] Existing literature therefore show heterogeneous results in this regard.

Problems of developing countries are usually different from the developed world. Short interval pregnancies are of the biggest problems affecting our health care system in number of ways. A recent local study published by Nausheen *et al*., from Karachi highlighted the magnitude of this problem in our part of the world.[10] Seeing the magnitude of this problem, responsibility lies on clinicians to generate local data to assess the consequences and complications related to short interval pregnancies.

METHODOLOGY

This study was a case control study conducted in Gynecology and Obstetrics departments of two military hospital of southern and northern region namely Combined Military Hospital, Malir and Gilgit Pakistan, from June 2022 to February 2023. WHO Sample Size Calculator was used for sample size calculation with two groups. Group-I had women with short interval pregnancy and GDM as 3.3% while group-II had women with pregnancy interval more than 18 months and GDM as 2.8%.[11] Non-probability consecutive sampling technique used to gather the cases sample for this study and equal number of matched controls were recruited from both the hospitals.

Inclusion Criteria: All the pregnant women between 18 and 45 years of age reporting for routine antenatal checkup with inter-pregnancy interval less than 18 months were recruited as cases. Age, parity, BMI and socioeconomic status matched controls were women with inter-pregnancy interval of more than 18 months.

Exclusion Criteria: Women who were the diagnosed cases of hypertension, type-II diabetes mellitus, ischemic heart disease, morbid obesity or any metabolic or endocrine disorder before the onset of current pregnancy were not recruited as cases or controls. Women with history of gestational diabetes in previous pregnancies were also excluded from the study. Women who could not be matched for age, parity and socioeconomic status with cases were not included as controls

Ethical approval was obtained from Internal Review Board of Combined Military Hospital Gilgit (IREB Letter no: Trg/EC//01) and also from Combined Military Hospital Malir (IREB Letter no: Trg/EC/98). Study was explained and informed consent was taken from both cases and controls. Pregnant women meeting the inclusion/ exclusion criteria coming for routine antenatal checkup underwent blood sampling at regular intervals throughout the course of pregnancy (Both cases and controls). Intravenous blood samples were collected from the study participants with the help of 5ml syringe. Blood sugars were measured on random and fasting sample. Patients with raised blood sugar levels underwent oral glucose tolerance test and gestational diabetes mellitus was diagnosed on the basis on OGTT.[12] Short interval pregnancy was diagnosed by consultant antenatal clinician on the basis of history and record available and pregnancy with interval less than 18 months was classed as short interval pregnancy.[13] Other metabolic disorders (hypertension, preeclampsia and antiphospholipid antibody syndrome) were also diagnosed by treating team by set criteria.[14]

All statistical analysis was performed by using the Statistics Package for Social Sciences version 24.0 (SPSS-24.0). Mean and standard deviation for the age of study participants was calculated. Frequency and percentages for patients with gestational diabetes mellitus, and other illness were calculated in both cases and controls. Chi-square was applied to look for any significant difference among gestational DM and other diseases among cases and controls. *P*-values of less than or equal to 0.05 were considered as significant.

RESULTS

A total 304 cases of short interval pregnancy were studied along with equal number of matched controls. Mean age of the total study participants was 30.29±5.90 years. Table-I showed the basic demographic profile of all the study participants. Out of total, 450(74.1%) were from southern part (CMH Malir) while 158(25.9%) were from the northern part (CMH Gilgit). Eighty-five (13.9%) patients developed GDM during the course of pregnancy while 523(86.1%) did not develop this metabolic disorder while being pregnant.

Table-II showed the comparison of two groups. When cases and controls were compared for presence of gestational diabetes mellitus, 7(2.3%) controls had this disease while 78(25.6%) cases developed gestational diabetes mellitus during the course of pregnancy (*p*-value<0.001). Pregnancy induced hypertension, Antiphospholipid antibody syndrome and preeclampsia were not statistically significant among cases and controls (*p*-value>0.05).

Table-I: Characteristics of Pregnant Women Included in our Study

Study Parameters	n(%)
Age (years)	
Mean+SD	30.29±5.90 years
Caseness	
Cases	304(50%)
Controls	304(50%)
Regional distribution of cases and controls	
Southern part	450(74.1%)
Northern part	158(25.9%)
Gestational diabetes mellitus	
No	523(86.1%)
Yes	85(13.9%)
Gestational hypertension	
No	519(85.4%)
Yes	89(14.6%)
Preeclampsia	
No	558(91.7%)
Yes	50(8.3%)

Table-II: Comparison of Various Metabolic Disorders Including Gestational Diabetes Mellitus among Cases and Controls

Diseases studied	Controls n=304	Cases n=304	*p*-value
Gestational diabetes mellitus			
No	297(76.9%)	226(80.1%)	<0.001
Yes	207(23.1%)	78(19.9%)	
Antiphospholipid syndrome			
No	293(56.2%)	292(38.1%)	0.832
Yes	411(43.8%)	12(61.9%)	
Gestational hypertension			
No	263(73.1%)	256(54.1%)	0.422
Yes	41 (26.9%)	48(45.9%)	
Preeclampsia			
No	275(78.8%)	283(73.7%)	0.237
Yes	29(12.7%)	21(19.1%)	

DISCUSSION

Women with short interval pregnancies were found at high risk of having gestational DM as compared to controls with normal pregnancy interval. GDM itself becomes a risk factor for various adverse maternal and fetal conditions. Short interval between the two pregnancies doesn't give adequate time to women to replenish the nutritional and other requirements which may have exhausted in last pregnancy. This may predispose to number of untoward conditions which can have long term grave consequences for both mother and baby. We planned this study with an aim to compare presence of gestational diabetes mellitus in women with short inter pregnancy interval vs women with normal pregnancy interval in two northern and southern military hospital of Pakistan.

Agarwal *et al*., published a study in our neighboring country India highlighting association with various maternal outcomes with short inter-pregnancy intervals. They revealed that hypertension, gestational DM and anemia were the common conditions associated with pregnancy interval in their study participants.[15] We did not study anemia or any fetal outcome but with regards to gestational DM, we found that it was statistically significantly seen more in women with short inter pregnancy interval as compared to those who had normal inter pregnancy interval.

Weiss *et al*., Published a study in 2021 and targeted women in their third delivery for evaluation of impact of short inter-pregnancy interval on maternal and neonatal outcomes. They came up with the findings that maternal anaemia and small for gestational age neonates were found in more in women with short inter-pregnancy interval.[16] We studied hypertension, gestational DM, preeclampsia and antiphospholipid antibody syndrome and found that women with short inter-pregnancy interval were more at risk of having gestational DM.

A population based cohort study was published by Gebremedhin *et al*., in 2021 with an aim to establish association between inter-pregnancy interval and hypertensive disorders during pregnancy. They revealed that short inter-pregnancy interval increased the risk of preeclampsia in their study participants.[17] Our primary outcome was gestational DM but we studied other variables as well including preeclampsia but found out that inter-pregnancy interval does not increase the chances of preeclampsia in our study participants.

A local study done on patients of Islamabad and Wah evaluated factors associated with gestational DM and found out that short inter-pregnancy intervals was one of these factors. Our results supported their findings as women with short inter pregnancy interval were found more at risk of having gestational diabetes

mellitus as compared to control group which comprised of women with normal inter pregnancy interval.

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LIMITATIONS OF STUDY

Though case control study design covers a lot of limitations but still matching of cases and controls have certain limitations and certain confounding factors still may be linked to incidence of gestational diabetes in both the groups. Moreover, study data was from two entirely different regions of Pakistan which though have given an idea of two distinct regions but still generalization of results to one specific area of Pakistan could not be done.

CONCLUSION

Women with short inter pregnancy interval were found more at risk of having gestational diabetes mellitus as compared to control group which comprised of women with normal inter pregnancy interval.

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Authors' Contribution

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

RG & AR: Data acquisition, data analysis, critical review, approval of the final version to be published.

ZUN & FM: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

NA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

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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