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RESEARCH ARTICLE

"FETO-MATERNAL COMLICATIONS IN PREGANCY WITH METABOLIC SYNDROME -A HOSPITAL BASED STUDY"

Dr. Syed Bassit and Dr. Nowsheen Khan
Senior Resident Dept of OBGY, SKIMS MCH Bemina.

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Abstract

Background: Being first identified by Reaven as a syndrome in 1988,[14] metabolic syndrome (MetS) is a series of metabolic disorders, including abdominal obesity, impaired glucose tolerance and insulin metabolism, hypertension, and dyslipidaemia. [1,8,9]
Prepregnancy metabolic changes are not only the determinant of complications during pregnancy, after pregnancy, during postpartum life, but the reasons for inappropriate perinatal outcomes. Overweight women before pregnancy increases the risk of pregnancy complications; obesity turns out to be an independent risk factor for macrosomia,cesarean section,pregnancy-induced hypertension, preterm delivery, intrauterine growth restriction, congenital malformation, intrauterine foetal death,etc. [2,7]The emergence of MetS characteristics during pregnancy may also harm the fetus.[4]This study was conducted to study the maternal and foetal outcome in pregnant women with Metabolic Syndrome.
Methods: Metabolic syndrome was diagnosed by utilizing the pregnancy adaptation of MeS criteria of NCEPATP III laboratory and clinical criteria. Cases were followed throughout pregnancy till delivery and maternal and foetal complications were recorded.
Results: Sample size was 100patients less than 20 weeks of gestation with metabolic syndrome and 100 controls which were normal pregnant patients less than 20 weeks of gestation without any comorbidities. The mean age was 29-32 years. The mean gestational age was 13-16 weeks. LSCS was significantly higher in cases than controls. APH, Pregnancy Induced Hypertension, Pre-eclampsia, Gestational Diabetes Mellitus was significantly higher in cases as compared to controls. Preterm, IUGR, Macrosomia was significantly higher in cases as compared to controls.
Conclusion: Metabolic syndrome and its associated complications in pregnancy have a strong effect on the maternal and the fetal well-being. A careful history and examination,proper and timely investigations and proper monitoring and follow up with required medication and optimal control of all the parameters will result in better maternal and foetal outcome.

Corresponding Author: Dr. Syed Bassit
Address**:** Senior Resident Dept of OBGY, SKIMS MCH Bemina.

Introduction:

Being first identified by Reaven as a syndrome in 1988,[14] metabolic syndrome (MetS) is a series of metabolic disorders, including abdominal obesity, impaired glucose tolerance and insulin metabolism, hypertension, and dyslipidaemia. [1,8,9]

The prevalence of MetS in pregnant women varied from 3% to 42% in different studies based on the presence of preexisting syndrome components, age, and region.[6]

Pre-pregnancy metabolic changes are not only the determinant of complications during pregnancy, after pregnancy, during postpartum life, but the reasons for inappropriate perinatal outcomes. Overweight women before pregnancy increases the risk of pregnancy complications; obesity turns out to be an independent risk factor for macrosomia, caesarean section, pregnancy-induced hypertension, preterm delivery, intrauterine growth restriction, congenital malformation, intrauterine foetal death, etc. [2,7]

The emergence of MetS characteristics during pregnancy may also harm the fetus.[4]Diagnosis of MetS during pregnancy identifies women at high risk for cardiovascular and metabolic complications in later life and pregnant mothers potentially prone to pregnancy-related complications (preeclampsia, eclampsia, gestational diabetes mellitus [GDM], and coma). This characteristic makes it an appropriate opportunity to evaluate these adverse effects in perinatal period.[3]MetS is a risk factor for preterm delivery[5]and preeclampsia, leading to future cardiovascular disease in mothers.[10]

This study was undertaken to study the burden of co-morbidities and the maternal and foetal outcome in Pregnancy with Metabolic Syndrome.

Aims and Objectives:

1. To study the maternal outcome in pregnant women with Metabolic Syndrome
2. To study the foetal outcome in pregnant women with Metabolic Syndrome

Materials and Methods:

Study Design:

Prospective observational comparative study.

Study Period:

October 2020 to May 2021

This was a prospective observational study performed in the department of OBGY, Holy Family Hospital New Delhi after obtaining institutional ethical clearance and written informed consent from the patients.

Cases:

All pregnant patients less than 20 weeks of gestation with metabolic syndrome.

Metabolic syndrome was diagnosed by utilizing the pregnancy adaptation of MeS criteria of NCEPATP III.According to the NCEP ATP III definition, metabolic syndrome is present if three or more of the following five criteria are met: (1) Blood pressure, (2) fasting glucose (as a measure of insulin resistance and/or glucose intolerance), (3) obesity (measured as hip to waist ratio or body mass index (BMI ≥30), (4) HDL and (5) TG.

Control:

All normal pregnant patients less than 20 weeks of gestation without any comorbidities.

Exclusion criteria:

1. Multiple gestation.
2. Anaemia.
3. Cardiac disease.
4. Autoimmune diseases.

Results:

100 cases with Metabolic Syndrome and 100 controls as normal pregnant patients with no co-morbidity were recruited in this study and followed till delivery and maternal and foetal outcomes were recorded.

Table 1: Incidence of Metabolic syndrome.

	Frequency	Percentage
Total no. of ANC patients observed	1100	100%
Patients with metabolic syndrome	105	9.54%
Patients without metabolic syndrome	995	90.45%

Out of total 1100 antenatal patients, incidence of metabolic syndrome was 9.54%.

Table 2: Comparison of age(years) between cases and controls.

Age(years)	Cases(n=100)	Controls(n=100)	Total	P value
Mean ± SD	29.57 ± 3.91	28.29 ± 3.95	28.93 ± 3.97	0.022*
Median(25th-75th percentile)	30(27-32)	28(25.75-31)	29(27-32)	
Range	20-38	20-38	20-38	

Mean ± SD of age(years) in cases was 29.57 ± 3.91 which was significantly higher as compared to controls (28.29 ± 3.95).(p value=0.022)

Table 3:- Comparison of parity between cases and controls.

Parity	Cases(n=98)	Controls(n=100)	Total	P value
Primi	27 (27%)	32 (32%)	59 (29.50%)	0.191‡
Para1	36 (36%)	43 (43%)	79 (39.50%)	
Para2	32 (32%)	24 (24%)	56 (28%)	
Para3	5 (5.0%)	1 (1%)	6 (3.0%)	
Total	98 (100%)	100 (100%)	200 (100%)	

Distribution of parity was comparable between cases and controls. (Primi: 27.55% vs 32% respectively, Para1:- 35.71% vs 43% respectively, Para2:- 31.63% vs 24% respectively, Para3:- 5.10% vs 1% respectively) (p value=0.199).

Table4:- Comparison of mode of delivery between cases and controls.

Mode of delivery	Cases(n=100)	Controls(n=100)	Total
LSCS	72 (72%)	26 (26%)	98(49%)
NVD	28 (28%)	74 (74%)	105 (51%)
Total	100(100%)	100 (100%)	198 (100%)

Proportion of patients with mode of delivery: LSCS was significantly higher in cases as compared to controls. (LSCS:72% vs 28% respectively).

Table 5:-Comparison of maternal complications between cases and controls.

Maternal complications	Cases(n=100)	Controls(n=100)	Total	P value
Nil	30 (30%)	81 (81%)	111 (55.50%)	<.0001§
APH	15 (15%)	3 (3%)	18 (9%)	0.005‡
PPH	6 (6%)	3 (3%)	9 (4.50%)	0.498‡
Pregnancy induced hypertension	37 (37%)	10 (10%)	45 (22.50%)	<.0001§
Pre-eclampsia	21 (21%)	3 (3%)	24 (12%)	0.0001‡
Gestational diabetes	45	7	52	<.0001§

mellitus	(45%)	(7%)	(26%)	
Eclampsia	2 (2%)	0 (0%)	2 (1%)	0.497‡
DVT	2 (2%)	0 (0%)	2 (1%)	0.497‡
Gestational hypertension	14 (14%)	7 (7%)	21 (10.50%)	0.106§

§ **Chi square test**

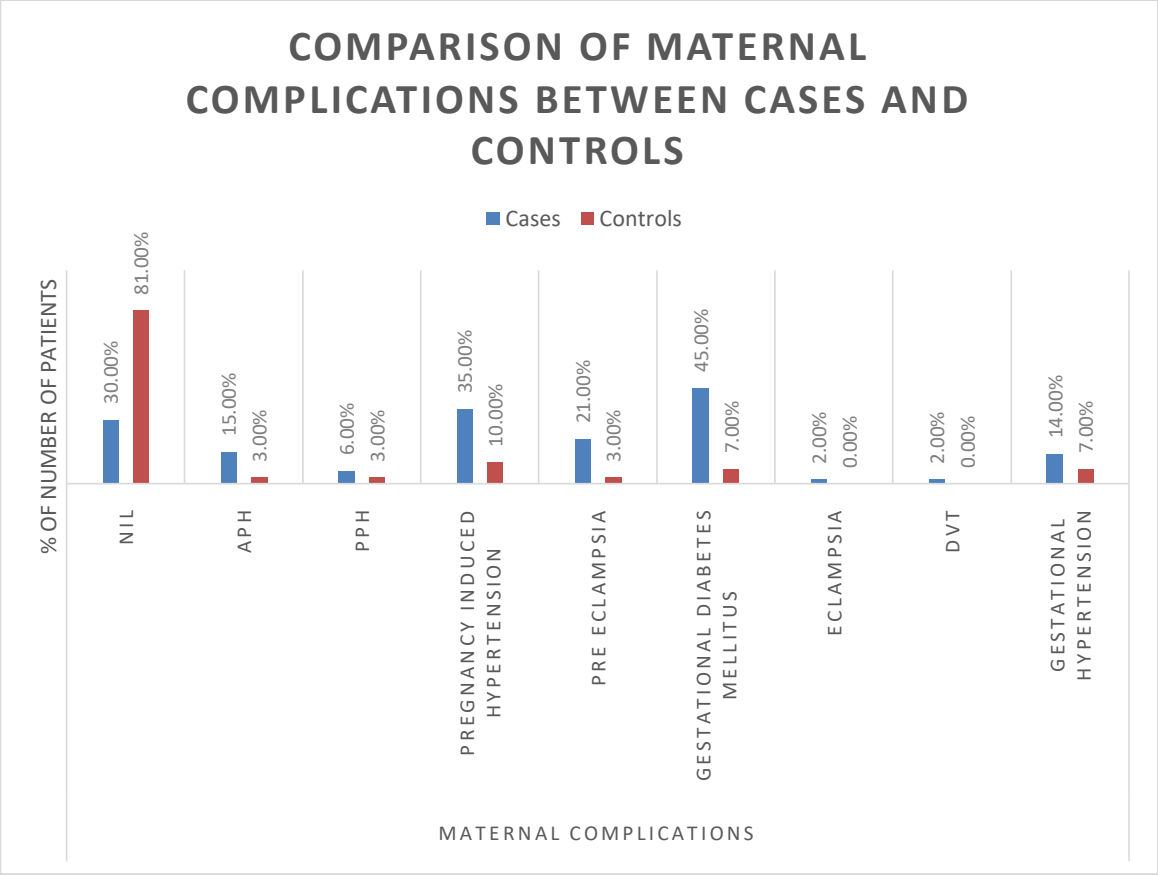

Figure 1:- Comparison of maternal complications between cases and controls.

Proportion of patients with maternal complications: APH, pregnancy induced hypertension, pre-eclampsia, gestational diabetes mellitus was significantly higher in cases as compared to controls. (APH: 15% vs 3% respectively (p value=0.005), Pregnancy induced hypertension:35% vs 10% respectively (p value<.0001), Pre-eclampsia: 21% vs 3% respectively (p value=0.0001), Gestational diabetes mellitus:45% vs 7% respectively (p value<.0001)). Proportion of patients without maternal complications was significantly lower in cases as compared to controls. (Nil:30% vs 81% respectively). (p value <0.0001)

Distribution of other maternal complications was comparable between cases and controls. (PPH:6% vs 3% respectively (p value=0.498), Eclampsia:2% vs 0% respectively (p value=0.497), DVT:2% vs 0% respectively (p value=0.497), Gestational hypertension:14% vs 7% respectively (p value=0.106)).

Table 6:- Comparison of fetal complications between cases and controls.

Fetal complications	**Cases(n=100)**	**Controls(n=100)**	**Total**	**P value**
Nil	57 (57%)	90 (90%)	147 (73.50%)	<.0001§
Preterm	18	5	23	0.004§

	(18%)	(5%)	(11.50%)	
IUGR	16 (16%)	3 (3%)	19 (9.50%)	0.003‡
LBW	10 (10%)	3 (3%)	13 (6.50%)	0.082‡
AFD	16 (16%)	10 (10%)	26 (13%)	0.207§
Macrosomia	7 (7%)	0 (0%)	7 (3.50%)	0.014‡

§ Chi square test

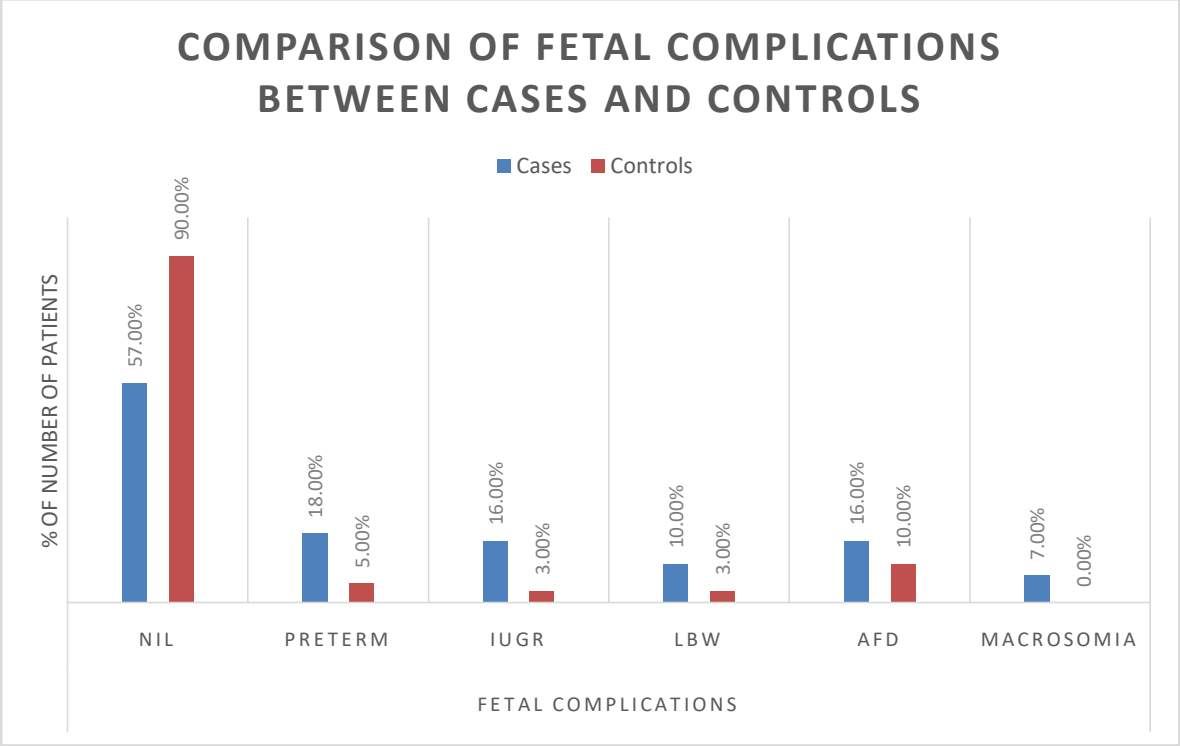

Figure 2:- Comparison of fetal complications between cases and controls.

Proportion of patients with fetal complications: Preterm, IUGR, macrosomia was significantly higher in cases as compared to controls. (Preterm: 18% vs 5% respectively (p value=0.004), IUGR:16% vs 3% respectively (p value=0.003), Macrosomia:7% vs 0% respectively (p value=0.014)). Proportion of patients without fetal complications was significantly lower in cases as compared to controls. (Nil:57% vs 90% respectively). (p value <0.0001)

Distribution of other fetal complications was comparable between cases and controls. (LBW:10% vs 3% respectively (p value=0.082), AFD:16% vs 10% respectively (p value=0.207)).

Discussion:-

This study was conducted in the department of obstetrics and gynaecology, Holy Family Hospital New Delhi with the aim to study the maternal and fetal complications in pregnant women with Metabolic syndrome fulfilling the criteria.

In our study the incidence of metabolic syndrome was 9.54% which was lesser than the study conducted by Jessica A. Grieger et al who had an incidence of 12.3 %. Another study conducted by Maria do carmo pinto et al[12] found an incidence of 3.0% metabolic syndrome in early pregnancy and 9.7% in postpartum period.

The mean age of cases in our study is 29.57 ± 3.91 while that of controls is 28.29 ± 3.95 with p-value 0.02. Both groups are comparable for maternal age.

Our study is in consonance with various authors as follows:

Author	Age in years
Jessica A Grieger et al (2018)	28.6
Kaiser Wani et al (2020)	31.2
Present study	28.29

The mean parity of cases in our study was Para 1.

Our study was in consonance with study conducted by Cathrine J. Vladntin et al[15] whose study found that a dose-response effect between increased parity and abdominal obesity and low HDL levels that were most likely risk factors for PIH. Our study was not in consonance with study conducted by Kaiser Wani et al[16] whose study had a mean parity of 2. High parity was associated with increased incidence of PIH in our study. Para 2 comprised of 40.54 %of total PIH cases followed by P_1 (37.84 %) followed by Primi (21.62).

Mode of delivery in cases vs controls in our study was significantly comparable.72% of cases delivered by LSCS vs 26% of controls and 28% of cases delivered by NVD vs 74% of controls.A study conducted by Dr. Saba Musharaf et al[13]concluded that the rate of caesareansection in GDM patients with increased BMI was 75% and only 25% had NVD.

Our study showed a significant difference of maternal complications between cases and controls.APH in cases was 15% vs 3% in controls (p value <0.001), PIH in 37% cases vs 10% in controls (p value <0.001),DVT in 2% cases vs 0% in control.PIH and DVT didn't show much difference (p value 0.498 & 0. 497), GDM in 45% cases vs 7% controls (p value <0.003).

Kaiser Wani et al studied the association of early pregnancy metabolic syndrome and subsequent incidence of gestational diabetes. He found an incidence of 24.7% GDM in his study. GDM was significantly higher for participants with hyper triglycerides at first trimester.

Proportion of symptom free pregnancy was 30% in cases vs 81% in controls (p value <0.001). Study by Boldizar Horvath et al[11] shows 27.2%symptom free vs 74.1% in controls.

Our study showed a significant difference of foetal complications between cases and controls.
Incidence of preterm babies was 18% in cases vs 5% in controls (p value <0.004)
And the incidence of IUGR babies was 16% in cases vs 3% in controls (p value <0.003).
Incidence of LBW babies and AFD was comparable in both cases and control.

- LBW: 10% vs 3% respectively. (p value <0.08)
- AFD: 10% vs 10% respectively. (p value <0.207)

Study conducted by Boldizar Horvath et al[11] showed similar results of foetal complications in cases vs control.

In proportion of preterm births was 15.2% in patients with metabolic syndrome vs 11.1% in control. (p value <0.05). Proportion of IUGR babies was 18.4% in metabolic cases vs 3.3% in controls (p value <0.001)

Declarations:
Funding:
None.

Conflict of Interest:
Nil.

Bibliography:-

1. **Azizi F, Hadaegh F, Khalili D, Esteghamati A, Hosseinpanah F, Delavari A, et al.** Appropriate definition of metabolic syndrome among Iranian adults: Report of the Iranian National Committee of Obesity. Arch Iran Med. 2010;13:426–8.

2. **Bartha JL, Marín-Segura P, González-González NL, Wagner F, Aguilar-Diosdado M, Hervias-Vivancos B**. Ultrasound evaluation of visceral fat and metabolic risk factors during early pregnancy. Obesity. 2007;15:2233–9.
3. **Bartha JL, González-Bugatto F, Fernández-Macías R, González-González NL, Comino-Delgado R, Hervías-Vivancos B.** Metabolic syndrome in normal and complicated pregnancies. Eur J ObstetGynecolReprod Biol. 2008;137:178–84.
4. **Bhowmik B, Afsana F, Siddiquee T, Munir SB, Sheikh F, Wright E, et al.** Comparison of the prevalence of metabolic syndrome and its association with diabetes and cardiovascular disease in the rural population of Bangladesh using the modified National Cholesterol Education Program Expert Panel Adult Treatment Panel III and International Diabetes Federation definitions. J Diabetes Investig. 2015;6:280–8.
5. **Chatzi L, Plana E, Daraki V, Karakosta P, Alegkakis D, Tsatsanis C, et al**. Metabolic syndrome in early pregnancy and risk of preterm birth. Am J Epidemiol. 2009;170:829–36.
6. **dos Prazeres Tavares H, Arantes MA, Tavares SBMP, Abbade JF, Calderon IdMP, Rudge MVC.** Metabolic syndrome and pregnancy, its prevalence, obstetrical and newborns complications. Open J Obstet Gynecol. 2015;5:618–25.
7. **Gluckman PD, Hanson MA, Cooper C, Thornburg KL.** Effect of in utero and early-life conditions on adult health and disease. N Engl J Med. 2008;359:61–73.
8. **Grundy SM, Brewer HB, Jr, Cleeman JI, Smith SC, Jr, Lenfant C.** Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association conference on scientific issues related to definition. ArteriosclerThrombVasc Biol. 2004;24: e13–8.
9. **Hamidreza Barahimi, MD AEP FR, Akbar Hasanzadeh, PhD, OmolbaninKafeshani.,** MSc Association of dietary pattern and metabolic syndrome in 15- to 49-years-old women. J Isfahan Med School. 2015;33:70–81.
10. **Hooijschuur MC, Ghossein-Doha C, Al-Nasiry S, Spaanderman ME.** Maternal metabolic syndrome, preeclampsia, and small for gestational age infancy. Am J Obstet Gynecol. 2015;213(370):e1–7
11. **Horvath B, Bodecs T, Boncz I, Bodis J.** Metabolic syndrome in normal and complicated pregnancies. Journal of metabolic syndrome and related disorders 2013; 11(3): 185-188.
12. **Limo MD, Melo AS, Sena AS, Barros VD, Amorim MM**. Metabolic syndrome in pregnancy and postpartum: prevalence and 20associated factors. Revista da AssociaçãoMédica Brasileira. 2019 Dec;65(12):1489-95
13. **Musharaf S , Malik S, Gupta N**. Risk Factors for Cesarean Delivery in Patients of Gestational Diabetes Mellitus at a Tertiary Care Centre - A Descriptive Observational Study.European Journal of Molecular & Clinical Medicine. 2020;7(11): 8146 -8152.
14. **Reaven GM**. Role of insulin resistance in human disease. Diabetes. 1988;37:1595–607.
15. **Vladutiu CJ, Siega-Riz AM, Sotres-Alvarez D, et al**. Parity and Components of the Metabolic Syndrome Among US Hispanic/Latina Women: Results from the Hispanic Community Health Study/Study of Latinos. Circ Cardiovasc Qual Outcomes. 2016;9(2 Suppl 1):S62-S69. doi:10.1161/CIRCOUTCOMES.115.002464
16. **Wani K, Sabico S, Alnaami AM, Al-Musharaf S, Fouda MA, Turkestani IZ, Al-Ajlan A, Alshingetti NM, Alokail MS and Al-Daghri NM** (2020) Early-Pregnancy Metabolic Syndrome and Subsequent Incidence in Gestational Diabetes Mellitus in Arab Women. Front. Endocrinol. 11:98. doi: 10.3389/fendo.2020.00098.