

Frequency of Metabolic Syndrome in Pre-Eclamptic Women Presenting at Tertiary Care Hospital, Hyderabad

Metabolic Syndrome in Pre-Eclamptic Women

Fahmida Parveen Memon, Ambreen Mughal, Shehzadi, Ruby and Nusrat

ABSTRACT

Objective: To determine the frequency of metabolic syndrome in Pre-eclamptic women presenting at Tertiary Care Hospital, Hyderabad.

Study Design: Descriptive cross sectional study

Place and Duration of Study: This study was conducted at the Department of Obstet and Gynae, Liaquat University of Medical and Health Sciences Hospital, Hyderabad from January, 2021 to December, 2021.

Materials and Methods: A total of 150 patients of age 20-40 years of any parity, presenting with preeclampsia 24-40 weeks of gestation were included. Patients with history of congestive cardiac failure, T2DM, CRF and history of hypo or hyperthyroidism were excluded. Metabolic syndrome was as defined according to NCEP, ATP-III criteria with abdominal obesity (waist circumference) for south Asian (>88 cm for women) plus any two of the following: Triglycerides > 150 mg /dl, HDL for women <50 mg/dl, Blood pressure >130/90 mmHg and Fasting blood sugar >110 mg/dl.

Results: Overall, 150 patients were included in our study. Out of these, 58 (38.7%) were suffered from metabolic syndrome (Figure. I). The average age, gestational age, BMI, fasting blood sugar, socioeconomic status and occupational status of metabolic syndrome and non-metabolic syndrome patients was almost equal, (p>0.050). Parity 0-2 was most common in non-metabolic syndrome patients, (p=0.002)

Conclusion: There is a high prevalence of metabolic syndrome in Preeclampsia women. Early diagnosis, compliance to preventive measure and treatment of underlying risk factors of metabolic syndrome can reduce its prevalence rate.

Key Words: Hypertension, Lipids, Metabolic syndrome, Obesity, Preeclampsia

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INTRODUCTION

Hypertensive disorders are major causes of maternal morbidity and mortality in pregnant women. Hypertension accounts for 5 to 10 percent of all complications of pregnancy¹. In developing countries prevalence rate of preeclampsia has been increased from 1.8% to 16.7%². Severity of hypertension or preeclampsia is strongly associated with perinatal outcomes and extent of different fetal injuries. Fetal growth retardation is main complication of preeclampsia due to the utero-placental vascular insufficiency which ultimately results in insufficient nutrition supply to the fetus³.

Department of Obstetrics & Gynecology, Liaquat University Hospital, Hyderabad.

Correspondence: Dr. Fahmida Parveen Memon, Associate Professor of Obstetrics & Gynecology, Liaquat University Hospital, Hyderabad.

Contact No: 0332 3526836

Email: dr_memon16@yahoo.com

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Increased body mass index or obesity in women make them more susceptible to develop preeclampsia, number of studies have conducted and reported that obesity causes elevation in inflammatory markers, insulin resistance and cardiovascular diseases and enhance the probability of preeclampsia five times more⁴. Some other risk factors include multiple pregnancies, preexisting diabetes, null parity, renal disease, autoimmune disease older maternal age⁵.

According to NCEP (National Cholesterol Education Program) presence of minimum three clinical features low high density lipoprotein, high triglycerides, abdominal obesity, increased fasting blood sugar and high blood pressure is a strong indicator of metabolic syndrome⁶. Late recognition of metabolic disease may lead to cardiovascular diseases and mortality. Researches on cardiovascular specialty have shown that deranged lipid profile directly influenced endothelial function, prolong dyslipidemia can cause endothelial dysfunction⁷.

In recent literature it has been described that maternal pre-disposition towards preeclampsia may be predicted by monitoring change in lipid values⁸. Association between hypertension or preeclampsia and altered total cholesterol, high density lipids and triglycerides level is well documented⁹. Furthermore, it was also reported

that abnormal lipids may lead to increase in thromboxane and low prostaglandins. This change in antioxidants and lipid peroxidase level can cause preeclampsia in pregnant women¹⁰.

The rationale of this study was to determine the frequency of metabolic syndrome in pre-eclamptic women presenting at tertiary care hospital, a local study conducted in Pakistan at Jinnah Post Graduate Medical Centre showed the prevalence of recurrent pre-eclampsia 25.26% and the incidence of metabolic syndrome of 19.3%. Appropriate strategies may be planned in prevention and treatment of metabolic syndrome which may decrease frequency of pre-eclampsia in our population.

MATERIALS AND METHODS

Study was conducted at obstetrics and gynecology department of Liaquat University of medical and health sciences hospital Hyderabad from 20th January 2021 to 19th December 2021 in 6 months duration. This study was conducted after approval from ethical board of hospital. Age: 20-40 years, women of all parity with Pre- eclampsia, gestational amenorrhea of 24-40 weeks calculated by early scan of first trimester, raised blood pressure of at least 140/90 mmHg or more on two separate occasions, at least 4 hours apart in the presence of proteinuria were included. Non-consenting, inadequate information regarding Pre-eclampsia diagnosis in the medical record of the patient, pregnancy complicated by Pre-eclampsia before the established period of five years, critically ill patients, patients with history of congestive cardiac failure, known case T2DM, patients with history of chronic renal disease, patients with history of hypo or hyperthyroidism were excluded. Permission from the institutional ethical review committee was taken prior to conduction of study. Written informed consent was obtained from every patient.

Preeclampsia was diagnosed as per WHO guidelines, two consecutive reading of high blood pressure (≤ 140 systolic and 90 diastolic) with difference of at least four hours after gestation period of 20 weeks and presence of associated proteinuria (300mg or above protein in 24 hours urine collection).

Brief history of hypertension was taken. Five components of metabolic syndrome were assessed. Blood pressure was measured by the researcher using a standard mercury sphygmomanometer with different cuff size twice, repeated after five minutes and the mean systolic and diastolic blood pressure was used for analysis. For variable of obesity, BMI was calculated as weight in kilograms divided by the square of height in meters.

Abdominal (waist) circumference was measured by drawing a horizontal line above the upper most lateral border of the ilium and then cross the line to indicate the midaxillary line of the body. Measurement was

made at the end of normal expiration at the nearest centimeter. Fasting blood sugar levels and lipid profile (after 12 hours of fasting) were taken after five ml of fasting venous blood sample withdraw from the anti-cubital vein of each participant after taking all aseptic precautions using sterile needles and syringes. Blood sugar and triglycerides were estimated by enzymatic method while high density lipoprotein (HDL) by precipitation method. Metabolic syndrome was as defined according to NCEP, ATP-III criteria with abdominal obesity (waist circumference) for south Asian (>88 cm for women) plus any two of the following: Triglycerides > 150 mg /dl, HDL for women <50 mg/dl, Blood pressure $>130/90$ mmHg and Fasting blood sugar >110 mg/dl.

Data was analyzed on SPSS version 16. Mean and standard deviation were calculated for age, parity, height, weight, BMI and gestational age. Frequency and percentage were calculated for socioeconomic status, occupational status, parity and metabolic syndrome (yes/no). P-value of ≤ 0.05 was taken as statistically significant.

RESULTS

Table No.1: Association of metabolic syndrome with demographic and baseline characteristics

Variable	Metabolic syndrome		p-value
	Yes, N (%)	No, N (%)	
Age (years)	28.29 \pm 4.59	27.34 \pm 5.05	0.250
Gestational age (weeks)	30.09 \pm 3.93	30.79 \pm 4.16	0.302
BMI (kg/m ²)	29.84 \pm 4.01	29.77 \pm 4.32	0.919
Fasting blood sugar (mg/dl)	101.37 \pm 14.26	101.75 \pm 13.71	0.872
Parity			
0-2	39 (67.2)	81 (88.0)	0.002
>2	19 (32.8)	11 (12.0)	
Socioeconomic status			
Lower	15 (25.9)	24 (26.1)	0.060
Middle	19 (32.8)	46 (50.0)	
Upper	24 (41.4)	22 (23.9)	
Occupational status			
Employed	33 (56.9)	66 (71.7)	0.062
Un-employed	25 (43.1)	26 (28.3)	

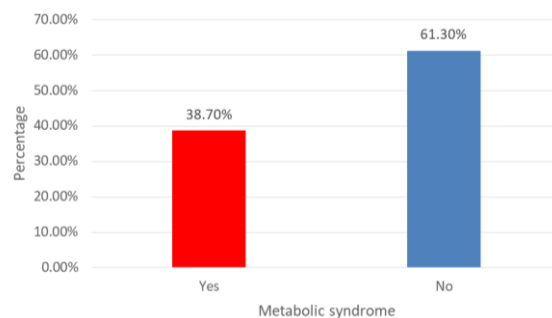


Figure No.1: Metabolic Syndrome Distribution

Overall, 150 patients were included in our study. Out of these, 58 (38.7%) were suffered from metabolic syndrome (Figure. I). The average age, gestational age, BMI, fasting blood sugar, socioeconomic status and occupational status of metabolic syndrome and non-metabolic syndrome patients was almost equal, ($p>0.050$). Parity 0-2 was most common in non-metabolic syndrome patients, ($p=0.002$) (Table. I).

DISCUSSION

Increase in blood pressure during pregnancy and insulin resistance has been described in numerous previous studies¹¹. Preeclampsia accounts for upto 8% of total pregnancies and contributes to significant neonatal and maternal deaths. Treatment of underlying causes should be considered in start of pregnancy. In a study conducted by Mazar et al¹² reported that metabolic score or presence of insulin resistance, high blood pressure and deranged lipid profile is independent indicator of preeclampsia, association of these metabolic indicators with preeclampsia is approved.

In our study metabolic syndrome was observed in 38.7% of preeclampsia women and mean gestational age of patients was 30.09 ± 3.93 weeks that shows complications of end stage pregnancy. A study was conducted by Zain et al¹³ reported 46.7% metabolic syndrome incidence and mean gestational age was 35.43 weeks in his study. Another study by Ray et al¹⁴ concluded a positive correlation between preeclampsia and indicators of metabolic syndrome like maternal triglycerides.

Dane et al¹⁵ conducted a study on 169 pregnant women and assessed indicators of metabolic syndrome in preeclamptic women after 32 weeks pregnancy. Results of this study show that values of indicators were higher in all parameters among preeclampsia women as compare to controls like mean blood pressure in cases was 135mmHg systolic and 90mmHg diastolic pressure, but in control group it was 100 mmHg ($P < 0.001$). In another study by Sibai et al¹⁶ frequency of metabolic syndrome among women with preeclampsia was observed 27%.

In our study mean BMI of patients was observed 29.84 ± 4.01 kg/m² among preeclampsia women. Beigh et al¹⁷ also reported correlation between weight gain in pregnancy and development of hypertension and preeclampsia in late weeks of pregnancy. Metabolic syndrome was observed in 4.4% of preeclampsia women. Lorenzo et al¹⁸ compared metabolic syndrome patients with healthy controls and reported that blood disorders are more common in women with metabolic syndrome ($P<0.001$).

Studies conducted by Gratacós et al¹⁹ and Zahran et al²⁰ also examined preeclampsia patients and measured their metabolic syndrome indicators. Significant difference was observed between markers of these levels and women with severe hypertension ($P<0.001$).

Triglyceride was found deranged in both studies which is strong indicator of metabolic syndrome.

CONCLUSION

Metabolic syndrome is highly associated with preeclampsia, early diagnosis, compliance to preventive measure and treatment of underlying risk factors of metabolic syndrome can reduce its prevalence rate.

Recommendations: Therefore, we recommend that there should be public screening and public awareness programs on national and regional levels to modify these factors and improve the mortality and morbidity of community due to heart diseases

Author's Contribution:

Concept & Design of Study:	Fahmida Parveen Memon
Drafting:	Ambreen Mughal, Shehzadi
Data Analysis:	Ruby, Nusrat
Revisiting Critically:	Fahmida Parveen Memon, Ambreen Mughal
Final Approval of version:	Fahmida Parveen Memon

Conflict of Interest: The study has no conflict of interest to declare by any author.

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