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Physiology

Demographic Status and Diet Pattern of Preeclamptic and Healthy Pregnant Women - A Comparative Study

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Abstract	Original Research Article

Background: Preeclampsia is a hypertensive disorder affecting 2-8% of pregnancies worldwide and is a major contributor to maternal and fetal morbidity and mortality, especially in low- and middle-income countries like Bangladesh. Preeclampsia is characterized by high blood pressure and proteinuria, and its occurrence is influenced by various demographic and dietary factors. Understanding these influences is critical in resource-limited settings to improve health outcomes for both preeclamptic and healthy pregnant women. *Objective*: This study aimed to assess and compare the demographic characteristics and dietary patterns of preeclamptic and healthy pregnant women in Bangladesh, with the goal of identifying risk factors associated with preeclampsia. *Methodology*: This cross-sectional comparative study was conducted over one year, from July 2018 to June 2019, at Rajshahi Medical College in Bangladesh. The study included 100 preeclamptic pregnant women as cases and 100 healthy pregnant women as controls, aged 18-35 years and at 28-32 weeks of gestation. Demographic data, dietary patterns, and serum levels of calcium, magnesium, and uric acid were measured. Statistical analyses, including Chi-square and Unpaired t-tests, were conducted using SPSS, with a significance level set at $p < 0.05$. *Results*: Preeclamptic women were significantly older and had higher BMI, systolic, and diastolic blood pressures compared to healthy pregnant women. Dietary analysis revealed that 60% of preeclamptic women had non-balanced diets, compared to only 2% of healthy women, indicating a statistically significant difference. However, there was no significant difference in socioeconomic status and parity between the two groups. Educational attainment was lower among preeclamptic women, with a higher proportion having only primary education compared to controls. *Conclusion*: The study highlights the impact of demographic and dietary factors on the risk of preeclampsia among pregnant women in Bangladesh. These findings underscore the need for public health interventions focused on nutritional support, educational outreach, and socioeconomic assistance to reduce the incidence of preeclampsia, especially among vulnerable groups. Addressing these factors may contribute to better maternal and fetal health outcomes in Bangladesh.
Keywords: Preeclampsia, pregnancy, hypertension.

INTRODUCTION

Preeclampsia is a hypertensive disorder that affects approximately 2-8% of pregnancies worldwide and is a significant contributor to maternal and fetal morbidity and mortality, particularly in low- and middle-income countries such as Bangladesh [1-3]. Characterized by high blood pressure and often accompanied by proteinuria, preeclampsia presents complex health challenges for both mother and child, requiring a deeper understanding of demographic and dietary factors that may influence its onset and progression. In Bangladesh, where healthcare resources are often limited, it is essential to explore how factors like socioeconomic status, age, education, and diet impact the health outcomes of both preeclamptic and healthy pregnant women [4-7].

The demographic status of women in Bangladesh plays a critical role in pregnancy outcomes. Factors such as age, education, socioeconomic background, and access to healthcare services are key determinants of maternal and fetal health. Studies indicate that women from lower socioeconomic backgrounds and rural areas often have limited access to quality prenatal care, making them more vulnerable to

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complications like preeclampsia. Additionally, young maternal age and lower levels of education are associated with an increased risk of preeclampsia, underscoring the importance of understanding these demographic variables to develop targeted interventions [6-9].

Dietary patterns among pregnant women in Bangladesh also have a significant impact on maternal health, particularly concerning the risk of preeclampsia. A balanced diet rich in essential nutrients is vital for maintaining a healthy pregnancy, yet dietary practices in Bangladesh are often influenced by socioeconomic status, cultural beliefs, and access to food [10-11]. Pregnant women in Bangladesh frequently consume diets that may lack adequate protein, iron, and essential vitamins, which are crucial for fetal development and maternal health. For preeclamptic women, dietary insufficiencies can exacerbate the condition, making diet an essential focus in understanding and managing preeclampsia.

Comparative studies between preeclamptic and healthy pregnant women in Bangladesh reveal that nutritional deficiencies and specific dietary patterns may play a role in the onset of preeclampsia. For instance, diets high in carbohydrates and low in protein and vitamins are common, especially among lower-income groups. These dietary habits may contribute to poor health outcomes in preeclamptic women, as inadequate nutrition has been linked to increased risks of hypertension and other pregnancy-related complications [12-13].

Additionally, cultural beliefs and social norms surrounding pregnancy and diet can influence the food choices of Bangladeshi women, impacting their overall health. Many women follow traditional dietary practices, some of which may not provide adequate nutrition. These dietary patterns, coupled with limited knowledge about the nutritional needs during pregnancy, may increase the risk of preeclampsia and other pregnancy complications, particularly among vulnerable populations [14].

Understanding the demographic and dietary patterns of preeclamptic versus healthy pregnant women in Bangladesh is crucial for developing effective public health strategies and interventions. By addressing nutritional deficiencies and promoting awareness of healthy dietary practices, healthcare providers can help mitigate the risks associated with preeclampsia. Furthermore, policies aimed at improving access to prenatal care and nutritional support, especially for at-risk populations, are essential steps toward reducing the prevalence of preeclampsia and improving maternal and fetal health outcomes in Bangladesh.

Objective

To assess the demographic status and diet pattern of preeclamptic and healthy pregnant women,

METHODOLOGY

This cross-sectional comparative study was conducted over one year, from July 2018 to June 2019, in the Department of Physiology in collaboration with the Department of Biochemistry at Rajshahi Medical College, Rajshahi. The study population included preeclamptic and healthy pregnant women aged 18-35 years with singleton pregnancies at a gestational age of 28-32 weeks. Preeclamptic pregnant women were assigned to the case group, while healthy pregnant women served as the control group. Preeclampsia was defined as the new onset of hypertension ($\geq$140/90 mmHg) with proteinuria or with significant end-organ dysfunction, with or without proteinuria, occurring after 20 weeks of gestation in previously normotensive and non-proteinuric women. Healthy pregnant women were defined as those with normal blood pressure, no systemic illness, appropriate weight gain for their gestational age, and no proteinuria.

Exclusion criteria included pregnant women with a history of diabetes mellitus, renal disease, cardiovascular disease, known hypertension, severe anemia, twin pregnancy, diagnosed hydatidiform mole, hemophilia, and other preexisting medical conditions that could alter study parameters. A total of 100 cases (preeclamptic women) and an equal number of controls (healthy pregnant women) were included in the study.

Serum calcium, magnesium, and uric acid levels were measured using a semi-automated analyzer with the Enzymatic Colorimetric Method in the Department of Biochemistry at Rajshahi Medical College. Data were processed and analyzed with SPSS (Statistics Package for Social Sciences) for Windows, version 23.0. Descriptive statistics, Chi-square (χ^2) tests, and Unpaired t-tests were used to analyze the data. Categorical data between the study groups were compared using the Chi-square (χ^2) test, while continuous data were analyzed with the Unpaired t-test. A significance level of 5% was set, with a p-value < 0.05 considered statistically significant.

RESULTS

Table-1: Demographic status of the study group

Table-1: Demographic status of the study group Parameters	Pre-eclamptic pregnant women(N=100) Mean±SD	Healthy pregnant women (N=100)Mean±SD
Age in years	28.55±4.01	26.58±4.02
Weight in kg	54.95±5.57	52.99±3.02
Height in cm	153.82±4.70	153.67±1.39
BMI	23.04±1.71	22.36±1.23
Gestational age (weeks)	30.42±1.16	30.37±1.23
Pulse in beat/min	78.61±4.57	73.53±2.02
Systolic BP	156.78±8.27	111.20±3.26
Diastolic BP	91.95±4.37	74.60±6.73

Table I presents the demographic profile of the respondents, including both the study group (preeclamptic women) and the control group (healthy pregnant women). The parameters compared between the two groups include age (years), weight (kg), height (cm), BMI (kg/m²), pulse rate (beats/min), systolic blood pressure (mm Hg), and diastolic blood pressure (mm Hg). Each characteristic is expressed as the mean ± standard deviation (SD), providing a comprehensive overview of the basic demographic and physiological differences between the groups.
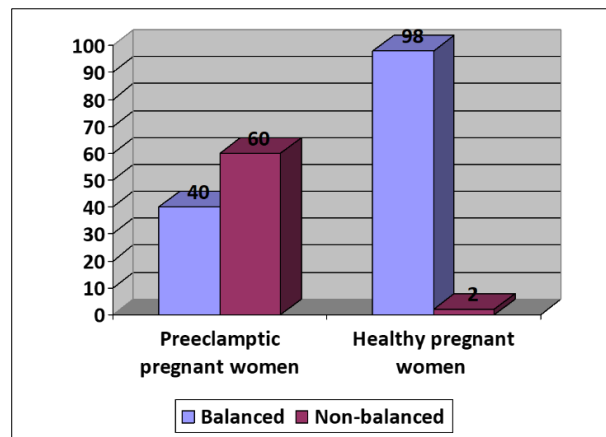
Figure-1: Distribution of study population according to diet pattern (n=200)

There are 40 balanced and 60 non-balanced in preeclamptic pregnant women (study group) and 98 balanced, 02 non-balanced in healthy pregnant women (control group). There is statistically significant difference in the diet pattern of preeclamptic pregnant women compared to healthy pregnant women.
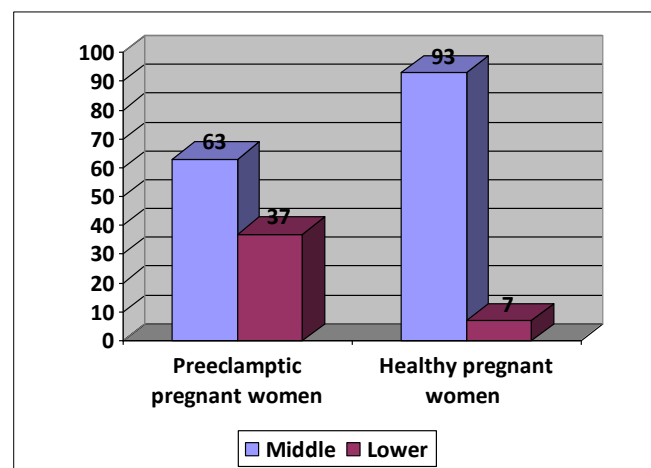
Figure-2: Distribution of study population according to socio economic status

63 in middle class and 37 in lower class in pre-eclamptic pregnant women (study group), 93 in middle class, 7 in lower class in healthy pregnant women (control group). There is no significance difference between the socio economic status of pre eclamptic pregnant women compared to healthy pregnant women.
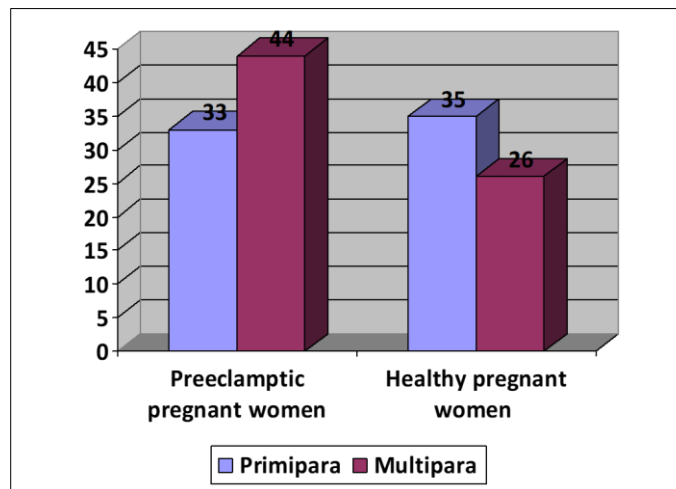

Figure-3: Distribution of study population according to parity

33 primipara and 44 multipara in pre-eclamptic pregnant women (study group) and 35 primipara and 26 multipara in healthy pregnant women (control group).

There is no significance difference between the parity of pre-eclamptic pregnant women compared to healthy pregnant women.
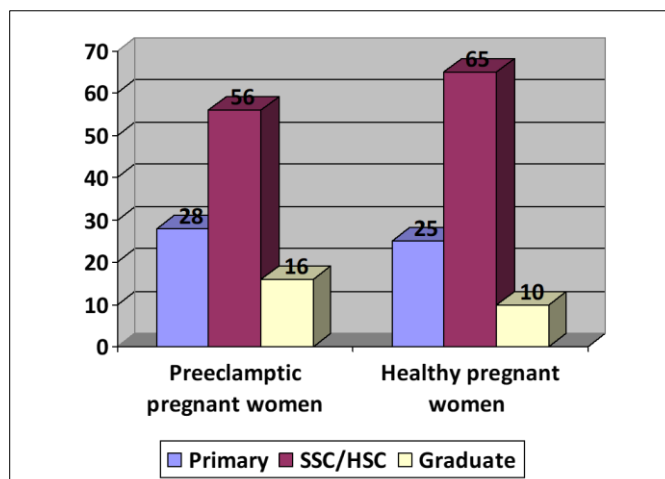

Figure-4: Distribution of study population according to educational status

In study group (pre-eclamptic pregnant women) primary 28%, SSC 56% and graduate 16%; in control group (healthy pregnant women) primary 25%, SSC 65% and graduate 10%.

DISCUSSION
The findings of our study align with existing literature that highlights the significant impact of demographic and dietary factors on the risk of preeclampsia in pregnant women. Preeclampsia, affecting approximately 2-8% of pregnancies globally, is a leading cause of maternal and fetal health complications, particularly in low- and middle-income countries like Bangladesh. Similar studies emphasize the role of age, socioeconomic status, and dietary practices in determining preeclampsia risk, supporting our study's focus on these variables. Our findings indicate that preeclamptic women were generally older, had higher BMI, and displayed significant differences in systolic and diastolic blood pressure compared to healthy pregnant women.

Consistent with our study, research has shown that preeclamptic women tend to have higher BMIs compared to their healthy counterparts. Studies from countries with similar socioeconomic contexts, also demonstrate that women with higher BMI are more susceptible to preeclampsia [12-13]. This correlation may be attributed to increased body fat and metabolic changes that exacerbate hypertension, a key

characteristic of preeclampsia. Our findings align with this trend, as preeclamptic women had a mean BMI of 23.04 ± 1.71 compared to 22.36 ± 1.23 in healthy pregnant women, reflecting a slight but notable increase in BMI among the preeclamptic group.

Dietary patterns were another focus of our study, revealing that 60% of preeclamptic women followed a non-balanced diet compared to only 2% of healthy pregnant women. This significant dietary difference is supported by other studies that highlight the importance of adequate protein and nutrient intake during pregnancy to reduce preeclampsia risk. Research indicates that low-protein, high-carbohydrate diets are common among preeclamptic women, often due to economic constraints and cultural beliefs [14]. In Bangladesh, similar dietary practices could contribute to the higher incidence of preeclampsia among women from lower socioeconomic backgrounds, as seen in our study.

Our findings regarding socioeconomic status are consistent with the broader literature. Although there was no statistically significant difference in socioeconomic status between preeclamptic and healthy pregnant women in our study, a higher proportion of preeclamptic women belonged to the lower socioeconomic class (37%) compared to healthy women (7%). Previous studies have also found that socioeconomic factors such as income and education level play a role in preeclampsia risk, with limited access to healthcare and nutritious food potentially contributing to poorer health outcomes among lower-income women [15].

Educational status further highlights disparities, as seen in our study where preeclamptic women had a lower percentage of graduates (16%) compared to healthy women (10%). Several studies emphasize the importance of maternal education in pregnancy outcomes, suggesting that women with higher education levels are more likely to access prenatal care and adopt healthier dietary practices [10]. In Bangladesh, limited education is often associated with reduced health literacy, which may prevent women from recognizing early signs of complications like preeclampsia.

Finally, the relationship between parity and preeclampsia has been explored in other studies, with some research suggesting that primiparous women are at a higher risk of developing preeclampsia compared to multiparous women [11]. In our study, however, there was no significant difference in parity between preeclamptic and healthy pregnant women, a finding that aligns with some studies that indicate parity alone is not a decisive factor in preeclampsia risk. Instead, factors like age, BMI, and diet appear to have a more direct impact.

CONCLUSION

In conclusion, our study's findings are largely consistent with previous research on the demographic and dietary factors associated with preeclampsia. By highlighting the importance of adequate nutrition, socioeconomic support, and education, this study emphasizes the need for targeted public health interventions to mitigate the risk of preeclampsia, particularly among vulnerable populations in Bangladesh.

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