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Frequency and its Associated Factors of Proteinuria Among Women having Preeclampsia with Hypertensive Disorders in Pregnancy at Khyber Teaching Hospital (KTH) Peshawar

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ABSTRACT

Background: Hypertensive disorders during pregnancy pose substantial risks to both maternal and fetal health. Preeclampsia, characterized by new-onset hypertension and proteinuria, represents a significant global health concern with varying regional prevalence. **Objective:** This study aims to address the critical knowledge gap regarding the frequency and associated factors of proteinuria among women with Preeclampsia and Hypertensive Disorders in Pregnancy. **Materials and Methods:** In this cross sectional study, the gestational age was determined by either dates or first-trimester scans. Blood pressure measurements were taken, and Preeclampsia was diagnosed using established criteria. Urine samples were collected and analyzed for proteinuria. Patients were further screened for systemic lupus erythematosus and diabetes mellitus. Exclusion criteria included multiple pregnancies, chronic hypertension, renal disease, and chronic diabetes mellitus. Data were analyzed using SPSS version 22, and statistical significance was set at $p \leq 0.05$. **Results:** Of the 137 participants, 54 (39.4%) were primiparous, and 83 (60.6%) were multiparous. The average age was 31.26 years with a range of 17-45 years. Proteinuria was detected in 26 (18.98%) patients. Proteinuria prevalence did not significantly vary by age group. However, its occurrence was notably higher in severe hypertensive patients (46.2%) and those with comorbidities such as diabetes (58.1%) and systemic lupus erythematosus (100%). Parity did not emerge as a decisive factor. **Conclusion:** Approximately 19% of the studied participants exhibited proteinuria, emphasizing the need for vigilant management and targeted interventions for high-risk pregnancies. While age showed limited influence, the severity of hypertension strongly correlated with proteinuria. Comorbidities, especially diabetes and systemic lupus erythematosus, significantly elevated the risk. Parity, however, did not emerge as a decisive factor.

INTODUCTION

Hypertensive disorder during pregnancy has a significant threat to both maternal and fetal health condition (1). Preeclampsia is defined as systematic syndrome that is characterized by new onset hypertension and proteinuria in pregnancy (2). It especially targets live and kidneys which leads to proteinuria while it mainly targeted pregnant women worldwide, its burden shows regional variation, reflecting diverse genetic, environmental and socio economic factors(3).

Studies indicate that preeclampsia occurs round about 2-8% of pregnancies worldwide making it a leading cause of maternal and neonatal morbidity and mortality (4). It is a multifactorial condition which is affected vascular dysfunction, environmental factors, and genetic predisposition. Additionally, several risk factors like advance maternal age, first pregnancy, obesity multiple gestations and first pregnancy contribute to its onset and severity(5). A deeper exploration of these factors is essential to unravel the complexities surrounding its onset and progression.

Numerous studies investigated the role and its association of proteinuria among women having Preeclampsia with Hypertensive Disorders (6). While preeclampsia is a global concern, its prevalence exhibits notable regional variations(7). A retrospective study conducted by Tingting Lei In China indicate that

cesarean section rate was high (84.4%) in Preeclampsia patient as non-Preeclampsia patient(25.9%)(8). Moreover the studies indicate that a proteinuria which is a hallmark of Severe preeclampsia affects around about 40-60% of women (9). So, these results indicate the critical need for further research focusing specifically on the prevalence and associated factors of proteinuria among women having Preeclampsia with Hypertensive disorders.

Despite the growing body of knowledge surrounding preeclampsia, there exists a notably a scarcity of local data in Khyber Pajtumkhawa, Pakistan. Understanding the frequency and specific risk factors associated with proteinuria in women with preeclampsia in this region is crucial for several reasons. Firstly, local trends may deviate from global statistics due to unique genetic, cultural, and environmental factors. Additionally, the dearth of localized data highlights a critical research gap. This investigation seeks to bridge this lacuna in knowledge, thus offering a valuable contribution to both the academic community and healthcare practitioners working in this region. So this study was conducted to determine the frequency and its associated factors of proteinuria among women having Preeclampsia with Hypertensive Disorders in Pregnancy.

MATERIAL AND METHODS

After approval from hospitals ethical and research committee, this cross sectional (Descriptive) study was conducted on 137 patients with singleton pregnancy and after 20 weeks of period of gestation. The study was conducted from April 2024 to September, 2024 at Khyber Teaching Hospital Peshawar.

A thorough medical history was obtained from each participant. Gestational age was determined using either the date of last menstruation or a first-trimester ultrasound scan. Blood pressure measurements were taken using a standard sphygmomanometer. Preeclampsia was diagnosed based on a systolic blood pressure (SBP) of at least 140 mmHg and/or a diastolic blood pressure (DBP) of at least 90 mmHg, occurring after 20 weeks of gestation in women with previously normal blood pressure readings. Urine sample was taken in a sterile container and dipstick was placed in it for l0 minutes. Findings were recorded and patient were labeled as positive if proteinuria >+1 was detected. After the diagnosis of preeclampsia purpose of study were explained to the patients and written informed consent were taken. The included patients were further investigated through ANA and fasting blood sugar to diagnose systemic lupus erythematous and diabetic mellitus respectively.

Female with multiple pregnancy, chronic hypertension, chronic renal disease and chronic diabetes mellitus were excluded as they act as confounders in study results.

Each sample was assigned a unique identifier. To prevent delays and potential errors, all specimens were transported to the KTH Peshawar laboratory within a one-hour timeframe. A consultant pathologist conducted the tests. Random urine protein levels in spot specimens were measured using a colorimetric method with the Microlab 300 machine. All the data was recorded in specially designed performa. Data was analyzed using SPSS version 22. Normality of the data was checked through Shapiro-Wilk test. Chi square/fisher exact test was used for association of proteinuria with other explanatory variable. P value ≤ 0.05 was considered significant. All the data was presented in the form of Tables and chart.

RESULTS

A total of 137 pregnant women presenting with preeclampsia to the antenatal care unit of Khyber Teaching Hospital Peshawar, were included in the study. There were 54 (39.4%) were primipara and 83(60.6%) were multipara. The patients' average age was 31.26 years, with a standard deviation of 6.7 years and a range of 17 to 45 years. The patients were categorized into four age groups, with the majority (27%) falling within the 26-30 years age range. The distribution of

patients across the age categories was as follows: 21.9% were under 25 years, 27% were between 26-30 years, 16.8% were between 31-35 years, and 34.3% were over 35 years old (as shown in Table 1).

Table 1

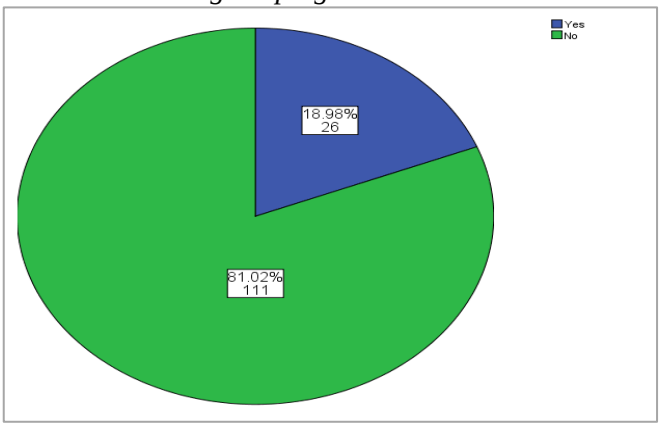
Age and parity-wise distribution of the patients

Variable	Categories	Count	Percentage
Parity	Primi	54	39.4%
	Multi	83	60.6%
Age (in years)	<= 25.00	30	21.9%
	26.00 - 30.00	37	27.0%
	31.00 - 35.00	23	16.8%
	36.00+	47	34.3%

The proteinuria was found in 26(18.98%) patients. While the rest of patients were free of proteinuria in pregnant women presenting with preeclampsia (Figure 1).

Figure 1

Proteinuria among the pregnant women



Age wise distribution of proteinuria shows that proteinuria was observed a little bit high in upper age group and decrease as the age decrease but this difference was insignificant with p-value=0.628. Mild hypertensive patients show 19.2 proteinuria, moderate hypertensive patients shows 13.9% proteinuria while severe hypertensive patients shows 46.2% proteinuria. Similarly diabetes patients shows 58.1% proteinuria while the non-diabetic patients have 7.5% proteinuria. When systemic lupus erythematous pregnant patients shows 100% proteinuria. Parity wise stratification also shows that primi para was more prone to proteinuria as that of multiparty but this difference was insignificant with p- value=0.220. It was observed that hypertension, diabetic mellitus and systemic lupus erythematosus have shown significantly high proteinuria with p-value 0.024, 0.000 and 0.000 respectively (Table 2).

Table 2

Factors associated with proteinuria in pregnant women with preeclampsia

Variable	Categories	Proteinuria				p-value
		Yes		No		
		Count	Row N %	Count	Row N %	
Hypertension	Mild	10	19.2%	42	80.8%	0.024
	Moderate	10	13.9%	62	86.1%	
	Severe	6	46.2%	7	53.8%	
Diabetes Mellitus	Yes	18	58.1%	13	41.9%	0.000
	No	8	7.5%	98	92.5%	
systemic lupus erythematosus	Yes	12	100.0%	0	.0%	0.000
	No	14	11.2%	111	88.8%	
Parity	Primi	13	24.1%	41	75.9%	0.220
	Multi	13	15.7%	70	84.3%	
Age (in years)	<= 25.00	5	16.7%	25	83.3%	0.628
	26.00 - 30.00	5	13.5%	32	86.5%	
	31.00 - 35.00	6	26.1%	17	73.9%	
	36.00+	10	21.3%	37	78.7%	

DISCUSSION

The findings of this study provide valuable insights into the frequency and factors associated with proteinuria among pregnant women presenting with preeclampsia in Khyber Pakhtunkhwa, Pakistan. Notably, proteinuria was detected in approximately 18.98% of the patients, indicating a substantial proportion of cases with this hallmark symptom of severe preeclampsia. In a comprehensive review of literature encompassing diverse global populations, studies consistently report a prevalence of proteinuria ranging from 15% to 25% in preeclamptic pregnancies (10,11). This concordance underscores the universality of proteinuria as a hallmark feature of severe preeclampsia across different geographical and ethnic contexts.

Our findings regarding age and proteinuria echo previous studies in preeclamptic cohorts both observed a similar age-related pattern, with a slight increase in proteinuria incidence in older mothers, albeit statistically insignificant (10–12). This aligns with our results, emphasizing that while maternal age may have a role, it isn't a primary factor in this population. Our localized data from Khyber Pakhtunkhwa, Pakistan, adds regional context to this relationship, underlining the need for tailored approaches based on specific demographics. Our findings regarding the association between diabetes mellitus and proteinuria are in line with previous investigations. Previous studies (13–15) also demonstrated a significant increase in proteinuria incidence among pregnant women with comorbid diabetes mellitus. Garcia reported a prevalence of 55% in diabetic patients,(16) while other studies found a similar pattern with 60% of diabetic patients exhibiting proteinuria (17,18). These results affirm the critical need for specialized management strategies for pregnant women facing the dual challenge of diabetes and preeclampsia. Our study reinforces the consensus that a tailored approach is imperative in addressing the unique complexities presented by this comorbidity. Our study's observation of 100% proteinuria incidence among pregnant patients with systemic lupus erythematosus (SLE) aligns with previous research. Studies by (19,20) similarly reported a complete prevalence of proteinuria in pregnant women with SLE. These findings collectively underscore the pronounced risk of proteinuria in this specific population, emphasizing the crucial importance of specialized care and vigilant monitoring throughout pregnancy for women with SLE.

Our study's analysis of parity aligns with previous research, which also found no significant disparity in proteinuria incidence between primiparous and multiparous women (21,22). This collective evidence suggests that, in this specific population, parity may not be a dominant factor influencing the development of proteinuria.

Our findings corroborate previous studies that have identified hypertension, diabetes mellitus, and systemic lupus erythematosus as significant predictors of proteinuria in pregnant women with preeclampsia (22–24).The consistent pattern of these associations underscores the crucial role of effectively managing these comorbidities in pregnant women with preeclampsia to mitigate the risk of proteinuria and its potential complications.

CONCLUSION

Our research identified that about 19 patients out of 100 are suffering from proteinuria, who need to be be monitored properly and some meaningful interventions are required that must be taken into account in the zone of high risk population, however, there were no evidences of association of age with severity of hypertension, which is considered the most common collative factor in proteinuria. Comorbidities, especially

diabetes and systemic lupus erythematosus, significantly elevated the risk. Parity, however, did not emerge as a decisive factor. This research work recommends many factors to be taken into attention such as, through monitoring, special attention to the patients with comorbidities and management of hypertension. The study aims to provide an outcome of the high risk zones, and also suggests special care for the patients.

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