Original Article

Clinico-Demographic Profiles and Urinary Albumin in Prediction of Preeclampsia among Pregnant Women at a Tertiary Care Hospital

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Abstract

Background: The clinical profiles and urinary albumin are very important for the prediction of preeclampsia among the pregnant women. **Objective:** The purpose of the present study was to assess the clinical and demographic profiles as well as the urinary albumin for the prediction of preeclampsia among the pregnant women. **Methodology:** This cohort study was conducted in the OPD of the Department of Obstetrics and Gynaecology at Rajshahi Medical College Hospital, Rajshahi, Bangladesh from January 2013 to December 2014 for a period of two (2) years. This study was carried on pregnant woman attending in outdoor department of Gynaecology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh before 20th weeks of pregnancy who were healthy normotensive primigravidae with singleton pregnancy. The details demographic profiles, edema were collected from the study population. Urinary albumin was estimated before 20th weeks and after 28th weeks of pregnancy. **Result:** In the present study, 75 women were included; all were before 20th weeks of pregnancy without any complication or any risk factor for developing PE. Among the study group incidence of PE was 16%. The population are 24(32.0%) low, 31(41.3%) middle and 20(26.7%) high in socio economic conditions. Education level of study population was 45% completed primary education level, illiterate (27%) and secondary education (28%). Edema was absent in 1st visit, in 2nd visit 6(+), 6(++) present who developed PE, 18(+) present who did not develop PE. Edema was absent in 1st visit and (+) 6(50.0%) and (++) in 6(50.0%) present who developed PE in 2nd visit. Urine albumin in 1st visit nil in 6(50.0%), trace in 3(25.0%) and (+) in 3(25.0%) who developed PE. **Conclusion:** In conclusion housewife living in urban area in middle income socioeconomic condition are the most commonly presented with preeclampsia and urinary albumin is the most commonly detected in the pregnant women presented with preeclampsia. *[Journal of Science Foundation 2018;16(2):54-59]*

Keywords: clinical and demographic profiles; urinary albumin; predicting; preeclampsia; pregnant women

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Introduction

Preeclampsia (PE) affects from 2 to 8% pregnancies worldwide (Salako et al., 2003). It is major cause of maternal and perinatal morbidity and 40% of induced preterm births are due to PE. Rodriguez et al (1988) have shown that standardized surveillance testing for end organ dysfunction in women with PE helps to reduce maternal complication.

If the PE is detected early, with prompt and effective treatment, the PE features subside completely and the prognosis is not unfavorable, both for the mother and the baby. However, if the cases are left uncared for or with cases of acute onset, serious complications are likely to occur. In such conditions, both the mother and the baby are in danger. Increased maternal deaths are mainly related to eclampsia, accidental haemorrhage, acute renal failure, pulmonary oedema, disseminated intravascular coagulopathy and HELLP syndrome. Though mortality has been reduced significantly in the advanced countries, it still remains high in the developing country. Although the maternal mortality has been reduced significantly, the perinatal mortality still remains very high even in the developed countries (7-10%); however, in the developing countries, the perinatal mortality remains to the extent of about 20%, about 50% of which being stillborn (Salako et al., 2003).

PE is not a totally preventable disease. However, some specific high risk factors leading to PE may be identified in an individual. An absolute rise of blood pressure of at least 140/90mm Hg, if the previous blood pressure is not known or a rise in systolic pressure of at least 30 mm Hg, or a rise in diastolic pressure of at least 15 mm Hg over the previously known blood pressure is called pregnancy induced hypertension. Demonstration of pitting oedema over the ankles after 12 hours bed rest of rapid gain in weight of more than 1 lb a week or more than 5 lb a month in the later months of pregnancy may be the earliest evidence of PE. However, some amount of oedema is common (physiological) in a normal pregnancy. Presence of total protein in 24 hours urine of more than 0.3 gm or$\geq$2+(1.0gm/L) on at least two random clean-catch urine samples tested $\geq$4 hours apart in the absence of urinary tract infection is considered significant. Therefore this present study was undertaken to assess the clinical and demographic profiles as well as the urinary albumin for the prediction of preeclampsia among the pregnant women.

Methodology

This was a descriptive cohort study which was conducted in the OPD of the Department of Obstetrics and Gynaecology at Rajshahi Medical College Hospital, Rajshahi, Bangladesh. This study was carried out from January 2013 to December 2014 for a period of two (2) years. This study was carried on pregnant woman attending in outdoor department of Gynaecology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh before 20 weeks of pregnancy who were healthy normotensive primigravidae with singleton pregnancy. At first 100 pregnant mothers were enrolled for the study. On the basis of inclusion and exclusion criteria 75 pregnant women finally included in this study. Pregnant women who fulfill the following criteria (inclusion and exclusion) was constituted as the study population for the research. Women with multiple pregnancies, chronic hypertension, diabetes mellitus, and chronic renal disease were excluded from this study. Healthy normotensive primigravidae with singleton pregnancy were enrolled in this study before 20th weeks and were followed up after 28th weeks of pregnancy. The details data of their age, proteinuria in the level of nil, trace, +, ++ and +++ before 20th weeks and after 28th weeks of pregnancy were collected for this study. All the collection data were recorded in pre designed data sheet. History of the patient was taken; clinical examination were performed and information was recorded in a pre-designed data sheet. This had been done to know their age, socio-economic status, occupation, education background, level of nutrition, attitude towards health care.

Data were checked for validity were coded and entered into computer for analysis by using SPSS software programme. Result so obtained were evaluated and analyses statistically. Statistical significance were done at appropriate level (p<0.05 or p<0.01) by applying relevant statistical tests. All the women enrolled in the study were explained about the nature and purpose of the study and only those who gave consent were included in this study. Also clearance from the Ethical Review Committee of Rajshahi Medical College, Rajshahi was taken to carry this study.

Result

In the present study, 75 women were included; all were before 20th wks of pregnancy without any complication or any risk factor for developing PE. Among them PE developed in 12 patients, the rest 63 patients not developed preeclampsia, remain normotensive. Among the study group incidence of PE was 16%.

Table 1: Demographic Characteristics of Study Population

Socio-demographic Variables	Frequency	Percentage
Occupation Housewife	32	42.7
Day labour	20	26.7
Service holder	23	30.7
Residence Urban	48	64.0
Rural	27	36.0
Socio economic condition <10000 taka (Low)	24	32.0
10000-20000 taka (Middle)	31	41.3
>20000 taka (High)	20	26.7
Total	**75**	**100.0**

Table 1 showed the demographic characteristics. Housewife 32(42.7%), day labour 20(26.7%), service holder 23(30.7%) in residence 48(64%) resided in urban area and 27(36.0%) resided in rural area. The population are 24(32.0%) low, 31(41.3%) middle and 20(26.7%) high in socio economic conditions.
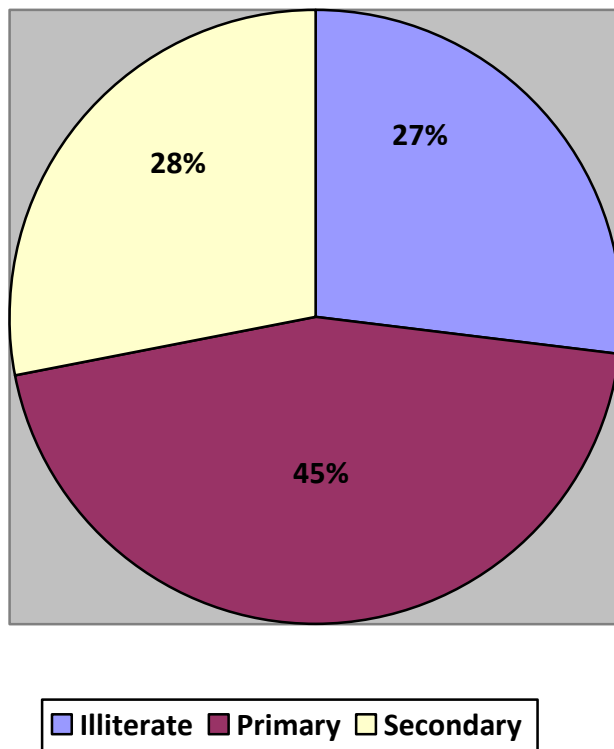

Figure I: Education level of study population

Figure I showed education level of study population that 45% completed primary education level, illiterate (27%) and secondary education (28%).

Table 2: Edema and Urinary Albumin in 1ˢᵗ and 2ⁿᵈ visit (n=75)

Variables	1ˢᵗ visit (before 20 weeks)		2ⁿᵈ visit (after 28 weeks)	
	PE(n=12)	Not PE(n=63)	PE(n=12)	Not PE(n=63)
Edema	12(Nil)	63(Nil)	6(+) 6(++)	45(Nil) 18(+)
Urine albumin	6(Nil 3(Trace) 3(+)	51(Nil) 12(Trace)	6(++) 6(+++)	21(Nil) 27(Trace) 15(+)

Table 2 showed edema absent in 1ˢᵗ visit, in 2ⁿᵈ visit 6(+), 6(++) present who developed PE, 18(+) present who did not develop PE. Urine albumin in 1ˢᵗ visit 6(nil), 3(trace), 3(+) who developed PE, 51(nil), 12(trace) who did not develop PE. In 2ⁿᵈ visit 6(++), 6(+++) present who developed PE and 21(nil), 27(trace), 15(+) present who did not develop PE.

Table 3: Edema and Urinary Albumin in 1ˢᵗ and 2ⁿᵈ visit

Variables	Findings	Preeclampsia		Total	P-value
		Present	Absent		
Edema					
1st visit	Absent	12 (100)	63(100)	75(100)	0.954
2ⁿᵈ visit	Absent	0(00%)	45(71.4)	45(60.0)	
	Present (+)	6(50.0)	18(28.6)	24(32.0)	0.596
	Present (++)	6(50.0)	0(00%)	6(8.0)	
Urine albumin					
1st visit	Nil	6(50.0)	51(81.0)	57(76.0)	
	Trace	3(25.0)	12(19.0)	15(20.0)	0.765
	(+)	3(25.0)	0(00)	3(4.0)	
2ⁿᵈ visit	Nil	0(00)	21(33.3)	21(28.0)	
	Trace	0(00)	27(42.9)	27(36.0)	
	(+)	0(00)	15(23.8)	15(20.0)	0.753
	(++)	6(50.0)	0(00%)	6(8.0)	
	(+++)	6(50.0)	0(00)	6(8.0)	

Figures in the parentheses denote corresponding percentage.

Table 3 showed edema absent in 1ˢᵗ visit and (+) 6(50.0%) and (++) in 6(50.0%) present who developed PE in 2ⁿᵈ visit. Urine albumin in 1ˢᵗ visit nil in 6(50.0%), trace in 3(25.0%) and (+) in 3(25.0%) who developed PE. In 2ⁿᵈ visit (++) in 6(50.0%) and (+++) in 6(50.0%) who developed. Data were analyzed using Chi-square (χ^2) test which is not significant (P-value >0.05).

Discussion

The pathophysiological event resulting in preeclampsia begins early in pregnancy and precedes the onset of clinical features (Torrado et al., 2015). Most important pathophysiological hallmark is endothelial cell damage (Ohkuchi et al., 2016). Microalbuminuria is a marker of endothelial dysfunction and can be used as

an early marker of endothelial dysfunction of preeclampsia, before the onset of overt syndrome as it is likely that overt proteinuria is preceded by a microalbuminuric phase. Although 24-h collection of urine is the gold standard for quantifying urine albumin excretion, it is cumbersome and results in delay of at least 24 h in diagnosis (Fagerstrom et al., 2015). Therefore, the spot urinary albumin-to-creatinine ratio has been advocated as an alternative.

This study was designed to prospectively evaluate the possibility of early prediction of the subsequent development of PE using estimation of levels of some known biochemical substances affected by the disease in serum samples of healthy primigravidae with singleton pregnancy. The selection of primigravidae with singleton pregnancy was based on the knowledge that these groups of women are more prone to developing the disease when all other risk factors are excluded. Those with conditions such as multiple gestation, chronic hypertension, diabetes mellitus and renal disease were carefully excluded from the study.

The concomitant study of several tests was to compare their respective performances alone and in combination. The mean SBP, DBP and MAP value were all significantly higher in the PE group. This was expected in view of the criteria used for the diagnosis of the disease. The mean arterial pressure (MAP) has been shown to be predictive of PE, although some other studies indicated otherwise (Redman et al., 1976). Housewife 32(42.7%), day labour 20(26.7%), service holder 23(30.7%) in residence 48(64%) resided in urban area and 27(36.0%) resided in rural area. The population are 24(32.0%) low, 31(41.3%) middle and 20(26.7%) high in socio economic conditions. Education level of study population was 45% completed primary education level, illiterate (27%) and secondary education (28%).

Edema was absent in 1st visit, in 2nd visit 6(+), 6(++) present who developed PE, 18(+) present who did not develop PE. Urine albumin in 1st visit 6(nil), 3(trace), 3(+) who developed PE, 51(nil), 12(trace) who did not develop PE. In 2nd visit 6(++), 6(+++) present who developed PE and 21(nil), 27(trace), 15(+) present who did not develop PE. Similar to this present study urinary albumin is an important marker for the prediction of preeclampsia. Shaarawy and Salem (2001) have reported that the sensitivity of predicting PE by measuring microalbumin in early pregnancy is varied between 50% to 68%; the specificity is varied between 58 to 97%, PPV is varied between 26 to 61% and the NPV is varied between 87-94%. One of the reasons of this variability is the lack of strict criteria regarding the selection of the PE subjects and in most of the cases the PE and Gestational Hypertension (the nonproteinuric type of Pregnancy Induced Hypertension) were mixed up in different proportions. Out of 119 pregnant subjects 10 developed PE in later stages; thus, the prevalence is about 8.4% which is little lower than the usual values in the developing world, but seems to be reasonable is an urban setting. The present study data shows that the group of pregnant subjects who developed PE in later stages had significantly higher values of ACR as compared to cases who did not develop PE.

Fatema et al (2011) have reported that the sensitivity of microalbumin as a predictor of PE is found to be 80% which lies above the values reported by various authors. The specificity however, is slightly lower and the NPV is 96.42%. The substantial discrepancy between the earlier works and the present study regarding PPV may be explained by the fact that, in almost all the earlier studies, the gestational age of the subjects is higher and that increased the possibility of including already developed PE at a mild stage. Increasing the number of subjects may also increase PPV.

Other factors that might have been relevant but were not assessed included women's level of activity before the urine was collected. Although 24-h collection of urine is the gold standard for quantifying urinary albumin, a spot urinary albumin-to-creatinine ratio was used in this study because it was more likely to reflect clinical practice for a screening test, and because an attempted 24-h collection would very likely had been futile and erroneous (Demirci et al., 2015). Some of the past studies have shown excellent correlation between spot urinary albumin-to-creatinine ratio and albumin excretion in 24-h urine sample in normal pregnancy and preeclampsia (Morris et al., 2012).

Many previous studies has measured microalbuminuria in an attempt to predict preeclampsia in early pregnancy, postulating that the state of gross proteinuria is preceded by the stage of microalbuminuria. In one study, it was found that the logarithmic conversion of urinary albumin-to-creatinine ratio at 11 to 13 weeks of gestation helped to predict preeclampsia. Singh et al (2015) identified the presence of

microalbuminuria at 28–30 weeks of gestation to be predictive of subsequent preeclampsia with an odds ratio of 2.1 (95% CI 1.26–3.53). Another study showed that microalbuminuria at 10–12 weeks of gestation had 50% of sensitivity, 58% specificity, 50% PPV and 91% NPV for the later development of preeclampsia (Gupta et al., 2017).

The limitations in the conduct of this study was recruitment of patients into the study using the strict exclusion criteria affected the number eligible for the study because our patients in our country rarely book early in pregnancy unless they develop complications.

Conclusion

In conclusion housewife living in urban area in middle income socioeconomic condition are the most commonly presented with preeclampsia. Urinary albumin is the most commonly detected in the pregnant women presented with preeclampsia. Urinary albumin should be detected during pregnancy for the prediction of preeclampsia.

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