Original Article

Determination of Risk Factors for Pre-eclampsia in a Tertiary Hospital of Bangladesh: A Descriptive Study

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Abstract:

Background: Pre-eclampsia (PE), a hypertensive disorder of pregnancy is estimated to complicate 2%-8% of pregnancies and remains a principal cause of maternal and fetal morbidity and mortality. The identification of its predisposing factors in the pre-pregnancy and initial stage of pregnancy will help in reducing the morbidity and mortality.

Aim: The aim of this study is to determine the risk factors for PE among pregnant women in a tertiary level hospital.

Methods: This study was conducted in the Department of Obstetrics and Gynaecology of Shaheed Suhrawardy Medical College & Hospital, a tertiary care hospital in Dhaka, Bangladesh, from January to December 2019. A total number of 50 pregnant women with pre-eclampsia, who got admitted in this hospital were selected as study group. This was a hospital based descriptive study.

Results: Most of the participants were within 35-45 years of age group and mean age 38.92 ± 2.21. The factors that were found to be significant predictors of risk for development of PE were primigravida, inadequate education, low socio-economic status, past history of PE or hypertension and family history of PE or hypertension.

Introduction

Hypertension (HTN) is considered as an important public health problem in both developed and developing countries.[1] Hypertensive Disorder of Pregnancy (HDP) is one of the principal reasons of maternal mortality and morbidity amongst pregnant women in the world.[2] It affects 10% of pregnancies and are specified by the International Society for the Study of Hypertension in Pregnancy (ISSHP) as new onset hypertension (≥140 mmHg systolic or ≥90 mmHg diastolic) after 20 weeks gestation[3]. This all-encompassing definition includes chronic hypertension, gestational hypertension and pre-eclampsia (de novo or superimposed on chronic hypertension).[3,4] Internationally, pre-eclampsia is defined as new onset of gestational hypertension (systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg) associated with new onset of at least one of following conditions - proteinuria, maternal organ dysfunction (liver, neurological, hematological, or renal involvement), or utero-placental dysfunction at or after 20 weeks gestation.[3,4] As per the assessment of WHO, incidence of pre-eclampsia is approximately seven times higher in developing countries (2.4% of live birth) than in developed countries (0.4%).[2] Pre-eclampsia complicates 2%-8% of pregnancies and happens predominantly during the second half of pregnancy. Study reveals overall rates of pre-eclampsia remain static; however rates of severe pre-eclampsia appear to have increased over recent decades[5]. Globally, pre-eclampsia is a complex medical disorder. Each year, it leads

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to >500,000 fetal and neonatal deaths and >70,000 maternal deaths. Pre-eclampsia can worsen quickly and without any cautionary indication.[4] It develops quite speedily and if not detected well in time can lead to severe eclampsia, which is one of the top five direct causes of maternal and perinatal morbidity and mortality globally.[6] It has significant impact on maternal and fetal health in the immediate and long term.[2,4,5,6] In case of mother, there is two-to-four-fold increased risk of long-term hypertension, a doubling of the risk of cardiovascular mortality and major adverse cardiovascular consequences as well as a 1.5 fold increased risk of stroke. In respect of the fetus, there is antenatal risks of abortion, prematurity, intra-uterine growth restriction (IUGR), preterm birth (most commonly iatrogenic), oligohydramnios, placental abruption, fetal distress, and fetal death in utero.[3,7]

The etiology of pre-eclampsia is not always comprehended well and immunological factors apparently underlie the placental disease, whereas genetic arrangements decide maternal susceptibility[8]. Abnormal placentation related to immune mechanisms and maladaptation of the placenta may be the first step in the etiology and development of PE.[6,7] Abnormally implanted placenta is believed to result in poor uterine and placental perfusion. This culminates in a state of hypoxia and increased oxidative stress and also the release of anti-angiogenic proteins into the maternal plasma along with inflammatory mediators.[5,6] It is evident that there is no such mechanism existing that by itself is singularly responsible for the syndrome of pre-eclampsia. It is believed to be of multi-factorial origin[7,8,9]. Early identification of pre-eclampsia (and if possible, prevention) is a fundamental principle of adequate management.[6]

Given the high importance of this disorder, a large number of studies have been conducted to assess risk factors of nulliparity, high maternal age, race, genetic factors, obesity, chronic hypertension and multi-fetal pregnancy - all of which are found to be contributory[8]. Understanding the most important risk factors in the population would be helpful and practically handy for the clinicians in order to detect the patient early and well in time, who is likely to develop pre-eclampsia[2,7]. Hence, appropriate antenatal management will certainly remain as the important part of prevention. Focusing on each woman's risk factor through constant antenatal monitoring on individual will assist identify women, who are most likely to develop pre-eclampsia. Such management will ensure early diagnosis followed by quick intervention, both in terms of feto-maternal monitoring and timing of delivery. Hence, it is considered necessary to develop an integrated model to assess patient-specific risk factors for the development of

pre-eclampsia on the basis of maternal demographic, socio-economic, obstetrics, nutritional and anthropometric parameters.[9] Therefore, we carried out this study to ascertain the risk factors of PE by collecting the data using questionnaire schedule from admitted cases of PE patients, who had given their consent.

Materials and Methods

The study was conducted in department of Obstetrics and Gynaecology, Shaheed Suhrawardy Medical College & Hospital, a tertiary care hospital in Dhaka, Bangladesh from January to December 2019, for a period of 12 months. It was a hospital based descriptive study. A total number of 50 pregnant women with PE who got admitted in this hospital and gave consent, were included in this study. Data was gathered using a pre-tested questionnaire. The questionnaire included demographic and socio-economic information. The history of gravidity, parity, abortion, bad obstetrics history, past history of eclampsia, diabetes mellitus and hypertension were elicited. After taking history thoroughly, relevant clinical examination and some baseline investigations were done. Height was measured and pre-pregnancy weight was noted. For renal function urine for protein, blood for urea, creatinine and uric acid estimation were done. This study was approved by institutional Review board and informed consents were taken from all the participants. The data was processed and analyzed with the help of computer program SPSS for windows latest version.

Results

Table I

Demographic Distribution of PE Patients (n = 50)

Description	Number	Percentage
Age (years)		
<20	08	16%
>20–25	05	10%
>25–30	03	06%
>30–35	08	16%
>35–40	22	44%
>40	04	08%
BMI		
>25	29	58%
18–25	20	40%
<18	1	2%

In this study, most of the patients belonged to >35 years of age group (52%) and 16% of patients were under the age of 20 years. Women with higher body index (BMI> 25) were in risk of developing PE.

Table II

Socio-economic Risk Factors (n = 50)

Description	Number	Percentage
Education		
Illiterate	3	6%
Primary Level (Class V)	21	42%
Up to SSC	12	24%
Up to HSC	8	16%
Graduation & above	6	12%
Occupation		
Housewife	21	42%
Service Holder	16	32%
Business	13	26%
Monthly Income		
< 10,000 Tk.	16	32%
10,000 - 20,000 Tk.	23	46%
21,000 – 30,000 Tk.	9	18%
> 30,000 Tk.	2	4%

In this study, 32% women were from poor socio-economic status and majority of patients (46%) were from lower middle class family. Most of the patients (42%) had up to primary level of education and occupation was not significantly associated with development of PE.
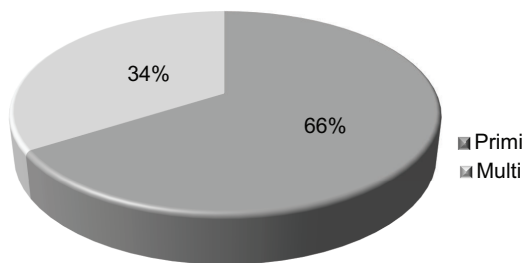

Fig.-1: *Risk of Gravida with PE (n=50)*

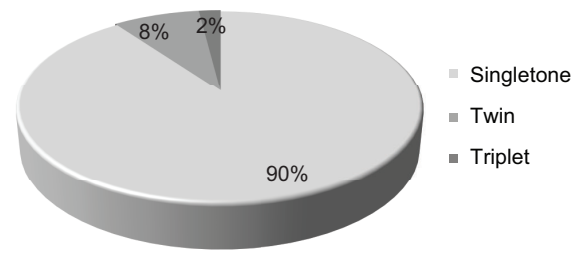Fig-1 shows Primigravida constituted (66%) of total PE cases.

Fig-1 : *Shows Primigravida constituted (66%) of total PE cases.*

Fig-2: No of Fetus among PE Patients (n = 50)

Table III

Association of Interval of Pregnancy with PE (n = 17)

Description	Number	Percentage
< 1 year	01	5.88%
1 – 2 years	02	11.76%
> 2-3 years	03	17.65%
>3-4 years	04	23.53%
>4-5 years	04	23.53%
>5 years	03	17.65%

PE patients in majority had pregnancy at >03 years interval.

Table IV

Medical Disorder and Past History for Risk Factors of PE (n = 50)

Description	Number	Percentage
History of Hypertension		
Yes	18	36%
No	32	64%
History of Diabetes Mellitus		
Yes	13	26%
No	37	74%
History of Renal Disorder		
Yes	1	2%
No	49	96%
History of Hypothyroidism		
Yes	6	12%
No	44	88%

This table showed that maternal medical disorder had some risk in development of PE; such as hypertension (36%), diabetes mellitus (26%) and hypothyroidism (12%).

Table V

Past History and Family History of Pre-eclampsia for Risk Factors of PE

Description	Number	Percentage
History of PE/HTN in Previous Pregnancy (n=17)		
Yes	10	58.82%
No	07	41.18%
Family History of PE (n=50)		
Yes	33	66%
No	17	34%

Majority of patients had positive family history of PE (66%) and had history of PE/HTN in previous pregnancy (58.82%).

Discussion

Pre-eclampsia is known to be associated with maternal and fetal complications, which is basically a syndrome unique to human pregnancy. The risks factors that are known to be affecting the commencement of pre-eclampsia encompasses primigravida, increased BMI, extremes of maternal age, socio-economic factors, increased birth interval, and the presence of gestational diabetes, having history of pre-eclampsia, hypertension in previous pregnancy, family history of pre-eclampsia or hypertension are the major risk factors for the pre-eclampsia/ eclampsia during pregnancy.

Various factors have been assessed as likely risks for pre-eclampsia through different studies.

In the present study, most of the patients were belonging to the segment of more than 35 years of age (52%) and 16% patients were below 20 years of age. In the study of Luealon P, Phupong V and study of Fred A, Kenny C, Fergus P, there were relationship of enhanced risk of pre-eclampsia with maternal age ≥ 35 years.[5,10] The increased BMI in the pre-pregnancy period is identified as a risk factor for PE in many studies. Our study also agreed to the same, 58% patients had BMI >25. [2,5,7,9,10]

In this study the patients were belonging to families mostly from the lower and middle social strata and there was difference in prevalence of hypertension in different education classes also. Most of them had upto primary level of education, which were also observed in many studies[2,6,8,9]. Education plays a key-role in awareness building about the disease and the precautionary measures to be undertaken by the healthy individual. Majority of the patients were housewives (42%). Here occupation was not significantly related with development of PE.[2,6,9] Working women are more susceptible to develop PE as they are more stressed.

Primigravida constituted majority (66%) of total PE cases in this study, which was also observed in many studies.[2,5,6,9] It was also observed in this study that among PE patients 90% of patients were carrying singleton pregnancy, 8% and 2% were having twin and triplet pregnancy respectively. Similar results were also obtained in the study conducted by G Teklit et al.[6]

PE patients in majority had pregnancy at >03 years interval. In some other studies also similar outcomes were observed.[5,7]

The study further indicated that maternal medical disorders had some risk in development of PE; such as hypertension (36%), diabetes mellitus (26%) and hypothyroidism (12%). In one study by Punyatoya B, Chhabra P, Sharma A K, Guleria K, 11.5% and 3.3% cases had a past history of hypertension and diabetes mellitus respectively, which was greater than controls (1.6% and 0% respectively). Ros et al quoted that in diabetic women, high levels of plasma triglycerides leads to accumulation of triglycerides by endothelial cells leading to dysfunction of the endothelial cells that predisposes to develop high blood pressure.[9]

Similar to other studies, majority of patients had positive family history of PE (66%) [2,6,7,9] and had history of PE/HTN in previous pregnancy (54.54%) in this study.[6,7,9]

Limitations

The limitations of this study are appended as under:

- Since, it was a hospital based study, it is recommended not to be considered as generalized for the whole population.

- The total duration of the study and the number of patients taken as sample were apparently not adequate for reaching at an appropriate conclusion. Hence, it is considered imperative to conduct further studies on large number of patients spreading over adequate period of time, so as to arrive at conclusive results.

Conclusion

Pre-eclampsia is a multi-factorial disease. The results of this study suggest that there are various risk factors for pre-eclampsia. Identification of these risk factors will essentially increase the ability to diagnose and observe women likely to develop pre-eclampsia before the onset

of disease for timely intervention and better maternal and fetal outcomes. Nevertheless, advances in screening, detection and diagnosis as well as the antenatal, perinatal, and postnatal management of pre-eclampsia are needed for the mother and their offspring. Encouraging pregnant women in developing awareness for seeking to maintain good physical condition and healthy lifestyle would provide a chance to diagnose pre-eclampsia at an early stage. Awareness of pre-eclampsia risk factors can help to keep track of patients, make earlier diagnoses and predict which patients are more likely to develop pre-eclampsia.

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