Maternal and Neonatal outcome in Pre-eclamptic patients and the Development of Fact Sheet

Elwelely M.,Z., Heba M.,F.,

Lecturer of Maternity and Gynecological Nursing, Faculty of Nursing, Tanta University
Assistant prof. of Maternity Obstetrics and Gynecological Nursing, Faculty of Nursing, Port-Said University

Abstract: Pre-eclampsia (PE) is a major complication of pregnancy. It is pregnancy-specific condition, represents a major cause of morbidity and mortality in mother, fetus and infant in many parts of the world. The aim of the present study was, to find out the risk factors associated with preeclampsia and evaluate the maternal and neonatal outcomes of pregnancy and develop a fact sheet for patients. The study was conducted in the labor ward of Obstetrics Department at Tanta University Hospitaland and El-menshawy Hospital from October 2016 to April 2017. A total of 200 parturient women (100 with pre-eclampsia and 100 control without the disease), using the statistical equation, the sample was recruited for this study according to the inclusion and exclusion criteria. *The tools used for data collection consisted of;* A Structured interviewing questionnaire, maternal assessment sheet "on admission to labor room" Partograph, summary of labor sheet and neonatal assessment record. A pilot study was conducted on 20 parturient women to assess the applicability of the data collection tools and the feasibility of the study. The *results* revealed that women with preeclampsia were significantly younger and older than normotensive women, had low mean parity, and history of PE. The majority of the preeclamptic group had severe preeclampsia (p=0.001[**]). More poor pregnancy outcome was noticed among women with preeclampsia compared to those in the control group. *Recommendation;* increasing women awareness, early diagnosis of preeclampsia, early referral, adopting recent modalities of diagnoses and management in appropriate setting and with adequate resources may lead to better pregnancy outcome

Keywords: preeclampsia, pregnancy outcome and fact sheet

INTRODUCTION

Preeclampsia is a pregnancy-specific condition, which usually occurs after 20 weeks of gestation and resolves with delivery, it may be mild or severe. It is determined clinically by identification of pregnancy induced hypertension, proteinuria or generalized edema or both. Edema is no longer included because of the lack of specificity *(Cunningham et al., 2010)).*

The incidence of preeclampsia varies greatly worldwide; it ranges between 2.0% and 10.0% of pregnancies. According to WHO estimates the incidence of preeclampsia was seven times higher in developing countries compared to those in developing countries (2.8% vs. 0.4% respectively). In Egypt, the prevalence of PE is 10.7% in a community based study *(Gadalla et al., 1986).* While, in hospital based studies it ranged from 9.1% *(Mahaba et al., 2001b)* to 12.5% *(El-Houseinie et al., 1994)* of all deliveries.

Several risk factors predispose women to preeclampsia including nulliparity, extremes of age, obesity, a pregnancy interval of more than 10 years, previous history of preeclampsia or gestational hypertension, preexisting renal disease, multiple pregnancies. Genetic factors are at least partially responsible whether a maternal or a paternal family history of preeclampsia will increase the risk of developing it *(Barton and Sibai, 2008)).*

Severe hypertension, a feature of severe pre-eclampsia and preexisting hypertension and advanced maternal age *(Barton et al., 2011)* are associated with adverse neonatal outcomes because these mothers are prone to abruptio placenta, cerebro-vascular and cardiovascular complications, disseminated intravascular coagulation, acute renal failure and maternal death, IUGR, preterm delivery and neonatal deaths*(Haddad &Sibai, 2009).*

The nurse midwife plays a significant role in providing care for high risk pregnant women. She should recognize that the mainstay of treatment for pre-eclampsia remains ending the pregnancy by delivering the fetus (and the placenta). This can be a significant problem for the baby if pre-eclampsia occurs at 24-28 week of gestation. Thus, many strategies have been proposed to delay the need for delivery. The nurse midwife could assist with early recognition of the symptomless syndrome. She should also be aware of the serious nature of the condition in its severest form, adhere to agreed guidelines for admission to hospital, and have a great knowledge of investigations and the use of antihypertensive and anticonvulsant therapy. In addition, she can provide postnatal follow up and counseling for future pregnancies *(Yoder et al., 2009).*

Significance of the Problem:

In Egypt, the prevalence of preeclampsia is 10.7% in a community based study of *(Shourbagy et al., 2011).* It ranks the second cause of maternal death (after hemorrhage). Health promotion is of particular importance to midwives who promote health rather than manage a diseased ill health. There is now an explicit need for the midwife to direct her attention to identify risk factors, maternal and fetal complications associated with preeclampsia and develop a fact sheet for patient teaching about preeclampsia. Until now no studies

were carried out in Tanat to examine maternal, fetal complications and outcome associated with preeclampsia.

AIM OF THE STUDY

The Aims of the Study were to:

1. Identify the risk factors associated with preeclampsia.
2. Evaluate maternal and neonatal outcomes of pre-eclamptic women
3. Develop a fact sheet for patient teaching about pre-eclampsia

Subjects and Methods:

Study Design: A case-control study design was used to investigate the current research problem.

Study Setting: This study was conducted in Obstetrics department of Tanta University hospital and Elmenshawy hospital

Study Sample: According to sample size equation the sample of the study group was 100 cases, so, all the patients admitted to labor department of the above mentioned setting were included in the study till sample reached the required number (100). For each pre-eclamptic patient a healthy parturient woman was chosen randomly till the sample of the control group reached the required number (100). Patients were recruited for this study according to the following criteria:

1- Having a definite specific diagnosis of PE
2- Gestational age ≥33 weeks

The exclusion criteria for the studied sample:

Essential hypertension, pregnancy induced hypertension without proteinuria, blood, kidney and liver diseases, APH and IUFD

The controls enrolled in the study have fulfilled the same inclusion criteria: Have no history of PE in the current or previous pregnancy, and 3) Gestational age ≤33 weeks

Data collection was done through the use:

1. A Structured interviewing questionnaire; which include data about: socio-demographic data, obstetrical history and current pregnancy history
2. Clinical examinations was done by the on duty physician and assisted by the researcher. Both general and local physical examinations, Pelvic & abdominal ultra-sonography examination were done for both groups to estimate gestational age, to determine multiple fetuses, polyhydramnios and to detect fetal IUGR. Investigations and CTG were also done for both groups. The partograph was also used to record woman condition during labor and summary of labor sheet whether it is CS or NVD was used to record woman and neonatal condition after labor.

Official permission was obtained by submission of an official letter from the Faculty of Nursing to the responsible authorities of the study setting to obtain the permission for data collection. Concerning the ethical consideration, the aim of the study was explained to every woman before participation, which was totally voluntary and an oral consent was obtained. The patients and controls were submitted to the interview and the diagnosis and classification of preeclampsia was done by the on duty physician according to the criteria given by *Cunningham et al., (2010).*

Statistical analysis: After collection of the data, it was revised, coded and fed to statistical software SPSS version 16. The statistical analysis used considered all tests to be two tailed with alpha error = 0.05. Microsoft office Excel software was used to construct the needed graphs. After data coding the following data manipulations were done. After data manipulation was done all numeric data were expressed in the form of range (minimum to maximum), mean and standard deviation (SD). Categorical data were expressed in the form of frequencies and percentages.

RESULTS

Table 1 Distribution of the studied women according to their characteristics

Characteristics	Control (n=100)		study (n=100)		X^2	P
	No	%	No	%		
Age						
▪ < 25 years	27	27.0	41	41.0	14.3	0.001**
▪ 25-	64	64.0	38	38.0		
▪ 35+	9	9.0	21	21.0		
Mean ± SD	26.8 ± 5.3		26.7 ± 5.3			0.862
Job status						
▪ Housewife	68	68.0	92	92.0	18.0	0.000**
▪ Working	32	32.0	8	8.0		
Education						
▪ Illiterate, read and write	21	21.0	28	28.0	25.11^	0.000**
▪ Primary	0	0.0	4	4.0		
▪ Preparatory	2	2.0	0	0.0		
▪ Secondary	48	48.0	62	62.0		
▪ University	29	29.0	6	6.0		

Parity						
▪ Para 0	52	52.0	39	39.0	3.41	
▪ Para 1	6	6.0	26	26.0	14.81	0.000**^
▪ 2-3	27	27.0	24	24.0	0.24	
▪ 4+	15	15.0	11	11.0	0.40	
Mean ± SD	2.7 ± 0.96		2.1 ±1.1		t=2.59	0.011*
Abortion ^{n}						
▪ Negative	33	68.8	23	37.7	10.4	0.001*
▪ Positive	15	31.3	38	62.3		
History of preeclampsia						
▪ No	46	95.8	41	67.2	35.6	0.000*
▪ yes	2	4.2	20	32.8		

Hospitalization during pregnancy					26.5	0.000**
▪ Yes	2	2.0	28	28.0		
▪ No	98	98.0	72	72.0		

^ Mont Carlo Exact test
** P < 0.01 (significant)

Table 1 shows that women with pre-eclampsia were significantly (P=0.001**) more likely to be younger than 25 years (41.0% vs. 27.0%) and older than 35 years of age (21.0% vs. 9.0%) compared to the normotensive group with a mean of 26.8 ± 5.3 vs.26.7 ± 5.3 respectively. Meanwhile, they were more apt to be housewives, having low education and primipara, with also statistical significant differences (P=0.000**).

The same table also shows that women in the study group had more positive history of preeclampsia, history of abortion and hospitalization during the current pregnancy (32.8%, 62.3% & 28.0% vs. 4.2%, 31.3% & 2.0 respectively). Differences observed are statistically significant (P=0.000**).
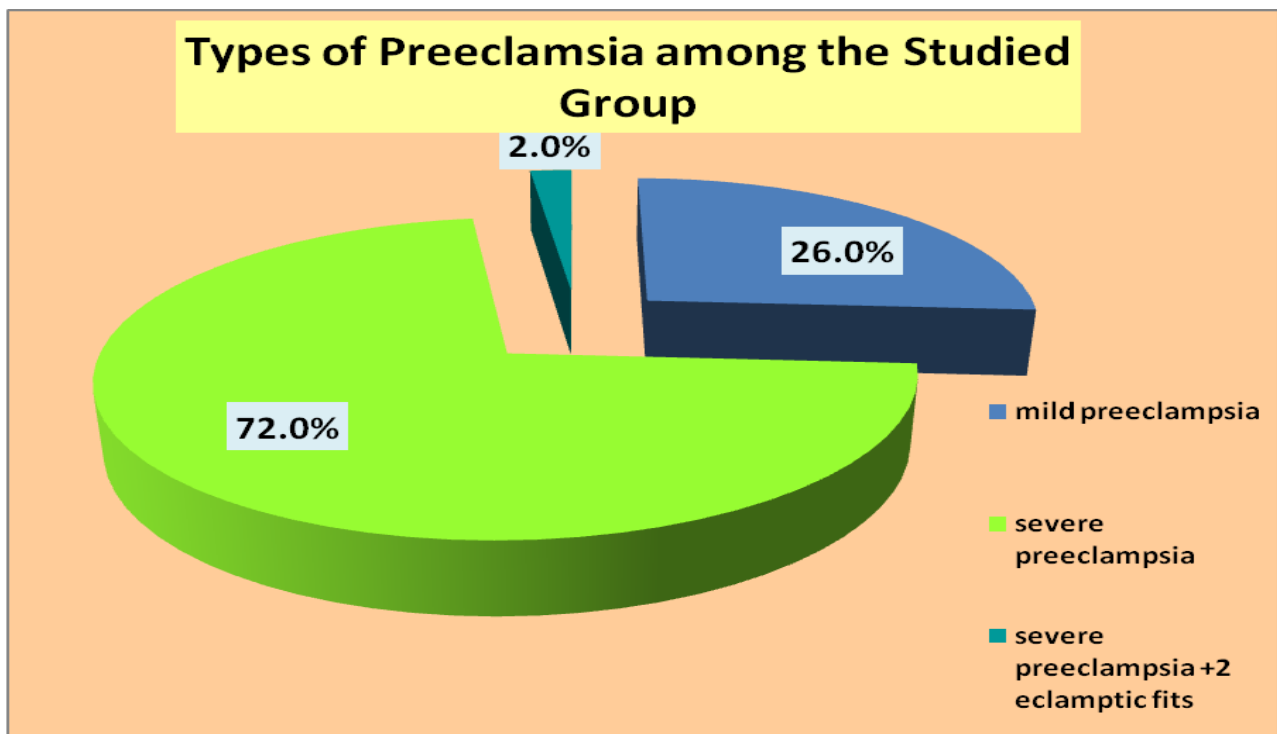

Figure 1: Prevalence of mild , severe preeclampsia and severe preeclampsia eclamptic fits among the Studied group (n=100)

Figure 1 shows that out of the total patients diagnosed with preeclampsia (100) and admitted to the labor unit of Tanta University Hospital during the study period. Patients with mild preeclampsia found were 26 (26.0%) and those exposed to severe preeclampsia were 72 (72.0%) and patients with severe preeclampsia eclamptic fits 2 (2.0%).

Table 2 Distribution of the studied women according to their general condition on admission to labor room

	Control (n=100)		Mild PET (n=26)		Severe PET (n=74)		TOS	P
	No.	%	N0.	%	No.	%		
Proteinuria							18.1^	0.000*
▪ 1+	0	0.0	6	23.1	0	0.0		
▪ 2+	0	0.0	20	76.9				
▪ ≥3					74	100.0		
Amniotic fluid index ▪ Average	95	95.0	21	80.3	59	79.3	21.3	0.000*
▪ Oligohydraminious	5	5.0	5	19.7	15	20.7		
Generalized edema	0	0.0	0	0.0	74	100.0		
Danger signals Severe headache	0	0.0	3	3.0	74	100.0		
Blurring of vision	0	0.0	0	0.0	74	100.0		
Nausea & vomiting	0	0.0	0	0.0	74	100.0		
Epigastric pain	0	0.0	0	0.0	74	100.0		
Systolic BP)	116.4 ± 8.1		151.5 ±11.6		165.1 ±11.5		F = 29.7	0.000**
Diastolic BP	75.5 ± 5.7		94.6 ± 9.0		105.5 ± 6.7		F = 25.9	0.000**
CTG								
▪ Normal	100	100.0	23	88.5	58	78.4	9.9^	0.006**
▪ Abnormal	0	0.0	3	11.5	16	21.6		

^ Mont Carlo Exact test P < 0.05 (significant)

Table 2 describes the general condition of women on admission to labor room. It reveals that women with severe preeclampsia 74 (74.0%) had proteinuria equal to or more than 3+, generalized edema, 2 fits, and abnormal CTG (8.1%) compared to those who had mild preeclampsia or the normotensive group. Differences observed were statistically significant (P=0.000). They also suffered from danger signals denoting severe preeclampsia; namely severe headache, blurring of vision, nausea and vomiting as well as epigastric pain.

The mean systolic and diastolic BP was significantly higher among women with severe preeclampsia compared to those who had mild preeclampsia or the normotensive group ((165.1±11.5 and 105±6.7 mm Hg vs. 151.5±11.6, 94.6±9.0 and 116.4±8.1, 75±5.7 mm Hg respectively). The differences observed are statistically significant (P=0.000**)

Table 3. Distribution of women according to the condition of the fetus and their mode of delivery.

Type of delivery	Control (n=100)		Mild (n=26)		Severe (n=74)		X^2	P
	No	%	No	%	No	%		
IUGR	0	0.0	4	15.4	32	43.2	60.5	0.000*
Preterm labor	2	2.0	3	11.5	56	75.7		
Vaginal delivery	91	91.0	11	42.3	2	2.7		
Elective CS	3	3.0	8	30.8	32	43.2		
Emergency CS	6	6.0	7	26.9	40	54.1		

* P < 0.05 (significant)

Table 3 shows that women with severe preeclampsia were significantly more likely to have IUGR and preterm labor (P= 0.000*). Moreover, more women were exposed to elective CS and emergency CS compared to the normotensive group and those with mild preeclampsia (43.2%, 54.1% vs. 3.0%, 6.0% & 30.8%, 26.9% respectively). Differences observed are statistically significant (P 0.000*).

Table 4 Distribution of the studied women according to their maternal outcomes.

Maternal outcomes	Groups				X^2	P
	Control (n=100)		study (n=100)			
	No	%	No	%		
Postpartum hemorrhage					54.9	0.000*
▪ Yes	3	3.0	27	27.0		
▪ No	97	97.0	73	73.0		
Administration of IV blood					54.9	0.000*
▪ Yes	3	3.0	27	27.0		
▪ No	97	97.0	73	73.0		
Postpartum eclampsia					Fisher	0.02*
▪ Yes	0	0.0	6	6.0		
▪ No	100	100.0	94	94.0		
Admission to Intensive care unite						
▪ Yes	3	3.0	18	18.0	16.8	0.000**
▪ No	97	97.0	82	82.0		

^ P value based on Mont Carlo exact test, ! P value based on Fisher exact test, * P < 0.05 (significant) ** P < 0.01 (significant)

As regard the impact of preeclampsia on maternal outcome (table 4) 27.0% of women were exposed to postpartum hemorrhage and received IV blood compared to only few women in the control group 3 (3.0%) with statistical significant difference (0.000*). Meanwhile, they were significantly more likely to suffer from postpartum preeclampsia and to be admitted to the intensive care unit (P=0.000*).

Table 5. Distribution of the studied women according to neonatal outcomes.

Neonatal assessment	Control (n=100)		Mild (n=26)		Severe (n=74)		X^2	P
	No	%	No	%	No	%		
Apgar score at 1 min							30.5	0.000*^
▪ < 4	0	0.0	3	11.5	6	8.1		
▪ 4-6	6	6.0	0	0.0	19	25.7		
▪ 7+	94	94.0	23	88.5	49	66.2		
Mean ± SD	8.1 ± 1.2		7.5 ±1.6		7.1 ± 2.2		F=8.5	0.000*ᵃ
Apgar score at 5 min							30.5	0.000*^
▪ < 4	0	0.0	1	3.5	3	4.1		
▪ 4-6	2	2.0	0	0.0	9	12.2		
▪ 7+	98	98.0	25	96.5	62	83.7		
Mean ± SD	8.9 ±1.0		8.3 ±1.9		7.5 ± 2.4		F=11.8	0.000*ᵃ
Birth Wight							24.9	0.000*^
▪ < 2.5 kg	7	7.0	2	7.7	22	29.7		
▪ 2.5-3.5 kg	81	81.0	21	80.8	52	70.3		
▪ >3.5 kg	12	12.0	3	11.5	0	0.0		
Mean ± SD	3.1 ± 0.47		3.1 ± 0.42		2.5 ± 0.52		F=31.2	0.000*ᵃ
Neonatal complications	Control (n=3)		Mild (n=12)		Severe (n=30)			
Need for resuscitation	3	100.0	10	83.3	15	50.0	6.0	0.04*
Admission to neonatal intensive care unit	0	0.0	2	16.7	10	33.3	2.39	0.000*^
Neonatal death	0	0.0	0	0.0	5	16.7	2.81	0.24

ᵃ P value based on ANOVA test
^ P value based on Mont Carlo exact test
* P < 0.05 (significant)

Concerning the impact of preeclampsia on the neonatal condition table 5 points to statistical significance differences (F=8.5 & F=11.8 and p = 0.000*) between the mean Apgar scores of the 3 groups at the first and fifth minute. In addition, women in severe pre-eclamptic group had higher percentage of newborns admition to the NICU (33.3%) compared to 16.7% in mild group and zero in normotensive group. Moreover, 5 (16.7%) deaths were reported among women with severe pre-eclampsia with statistical significant difference (P=0.24, X^2=2.81). This was mainly due to respiratory distress syndrome (two neonate), low Apgar score at 1st and 5th minutes two neonate), congenital abnormalities and neonatal sepsis one (neonate).

DISCUSSION

Preeclampsia is pregnancy-specific condition, represents a major cause of morbidity and mortality in mother, fetus and infant in many parts of the world. It affects about 3-8% of all pregnancies, but it is estimated to account for 40% to 60% of maternal deaths in developing countries *(Omole-Ohonsi&Ashimi2008)*. It is a disorder of widespread vascular endothelial malfunction and vasospasm that occurs after 20 weeks 'of gestation and can present as late as 4-6 weeks postpartum. It is clinically defined by hypertension and proteinuria, with or without pathologic edema *(Marcorelles, 2010)*.

Age, at both extremities of the reproductive period, is considered a risk factor to pregnancy outcomes in preeclampsia. The present result shows that women with preeclampsia were significantly more likely to be younger than 25 and older than 35 years of age compared to those with normotensive women (p=0.001**). This may be related to the progressive vascular endothelial damage that occurs with maternal aging and obstruction of maternal spiral arteriolar. In the same line *Vincent-Rohfritsch et al., (2012), Harutyunyan (2009) and Dietl et al., (2015)* have reported that the women at the extremes of maternal age having the greatest risk of pre-eclampsia.

On the other hand *Fatemeh et al., (2010)* in Iran, have demonstrated that, the mean maternal age was lesser (22.4±4.62 year) in the Preeclampsia group than in the control group (22.96±4.59) with no statistical significant difference (P=0.392).Conversely, *Cleary-Goldmann et al., (2005)*, did not find an increased prevalence of preeclampsia with advanced maternal age.

The results of the present study points to statistically significant difference between the two groups as regards job status, education, parity and positive history of preeclampsia (P= 0.000**). Such findings correspond well with the study of *Kuchake et al., (2010)* in India who reported that 71.2% of Preeclamptic women were illiterate and most of them were housewives. Low educational level attainment reduces access to medical care for screening and is often associated with greater exposure to poor nutrition, physical and mental stress as well as unhealthy life style.

Meanwhile, the large prospective cohort study of *Hernández-Díaz* et al.,(2009) found that the incidence of pre-eclampsia was 4.1% in primiparous women and 1.7% in parous women in Sweden between 1987 and 2004. It is believed that this is related to the maternal first exposure to trophoblasts, which are of fetal origin. Women with pre-eclampsia in the present study had statistically more positive history of abortion compared to the normotensive group (P=0.000**). This underscores the importance of provision of quality antenatal and natal care to this group, being nulliparous, and having history of previous abortion and with history of preeclampsia or previous admission to the hospital during their pregnancy. Similar findings were reported by *Trogstad., et al (2008)* in Norwegian in their study about Previous a Abortions and Risk of Pre-eclampsia.

According to the present study finding, almost three quarters of patients admitted to labor room were diagnosed with severe preeclampsia and the rest had mild preeclampsia. This figure is very close to that revealed by *Sangkomkamhang et al., (2010)* who have reported that among 151 pre-eclamptic patients, 57 (37.7%) had mild, 91 (60.3%) had severe pre-eclampsia and 3 (2%) had eclampsia.

Such delay of parturient women with severe preeclampsia until admission to labor room may have a deleterious effect on mother and her fetus. It may be due to misdiagnosis, mistreatment, difficulty in accessing medical help as well as lack of awareness about the danger signals and the pathological effect of preeclampsia on the different organs. Meanwhile, it reflects the importance of enhancing patient's awareness providing them with a fact sheet regarding the early detection and management of this disease. The present study also shows that women with severe preeclampsia were significantly more likely to have IUGR and preterm labor (P= 0.000*). Similarly, *Ødegård et* al., (*2000*) showed pregnancies complicated by severe preeclampsia had infant birth weights 12% lower than expected, while pregnancies with mild preeclampsia showed no difference in weight gain from expected. This emphasize the fact that the only definitive cure for severe preeclampsia is delivery of the fetus and placenta to minimize maternal morbidity and mortality and fetal risks (*Backes et al.,2011*) .

Women with severe preeclampsia in the current study were significantly more likely to be exposed to elective and emergency CS (P 0.000*). Similar finding were reported by *Blackwell et al., (2001) and Amorim et al., (2015)*.This finding implies that the deliveries among preeclamptic women whether severe or mild were more complicated and needed quality antenatal and natal care.

According to the present study results, the most common maternal complications were admission to ICU, eclampsia, followed by DIC and postpartum hemorrhage. These results are partially similar to those achieved by *Von Schmidt auf Altenstadt et al.,(2013) and Nyfløt et al.,(2017*) . Moreover, *Kuchake et al., (2010*) study in India have reported that HELLP syndrome was present in 8.0% and eclampsia in 10.0% of women in the Preeclamptic group.

Concerning the neonatal outcome, women with severe preeclampsia were exposed to lowest Apgar score, mean birth weight, more admission to the NICU (P=0.000*). In

this respect, *Aabidha et al., (2015*) have reported that 10% of the neonates in the severe preeclamptic group are with Apgar score less than 5 and 4.3% were deaths. Factors that may influence a low Apgar score included fetal hypoxia and preterm birth. Fetal hypoxia in preeclampsia could be explained by a decrease in the utero-placental blood flow resulting from severe hypertension

CONCLUSION

The majority of the preeclamptic group had severe preeclampsia and women with preeclampsia were significantly younger and older than normotensive women, had low mean parity, and history of abortion, PE and more admission to the hospital during pregnancy. Women with severe preeclampsia were significantly more likely to have proteinuria ≥3+, the highest percentage of systolic and diastolic BP, abnormal CTG and more CS. Poor maternal outcome and poor fetal outcome in the form of low Apgar score, low birth weight, more admission to the NICU as well as newborn deaths were significantly higher among the Preeclamptic group.

RECOMMENDATIONS

Provision of quality care to women with mild PE during pregnancy with regular follow up visits together with natal and postnatal care is essential to prevent fetal and maternal complications. Meanwhile, conducting periodical educational classes for pregnant women about danger signals of PE, risk factors, management, complications of preeclampsia, and providing them with informative and inclusive fact sheet are strongly recommended.

REFERENCES

[1].   *Aabidha PM , Cherian A G , Paul E, and Helan J (2015) :* Maternal and fetal outcome in pre-eclampsia in a secondary care hospital in South India . J Family Med Prim Care. Apr-Jun; 4(2): 257–260. doi: 10.4103/2249-4863.154669.

[2].   *Amorim MM, Katz L, Barros AS, Almeida TS, Souza AS and Faúndes A (2O15) :* Maternal outcomes according to mode of delivery in women with severe preeclampsia: a cohort study. Matern Fetal Neonatal Med. Apr;28(6):654-60. doi: 10.3109/14767058.2014.928689. Epub 2014 Jun 30.

[3].   *Blackwell SC, Redman ME, Tomlinson M, Jr J B Landwehr , Tuynman M and Gonik B (2001) :* labor induction for the preterm severe pre-eclamptic patient: is it worth the effort?. Journal of fetal medicine. Volume 10, Issue 5 . Pages 305-311 | Published online: 07 Jul 2009.

[4].   *Barton JR. and Sibai BM. (2008):* Prediction and prevention of preeclampsia. ObstetGynecol; 112(2Pt1): 359-372.

[5].   *Barton JR ., Barton L ., Istwan NB., Desch CN, Rhea DJ, Stanziano GJ,and Sibai BM(2011):* Elective delivery at $34^{0/7}$ to $36^{6/7}$ weeks' gestation and its impact on neonatal outcomes in women with stable mild gestational hypertension. AM J Obstet Gynecol.Volume 204, Issue 1, Pages 44.e1–44.e5.

[6].   *Backes CH., Markham K. , Moorehead P., Cordero L., Nankervis CA., and Giannone PJ.(2011)* :Maternal Preeclampsia and Neonatal Outcomes. J Pregnancy. 2011: 214365. Published online 2011 Apr 4. doi: 10.1155/2011/214365

[7].   *Cleary-Goldman J., Malone FD., Vidaver J. et al (2005)* : Impact of maternal age on obstetric outcome. Obstet Gynecol. 105(5 Pt 1):983–990. [PubMed]

[8].   *Cunningham FG., Leveno KJ., Bloom SL., HauthGC.,Spong CU. and Dwight JR. (2010)*: Text book ofWilliams' obstetrics- Hypertensive disorder inpregnancy. 23th Ed, McGraw-Hill, New York.

[9].   Dietl A. , Cupisti S., Beckmann MW. , Schwab M. , and Zollner U. (*2015*): Pregnancy and Obstetrical Outcomes in Women Over 40 Years of Age.Geburtshilfe Frauenheilkd. Aug; 75(8): 827–832. doi: 10.1055/s-0035-1546109 .

[10].   *El-Houseinie M., Salama EI., Radwan M., HemeidaSA.,Sammour MB. and Faris R. (1994):* Development of ascoring system for the prediction of the unfavorablepregnancy outcome. Egypt J Comm Med, 12(1): 71-8.

[11].   *El-Shourbagy M.,Refaie T., Savedk EI.,Din A., and Fathy M. (2011):*Impact of seroconvresion and antichamydial treatment on the rate of pre-eclampsia among Egyptian primgravidae . International journal of gynecology and obstetrics, 113 (4): 137-140.

[12].   **Fatemeh T., Marziyeh G., Nayereh G. et al., (2010):** Maternal and perinatal outcome in nulliparious women complicated with   pregnancy hypertension .J Pak Med Assoc; 60 (9): **707-710.**   Available at http:// www. Sciencedirect.com last accessed   on 12 September 2011.

[13].   *Gadalla F., Abd El-Salam AF., Wassif SM., KhalifaSM.,Foda MA, Ali AS. and Abd El-Hamid ESH .(1986):*Differential magnitude of high risk pregnancy in ruraland urban communities in Sharkia governorate.Egypt. J Comm Med, 2(2): 157-65.

[14].   *Haddad B. and. Sibai BM(2009):* Expectant Management in Pregnancies with Severe Pre-eclampsia. Semin Perintol :33:143-151.

[15].   *Harutyunyan A. (2009)* : Investigation of Risk Factors for Preeclampsia Development Among Reproductive Age Women Living in Yerevan, Armenia: A Case-Control Study. MD, MPH Candidate, Master of Public Health Integrating Experience ProjectCollege of Health Sciences .American University of Armenia.

[16].   *Hernández-Díaz S., , Toh S., and Cnattingius S. (2009):* Risk of pre-eclampsia in first and subsequent pregnancies: prospective cohort study,BMJ 2009; 338 doi: https://doi.org/10.1136/bmj.b2255 (Published 18 June 2009) Cite this as: BMJ 2009;338:b2255.

[17].   *Kuchake V G., Kolhe S G., Dighore P N. et al., (2010):* maternal and neonatal outcomes in preeclampsia syndrome. ijpsr; 1 (11): 74-82. Available online on www.ijpsr.com. Last accessed on 1/ August /2011.

[18].   *Mahaba HM., Ismail NA., El-Damaty SI. and Kamel HA.(2001b):* Pre-eclampsia: Epidemiology and outcome995 cases. J Egypt Public Health Assoc, LXXVI (5&6): 357-68.

[19]. **Marcorelles P.(2010):** Placenta and preeclampsia: relationships between anatomical lesions and clinical symptoms. Ann Fr Anesth Reanim; 29: e25-29.

[20]. *Nyfløt LT., Sandven I., Stray-Pedersen B., Pettersen S., Al-Zirqi I., Rosenberg M., Jacobsen A F. and Vangen S.(2017) :* Risk factors for severe postpartum hemorrhage: a case-control study. BMC Pregnancy and ChildbirthBMC. series – open, inclusive and trusted **17**:17. https://doi.org/10.1186/s12884-016-1217-0

[21]. *Omole-Ohonsi., A*, & **Ashimi A O. (2008)** *: Pre-eclampsia—A study of risk factors*. Nigerian Medical Practitioner, 53, 99–102. Retrieved July 10, 2012, from http://www.ajol.info/index.php/nmp/article/viewFile/28935/38075**.**

[22]. *R. A. Ødegård, LJ. Vatten, ST. Nilsen, KA. Salvesen, and R. Austgulen, (2000) :* Preeclampsia and fetal growth," Obstetrics and Gynecology, vol. 96, no. 6, pp. 950–955,. View at Publisher · View at Google Scholar · View at Scopus.

[23]. *Sangkomkamhang U., Laopaiboon M. and Lumbiganon P. (2010):* Maternal and Neonatal Outcomes in Pre-eclampsia and Normotensive Pregnancies. Thai J Obstet Gynaecol; 18(3): 106-113

[24]. *Vincent-Rohfritsch A., Le Ray C*., *Anselem O., Cabrol D. and Goffinet F*. (*2012*): Pregnancy in women aged 43 years or older: maternal and perinatal risks. J Gynecol Obstet Biol Reprod (Paris). Sep;41(5):468-75. doi:10.1016/j.jgyn.2012.04.013. Epub 2012 May 22.

[25]. *Von Schmidt auf Altenstadt JF., Hukkelhoven CW., van Roosmalen J., Bloemenkamp KW.(2013)* : Pre-Eclampsia Increases the Risk of Postpartum Haemorrhage: A Nationwide Cohort Study in The Netherlands PLoS One. 8(12): e81959. Published online 2013 Dec 18. doi: 10.1371/journal.pone.0081959.

[26]. *Yoder SR ., Thornburg LL., Bisognano JD. (2009)* : Hypertension in pregnancy and women of childbearing age.