Risk Factors And Pregnancy Outcomes Among Pregnant Women With Pre-Eclampsia

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Abstract

Background: Pre-eclampsia (PE) is a pregnancy specific disorder and a major cause of both fetal and maternal morbidity and mortality worldwide. **The Aim** of this study was to identify risk factors and pregnancy outcomes among pregnant women with pre-eclampsia. **Research design**: An exploratory descriptive design was used. **Sample:**A purposive of 200 women who were selected randomly. **Setting**: from labor unit affiliated to Damanhour Medical National Institute. **Tools: three tools** were used to collect data. **The first tool** was a structured interview questionnaire. **The second tool:** assessment of women's knowledge regarding pre-eclampsia and the **third tool** pregnancy outcome assessment checklist. **Results**: Premature rupture of membranes was observed among approximately three- quarters of them. More than half of them had caesarean section labor. Fetal distress was observed among about one-third of them and low birth weight (1500-2400 gm) constituted 27.6% of study subjects. Furthermore, admission to neonatal intensive care unit and oxygen administration were needed for (23 % & 36.8%) of study subjects' neonates respectively. Also, positive significant correlations were observed between pre-eclampsia and age, education, residence, parity as well as number of antenatal visit. In addition 69.0% of study subjects had poor total score. The study **concluded** that, age, level of education, residence, parity, and antenatal visits were determinants risk factors of pre-eclampsia in which that was significantly associated with maternal and neonatal morbidities as well as increasing cesarean section, LBW, and birth asphyxia. Consequently, it is **recommended** that teaching programs should be conducted to identify mothers at risk and encourage them for proper antenatal care.

Key Words: Pre-Eclampsia, Risk Factors, Maternal Outcomes & Neonatal Outcomes.

Introduction

Pregnancy is a unique, exciting often blissful time in women's life. It highlights the women's amazing creative and nurturing powers while providing bridge to the future. Pregnant women need to be responsible for providing support the health of her future child. The growing fetus depends entirely on its mothers' healthy body for all this needs. Consequently pregnant women must take steps to remain as healthy and well-nourished as they possibly can (**Casey, et al., 2015**)

Hypertensive disorders of pregnancy remain among the most significant and intriguing unsolved problems in obstetrics. It complicates 5-10% of all pregnancies and together they form one member of the deadly triad, along with hemorrhage and which contributes greatly to maternal morbidity and mortality. In developed countries about 16% of maternal deaths are due to hypertensive disorders. This includes: gestational hypertension, pre-eclampsia and eclampsia as well as chronic hypertension and pre-eclampsia superimposed on chronic hypertension (**Costa, et al., 2010**)

Pre-eclampsia (PE) is a pregnancy specific disorder commonly defined as hypertension and proteinuria after 20 weeks of gestational age. It occurs in approximately 3-5% of pregnancies and is still a major cause of both fetal and maternal morbidity and

mortality worldwide (**Costa, et al., 2009**) and several factors are associated with pre-eclampsia but some are not clearly proved. Current theories for the pathogenesis of pre-eclampsia include abnormal placentation, cardiovascular maladaptation to pregnancy, genetic and immune mechanisms, enhanced systemic inflammatory responses, nutritional, hormonal and angiogenic factors (**Baker, et al., 2010**).

Pre-eclampsia is a multisystem disorder of pregnancy. **Alam, (2010)** reported that, it is divided into mild and severe forms depending on the amount of elevation of the blood pressure and the degree of proteinuria. In mild type: blood pressure ranges from 140/90 to 160/110 mmHg; proteinuria < 5gm/24hrs; edema of face, hands and feet are the prominent signs. On the other hand, severe pre-eclampsia is characterized by: blood pressure > 160/110 mmHg; proteinuria > 5g per 24hrs; oliguria < 400ml in 24 hrs; cerebral or visual disturbances; epigastric pain or more specifically right upper quadrant pain that may indicate liver involvement; pulmonary edema, hepatocellular dysfunction, thrombocytopenia, elevated serum creatinine and microangiopathic hemolysis (**Sudha, et al., 2009 & Rathore, et al., 2010**)

The prevalence of pre-eclampsia varies according to the difference in classifications, definitions and the fact that many estimates are hospital basis **(Dekker 2014)** Most of the complications, related to pre-eclampsia are occurring due to maternal negligence or unawareness on the disease and its management. Self-care offers a real potential for improving their health status, and thus to prevent the severe form of pre-eclampsia at a deteriorating health cost. Self-care would be the most effective and appropriate approach to enhance both maternal and fetal well-being, as well as the successful outcome of pregnancy **(Laura, et al., 2014)**

Pre- eclampsia is confounded by the continued mystery of the etiology and the unpredictable nature of the disease. So, it can be controlled by regulation of diet, relaxation, by avoiding stress, early identification and medication, monitoring blood pressure level, rest, urine testing for the presence of albumin and by making some adjustments in lifestyles. Clearly, the need for education and awareness among these women remains evident **(Namitha, et al., 2010).** To date, few studies have examined maternal and neonatal complications and outcomes in pre-eclampsia in Egypt.

Significance of study

Pre-eclampsia complicates around 5% of pregnancies and hypertensive disorders of pregnancy are responsible for over 60,000 maternal deaths worldwide annually **(Kate, et al., 2015)** However, the impact of the disease is felt more severely in developing countries, incidence of eclampsia in developing nations varies widely, ranging from 1 case per 100 pregnancies to 1 case per 1700 pregnancies . Rates from African countries such as South Africa, Egypt, Tanzania, and Ethiopia vary from 1.8% to 7.1 %(**WHO 2011).** Pre-eclampsia needs to be identified as a priority area in reducing maternal mortality in developing countries. So, raising awareness of the need for women to reach antenatal care, emergency care without delay and trained to recognize danger signs during pregnancy are responsibilities of maternity and community health nurses.

Aim of study

This study was conducted to identify risk factors and pregnancy outcomes among pregnant women with pre-eclampsia.

Research questions

- What are the association between ages, level of education, residence, parity, antenatal visits , BMI, family income, weeks of gestation and pre-eclampsia?
- What are pregnancy outcomes among pregnant women with pre-eclampsia?

Operational definitions

Pregnancy outcome include maternal and fetal outcome

Maternal outcome involves weeks of gestation, onset of labor, type of delivery, maternal distress, rupture of membranes, as well as duration and complications of labor.

Fetal outcome comprises fetal distress and fetal death, Apgar score, need for oxygen administration, and birth weight as well as admission to neonatal intensive care unit

Material and Methods

Design

An exploratory descriptive research design was utilized to fulfill this study.

Setting

The study was conducted in eclampsia units and labor wards, affiliated to Damanhour Medical National Institute in El-Beheira Governorate.

Subjects

Pregnant women with pre-eclampsia were selected from previously mentioned setting to carry out this study.

Sampling technique

Purposive sampling method was used for selected pregnant women using simple random sampling technique after identifying the list of rate per setting.

Sample size

A sample of 200 pregnant women with pre-eclampsia are needed to detect a clinically meaningful difference at rate of neonates of pre-eclampsia who needed intensive care unit (NICU) = 16.5%, at alpha level of 0.05 with power of 80%. They were selected according to the following **inclusion criteria**: in the third trimester of pregnancy, free of chronic diseases e.g. diabetes, hypertension, diagonsed with mild or severe pre-eclampsia and willing to participate in the study

Tools of data collection

Three tools were developed by the researchers to collect data.

Tool I : A structured interview questionnaire was developed based on the current review of literature. It was used by the researchers to collect data about thestudy subjects, it entailed the following parts:

Part (1): Socio- demographic data such as age, level of education, occupation, residence, and family income.

Part (2): Data related to current pregnancy such as parity, antenatal visits (time- frequency) and weeks of gestation.

Part (3): Physical examination measurements to obtain baseline data about blood pressure, height and pre pregnancy weight, weight in kilograms and height

in centimeters were measured for all women included in the study. Weight was recorded to the nearest 0.5 kg, height was recorded to the nearest 0.1 cm and body mass index (BMI) was calculated. Then, compared with, the reference value to identify overweight or obesity among women as following:
Less than 18.5 kg/ cm^2 (underweight)   18.5 – 24.9 kg/cm^2 (normal weight)
25.0 – 29.9kg/cm^2 (overweight)   30.0 – 34.9 kg/cm^2 (obesity) **(WHO, 2011)**

Tool II: assessment of women's knowledge regarding pre-eclampsia was developed based on the current review of literature .It comprised of 48 items to assess women's knowledge regarding pre-eclampsia. It included five main groups of questions. These five main groups of questions entail the following information: definition of pre-eclampsia (N=1), signs and symptoms (N=12), risk factors (N=17), consequences (N=12), preventive measures of pre-eclampsia (N=6). Subjects' response to each item was scored as follows: complete answer (3), incomplete answer (2), and don't know (1). The total score ranged from (48-144) the subjects' knowledge was ranked as poor, fair, and good knowledge according to their total scores. The highest score in this system conveys better knowledge.
- Good knowledge for total score 112-144
- Fair knowledge for a total score of 80- < 112
- Poor knowledge for a total score of 48- < 80

Tool III: Pregnancy outcome assessment checklist was developed based on the current review of literature to collect data about

- **Maternal assessment checklist was included** onset of labor (spontaneous or induced), presence of maternal distress, time of rupture of membranes, type of labor, duration of the three stages of labor, (first, second and third); occurrence of complications during labor.
- **Fetal assessment checklist included:** presence of fetal distress, neonates status (alive, stillborn or dead), birth weight, Apgar score at one and five minutes (normal, mild or severe asphyxia) and need for oxygen administration and admission to neonatal intensive care unit.
- **Ethical consideration**: For each recruited subject the following issues were considered: Securing the subject's informed consent, keeping the subject's privacy, assuring the subjects of their data confidentiality, and the right to withdraw at any time.

Methods
The study was carried out according to the following steps
- An official letter from the Faculty of Nursing, Damanhour University was obtained and forwarded to the responsible authorities of the study setting to take their permission to conduct the study after explaining its purpose.
- Tools of data collection were developed by the researchers after extensive review of relevant and current literature. Tools were checked for content validity by a jury of five experts in the field.
- Tools reliability was tested by Cronbach alpha test. Its result was 0.723 which indicates an accepted reliability of the tool.
- A pilot study was carried out on 20 women excluded from the study to ascertain the clarity and the applicability of the tool as well as to estimate the time needed to it.
- Data were collected through an interview schedule, which was conducted individually and in total privacy. Tool one and two were collected from parturient either during the first stage of labor or during immediate postpartum period after explaining the purpose of study.
- Maternal and fetal assessments (tool three) were used for each study subjects during their four stages of labor to monitor birth outcomes. The average number of interviewee per day was 2-3 depending upon the number of deliveries
- Data were collected over a period of 8 months starting from the beginning of September 2014 till the end of April 2015.

Statistical analysis: data analysis was carried out on window XP using SPSS program version 16. The collected data was categorized, coded, computerized, tabulated and analyzed. Finally, analysis and interpretation of data were conducted using the following statistical measures were used: - **Descriptive statistical** including frequency, distribution, mean, and stander deviation were used to describe different characteristics. **Spearman's Rho correlation** used to test correlation, between two quantitative variables not normally distributed or dichotomous qualitative variable.

Results

Table (1): Distribution of the Study Subjects According to Their Socio-Demographic Data.

Socio-demographic data	No(n=200)	%
Age		
20-	84	42.0
25-	50	25.0
30-34	66	33.0
Mean±SD	27.48±8.5	
Level of education		
Illiterate/Read & write	66	33.0
Basic	44	22.0
Secondary	62	31.0
Higher education	82	14.0
Occupation		
Housewife	130	65.0
Working	70	35.0
Residence		
Rural	88	44.0
Urban	112	56.0
Family income		
More than enough	30	15.0
Just enough	138	69.0
Less than enough	32	16.0

Table (2): **Distribution of the Study Subject According To Their Obstetric Data & Physical Examination.**

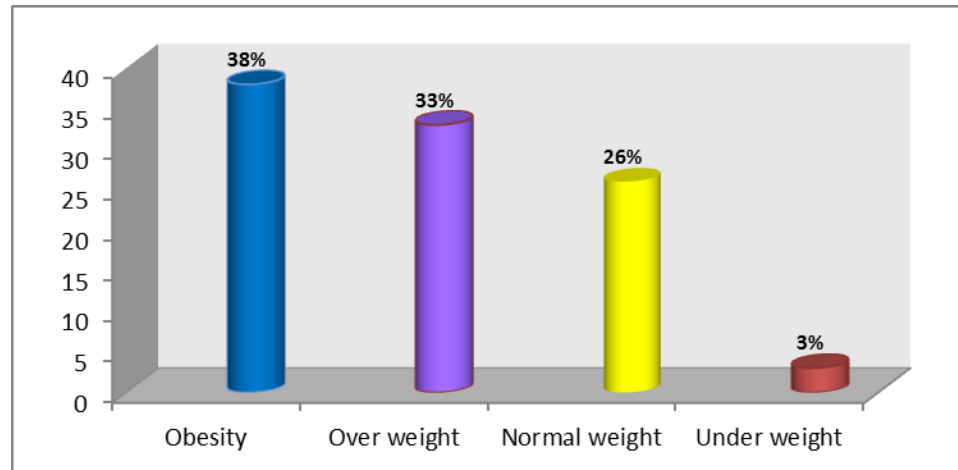| Obstetric data	No (n=200)	%
Parity		
Primi	132	66.0
Multi	68	34.0
Antenatal visits		
Yes	186	93.0
No	14	7.0
Time of initial visit	n=(186)	
1st trimester	151	81.2
2nd trimester	31	16.6
3rd trimester	4	2.2
Number of antenatal visits	n=(186)	
< 4	34	18.3
≥ 4	152	81.7
Min-Max	**1-22**	
Mean ±SD	**6.3±3.9**	
Week of gestation		
< 37	52	26.0
≥ 37	148	74.0

Figure (1): Body Mass Index Of Pre-Eclamptic Pregnant Women.

Table (3): Distribution of the Study Subjects According to Their Labor' Characteristics.

labor' characteristics	No	%
Onset of labor		
Spontaneous	154	77.0
Induced	46	23.0
Maternal distress		
Present	34	17.0
Absent	166	83.0
Time of rupture of membranes		
Premature	144	72.0
Mature	56	28.0
Type of labor		
Normal vaginal	82	41.0
Caesarean section	118	59.0
Duration of labor		
(primiparae)	**(n=34)**	
1st Stage (hours)		
<12	8	23.6
12-16	20	58.8
>16	6	17.6
2nd Stage (hours)		
<1	6	17.6
1-2	28	82.4
3rd Stage(minutes)		
<10	28	82.4
10-20	6	17.6
Duration of labor (Multiparae)		
1st Stage (hours)	**(n=48)**	
< 6	4	8.4
6-8	34	70.8
>8	10	20.8
2nd Stage (minutes)		
10-30	36	75.0
>30	12	25.0

labor' characteristics	No	%
3rd Stage(minutes)		
10-20	46	95.8
>20	2	4.2
Complications of labor:	N=200	
Present	48	24.0
Absent	152	76.0
Type of complications#	**(n=48)**	
Genital injury	4	4.2
Prolonged labor	20	20.8
Hemorrhage	36	75.0
Abruptio placenta	2	4.2
Cord prolapse	2	4.2

82 women had normal labor 34were primi and 48were multi
#more than one answer

Table (4): Distribution of Study Subject According to Fetal/ Neonatal Outcome.

| Fetal / neonatal outcome	No	%
Fetal distress		
Present	64	32.0
Absent	136	68.0
Neonates' status		
Live births	174	87.0
Still births	18	9.0
Intrauterine fetal death	8	4.0
Birth weight	(n= 87)	
<1500	0	0.0
1500-2400	48	27.6
≥2500	126	72.4
Apgar score at 1 minute	(n= 174)	
Normal (7-10)	52	26.5
Mild asphyxia (4-6)	120	72.3
Severe asphyxia (0-3)	2	1.2
Apgar score at 5 minutes	((n= 174)	
Normal (7-10)	134	77.0
Mild asphyxia (4-6)	40	23.0
Severe asphyxia (0-3)	0	00.0
Need for oxygen administration:	(n= 174)	
Yes	64	36.8
No	110	63.2
Admission to neonatal intensive unit	(n= 174)	
Needed	40	23.0
Not needed	134	77.0
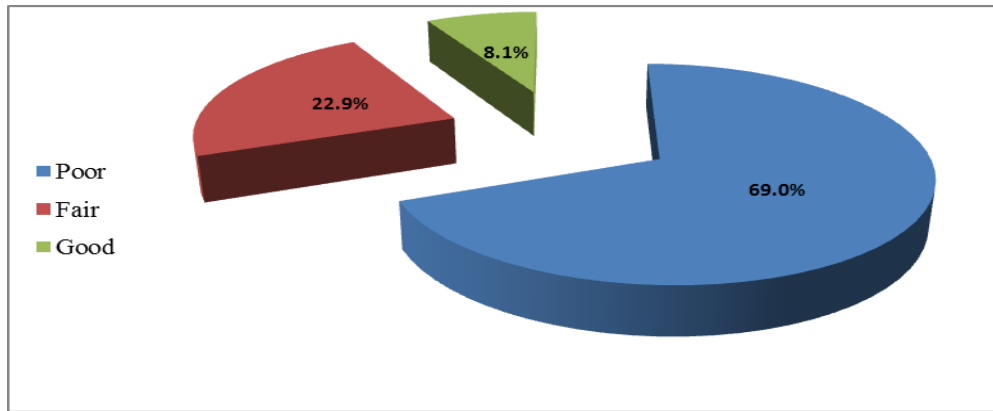
Figure (2) Total Knowledge Score About Pre-Eclampsia Among Studied Women.

Table (5): Correlation# Between Determinant Factors Of Pre-Eclampsia Among Studied Subjects.

Variables	Pre- eclampsia	
	R	P
Age	0.62	0.0001*
Education (Not educated/Educated)	0.39	0.0001*
Occupation (Employed/Not employed)	0.056	0.416
Family income	0.01	0.85
Residence	0.14	0.04*
Parity	0.212	0.004*
Number of antenatal visit	0.18	0.009*
Weeks of gestations	0.02	0.74
Body mass index(BMI)	0.05	0.59

#Spearman's Rho Correlation   R   Correlation coefficient =0-1
P   Significant correlation < 0.05
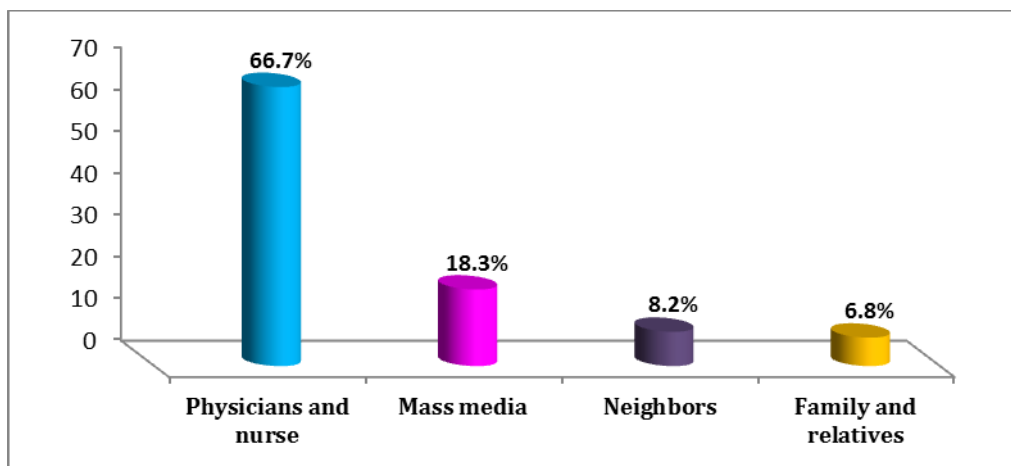
Figure (3): Studied Sample' Sources Of Knowledge About Pre-Eclampsia.

According to **Table (1):** 42.0% of study subjects aged 20 to less than 25 years with mean age 27.48±8.5. 31.0% of them had secondary schools graduates, comparing to only 14.0% with higher education. As for their occupation, about 65.0% of them were housewives, and 44.0% of them were living in rural area. 69.0% of them had just enough family income.

Table (2): illustrates that 66.0% of subjects' were primipara. 93.0% of them received antenatal care. Most of those who received antenatal care 81.2% had started it during their first trimester, while 2.2% had started antenatal visits during the third trimester of pregnancy. A good proportion of them 81.7% received adequate antenatal care (≥4 visits) with a mean of 6.3±3.9 visits. The subjects' weeks of gestation were less than 37 weeks among 26.0%.

Figure (1): shows 38% of them were obese and 33% were overweight. While the pregnant women who were normal body weight and underweight constituted 26% and 3% respectively.

Table (3): shows labor characteristics' of study sample. It was obvious that 77.0% of them had spontaneous onset of labor. In addition, maternal distress didn't occur among 83.0% of them. Meanwhile, premature rupture of membranes was observed among 72.0% of them. 59.0% of them had caesarean section labor. The same table exhibits study subjects according to their duration and complications of labor. Of those normal vaginal labor, 34 women was primipara, duration of the first stage of labor was less than 12 hours among 23.6% of them. In addition, duration of the second stage was 1-2 hours among 82.4% of them. Duration of the third stage of labor was 10-20 minutes among 17.6% of them.

On the other hands, regarding multipara (48 women), duration of the first stage of labor was 6-8 hours among 70.8% of the study subjects. Duration of the second stage of labor was 10-30 minutes among 75.0% of them. In addition, Duration of the third stage of labor was 10-20 minutes among 95.8% of them. The table also showed that complications of labor were present among 24.0% of the women; a great percentage 75% of them had hemorrhage.

Table (4): clarifies fetal/ neonatal outcome among study subjects. Fetal distress was observed among 32.0% of them. Neonate's status revealed that 87.0% of them delivered live neonates. In addition, low birth weight (1500-2400 gm) constituted 27.6% of study subjects. Moreover, Apgar score at one minute was normal (7-10) among 26.5 % of them, mild asphyxia (4-6) was detected among 72.3% of them. Meanwhile, Apgar score at 5 minutes was found to be normal among 77.0% of them. However, mild asphyxia was observed among 23.0% of them.

Furthermore, admission to neonatal intensive care unit and oxygen administration were needed for (23 % & 36.8%) of study subjects' neonates respectively.

Figure (2): demonstrates total score of knowledge about pre-eclampsia among study subjects. It was found that, 69.0% of study subjects had poor total score, 22.9% had fair total score. However, good total score was attained by only 8.1% of them with a mean of 46.6± 21.8.

Table (5): reveals that, positive significant correlations were observed between pre-eclampsia and age, education, residence, parity as well as number of antenatal visit. Moreover, it was observed that, there were no significant correlations with pre-eclampsia and occupation, family income, weeks of gestations and body mass index (BMI).

Regarding sources of knowledge of women about pre-eclampsia, **Figure (3)**: illustrates that, 66.7% of the studied sample obtained their knowledge about of pre-eclampsia from physicians and nurse, while 18.3% from mass media, in which 8.2% obtained their knowledge from neighbors and finally 6.8% of them obtained their knowledge from their family and relatives.

Discussion

Pre-eclampsia represents an extremely important problem in women's health all over the world. Despite numerous clinical observations and studies, the etiology and exact sequence of pathophysiological events accompanying this specific disorder have still remained unresolved. The most commonly considered concepts, however, include: genetic, endocrine and immunological mechanisms. There is also the potential participation of psychological factors. **(Jennifer et al., 2010)**

The findings of the present study revealed that more than two-fifths of pre-eclamptic women aged 20 to less than 25 years and it was positive correlation between age and risk of pre-eclampsia.(Table 1) This result is kind of expected where the relevant literatures suggest that young primigravida the increase incidence of PE may be due to poor immune capacity at young age, while increased incidence with increasing age may probably reflect the increasing incidence of essential or latent essential hypertension. This is nearly congruent with **(Kuchake et al., 2010)** who conducted a study about "Maternal and neonatal outcomes in pre-eclampsia". Their study revealed that there is a J-shaped curve for relationship between maternal age and the incidence of PE with a slightly increased pattern among young pregnant and a markedly increased incidence among the older ones, more than 35 years. So, advanced age is common risk factor for PE. In addition, this finding is similar to

that of **EL-Moselhy et al., results (2011)** who study the risk factors and impacts of pre-eclampsia: an epidemiological study among pregnant mothers in Cairo, Egypt. This may be attributed to similarity of population' genetic composition. On the other hand, some studies indicated that there was no significant relationship between the maternal age and pre-eclampsia Such difference could be due to the specificity of each population and another. **Ganesh et al., (2010)**

The present study revealed that more than half of pre-eclamptic women lived in urban communities and it was positive correlation between residence and risk of pre-eclampsia. Table (1) Some potential explanations for these differences are that there is a very high rate of negative smoking particularly among urban women, increase incidence of chronic diseases & increase stressors among them. An alternative explanation may be related to climatic differences across Egypt regions. Yet, this result is not in congruent with **Shawhy & Sadik results (2011).** Who performed study about differential magnitude of high risk pregnancy in rural and urban communities in Egypt, they reported that pre-eclampsia has remained a significant public health threat in both developed and developing countries contributing to maternal morbidity and mortality globally and with no identifiable residence even rural or urban.

Pre-eclampsia, part of the spectrum of pregnancy-induced hypertension (PIH) is typically a disease of the first pregnancy, with a reduction in incidence among multiparas. **Shamsi et al., (2010)** the result of the present study showed that, primigravidas accounted for about two thirds in pre-eclampsia women as compared to multigravidas, which accounted for one third. Also, it was positive correlation between parity and risk of pre-eclampsia. **Table (2)**: Similar findings were reported in two studies. The first was carried out by **Al-Mulhim et al., (2003)** about pre-eclampsia: maternal risk factors and perinatal outcome. The second was carried by **Pridjian et al., (2002)** about Pre-eclampsia: clinical and pathophysiologic considerations. However, these results are incongruent with study done by **Muti et al., (2015)** who found that women with high-parity are at an increased risk of developing pre-eclampsia. This discrepancy in the results of this study may be explained by differences in the population characteristic.

The importance of antenatal care has long been universally established and emphasized. Proper antenatal care is widely accepted as one of the most important factors which determine better pregnancy outcomes. **(Aksornphusitaphong & Phupong (2012).** The findings of the present study revealed

that, more than two- thirds of pre-eclamptic women visited the antenatal clinic more than 4 times and it was positive correlation between antenatal visits and risk of pre-eclampsia. (Table 2) It was positive to find-out that the majority of women attended antenatal clinics in many of the available health settings of the community any way. This may be due to the fact that almost one-third of pre-eclamptic women had secondary schools graduates and had enough family income as well as more than one third were working. Table (1) This was expected, since educated women are more likely to have better access to the community health care and family planning services that help in the prevention, early detection and management of obstetric complications. Moreover, there was positive correlation between level of education and risk of pre-eclampsia, while no correlation regarding family income and occupation. (Table 5) **Moghadam et al., (2012)** this result is in accordance with literature which emphasizes the importance of education and antenatal visit for pregnant women to avoid or decrease the incidence of complications during pregnancy, labor and post-partum period. **Pervin et al., (2012)** Moreover, study done by **Shweta et al., (2011)** on Evidence – Based prenatal care visits revealed that the number of prenatal care visits for pregnant women was approximately nine visits for nulliparous women and seven visits for parous women.

On the contrary with this present study, result the study of **Sultana et al., (2013) & Anthony et al., (2012)** The first had studied risk factors for pre-eclampsia. They had reported that severe pre-eclampsia was commonly observed in unbooked cases, who received minimal or no antenatal care. The second had investigated the impact of prenatal care on neonatal deaths in the presence and absence of antenatal high-risk conditions.

The result of present study further revealed that no statistically significant correlation was found between pre-eclamptic women and body mass index (BMI). Table (5) This finding is in line with **Lou et al., (2008) & Ziaei et al., (2008)** who reported that no statistically significant correlation was found between pre-eclamptic women and body mass index between PE cases and controls.

On the other hand, these results are incongruent with **Agudelo's & Belizan's results (2000)** who did a study about risk factors for pre-eclampsia in a large cohort of Latin American and Caribbean women. They concluded that overweight and obesity contribute significantly to pre-eclampsia and pre-pregnancy and body-mass index (BMI) is associated with increased blood pressure throughout pregnancy. In addition, the current finding doesn't agree with the studies of **Jacobs et al., (2007)** in South Australia

which revealed that incidence of both mild and severe hypertensive disorders of pregnancy rises with increasing BMI. It doesn't also match with the study of **Bodnar et al., (2007)** about "pre-pregnancy body mass index and the occurrence of severe hypertensive disorders of pregnancy" they demonstrate a consistently strong positive association between maternal pre-pregnancy body mass index and the risk of pre-eclampsia. **(Barua, 2012)**

Onset of labor may occur spontaneously in cases of PE and eclampsia or it is more likely to be stimulated by artificial induction. Hypertensive pregnant patients have 3-4 times more preterm deliveries than did the normotensive women. **(Ye, RW. 2009)** In the current study, more than three quarters of women with pre eclampsia had spontaneous onset of labor. (Table 3)

Pre-eclampsia considered as major causes of morbidity and mortality both in mother and fetus **(Sultana & Aparna, 2013).** The present study revealed that pre-eclampsia was significant association with higher rate of premature rupture of membrane, caesarean births and induced labor, maternal distress. (Table 3) This result is in accordance with **Vreeburg et al., (2004)** they did study about Hypertension during pregnancy: risk factors for adverse maternal and/or perinatal outcome. They reported that the hypertensive group had high incidence of induced labor and an increased risk for low birth weight. In addition, this result agrees with **Kolusari et al., (2008) & Plunkett et al., (2008),** who mentioned that onset of labor may occur spontaneously in cases of PE and eclampsia or it is more likely to be stimulated by artificial induction. Moreover, they further elaborated that adverse pregnancy outcomes associated with pre- eclampsia, such as maternal distress, early rupture of membranes and many complications for mother and infant.

Women with pre-eclampsia have an increased rate of cesarean section consequent upon the high incidence of intrauterine growth restriction, fetal distress and prematurity. **(Polsani et al., 2013)** This finding accordance with results of this study in which the almost more than half of pre- eclampsia women delivered by cesarean section**.** Table (3) This result coincides with the findings of **Witlin et al., (2000)** who mentioned that operative delivery by cesarean section in pregnancies with pre-eclampsia reduced complications to the fetus as well as the mother. The same result is also supported by **Gofton et al., (2001)** and **Al-Mulhim et al., (2003)** works who found that an increase rate of caesarean birth among mothers who were pre-eclamptic and vaginal deliveries were less frequent in women with pre-eclampsia as compared with healthy controls.

Increase rate of caesarean may be result from prolonged labor, where pre-eclampsia had significantly prolonged labor, premature rupture of membrane, In disagreement of this current study, results of study done in Nigeria by **Iyoke, et al., (2014)** indicated that about one quarter of women delivery by cesarean section. Difference may be due to the variation in approach of management and control of pre-eclampsia. So it was not surprisingly, there are marked complications of labor were presented among 24% of pre-eclamptic women. These complications include genital injury, prolonged labor, hemorrhage, abruptio placenta, cord prolapsed and retained placenta. (Table 3)

The neonatal morbidity was more common in pre-eclampsia**. (The American College of Obstetricians & Gynecologists (ACOG) Committee on Practice Bulletins--Obstetrics 2012)** The result of the present study revealed that lower birth weight, and APGAR score associated with pre-eclamptic women. Table (4) This may be resulted from fetal distress which was also higher among the study subjects. Therefore, the need for resuscitation and oxygen administration were higher among them. This finding coincides with the results of at least three other researches. First, **Bener (2013)** who had studied the impact of socioeconomic, lifestyle habits and obesity in developing of pregnancy induced hypertension. Second, **Attiya et al., (2009)** who had studied neonatal outcome in pre-eclamptic patient. Third, **Masoura et al., (2012)** who had investigated the Neonatal outcomes of late preterm deliveries with pre-eclampsia. The first and third studies had reported that Low APGAR score was seen higher in pre-eclamptic group as compared to controls and there was high need for admission to NICU in pre-eclamptic group compared to controls. The second further elaborated that pre-eclampsia has great implication on adverse neonatal outcome. The various complications seen are low APGAR score, IUD, low birth weight, intrauterine growth restriction and increased need for admission to Neonatal Intensive Care Unit (NICU).

On the other hand, the current finding is incongruent with study of done by **Xu Xiong et al., (2002)** who had studied impact of pre-eclampsia and gestational hypertension on birth weight by gestational age. They reported that infants born at term to mothers with pre-eclampsia have similar birth weights, on average, to those of infants born to women who do not experience this condition; however, infants born preterm to mothers with pre-eclampsia weigh significantly less than those born to women with normal blood pressure during pregnancy.

As expected infants of PE women were delivered earlier and, therefore, there was significant difference in birth weight of the neonates of PE patients compared to normal pregnancy (2.26±0.91 vs.

3.22±0.41 Kg,). [44] The results of the present study indicated that low birth weight (1500-2400 gm) constituted more than one fourth of pre-eclamptic women. These finding supported by other studies revealed the same results, **Barton et al., (2001)** observed that the mean birth weight of the neonate was significantly lower in the group with pre-eclampsia than that of gestational hypertension. **Kenny et al., (2014)** found that pre-eclampsia was associated with a 5% reduction in birth weight. In severe pre-eclampsia, the reduction was 12% and in early onset disease, birth weight was 23% lower than expected.

The present study revealed that women were more likely to obtain poor total score of knowledge. Figure (2) This finding is expected since women in the present study were more likely to be illiterates or basic education, housewives and from rural areas. They were also had just enough family income. Women with this background are less exposed to biomedical system (they go to the doctor less frequently) although, two thirds of women in the current study mentioned physicians and nurses as the main source of their knowledge regarding pre-eclampsia. Figure (3) In addition, they had less information about morbid conditions and where to go for treating each. This finding is consistent with the study of **Whitney et al., (2012)** about factors associated with patient understanding of pre-eclampsia, where concluded that pregnant patients have a generally poor understanding of pre-eclampsia.

The current finding also corresponds with the study of **Okpomeshine's, (2014)** about "knowledge, attitudes, and perceptions of pre-eclampsia among first-generation Nigerian women in the United States ". She reported that the lowest knowledge of pre-eclampsia was 1.15 times more common (OR = 1.15, 95%, CI = 0.45–2.98) than greater knowledge of pre-eclampsia.

Pre-eclampsia is a largely preventable condition & the maternal mortality is decreasing, but the perinatal mortality still remains very high (7-10%) even in the developed and developing countries .With the target of the Millennium Development Goals in sight, pre-eclampsia/eclampsia needs to be identified as a priority area in reducing maternal mortality in developing countries. Since the mainstay of control remains health care based strategies, national governments and supporting agencies should channel efforts at strengthening the maternity and public health systems and improving access to trained health care providers. **(Fatemeh, et al., 2010)**

Conclusion

According to the findings of the present study it could be concluded that, age, level of education, residence, parity, and antenatal visits were determinants risk factors of pre-eclampsia in which that was significantly associated with maternal and neonatal morbidities as well as increasing cesarean section, LBW, and birth asphyxia. Need for oxygen administration and admission to neonatal intensive unit.

Recommendations

Based on the study findings it is recommended that:
- Teaching programs should be conducted by nurses to identify mothers at risk to offer them counseling and refer them to a hospital where pre-eclampsia can be managed. This is expected to reduce the perinatal mortality and morbidity and associated with pre-eclampsia in resource-limited settings.
- Proper antenatal care must be given to all pregnant women for early identification of pregnant women who have a high-risk for severe pre-eclampsia, subsequent monitoring and treatment of pregnancies with pre-eclampsia.
- Measures should be taken to control this deadly condition through behavioral change communication (BCC) regarding antenatal care, danger signs, delivery plan etc, involving both public and private sectors.
- Hence creating community awareness along with an improvement in the antenatal care and neonatal facilities will go a long way in reducing the incidence of pre-eclampsia and eclampsia.
- Further in depth researches are needed in different areas and on large scale in Egypt for full understanding of pre-eclampsia.

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