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Research Article

**PREVALENCE AND RISK FACTORS OF PRE-ECLAMPSIA AND
ECLAMPSIA AMONG PREGNANT WOMEN IN ARAR CITY, KSA**

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Abstract:

Background: Pre-eclampsia is the most common medical problem in pregnancy as it's specific syndrome that affects many organ systems and is recognized by new onset of hypertension and proteinuria that occur after 20 weeks' gestation.

Objective: to determine the prevalence of pre-eclampsia and to determine the main risk factors affecting the incidence rate of the cases among pregnant mothers in Arar city, KSA.

Methods: A cross sectional, community-based study conducted in Arar city, KSA, during the period from 1st September to 30 November, 2018, on 299 pregnant women with age group from 18 to 55 years. Data was collected through a pre-designed, online questionnaire. We utilized the SPSS program (Version 22) to analyze the study data. The X² test was used as a test of significance, and differences were considered significant at P value less than 0.05. **Results:** Pre-eclampsia was found in 20.7% of the total number of participants. Although the prevalence of pre-eclampsia in mothers aged between 25 and 35 years is 56.5%, we found no significant correlation between maternal age and pre-eclampsia. More than half (58.1%) of the positive cases to pre-eclampsia had family history of pre-eclampsia, and we found a highly significant association between the two variables (P<0.01) while we found insignificant correlation between pre-eclampsia and hypertension or diabetes mellitus as pre-eclampsia complicated 3.2% of the pregnancies with chronic hypertension and 1.7 of the pregnancies without chronic hypertension (P>0.05) also pre-eclampsia complicated 8.1% of the pregnancies with DM and 5.5% of the pregnancies without DM (P>0.05). that, 8.1% of mothers of twins pregnancy and 9.7% of the mothers of single fetus get pre-eclampsia, but the association between type of pregnancy and incidence of pre-eclampsia wasn't significant (P>0.05). In addition, a significant correlation was found between the parity of the mothers and incidence of pre-eclampsia. Regarding the clinical presentation, we found foot and hand edema in 65% of the preeclampsia cases but As regards the pre-eclampsia complications among the studied cases, premature labor was found in 50% of the cases, placental abruption in 35.5%, intrauterine growth retardation in 16.1%.

Conclusion: in Arar, KSA, Pre-eclampsia was found in 20.7% of the total number of participants which considered a relatively high prevalence. So, we recommend more detailed future studies to be undertaken in more detailed ways and over larger sample. Also health education about pre-eclampsia and eclampsia and their complications should be provided to the pregnant mothers.

Key words: Pregnant Mother, Hypertension, Pre-Eclampsia, Eclampsia, Risk Factors.

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INTRODUCTION:

Pre-eclampsia is the most common medical problem in pregnancy as it's specific syndrome that affects many organ systems and is recognized by new onset of hypertension and proteinuria that occur after 20 weeks' gestation, and its incidence has been reported in different parts of the world. This complication makes pregnancy problematic and is considered as common cause of prenatal and maternal morbidity and mortality in the world. [1] This complication develops in 5-10% of all pregnancies and 20% of first pregnancies and entails more than 40 percent of premature birth resulting from treatment. [2,3], Around 585,000 women die each year of pregnancy-related causes, 95% of them in developing countries [4]. Thirteen percent of these maternal deaths are due to hypertensive disorders of pregnancy, particularly eclampsia [4]. While maternal death due to preeclampsia is less common in developed countries, maternal morbidity is high and is a major contributor to intensive care unit admissions during pregnancy. [5-6] Approximately 12 to 25% of fetal growth restriction and small for gestational age infants as well as 15 to 20% of all preterm births are attributable to preeclampsia; the associated complications of prematurity are substantial including neonatal deaths and serious long-term neonatal morbidity, [5-7] the numerous maternal and fetal complications may be prevented by early diagnosis, raising individuals, awareness about pre-eclampsia, the mothers regular visits with doctors, and receiving full care during pregnancy. Pre-eclampsia in a previous pregnancy, family history, high blood pressure and high body mass index (BMI) are considered as risk factor for pre-eclampsia. [8]

Although the etiology of pre-eclampsia remains unknown. Current hypotheses suggest placental ischemia, immune maladaptation, genetic predisposition, and vascular mediated factors as contributing to the development of this disease [9], and the pathophysiologic processes underlying this disorder are described in two stages. [10] The first stage is characterized by reduced placental perfusion possibly related to abnormal placentation with impaired trophoblast invasion and inadequate remodeling of the uterine spiral arteries. The second stage refers to the maternal systemic manifestations with inflammatory, metabolic, and thrombotic responses converging to alter vascular function which can result in multi-organ damage. [11-12] Despite major medical advances, the only known cure for preeclampsia remains delivery of the fetus and placenta.

OBJECTIVES:

The main objective of this study is to determine the prevalence of pre-eclampsia and to determine the main risk factors affecting the incidence rate of the cases among pregnant mothers in Arar city, KSA.

PARTICIPANTS AND METHODS:

The present cross sectional, community-based study was conducted in Arar city, the capital of Northern Borders Governorate in the period from 1st September to 30 November, 2018, on 299 pregnant women with age group from 18 to 55 years.

Data was collected through a pre-designed, online questionnaire that was distributed among the targeted population. The questionnaire covered all the necessary items in the research.

ETHICAL CONSIDERATIONS:

Data collector gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

STATISTICAL ANALYSIS:

We utilized the statistical package for social sciences, version 16 (SPSS Inc., Chicago, Illinois, USA) to analyze the study data. The results were displayed as counts and percentages. The X² test was used as a test of significance, and differences were considered significant at P value less than 0.05.

RESULTS:

Table (1) show that above half of studied population there age range from 25 -35 years and 47% of them are overweight. Studies found that most of population reach university stage, and when asked them if they had work 47% of them said "No" and 74% of them are pregnant for the third to fifth time.

Table (2) discuss the problem of studied population as 6% of them suffer from diabetes mellitus and only 2% of them had chronic hypertension, 91% of pregnant women in these population not complain from bronchial asthma. almost all of them had no smoking, but most of them get caffeine drinks. When detect there Hemoglobin level it's found that 40% are normal and only 1% had severe anemia, when asked them if they had history of preeclampsia 79% of them said "No" .

Table (3) show association between sociodemographic variables and Preeclampsia, it's

found that 56% of women who had preeclampsia their age range from 25 – 35 years, may there is a relation between preeclampsia and weight as about half of these cases are overweight and when asked them if they work 51% of them said "No". it's found that 79% of cases that complain from preeclampsia reach university stage, and these problem appear in third to fifth pregnant in 41% of cases

Table (4) study the association between other variables and Preeclampsia, type of pregnancy may affect occurring of preeclampsia but 90% of cases had a single baby, when asked them if they had Previous knowledge about preeclampsia 71% of population said "No". 79% of preeclampsia cases had health education about complications of pregnancy, and most of these cases had Counseling about pregnancy and nutritional education. It's found that preeclampsia may be a hereditary disease as 58% of cases had a family history of it. Most of these cases had follow up during their pregnancy and also follow

up of their blood pressure. When measure hemoglobin level of preeclampsia cases found that 66% of cases are normal. When asked cases if they get Caffeine drinks 95% of them said "yes" but only 1% of them get smoking. When study the relation between preeclampsia and other chronic diseases as chronic hypertension and diabetes Mellitus found that above 90% of cases not complain from any of these chronic disease

Table (5) show that there is many of complication in preeclampsia, the most common complication is premature labor as it occur in 50% of cases and also placental abruption occur in 35% of them, but heart diseases are rarely happened. There is many of symptoms from them we can detect the preeclampsia as foot and hand edema occur in 65% of cases and half of cases complain from headache, when measure the blood pressure of these cases it's found that 62% of them are hypertension.

Table (1): Sociodemographic characteristics of the studied population. (N=299)

	Frequency	Percent
Age Group		
<20	13	4.3
20-25	56	18.7
25-35	166	55.5
>35	64	21.4
BMI Group		
Low	7	2.3
Normal	82	27.4
Overweight	141	47.2
Obese	69	23.1
Educational Level		
Primary	3	1.0
Secondary	50	16.7
University or higher	246	82.3
Working Status		
Yes	141	47.2
No	158	52.8
Parity		
1 st pregnancy	35	11.7
1-3	138	46.2
3-5	74	24.7
>5	52	17.4

Table (2): Diabetes mellitus, chronic hypertension, bronchial asthma, smoking, caffeine drinks, in vitro fertilization, Hemoglobin level and preeclampsia In the study population. (N=299)

	Frequency	Percent
Diabetes Mellitus		
Yes	18	6.0
No	281	94.0
Chronic Hypertension		
Yes	6	2.0
No	293	98.0
Bronchial Asthma		
Yes	25	8.4
No	274	91.6
Smoking		
Yes	3	1.0
No	296	99.0
Caffeine Drinks		
Yes	254	84.9
No	45	15.1
In vitro Fertilization		
Yes	11	3.7
No	288	96.3
Hemoglobin level		
Don't know	72	24.1
Normal	120	40.1
Mild anemia	83	27.8
Moderate anemia	20	6.7
Severe anemia	4	1.3
Preeclampsia		
Yes	62	20.7
No	237	79.3

Table (3): association between sociodemographic variables and Preeclampsia

Variable	Response	Preeclampsia		Total (N=299)	P value
		Yes (N=62)	No (N=237)		
Age group	<20	3	10	13	0.991
		4.8%	4.2%	4.3%	
	20-25	11	45	56	
		17.7%	19.0%	18.7%	
	25-35	35	131	166	
		56.5%	55.3%	55.5%	
	>35	13	51	64	
		21.0%	21.5%	21.4%	
BMI group	Low	0	7	7	0.512
		.0%	3.0%	2.3%	
	Normal	19	63	82	
		30.6%	26.6%	27.4%	
	Overweight	30	111	141	
		48.4%	46.8%	47.2%	
	Obese	13	56	69	
		21.0%	23.6%	23.1%	
Working status	Yes	30	111	141	0.469
		48.4%	46.8%	47.2%	
	No	32	126	158	
		51.6%	53.2%	52.8%	
Educational level	Primary	0	3	3	0.422
		.0%	1.3%	1.0%	
	Secondary	13	37	50	
		21.0%	15.6%	16.7%	
	University or higher	49	197	246	
		79.0%	83.1%	82.3%	
Parity	Primigravida	0	35	35	0.0001
		.0%	14.8%	11.7%	
	1-3	26	112	138	
		41.9%	47.3%	46.2%	
	3-5	19	55	74	
		30.6%	23.2%	24.7%	
	>5	17	35	52	
		27.4%	14.8%	17.4%	

Table (4): Association between other variables and Preeclampsia

Variable	Responses	Preeclampsia		Total (N=299)	P value
		Yes (N=62)	No (N=237)		
Type of pregnancy	twins	5	8	13	0.078
		8.1%	3.4%	4.3%	
	single	56	213	269	
		90.3%	89.9%	90.0%	
		1	16	17	
	1.6%	6.8%	5.7%		
Previous knowledge about preeclampsia	no	37	178	215	0.014
		59.7%	75.1%	71.9%	
	yes	25	59	84	
		40.3%	24.9%	28.1%	
Health education about complications of pregnancy	no	13	156	169	0.0001
		21.0%	65.8%	56.5%	
	yes	49	81	130	
		79.0%	34.2%	43.5%	
Counseling about pregnancy and nutritional education	no	11	109	120	0.0001
		17.7%	46.0%	40.1%	
	yes	51	128	179	
		82.3%	54.0%	59.9%	
Follow up of blood pressure during pregnancy	no	7	63	70	0.007
		11.3%	26.6%	23.4%	
	yes	55	174	229	
		88.7%	73.4%	76.6%	
Pregnancy follow up	no	5	45	50	0.026
		8.1%	19.0%	16.7%	
	yes	57	192	249	
		91.9%	81.0%	83.3%	
History of in vitro fertilization	no	59	229	288	0.407
		95.2%	96.6%	96.3%	
	yes	3	8	11	
		4.8%	3.4%	3.7%	
Family history of preeclampsia	no	26	220	246	0.0001
		41.9%	92.8%	82.3%	
	yes	36	17	53	
		58.1%	7.2%	17.7%	

Hemoglobin level	Don't know	5	67	72	0.0001
		8.1%	28.3%	24.1%	
	normal	41	79	120	
		66.1%	33.3%	40.1%	
	Mild anemia	15	68	83	
		24.2%	28.7%	27.8%	
	Moderate anemia	1	19	20	
		1.6%	8.0%	6.7%	
Severe anemia	0	4	4		
	.0%	1.7%	1.3%		
Caffeine drinks	no	3	42	45	0.006
		4.8%	17.7%	15.1%	
	yes	59	195	254	
		95.2%	82.3%	84.9%	
Smoking status	no	61	235	296	0.503
		98.4%	99.2%	99.0%	
	yes	1	2	3	
		1.6%	.8%	1.0%	
Chronic hypertension	no	60	233	293	0.363
		96.8%	98.3%	98.0%	
	yes	2	4	6	
		3.2%	1.7%	2.0%	
Diabetes Mellitus	No	57	224	281	0.308
		91.9%	94.5%	94.0%	
	yes	5	13	18	
		8.1%	5.5%	6.0%	

Table (5): Complications and symptoms in Preeclampsia cases. (N=62)

	Frequency	Percent
Complications		
none	13	21.0
Premature labor	31	50
apportion	7	11.3
Placental abruption	22	35.5
Intrauterine growth retardation	10	16.1
Renal impairment	3	4.8
Heart diseases	1	1.6
others	3	4.8
Symptoms		
none	3	4.8
hypertension	39	62.9
Foot and hand oedema	41	65
convulsions	1	1.6
headache	31	50
delirium	2	3.2

Overlapping may occur

DISCUSSION:

Pre-eclampsia and eclampsia is considered the most common medical problem in pregnancy, and its incidence has been reported in different parts of the world [13]. It results from the interaction between psycho-social, nutritional, economical, environmental and also genetic factors [13]. This complication makes pregnancy problematic and is considered as common cause of prenatal and maternal morbidity and mortality in the world [13]. A high rate of pre-eclampsia in developing countries [14].

We conducted this cross-sectional descriptive study to indicate the prevalence of pre-eclampsia and eclampsia among a representative sample of pregnant women in Arar city, KSA. This study included 299 pregnant women with age group from 18 years to 55 years, the majority of them (76.9%) were more than 25 years old.

In this study, Pre-eclampsia was found in 20.7% of the total number of participants. In a study done by Kahn mouei-aghdam F [15], of the cases under study (592 cases), 18 women (3%) had eclampsia and the rest (97%) had pre-eclampsia, which is a higher results than ours. Another study found that

preeclampsia, eclampsia, and transient hypertension of pregnancy accounted for up 2.8% of deliveries, and the overall prevalence of eclampsia was found to be 0.06% of all pregnancies [16]. Also Lawoyin TO et al. [17] found a lower prevalence of pre-eclampsia (2.8%). In a study conducted in Latin American [18], a total of 878,680 women were included in the analysis. Of these, 42,530 women (4.8%) developed pre-eclampsia and 1872 (0.2%) were complicated by eclampsia.

Although the prevalence of pre-eclampsia in mothers aged between 25 and 35 years is 56.5%, we found no significant correlation between maternal age and pre-eclampsia. This high incidence may be because of the majority of participants were from this age group. Other studies done in different areas into account that have demonstrated the influence of age on pre-eclampsia incidence, it was expected that age to be an effective factor in the incidence of pre-eclampsia and eclampsia but it was not. On the contrary, the results obtained by Agustin Conde-Agudelo [18] indicates that maternal age ≥ 35 years is associated with a significantly increased risk of pre-eclampsia in a large cohort of Latin American and Caribbean women. In another study the relationship between age and pre-eclampsia revealed that 7.6% of mothers

aged below 30 of whom 97.3% were with pre-eclampsia and only 2.6% with eclampsia. Likewise, in mothers above 30 years, the incidence rate of the pre-eclampsia and eclampsia was 96.4% and 3.6%, respectively [15].

As other effective factor in the incidence of pre-eclampsia and eclampsia we can refer to history of eclampsia or pre-eclampsia in family. In our study, 58.1% of the positive cases to pre-eclampsia had family history of pre-eclampsia, and we found a highly significant association between the two variables ($P < 0.01$). These results were similar to Kahn mouei-aghdam F's [15].

Chronic diseases such as diabetes mellitus and hypertension also thought to have a considerable effect on the prevalence of pre-eclampsia in pregnant women, however; in our study we found insignificant correlation between pre-eclampsia and hypertension or diabetes mellitus as pre-eclampsia complicated 3.2% of the pregnancies with chronic hypertension and 1.7 of the pregnancies without chronic hypertension ($P > 0.05$) also pre-eclampsia complicated 8.1% of the pregnancies with DM and 5.5% of the pregnancies without DM ($P > 0.05$). In another study, development of preeclampsia and eclampsia was found to be four times higher in patients with chronic hypertension preceding pregnancy [19]. A higher results obtained in another study from Canada [20], pre-eclampsia complicated 21% of the pregnancies with chronic hypertension. In Saeed M.G. Al-Ghamdi's [16], only 16% of the total patients had chronic hypertension preceding the pregnancy, only half of them had pre-eclampsia. In comparison, another study [15] reported that rate of eclampsia was higher in women with chronic hypertension, but lower regarding pre-eclampsia.

The results of the current study showed also that, 8.1% of mothers of twins pregnancy and 9.7% of the mothers of single fetus get pre-eclampsia, but the association between type of pregnancy and incidence of pre-eclampsia wasn't significant ($P > 0.05$). Unlike in similar study, they reported that the incidence of pre-eclampsia in mothers with twinning is higher than mothers without [15]. Other conducted studies also have presented the same finding [21].

The number of previous pregnancies has been pointed out as an effective factor in the incidence of eclampsia and pre-eclampsia. In our present study a significant correlation was found between the parity of the mothers and incidence of pre-eclampsia. Correspondingly, previous studies carried out in other regions have found this factor as an effective one in

the incidence of eclampsia and preeclampsia [22, 23, 24].

Regarding the clinical presentation, we found foot and hand edema in 65% of the preeclampsia cases. In Saeed M.G. Al-Ghamdi's [17], lower limb edema is detected in only 15% of the cases. Various studies have shown that these hypertensive pregnancies were associated with increased perinatal morbidity and mortality [25, 26, 27].

In the current study, in studying the case complications, premature labor was found in 50% of the cases, placental abruption in 35.5%, intrauterine growth retardation in 16.1% and 21% of the cases had no complications. In order to prevent eclampsia or pre-eclampsia during pregnancy, it is suggested that future studies to be undertaken in more detailed ways and over larger sample. Also health education about pre-eclampsia and eclampsia and their complications should be provided to the pregnant mothers.

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