

## Frequency of Hypertension Associated with Pregnancy among The Pregnant Women Attending Maternal and Child Care Centers in Belbeis City.

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### Abstract

**Background:** Hypertensive disorders of pregnancy are a major cause of maternal and fetal mortality and morbidity, and affect approximately 8% of all pregnancies. **Objective:** To identify frequency of hypertension among pregnant women attending (MCH) centers in Belbeis city and to identify probable factors associated with hypertension. **Method:** A cross-sectional study included 554 pregnant women after 20 weeks of gestation enrolled from 2 rural primary health care centers in Belbeis City (Sharkia governorate) during the period from the first of September 2014, to end of April 2015. **Results:** The study revealed that, the percentage of hypertension among pregnant women was 4.5% and there were no cases of preeclampsia. The significant risk factors predisposing to development of hypertension during pregnancy were age of mother, smoking, family size, obesity, presence of diabetes mellitus, renal diseases and history of hypertension in previous pregnancy. By logistic regression only age of mother was independent predictor of hypertension in pregnant mother. **Recommendation:** The health care physicians in the (MCH) Centers should increase their efforts to provide the high risk pregnant women as early as possible with proper antenatal care and management of hypertension during pregnancy.

**Key words:** *hypertension, pregnancy*

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### Introduction

Gestational hypertension or pregnancy induced hypertension (PIH) is the development of new hypertension in pregnant women after 20 weeks gestation without the presence of protein in the urine or other signs of preeclampsia. Hypertension is defined as blood pressure greater than 140/90 mm Hg.<sup>1</sup> Preeclampsia (PE) is a disorder of pregnancy characterized by high blood pressure and a large amount of protein in the urine (>300 mg of protein in a 24-hour urine sample) with additional medical signs and symptoms.<sup>2</sup> Eclampsia is considered when tonic-clonic seizures appear in a pregnant

woman with high blood pressure and proteinuria.<sup>3</sup> In Egypt, maternal mortality ratio is reported to be 45 per 100000 live births according to WHO.<sup>4</sup> In a study conducted to estimate the prevalence of hypertensive diseases of pregnancy in Egypt (4.2%) had pregnancy induced hypertension, (3.8 %) had preeclampsia and eclampsia was (0.3%).<sup>5</sup> Complications of preeclampsia can affect both the mother and the fetus. Acutely, preeclampsia can be complicated by eclampsia, the development of HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count),

hemorrhagic or ischemic stroke, liver damage and dysfunction, acute kidney injury, and acute respiratory distress syndrome (ARDS).<sup>6</sup> Known risk factors for preeclampsia include null parity (never given birth), Diabetes mellitus (DM), kidney disease, chronic hypertension, prior history of preeclampsia, family history of advanced maternal age (>35 years), obesity, anti-phospholipid antibody syndrome, multiple gestation, having donated a kidney and having sub-clinical hypothyroidism or thyroid antibodies.<sup>7</sup> This study was conducted to estimate frequency of hypertension among pregnant women attending rural health care centers in Belbeis city and to identify probable factors associated with hypertension. Knowing prevalence of hypertension among a sample of pregnant women in rural area may help strengthen the role of health care centers in early detection and improvement of outcome in pregnancy associated hypertension.

**Objectives:** To identify frequency of hypertension among the pregnant women (more than 20 weeks) attending the maternal and child health care (MCH) centers in Belbeis City and probable risk factors.

## Participants and Method

A cross-sectional study was carried out in two (MCH) centers in Belbeis City in Sharkia Governorate at the period from the first of September 2014 to the end of April 2015.

**Sample size:** Based on an average of 10% as prevalence of gestational hypertension WHO<sup>8</sup> a sample size of 554 produces a two-sided 95% confidence interval with a width equal to 0.05.

**Inclusion Criteria:** All attending pregnant females including primigravida (PG) and multigravida (MG) above 20 weeks.<sup>1</sup>

### Study tools:

**A- Interview Questionnaire:** Pregnant women were interviewed by the investigator and the questionnaire sheet

was filled to collect data about: **Socio-demographic characteristics** include age, residence, occupation of pregnant women, and educational level. **Lifestyle and dietary history:** Like eating high fatty foods, salty food and practicing regular exercise. **Obstetric history,** Gravidity and parity, GA, fetal kicks and previous pregnancies. **Present history:** Analysis of current complaint, symptoms suggestive of high blood pressure level such as, (headache, nausea, vomiting and blurring of vision), history of predisposing medical diseases such as DM, Renal diseases. Present history of taking treatment to hypertension. **Past history:** which includes past history of hypertension, hypertension during previous pregnancies, use of contraceptive methods, drug intake, past history of edema of both lower limbs and proteinuria in previous pregnancies and Past history of twin pregnancy and family history of hypertension.

### B- Clinical Examination:

**I. Anthropometric measurements:** (1) **Weight:** weight was measured to the nearest 0.5 Kg, with a portable beam scale, where pregnant women were bare footed with light clothes. (2) **Height:** height was measured to the nearest 1 cm while the pregnant women stranded perfectly by using a scaled meter. (3) **Body mass index (BMI):** BMI was calculated from weight and height as follows,  $BMI = \text{weight (kg)} / \text{height}^2 \text{ (m)}$ . BMI was used as an indicator of degree of obesity with the following classification according to (Battacharya et al., 2007)<sup>9</sup>: Underweight:  $<19.5 \text{ Kg/m}^2$ , Normal weight  $19.5\text{-}24.5 \text{ Kg/m}^2$ , Overweight:  $25\text{-}29.5 \text{ Kg/m}^2$ , Obese:  $30\text{-}40 \text{ Kg/m}^2$  and Morbid obese:  $\geq 40 \text{ Kg/m}^2$ .

### II. Lower limbs edema.

**III. Blood pressure measurement:** Blood pressure was measured by standardized sphygmomanometer by the investigator and hypertension is diagnosed when the blood pressure  $\geq 140$  mm hg systolic or  $\geq 90$  mm Hg diastolic

on two separate readings taken at least four to six hours apart after 20 weeks gestation in an individual with previously normal blood pressure according to (longo et al., 2012).<sup>10</sup>

**C- Medical records:** The medical health recodes available in the maternal and child health centers belong to the selected group were recorded such as: (1) Hemoglobin level: pregnant women are considered anemic when hemoglobin level is less than 11g/dl. (2) Urine analysis for (Proteinuria): a urine dipstick reading of 1+ or greater. (3) Blood sugar (for diabetes mellitus).

*Pilot study:* Was conducted for testing the questionnaire, determining the time needed to fill the questionnaire and testing the respondent acceptance and understanding of the questions.

*Ethical consideration:* Informed consent was obtained from all pregnant women included in the study. An approval from ethical committee in Ain Shams University was obtained. An administrative approval was obtained from the manager of the medical health center and (MCH) care unit in Belbies. Confidentiality of data was ensured by making the questionnaire anonymous.

*Data Management:* The collected data was coded and entered into a personal computer for analysis. Fisher exact and Chi Square ( $X^2$ ) tests were done for qualitative data, t test was used for quantitative data. Logistic regression analysis was done using SPSS program version 20.

## Results

The study included 554 pregnant women (> 20 weeks), their ages ranged from (16-40 years) with mean  $\pm$  SD ( $25.5 \pm 4.5$  years), number of family members ranged from (1- 9) with mean  $\pm$  SD ( $3.1 \pm 1.2$ ), number of rooms in home ranged from (1 – 7) with mean  $\pm$  SD ( $2.6 \pm 0.5$ ). The majority of the pregnant women were housewife (97.4%) and only (2.6%) were working, and the majority of the pregnant

women had got intermediate education (70.4%) Table (1). The systolic blood and diastolic pressure of the pregnant women are shown in (Table (2)). The majority of the pregnant women were normotensives (95.5%) and only (4.5%) were hypertensive 95% CI (2.9- 6.2). The study also revealed that 9.7% of women had lower limb edema, 0.5% with albuminuria and there was no cases of preeclampsia.

As regard factors related to presence of hypertension there was a significant difference between the normotensives and hypertensives as regard the age and family size. Hypertensives were older, with larger family size than normotensives. However, they didn't differ as regard number of rooms at home Table (3). By logistic regression only age of the mother has a significant effect on the frequency of hypertension among pregnancy females.

There was no significant relation between presence of hypertension and working status of women, level of education, Hb level and parity. There was significant difference between normotensives and hypertensives as regard smoking and making sports, hypertensives were more smoker and practices special sports compared with normotensives, however there was no significant difference between normotensives and hypertensives as regard smoking of husband, history of taking salty food, and history of taking fatty food. There was a statistically significant difference between normotensives and hypertensives as regard lower limb edema and BMI as hypertensives were obese more than normotensives and presented with lower limb edema more than normotensives. However, there was no significant difference between normotensives and hypertensives as regard gestational age and presence of albumin in urine Table (4). There was a significant difference between normotensives and hypertensives as regard presence of headache, feeling of fetal kicks and history of hypertension in

previous pregnancy, hypertensives had headache and poor feeling of fetal kicks and previous history of hypertension with pregnancy more than normotensives. Also, hypertensives were diabetics and had history of renal diseases more than normotensives ( $P < 0.05$ ) Table (5). However, there was no association between hypertensive state and twin pregnancy, presence of dyspnea during sleeping, familial history of hypertension and familial history of hypertension with pregnancy. Also, there was no relation between hypertensive state and presence of hypertension before pregnancy, past history of twin pregnancy, past history of taking medicines for long time, means of contraception and presence of lower limb edema or albumin in urine in previous pregnancy.

## Discussion

This study show that the percentage of hypertension among pregnant women attending the (MCH) centers in Bellies city was (4.5%). This result is in agreement with results of *Duley*<sup>11</sup>, study in Canada, who found that the incidence of hypertensive disorders in pregnancy is estimated to range between (3%) and (10%) among all pregnancies.

As regard age of pregnant women, it was found that there is a significant relation between presence of hypertension and their ages, hypertensives were older ( $29.1 \pm 3.6$ ) than normotensives ( $25.4 \pm 4.6$ ), Odds ratio 1.3 (95% CI: 1.03- 1.64). This result is similar to that of *El deeb et al*<sup>5</sup>, study in Egypt who found that the highest incidence of preeclampsia was reported in women aged more than 40 years.

Current study didn't reveal a relation between gestational age and presence of hypertension which is opposing to *Ebighe and Aziken*<sup>12</sup> in Nigeria, who found that, the highest percentage of the hypertension (78.3%) occurred at the 2<sup>nd</sup> trimester compared to the lowest percentage (8.7%) at the 1<sup>st</sup> trimester. This discrepancy may be attributed to the selection of pregnant

females after 20 weeks of pregnancy as the risk may be the same at this age and larger one.

Considering the exposure of the pregnant women to stressful conditions like stress on work, there is no significant difference between normotensives and hypertensives as regard presence of stress. However study of *Shamsi et al* in Pakistan, found that in multivariate analysis, the risk of hypertension with pregnancy increased in women having stressful condition during pregnancy.<sup>13</sup>

As regards family size, current study showed that there is significant difference between the normotensives and hypertensives as regard family size, hypertensive were with larger family size with mean ( $3.7 \pm 1.4$ ) than normotensive with mean ( $3.4 \pm 1.2$ ). However, *Abdel El wahaab et al*<sup>14</sup> in a cross sectional study in Egypt in Zagazig City, found that there is no significant difference between the normotensives and hypertensives as regard housing crowding index. The relation between hypertension and high crowding has long been considered as an indicator of a stressful situation associated with morbidity and with increased incidence of chronic condition.

In current study, obese women were more likely to have hypertension with pregnancy than women with lower body weights. This result is in agreement with *Duckitt and Harrington*<sup>15</sup> in their controlled cohort study in America, as they showed that, the risk of hypertension with pregnancy is increased in women with raised body mass index.

Regarding to the reported clinical presentation in the present study there was a significant difference between the normotensives and hypertensives as regard lower limb edema and headache, as hypertensives are presented with lower limb edema and headache more than normotensives. This result is in agreement with *El deeb et al*<sup>(5)</sup> study in Egypt in Zagazig University hospitals, during the year 2009, and found that while headache

was the most common symptom (21.0%), edema of the lower limb was the most common reported sign (31.9%).

As regard parity, current study revealed that, there is no significant relation between hypertension among pregnant women and parity. However, *Wikstorm et al*<sup>16</sup> in their study in Sweden, found that the risk of hypertension with pregnancy increase in primipara compared to multipara ( $\geq 3$  deliveries).

As regards the proteinuria and hypertension with pregnancy current study showed that there is no significant difference between normotensive and hypertensive as regard presence of albumin in urine, only (0.6%) of normotensive suffering from proteinuria and all hypertensive presented without proteinuria so, no cases of pre-eclampsia was detected in this study. This is opposing to *Abdel El wahaab et al*<sup>14</sup> in their study in Egypt found that (40.9%) of hypertensive pregnant women are significantly suffering from proteinuria compared to (11.1%) of normotensive pregnant women.

There was a significant relation between DM and risk of hypertension in pregnancy in current study, as diabetic women were at high risk to develop hypertension during pregnancy more than non-diabetics. Similar findings were seen by *Shamsi et al*<sup>13</sup> study in Pakistan, who found in multivariate analysis, women having pre-gestational diabetes and gestational diabetes were higher among hypertensive cases (12.4%) as compared to controls (1.9%).

Renal diseases in current study were higher (4.0%) in hypertensive pregnant women compared to normotensives (0.0%). This result is in agreement with *Abdel El wahaab et al*<sup>14</sup> who found that patients with renal diseases are at high risk to develop hypertension during pregnancy 3.01 times more than who do not have.

### Conclusion

Current study revealed that, the

percentage of hypertension among the pregnant women who are attending the (MCH) Centers in Belbeis city was (4.5%). Significant risk factors predisposing for the development of hypertension during pregnancy were history of smoking, larger family size, increased maternal age, history of diabetes mellitus, renal diseases and obesity. Therefore, increased efforts should be made by the health care physicians in the (MCH) Centers to provide the high risk pregnant women as early as possible with proper antenatal care and management of hypertension during pregnancy.

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**Table (1):** Socio-demographic characteristics of studied women.

Socio-demographic characteristics		$\bar{x} \pm SD$	Range
Age (years)		25.5 $\pm$ 4.5	16 – 40
Family size		3.1 $\pm$ 1.2	1 – 9
Number of rooms in home		2.6 $\pm$ 0.5	1 – 7
		<b>n</b>	<b>%</b>
<b>Job*</b>	Housewife	534	97.4%
	Employee	14	2.6%
<b>Education</b>	Illiterate	33	6.0%
	Read and write	106	19.1%
	Intermediate	390	70.4%
	University	25	4.5%

\*There was missed data

**Table (2) :** Blood pressure of pregnant women attending the maternal and child health centers in Belbeis city.

	$\bar{x} \pm SD$	Range
<b>1<sup>st</sup> reading of systolic blood pressure</b>	115.9 $\pm$ 11.9	90 – 185
<b>2<sup>nd</sup> reading of Systolic blood pressure</b>	114.7 $\pm$ 10.8	80 – 170
<b>1<sup>st</sup> reading of Diastolic blood pressure</b>	75.0 $\pm$ 8.0	60 – 100
<b>2<sup>nd</sup> reading of Diastolic blood pressure</b>	74.5 $\pm$ 7.2	60 - 100

**Table (3):** Comparison between normotensive and hypertensive pregnant women according to age, family size and number of rooms in home.

Parameters	Normotensives N = 529		Hypertensives N = 25		t.test	
	Mean±SD		Mean±SD		P.value	
Age	25.4	4.6	29.1	3.6	<0.001	Sig.
Family size	3.1	1.2	3.7	1.4	0.04	Sig.
Number of rooms in home	2.7	0.6	2.8	0.4	0.52	NS

**Table (4):** Gestational age and sings of preeclampsia among pregnant women included in the study.

Parameters		Normotensives (n= 529)		Hypertensives (n= 25)		P.value (Fisher's exact)	
		n	%	n	%		
Gestational age	< 32 weeks	494	93.4	23	92.0	0.680	NS
	> 32 weeks	35	6.6	2	8.0		
BMI*	Normal	75	14.7	1	4.0	0.009	Sig
	Overweight	187	36.7	4	16.0		
	Obese	248	48.6	20	80.0		
Lower limb edema*	Absent	464	92.1	13	54.2	<0.001	Sig
	Present	40	7.9	11	45.8		
Albuminuria*	Absent	525	99.4	24	100.0	1	NS
	Present	3	0.6	0	0.0		

\*There was missed data

**Table (5):** Comparison between normotensive and hypertensive pregnant women according to history of chronic diseases.

		Normotensives (n= 529)		Hypertensives (n= 25)		Fisher's exact	
		n	%	n	%		
<b>History of renal diseases*</b>	Absent	523	100.0	24	96.0	0.046	S
	Present	0	0.0	1	4.0		
<b>History of heart diseases*</b>	Absent	521	99.6	25	100.0	1	NS
	Present	2	0.4	0	0.0		
<b>Diabetes mellitus*</b>	Absent	525	99.4	23	92.0	0.018	S
	Present	3	0.6	2	8.0		
<b>History of Endocrine diseases*</b>	Absent	523	100.0	25	100.0		
	Present	0	0.0	0	0.0		

\*There was missed data