

## Predictive value of mean arterial pressure in first trimester of pregnancy for risk of preeclampsia

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### Objective

To determine the accuracy of using systolic (SBP) and diastolic blood pressure (DBP), mean arterial pressure (MAP), and increase of blood pressure (BP) in prediction of Preeclampsia (PE).

### Methods

The study included 400 participants. This prospective study is based on 300 normotensive pregnant and 100 preeclamptic pregnant divided in two subgroups: mild (n=67) and severe (n=33) PE. The first examination and BP check were performed in the period of 6-12 week of gestation (wg).

### Results

We found significant difference between the groups, but the more important differences in BP values (especially diastolic and MAP) existed before the pathological increase of the BP above the normal values. The pathological increase happened most often after 31 wg (at 92, 5%) and less often after 26 wg (at 7, 5%) in pregnancies with mild PE, while the pregnancies with severe PE, 18, 2% had increased BP after 21 wg; 24% in the period of 26-30 wg and 57, 58% after 31 wg. Based on the results we conclude that when BP is measured in the first trimester of pregnancy, the MAP is a better predictor for PE than SBP and DBP.

### Conclusion

During the first hospital visit at first trimester, an integrated approach combining data from maternal characteristics and history and maternal blood pressure measurement can define the patient who are at risk for PE.

**Table 1. Maternal characteristics and pregnancy outcome by study groups**

Characteristics	Controls n=300	mild preeclampsia n=67	severe preeclampsia n=33	P value
Maternal age (years)	27.5±5.04 (17-42)	27.4±5.9 (17-42)	29.2±5.8 (16-43)	p>0.05†
Parity (%)				
Primipara	46.7 (140/300)	65.7 (44/67)	60.6 (20/33)	p<0.05†
multipara	53.3 (160/300)	34.3 (23/67)	39.4 (13/33)	
Smoking status	10.33 (31/300)	1.49 (1/67)	30.3 (1/33)	<0.05‡
BMI	22.7±1.7 (19.1-27.6)	25.53±1.6 (21.8-27.9)	25.8±2.2 (21.7-29.1)	<0.01§
<19.99	1.7 (5/300)	0 (0/67)	0 (0/33)	
20.0-24.99	87.3 (262/300)	23.9 (16/67)	30.3 (10/33)	
25.0-29.99	11.0 (33/300)	76.1 (51/67)	69.7 (23/33)	
Weight gain (kg)	13.9±3.1 (7-29)	19.6±3.8 (13-31)	20.2±7.4 (10-39)	
Duration of pregnancy	39.6±0.9 (37-42)	39.1±0.9 (37-40)	37.5±2.0 (32-40)	<0.01†
≤32	0 (0/300)	0 (0/67)	3.03 (1/33)	
33-36	0 (0/300)	0 (0/67)	18.2 (6/33)	
>37	100 (300/300)	100 (67/67)	78.8 (26/33)	

Data are given as mean, standard deviation and range or % unless otherwise specified; n= number of subjects;  
† multivariate analysis; ‡ chi-squared test

**Table 2. Characteristics of mild and severe preeclampsia**

Variables	Mild preeclampsia (n=67)	Severe preeclampsia (n=33)
Onset of PE**‡ (week of gestation)	34.5± 2.7 (26-38)	30.4± 4.5 (21-38)
Gestational age during the PE onset (%)*‡		
≤25	0	18.18
26-30	7.5	24.2
≥31	92.5	57.6
Duration of PE**§ (weeks)	4.8± 2.6 (1-14)	8.0± 4.3 (2-16)

MP= group with mild preeclampsia; SP= group with severe preeclampsia; \*Data are given as median, standard deviation and range; \*\* p<0.01; ‡ chi-squared test; Student's t test.

**Table 3. Values of systolic blood pressure, diastolic blood pressure and mean arterial pressure**

Characteristics	Normal pregnancies n=300	mild preeclampsia n=67	severe preeclampsia n=33	P value*
SBP (mmHg) 8-12 wg	102.2±7.4	111.8±8.7	114.2±10.5	>0.05
DBP (mmHg) 8-12 wg	63.7±4.9	73.4±7.5	75.5±8.2	<0.05**
MAP (mmHg) 8-12 wg	76.5±5.4	86.2±7.66	88.4±8.6	<0.05

Data are given as mean and standard deviation; n= number of subjects; SBP- Systolic blood pressure; DBP- Diastolic blood pressure; MAP-Mean arterial blood pressure; wg=week of gestation; \*)\* two way ANOVA; \*\*control vs. severe preeclampsia;