

## INFANTS OF MOTHERS WITH PREECLAMPSIA RISK FACTORS

Lejla Kamerić, Zlatan Fatušić, Dženita Ljuca, Gordana Bogdanović, Almir Halilović, Alen Kamerić

© by Acta Medica Saliniana  
ISSN 0350-364X

**Type of manuscript:**  
Professional papers

**Title:**  
INFANTS OF MOTHERS WITH  
PREECLAMPSIA RISK FACTORS

**Authors:**  
Lejla Kamerić, Zlatan Fatušić,  
Dženita Ljuca, Gordana Bogdanović,  
Almir Halilović, Alen Kamerić

DOI: 10.5457/441

**Affiliations:**  
Gynaecology  
and Obstetrics Clinic,  
University Clinical Center Tuzla,  
Bosnia and Herzegovina

**Received:**  
29.11.2017.

**Corresponding author:**  
Lejla Kamerić  
Clinic for Gynecology and Obstetrics,  
University Clinical centre Tuzla,  
Trnovac bb, 75 000, Tuzla,  
Bosnia and Herzegovina  
lejlagin71@gmail.com  
Tel: +387 35 303 408  
Mob + 38761 280 806

The aim of this research is to present that pregnant women with preeclampsia risk factor often give birth to infants with lower birth weight as well as infants who have lower Apgar score values.

**Material and methods:** This prospective study included 240 pregnant women of different priority, aged 20 to 40, with one or more preeclampsia risk factors which are related to personal or family anamnesis and their infants.

**Results:** Pregnant women with preeclampsia risk factors gave birth to infants with 19% chance of being hypotrophic, chance that infants might be hypotrophic is 3,16 (95%CI: 1,39-7,41) is bigger in this group of pregnant women. Giving birth to babies with lower birth weight is often with pregnant women who have more preeclampsia syndromes. Linear decline of Apgar score values has been evident with increased number of infants with lower birth weight, meaning more children with lower birth weight have lower Apgar score values at the 1st. minute of birth. Lower Apgar score values at birth is seen with infants from mothers who had more preeclampsia syndromes.

**Conclusion:** Frequency of giving birth to infants with lower birth weight as well as giving birth to infants with lower Apgar score values is often with mothers who have preeclampsia risk factors.

**Key words:** risk factors, preeclampsia, infants.

## INTRODUCTION

Preeclampsia is a syndrome which is provoked during the pregnancy as a consequence of hypertension and it is followed by proteinuria, edema and very often, changes on other organic systems after 20 weeks gestation (NG)<sup>1</sup>. During the pregnancy which is complicated by hypertension, fetus is endangered because of damaged uteroplacental blood vessels, and that causes weaker supply of nutrients and lower concentration of oxygen in fetal blood (hypoxia, ischemia). These negative factors cause intrauterine arrest of the fetus growth, intrauterine mortality is often present, premature birth, premature infants and perinatal mortality. Incidence IUGR is increasing with the difficulty and duration of hypertension. The high perinatal mortality, from 20 to 30 %, is with women with preeclampsia and it is developed because of infarction of placenta or its growth arrest.<sup>2</sup>

The aim of this study is the analysis of personal or family anamnesis of the risk factors of mothers as predictors to give birth to infants with lower birth weight as well as lower Apgar score values.

## MATERIAL AND METHODS

This research has been conducted as prospective study at Gynaecology and Obstetrics Clinic, Tuzla University and Clinical Center. The research included 240 pregnant women, aged 20 to 40, who were regularly controlled by their gynaecologists. The subjects were divided into two groups, a test group and a controlled group. The test group had 120 pregnant women with preeclampsia risk factors (young primipara, older women of multiple births, previous pregnancy with complications which were caused by preeclampsia symptoms, diabetes, over weight, thrombus, kidney disease, hyperemesis, high blood pressure, proteinuria, vitro fertilization pregnancy, family hypertension).

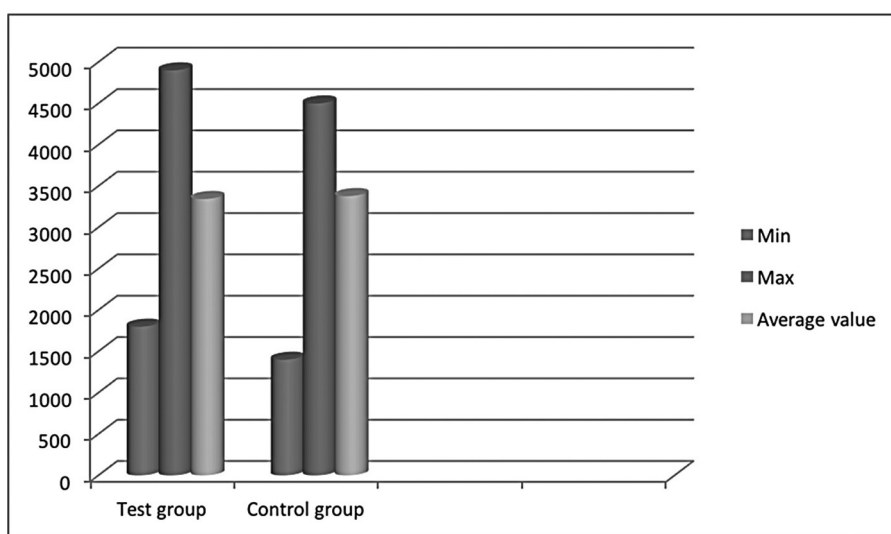
The controlled group had 120 pregnant women, aged 20 to 40, primipara and women of multiple births, with no pregnancy risk factors, who were regularly controlled by their gynaecologists. Pregnant women with multiple gestation were not included into this research. All the subjects in this research had the following analysis: pregnancy duration at the moment of birth, present preeclampsia symptoms,

birth weight of the infant and standards of intrauterine growth and Apgar score values. Preeclampsia symptoms were analysed based on whether the pregnant woman had blood pressure higher than 140/90mmHg, after the 20th. week of pregnancy and present particles of protein in urine (300mg/L). For the intrauterine growth evaluation of the infants, we used percentile curve of birth weight of infants in Bosnia and Herzegovina.<sup>3</sup> The clinic evaluation of the born fetus was specified according to Apgar score at the 1st. and the 5th. minute of birth. Apgar score at birth was determined by the following parameters: heart rate, breathing, muscle tone, reflexes and skin tone of the infant at the birth. Each of these parameters was noted with the grades from 0 to 2, and Apgar score was determined with summation of these parameters.

Statistical analysis of data in this research was conducted by using the standard methods and procedures of descriptive and inferential statistics. The frequencies of phenomenon were tested with  $\chi^2$  test where beside  $\chi^2$  in the result interpretation, the Odds Ratio was analysed as well. When presenting numeric data, minimum and maximum values were calculated, the mean value and standard deviation as well. Statistical hypotheses which include this type of data were tested by Student T-test, ie ANOVA procedure. While testing, statistical hypotheses were tested with the significance of 5% ( $p=0.05$ ). During elaboration process we used Epi info programs (especially Statcalc module), Excel and Arcus Quickstat biomedical. Epi info is a free program with lots of options and it is recommended by the World Health Organization.<sup>4</sup>

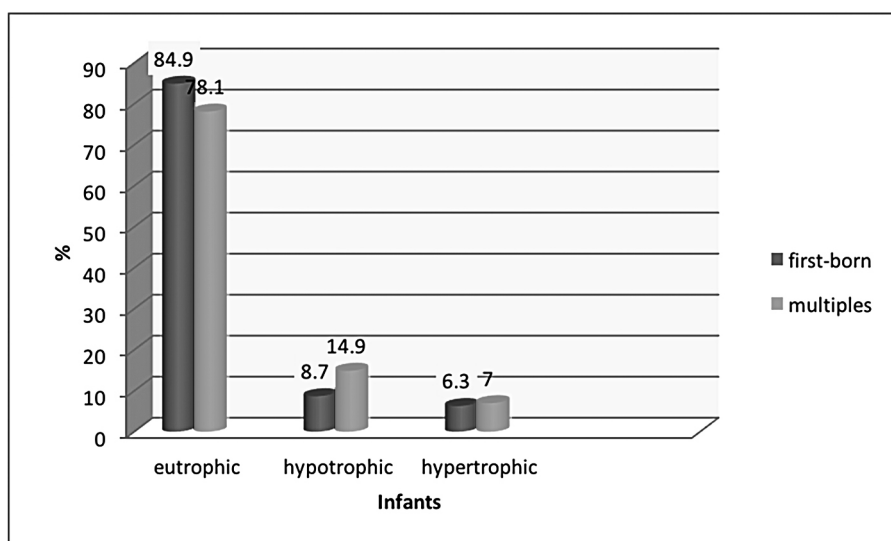
**RESULTS**

Picture 1 shows the infant birth weight of all conducted subjects.



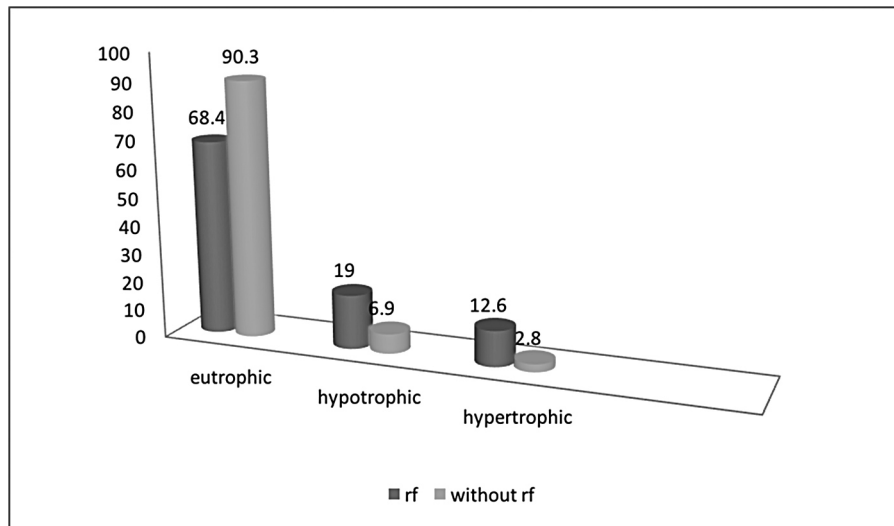
**Picture 1.** Infants birth weight

There was not significant difference between the mean value of the infant birth weight of the test and controlled group ( $t=0,56$ ,  $p=0,578$ ).



**Picture 2.** Infant birth weight according to parity of mothers

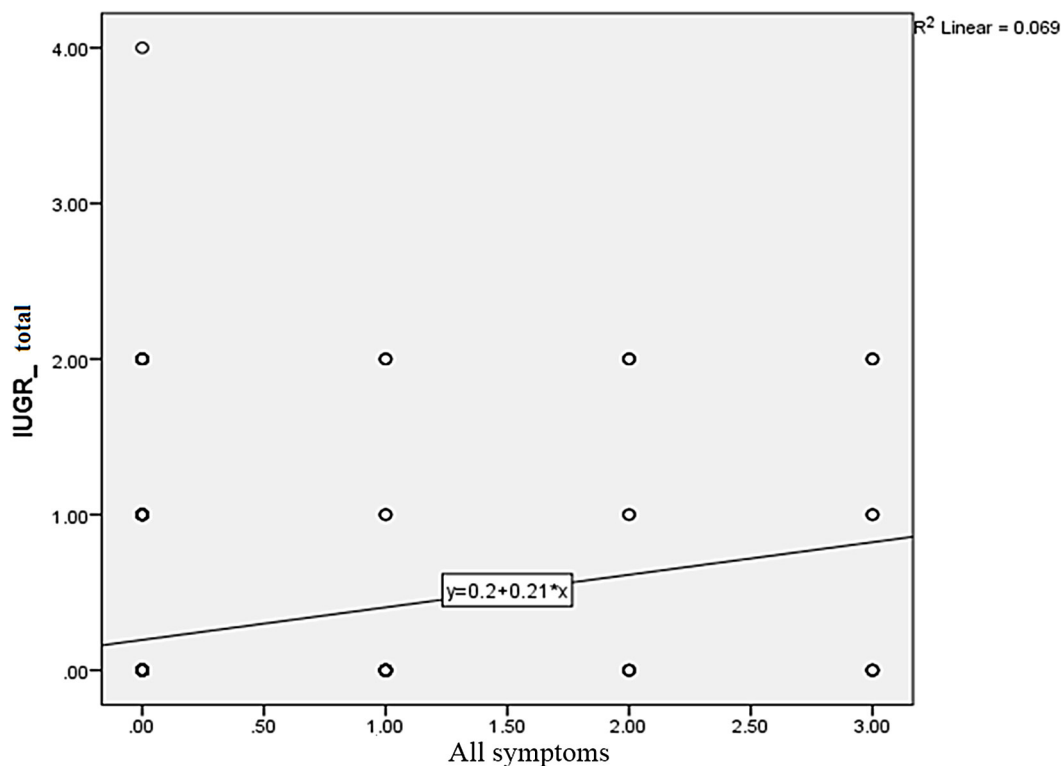
With analysis of infant birth weight according to parity of mothers, there was not statistical difference in frequency of hypotrophic infants according to parity of mothers.



**Picture 3.** Risk factors and infant birth weight

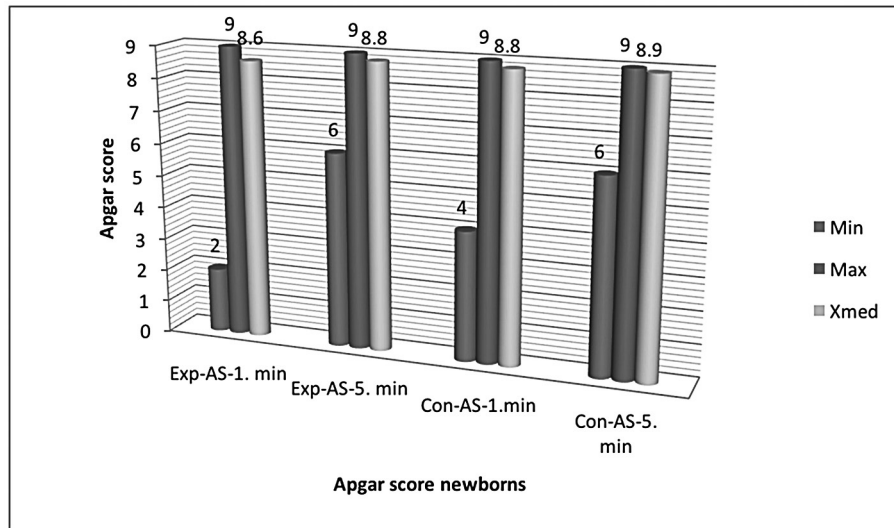
Statistical significant connection has been found between the hypotrophic infants of risk factors presence ( $\chi^2=6,96$ ,  $p=0,008$ ). The chance for appearance of hypotrophic infants is 3,16 (95%CI: 1,39-7,41) times

bigger in the group of pregnant women with one or more preeclampsia risk factor. In the test group, with pregnant women who had personal anamnesis, infants had lower birth weight ( $t=2,757$ ,  $p=0,07$ ).



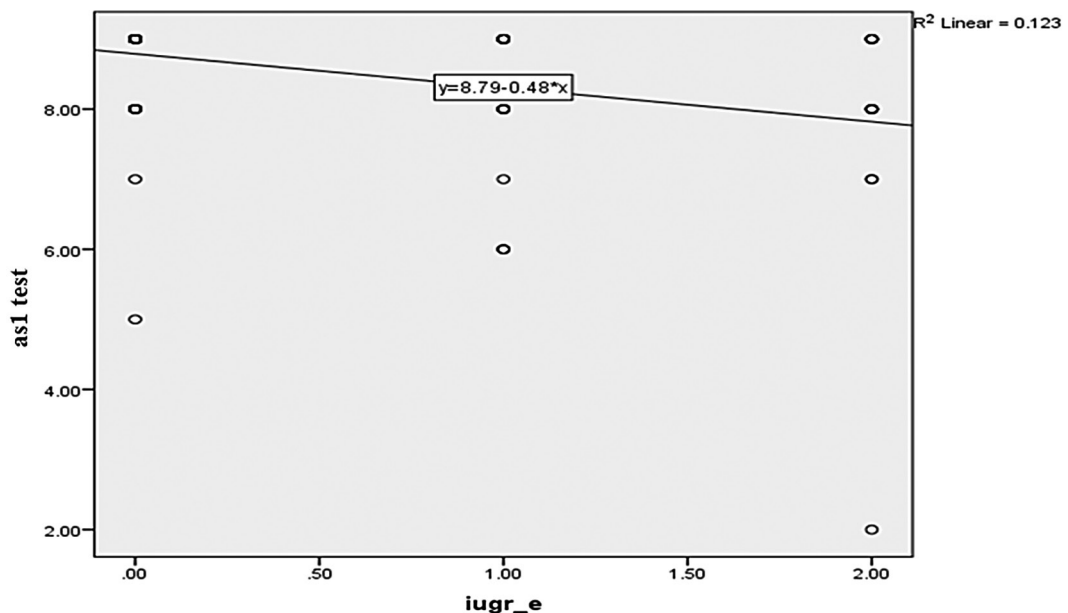
**Picture 4.** Symptoms of women with IUGR

Statistically significant higher frequency of infants with lower birth weight was found with pregnant women who had more preeclampsia symptoms ( $p=0,002$ ).



Picture 5. Infant Apgar score

Apgar score after the 1st. minute is statistically significant and higher in the group of pregnant women with no risk factors for preeclampsia ( $t=2,02$ ,  $p=0,044$ ).



Picture 6. IUGR and Apgar score of infants at the 1st. minute

It is evident that infants with lower birth weight have lower Apgar score at the 1st. minute of birth. Statistically significant difference was found in the numbers of symptoms and Apgar score of infants ( $t=2,96$ ;  $p=0,004$ ).

**DISCUSSION**

During our research we have discovered that women who were pregnant for the first time, had higher chances by 3,16 times to have hypothropic infants in the group of pregnant women with one or more preeclampsia risk factors. Similar results were found in the Indian study ,where in the group of pregnant women with preeclampsia, 8% hypothropic infants were traced.<sup>5</sup> At SKB (University Clinical Hospital) Mostar Gynaecology and Obstetrics Clinic, the frequency of lower birth weight infants with hypertension disorder was 17%.<sup>6</sup> According

to the same authors, higher percentage than in our study, are with pregnant women with preeclampsia who gave birth to 26,1% infants of lower birth weight, in the group with hypertension gestation is 14,5%, while pregnant women with chronic hypertension gave birth to infants with birth weight lower than 2500 grams. During our research the average infant birth weight was 3345 (SD±448), similar to the average infant birth weight in SKB (University Clinical Hospital) Mostar 3224,55±700,65 (750g-4300g).<sup>6</sup> Similar results can be found in the literature where the average birth weight was 3300 (2930-3628).<sup>7</sup> Pregnant women with preeclampsia gave premature birth to a quarter infants, and higher percentage (24%) infants were smaller than is normal for gestation period.<sup>8</sup> In utero „stress“ to which infants of preeclampsia mothers are exposed, it is possible for them to have acceleration of fetal maturation

and better prognosis than other premature born infants.<sup>9</sup> Al Fatih et al. compared premature born infants of mother with preeclampsia and without it. From 348 pregnant women, 143 (41,1%) were diagnosed with preeclampsia. The mean value body weight, Apgar score at the 1st. and the 5th. minute were significantly higher in the group of pregnant women without preeclampsia (2041g, to 1729g; 7,17 to 6,33; 8,50 to 8,05).<sup>9</sup>

Results of our research show statistically significant difference between the test and controlled group of pregnant women who gave births to children with lower body weight for the gestation period ( $t=2,757$ ,  $p=0,07$ ). Similar results are given by Schneider et al. in the big study ( $n=647,392$ ) meaning that neonatal complication with preeclampsia include IUGR, acute respiratory distress syndrome, postpartum neonatal hypoglycemia and low Apgar score at birth.<sup>10</sup> In the group of pregnant women with present preeclampsia risk factors was the higher number of hypotrophic infants 18 (19,0%) and statistically significant difference connection was found between hypotrophic infants and risk factors. In our research we have found that pregnant women with no preeclampsia risk factors have higher chances of having infants who are eutrophic. Yerlikaya et al. in their study have found that the risk of stillborn babies is increasing with mother's weight (odds ratio (OR), 1,01 per kilo above 69 kilos), with Afro-Caribbean origin pregnant women (OR, 2,01), those with assisted reproduction (OR, 1,79), with those who smoked (OR, 1,71), with those who have history of chronic hypertension (OR, 2,62), systemic lupus erythematosus/antiphospholipid syndrome (OR, 3,61) or diabetes mellitus (OR, 2,55), and it is increased with women with stillborn baby history (OR, 4,81).<sup>11</sup>

In one research which was conducted in India from 15 high risk pregnancies, with 9 (52,9%) were infants with IUGR and PIH of mothers, while 8 (47,1%) were infants with IUGR, which is significantly higher than in our research and is explained with lower number of analysed pregnancies.<sup>12</sup> Skender et al. have found that from 179 babies from mothers with PIH, 20 (11,7%) of them had registered IUGR.<sup>13</sup> Nagar et al. within their research have found that pregnant women with preeclampsia had 35,7% infants with IUGR.<sup>14</sup>

Stillborn babies risk is 3,6 to 1000 total and 5,2 to 1000 during the pregnancy with preeclampsia (relative risk 86, 95% CI 46-142).<sup>15</sup> Relative risk of stillborn babies is significantly increased with preeclampsia in the early stage of pregnancy. According to Sharma et al. fetal risk of mortality related to preeclampsia begins when preeclampsia starts to be clinical obvious.<sup>16</sup> During our research there were no stillborn babies. One big study in India showed that RI measurements can serve in preeclampsia detection as well as with IUGR.<sup>16</sup>

Also when observing the symptom presence with the test group of pregnant women and infant birth weight, we have concluded that when higher number of preeclampsia symptom is present, the number of children with lower body mass for the pregnancy period is growing ( $p=0,002$ ). The same results were given by Pearson coefficient correlation.

Our study has shown that mean value of Apgar score at the 1st. minute is 8,6 ( $SD\pm 1,0$ ) in the test group of pregnant women, and that there is the significant difference among the test and controlled group, ie infants born by mothers from the controlled group have better vital parameters at birth ( $t=2,727$ ;  $p=0,07$ ). Geyl et al. during their research also had infants with lower Apgar score at the 1st. and the 5th. minute of birth with preeclampsia pregnant women. In the big study which covered ( $n=647,392$ ) pregnant women and their infants concluded that neonatal complication with preeclampsia include IUGR, acute respiratory distress syndrome, postpartum neonatal hypoglycemia and lower Apgar score at birth.<sup>17</sup> Ayaz et al. in their study from 73 cases with preeclampsia, 31 infants had lower Apgar score.<sup>18</sup> Sulaeman et al. during their study have found lower Apgar values at the 1st. and the 5th. minute of birth with 18% and 5,4% infants. They have not found statistically significant difference at the 5th. minute at birth.<sup>19</sup>

Pregnant women with preeclampsia risk factors more often give birth to infants with lower body mass for the period as well as with lower Apgar score.

## REFERENCES

1. Wagner M. What every midwife should know about ACOG et VBAC. Critique of ACOG Practice Bulletin 5. July 1999. Vaginal birth after previous cesarean section. Midwifery Today Int midwife Fall 2001; 41-43.
2. Brezovec Cvetnić B, Bartolek D. Patološka stanja u trudnoći U: Klinička anesteziologija (ur) Jukić M, Majerić Kogler V, Husedžinović I, Sekulić A, Žunić J. Medicinska naklada, Zagreb 2005; 779-786.
3. Muratović S. Percentilne krivulje rasta žive novorođenčadi za populaciju Bosne i Hercegovine. Doktorska disertacija. Medicinski fakultet Univerziteta u Tuzli 2011.
4. Altman D. G. Practical Statistic for Medical Research, Chapman and Hall, New York 1990.
5. Nagar T, Sharma D, Choudhary M, Khoiwal S, Nagar RP, Pandita A. The Role of Uterine and Umbilical Arterial Doppler in High-risk pregnancy: A Prospective Observational Study from India. Clin Med Insights Reprod Health 2015; 9: 1-5.
6. Barišić T, Šimić A, Tomić V, Soldo D, Orlović M, Vasilj A. Učestalost rađanja novorođenčadi niske porođajne mase u trudnoćama s hipertenzivnim poremećajima. Journal for Gynecology, Perinatology, Reproductive medicine and Ultrasonic diagnostics 2015; 79.
7. Singh T, Leslie K, Bhide A, Dantonio F, Thilaganathan B. Role of Second-Trimester Uterine Artery Doppler in Assessing Stillbirth Risk. Obstetric&Gynecology 2012; Vol. 119,NO. 2; Part 1.
8. North RA, McCowan LME, Dekker GA, Poston L, Chan EHY, Stewart AW. Clinical risk prediction for preeclampsia in nulliparous women: development of model in international prospective cohort. BMJ 2011; 342.



9. Al Fatah A. N, Susilo S. A, Pratiwi K. N, Irwinda R, Sungkar A, Wibowo N. Does preeclampsia give beneficial effect on neonatal outcomes of preterm infants? Department of Obstetric and Gynecologist Universitas Indonesia, Jakarta, Indonesia 2015.
10. Schneider S, Freerksen N, Maul H. Risk groups and maternal-neonatal complications of preeclampsia. Current results from the national German Perinatal Quality Registry. *J Perinatal Med* 2011; 39 (3): 257-63.
11. Yerlikaya G, Akolekar R, McPherson K, Syngelaki A, Nikolaides KH. Prediction of stillbirth from maternal demographic and pregnancy characteristics. *Ultrasound Obstet Gynecol* 2016; 48(5): 607-612.
12. Agrawal P, Agrawal RK, Agrawal MC. Persistent uterine artery notch-A predictor of intrauterine growth retardation and pregnancy induced hypertension. *The Journal of Obstetrics and Gynecologia of India* 2006; Vol. 56, No 4: 301-303.
13. Skender M, Lapčević J, Jovčić N, Milenković S. Struktura morbiditeta novorođenčadi iz trudnoća prečeenih hipertenzijom. *Ginekološko akušerska nedelja* 2008.
14. Nagar T, Sharma D, Choudhary M, Khoiwal S, Nagar RP, Pandita A. The Role of Uterine and Umbilical Arterial Doppler in High-risk pregnancy: A Prospective Observational Study from India. *Clin Med Insights Reprod Health* 2015; 9: 1-5.
15. Harmon Q. E, Lisu H, Umbach D, Klungsøyr K, Engel S, Magnus P, Skjærven R, Zhang J, Wilcox A. J. Risk of Fetla Death With Preeclampsia. *Obstetrics&Gynecology* 2015; 125(3): 628-635.
16. Sharma D, Nagar T, Choudhary M, Khoiwal S, Nagar RP, Pandita A. The Role of Uterine and Umbilical Arterial Doppler in High-risk Pregnancy: A Prospective Observational Study from India. *Clin med Insights Reprod health* 2015; 9: 1-5.
17. Geyl C, Clouquer E, Lambert J, Subtil D, Debarge V, Deruelle P. Links between preeclampsia and intrauterin growth restriction. *Gynecol Obstet fertil* 2014; 42: 229-233.
18. Ayaz A, Muhammad T, Hussaun SA, Habib S. Neonatal outcome in pre-eclampsic patients. *J Ayub Ned Coll Abbottabad* 2009; 21(2): 53-5.
19. Sulaeman A, Susilo, Karina N. Pratiwi, Adly N.A. Fattah, Rima I, Noroyono W. Determinants of low Apgar score among preeclampsic deliveris in Cipto Mangunkusumo Hospital. a retrospective cohoret study in 2014. *Medical Journal of Indonesia* 2014.



Scan this QR code with your mobile device for instant access to the current Issue of Acta Medica Saliniana