

Investigation of the relationship between idiopathic microscopic hematuria (in the first and second trimesters) and major adverse outcomes of pregnancy

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Abstract

Background: The aim of this study was to investigate the relationship between idiopathic microscopic hematuria (in the first and second trimesters) and major adverse outcomes of pregnancy.

Materials and Methods: Urinalysis was done for 700 pregnant women before 24 weeks of pregnancy. Those who had 3–5 red blood cells per milliliter in urinalysis were considered positive urinalysis. Then, all individuals were examined for blood pressure and other alarm signs of pregnancy complications in each visit. All mothers were followed for the incidence of preeclampsia, preterm delivery, and pregnancy outcome until the end of pregnancy.

Results: The results of this study showed that no significant difference in terms of incident of pregnancy complications between the pregnant women with and without hematuria and the only abortions and neonatal deaths differed between the two groups.

Conclusion: These results suggest that further studies are needed to determine whether idiopathic microscopic hematuria can be a predictive value for pregnancy complications or not.

Key Words: Idiopathic microscopic hematuria, low birth weight, preeclampsia, preterm labor

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INTRODUCTION

Preterm labor, fetal growth restriction, low birth weight, and preeclampsia are considered as the most important and most common adverse pregnancy outcomes. Hypertensive disorders occur in the course of 5–10% of all pregnancies and can be allocated a major contribution to maternal morbidity and mortality.^[1]

It is important that preeclampsia has prevented more than half of all deaths associated with pregnancy hypertension.^[2]

Preeclampsia also caused fetal growth restriction with impaired uterine placental perfusion due to vascular spasm, and it is a major cause of increased rates of perinatal morbidity and mortality.^[2]

Hence, it has been suggested to measure the various biological, biochemical, and biophysical markers that are involved in the pathophysiology of preeclampsia during early pregnancy to predict occurrence the disease.^[3]

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In a number of retrospective and prospective studies, it has been shown significant association between idiopathic hematuria and adverse pregnancy outcomes, particularly in preeclampsia.^[4,5] Significance of microscopic hematuria, especially during early pregnancy, is still unclear, and in some studies, association between the microscopic hematuria and pregnancy complications has been doubtful.

Incidence of microscopic hematuria during pregnancy has been reported 3–20%, and subsequently, its association with increased risk of preeclampsia has been reported from 2 to 8 times more than normal.^[6]

Because of the preeclampsia is a major cause of maternal mortality, it is important prognostic factors. Urinalysis test is low cost and can be done in the first prenatal care visit, and it can estimate the risk of preeclampsia during pregnancy. Further, it can reduce heavy financial and emotional burden of preterm birth. The aim of this study was investigation of the relationship between idiopathic microscopic hematuria (in the first and second trimesters) and major adverse outcomes of pregnancy.

MATERIALS AND METHODS

This study is a prospective cohort study that was carried out on pregnant women referred to obstetric clinics of Alzahra Hospital and Shahid Beheshti Hospital in Isfahan, Iran. The study was conducted from January 2013 for 1 year and the samples were selected randomly.

The pregnant women who referred to gynecology clinic were examined by a gynecologist. Eligible women were informed about the study and informed consent was obtained from the participants.

Pregnant women referred to obstetrics and gynecology clinics were evaluated in terms of the prevalence of microscopic hematuria and urine analysis. All participants had informed consent. Then, those patients who had idiopathic microscopic hematuria were enrolled in the study.

Participants who have a history of chronic hypertension, preeclampsia, diabetes, collagen vascular diseases, and general diseases such as diabetes mellitus, hypertension, chronic heart, kidney, liver, and endocrinology disease that may be associated with an increased risk of high blood pressure or other complications of pregnancy were excluded from the study.

Notably urine sampling was performed before any vaginal pelvic examination, which might be associated with bladder irritation. In addition, participants who had an anterior placenta position were excluded from the study because of the potential impact on the bladder and hematuria.

Urinalysis was done two times for all participants before 24 weeks of pregnancy. Pregnant women who had 3–5 red blood cells per milliliter in urinalysis were considered as positive urinalysis.

The causes of microscopic hematuria were investigated, and after exclusion of urologic causes, infectious and other causes of hematuria based on history, physical examination, and routine laboratory tests, participants with idiopathic microscopic hematuria were enrolled in the study.

Then, all individuals were examined for blood pressure and other alarming signs of pregnancy complications in each visit. All mothers were followed for the incidence of preeclampsia, preterm delivery, and pregnancy outcome until the end of pregnancy.

Data were analyzed using the Statistical Package for the Social Sciences version 20.0 (SPSS Inc., Chicago, IL, USA). Chi-square test has been used for between-group differences, and Logistic regression to predict the effect of variables related to gestational diabetes. A $P < 0.05$ was considered statistically significant.

RESULTS

A total of 700 pregnant women were included in the study. Ninety participants (12.86%) had hematuria in urine analysis in the first and second trimesters and 610 participants (87.14%) had not. The mean age of participants was 28.42 years (5.65 standard deviation, range 17–36 years). The mean age of participants with hematuria was 28.25 ± 5.621 years and without hematuria was 28.59 ± 5.679 years, and difference between two groups was not significant ($P = 0.791$). It showed that two groups of patients were matched in terms of age.

The results of comparisons between the pregnancy outcomes participants with and without microscopic hematuria are shown in Table 1.

The results of correlation between microscopic hematuria and pregnancy outcome are shown in Table 2.

DISCUSSION

Dipstick hematuria is very common during pregnancy but rarely signifies a disorder likely to impact on the pregnancy outcome.

The present study was conducted to investigate the association between idiopathic microscopic hematuria with pregnancy complications. The results of this study showed that the incidence of hematuria in pregnant women was 12.86%. In the previous studies, the incidence of microscopic hematuria during pregnancy has been reported 3–20%,^[6] and the results of the present study were consistent with the previous studies.

The results of this study showed no significant difference in terms of incident of pregnancy complications between the pregnant women with and without hematuria and the only abortions and neonatal deaths differed between the two groups.

In a retrospective cohort study that was conducted on 276/328 pregnant women to estimate the prevalence and associated risk of adverse pregnancy outcomes among pregnant women with microhematuria, 60% of the women had hematuria. Those with

hematuria were at increased risk of developing preeclampsia (odds ratio [OR] =9.5) and premature labor (OR = 3.8). These associations persisted after controlling for age, race, and urinary tract infection (preeclampsia OR = 9.1; premature labor OR = 4.2). Infants of women with hematuria were at a nonsignificantly increased risk of low Apgar scores (OR = 2.8) and low birth weight (OR = 1.9). In that study, microscopic hematuria was independently associated with an increased risk of adverse maternal complications such as preeclampsia and premature labor.^[6]

The results of a study by Stehman-Breen *et al.* on 4307 pregnant women with follow-up to at least 20 weeks' gestation showed that 132 (3%) of participants had idiopathic hematuria during pregnancy. Idiopathic hematuria was associated with an almost 2-fold increased odds for development of preeclampsia (adjusted OR = 1.89, 95% CI 1.12–3.18) but not with increased odds of gestational hypertension (OR = 0.78, 95% CI 0.46–1.32), and it was associated with greater risk of preeclampsia but not gestational hypertension.^[7]

The cause of differences between the results of our study with above studies can be due to the lower sample size of our study. The sample size in this study was 700 and this is much less than the above-mentioned studies. However, our results are consistent with the results of other studies.

A cohort study by Brown *et al.* surveyed the prevalence of hematuria and the development of preeclampsia, gestational hypertension, and preterm labor in 902 pregnant women. The development of preeclampsia or gestational hypertension or delivery of a small-for-gestational-age baby was similar in women with and without dipstick hematuria.^[8] These results suggest that further studies are needed to determine whether idiopathic microscopic hematuria can be a predictive value for pregnancy complications or not.

Table 1: Comparison the pregnancy outcomes between participants with and without microscopic hematuria

Variable	Microscopic hematuria positive (%)	Microscopic hematuria negative (%)	P
Preterm labor	15 (16.67)*	66 (10.82)	0.072
Labor complications			
Cesarean section	42 (46.67)	306 (50.16)	0.1
Abortion	3 (3.33)	3 (0.49)	0.035
Death	0 (0.0)	6 (6.67)	0.01
Weight gain (g)	2874.00±822.66	3028.20±397.39	0.115
Gestational diabetes mellitus	9 (15.0)	39 (6.39)	0.443
Preeclampsia	6 (6.67)	39 (6.39)	0.303
IUGR	0 (0.0)	2 (0.32)	0.122
Hidrops	5 (5.55)	15 (2.46)	0.061

*% per group. IUGR: Intrauterine growth restriction

Table 2: Correlation between microscopic hematuria and pregnancy outcome

Variable	OR	B	SE	Wald	P	95.0% CI	
						Lower	Upper
Preterm labor	1.636	0.814	0.738	1.217	0.270	0.531	9.586
Age	0.969	0.002	0.046	0.003	0.959	0.916	1.096
Weight	0.986	0.000	0.001	0.157	0.692	0.999	1.001
Labor complications	0.961	-0.171	0.505	0.114	0.735	0.314	2.267
Gestational diabetes mellitus	0.644	1.097	0.742	2.187	0.139	0.700	12.816
Preeclampsia	1.038	-0.348	1.146	0.092	0.762	0.075	6.670
IUGR	0.985	-18.936	40,192.970	0.000	1.000	0.000	
Hidrops	1.111	-19.119	40,192.970	0.000	1.000	0.000	

OR: Odds ratio, SE: Standard error, CI: Confidence interval, IUGR: Intrauterine growth restriction

On the other hand, it is important to follow-up pregnant women with idiopathic microscopic hematuria during and after pregnancy.

Study of Brown *et al.* showed that microscopic hematuria persisted in half (15 women) after 3 months of postpartum follow-up. Postpartum follow-up is recommended to detect women who have persistent hematuria and presumed underlying mild glomerulonephritis.^[8]

To the best of our knowledge, there was no study about hematuria and pregnancy in Iran.

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Conflicts of interest

There are no conflicts of interest.

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