

Research Article

Iron Deficiency Anemia, Cystitis, and Bacterial Vaginosis Increase the Risk for Developing Preterm Labor

Anemia Defisiensi Besi, Sistitis dan Bakterial Vaginosis Meningkatkan Risiko Terjadinya Kelahiran Prematur

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Abstract

Objective: To prove the association of iron deficiency anemia, cystitis, and bacterial vaginosis as risk factors for preterm labor.

Methods: This study was an observational case-control study conducted at the Polyclinic and IRD of Obstetrics and Gynecology Sanglah Denpasar General Hospital Center between September and December 2015. The sample selection was done by consecutive sampling with total sample as many as 35 case samples (women with preterm pregnancy) and 35 control samples (women with aterm pregnancy).

Results: Pregnant mothers with iron deficiency anemia had 4 fold increased risk of developing preterm labor (OR = 4.04, 95% CI = 1.15 to 14.16, $p = 0.023$) compared to those without iron deficiency anemia. Pregnant mothers with cystitis had 4 fold increased risk of preterm labor (OR = 4.00, 95% CI = 1.25 to 12.80, $p = 0.016$) compared to those without cystitis. Pregnant mothers with bacterial vaginosis had 3 fold increased risk of preterm frequency (OR = 3.24, 95% CI = 1.22 to 8.63, $p = 0.017$) compared to those without bacterial vaginosis.

Conclusion: Iron deficiency anemia, cystitis, and bacterial vaginosis increase the risk for developing preterm labor.

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Keywords: bacterial vaginosis, cystitis, iron deficiency anemia, preterm labor

Abstrak

Tujuan: Untuk membuktikan hubungan anemia defisiensi besi, sistitis, dan bakterial vaginosis sebagai faktor risiko kelahiran prematur.

Metode: Penelitian ini bersifat observasional dengan studi case-control yang dilakukan di Poliklinik dan IRD Kebidanan dan Penyakit Kandungan RSUP Sanglah Denpasar, yang dilakukan mulai bulan September 2015 hingga Desember 2015. Pemilihan sampel dilakukan dengan cara berurutan sampling dengan sampel penelitian sebanyak 35 sampel kasus (ibu hamil preterm) dan 35 sampel kontrol (ibu hamil aterm).

Hasil: Ibu hamil dengan anemia defisiensi besi mempunyai peningkatan risiko 4 kali terjadinya kelahiran prematur (OR = 4,04, IK 95% = 1,15-14,16, $p = 0,023$) dibandingkan dengan ibu hamil tanpa anemia defisiensi besi. Ibu hamil dengan sistitis mempunyai risiko 4 kali lebih terjadinya kelahiran prematur (OR = 4,00, IK 95% = 1,25-12,80, $p = 0,016$) dibandingkan dengan ibu hamil tanpa sistitis. Ibu dengan vaginosis bakterial memiliki peningkatan risiko 3 kali terjadinya kelahiran prematur (OR = 3,24, IK 95% = 1,22-8,63, $p = 0,017$) dibandingkan dengan ibu hamil tanpa vaginosis bakterial.

Kesimpulan: Anemia defisiensi besi, sistitis, dan vaginosis bakterial meningkatkan risiko terjadinya kelahiran prematur.

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Kata kunci: anemia defisiensi besi, kelahiran prematur, sistitis, vaginosis bakterial

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INTRODUCTION

The Millennium Development Goals targeted to reduce two-thirds mortality rate of infants and toddlers than 1990's frequency which is 20 per 1,000 live births until 2015. Currently, the infant mortality rate is still high, which is amounted to 67 per 1,000 live births. The major cause of high infant mortality rate is preterm labor. Premature babies have 35 times higher risk of death compared to aterm babies.¹

According to WHO, the worldwide prevalence of anemia in pregnancy is 55% and will likely increase linearly in accordance to increasing gestational age. In Indonesia, the prevalence of anemia among pregnant women is 63%², whereas, 46.2% of pregnant women in Bali suffer from anemia.³

Other than iron deficiency anemia, other factors that may affect premature labor include urinary tract infection (cystitis) and bacterial vaginosis. UTI is associated with adverse pregnancy, including

preterm labor, fetal growth retardation, and stillbirth.⁴

Bacterial vaginosis is a gram-positive streptococcus bacteria, also known as Streptococcus agalactiae. Approximately 40-70% of pregnant women with bacterial vaginosis will likely spread the pathogenic bacteria to their babies vertically ie during vaginal labor. This occurs due to retrograde bacterial infection from the vagina into the uterus which later penetrate into the placental membrane, thus may lead to premature labor, stillbirth, and miscarriage.⁵

METHODS

This research was an observational case-control study conducted at the Polyclinic and IRD of Obstetrics and Gynecology Sanglah Denpasar General Hospital Center during the period from September 2015 to December 2015. The sample selection was done by consecutive sampling with total sample as many as 35 case samples (women with preterm pregnancy) and 35 control samples (women with aterm pregnancy). Mean values were compared between groups using independent T test, $p < 0.05$ was considered statistically significant.

RESULT

Demographic characteristics of the subjects are presented in Table 1. No significant differences were observed.

Association between Iron Deficiency Anemia and Preterm Labor

Chi-Square test was used to determine the association between iron deficiency anemia and preterm labor (Table 2).

Iron deficiency anemia was significantly associated with preterm labor ($p = 0.023$) OR = 0.023). In addition, subjects with iron deficiency anemia had 4 fold increased risk of developing preterm labor (OR = 4.04, 95% CI = 1.15 to 14.16, $p = 0.023$) compared to those without iron deficiency anemia.

Association between Cystitis and Preterm Labor

Chi-Square test was used to determine the association between cystitis and preterm labor (Table 3).

Table 1. Demographic Characteristics of the Subjects

Variable	Preterm Pregnancy (N=35)		Aterm Pregnancy (N=35)		p
	Mean	SD	Mean	SD	
Age (Years)	25.37	5.53	26.89	6.33	0.290
Parity	0.74	1.07	1.03	1.04	0.261
Gestational Age	31.74	3.09	38.63	1.42	0.001

Table 2. Association between Iron Deficiency Anemia and Preterm Labor

		Group		OR	CI 95%	p
		Case	Control			
IDA	Positive	12	4	4.04	1.15-14.16	0.023
	Negative	23	31			

Table 3. The Association between Cystitis and Premature Labor

		Group		OR	CI 95%	p
		Case	Control			
Cystitis	Positive	14	5	4.00	1.25-12.80	0.016
	Negative	21	30			

Cystitis was significantly associated with preterm labor. Subjects with cystitis had 4 fold increased risk of preterm labor (OR = 4.00, 95% CI = 1.25 to 12.80, p = 0.016) compared to those without cystitis.

Association between Bacterial Vaginosis and Preterm Labor

Chi-Square test was used to determine the association between bacterial vaginosis and preterm labor (Table 4).

Bacterial vaginosis was significantly associated with preterm labor (p = 0.017). In addition, subjects with bacterial vaginosis had 3 fold increasing risk of preterm frequency (OR = 3.24, 95% CI = 1.22 to 8.63, p = 0.017) compared to those without bacterial vaginosis.

DISCUSSION

We found that subjects with iron deficiency anemia had 4 fold increased risk of developing preterm pregnancy compared to those without iron deficiency anemia. Anemia may lead to complications in preterm neonates, including low Apgar score and fetal distress. Anemia in the second trimester and third trimester may cause premature parturition, antepartum haemorrhage, intrauterine growth restriction, intrapartum asphyxia, gestosis, and cardiac decompensation.⁶ This research was supported by the results of Karasahin et al. research, (2006) which suggested that pregnant women with anemia had four times higher risk of developing premature labor and 1.9 times higher risk of having low birth weight (LBW) baby compared to nonanemic pregnant women.⁷

Chi-Square test results demonstrated that pregnant women with cystitis had 4 fold increased risk of preterm frequency compared to those

without cystitis. Cystitis is an infection involving the kidney, ureter, bladder, or urethra, while urinary tract infection (UTI) is a general term that indicates the presence of microorganisms (MO) in the urine.⁸ In a study involving 25,746 pregnant women with UTI disorders, it is reported that the majority pregnant women developed complications such as premature birth, gestational hypertension, anemia, and amnionitis.⁹ Similar to our study, Dimetry et al found that the risk of developing preterm labor were higher in people mothers who had histories of UTI during pregnancy.¹⁰ The study also revealed pregnant mothers suffering from UTI during had 2.2 times higher risk of developing premature labor compared to those without history of (RR = 2.2; 95% CI = 1.35 to 3.58).¹⁰

Chi-Square test result showed that bacterial vaginosis had 3 fold increasing risk of preterm frequency compared to those without bacterial vaginosis. Bacterial vaginosis was associated with increased risk of developing preterm labor (OR 1.5; 95% confidence interval, 1.2 to 1.9).¹¹ The prevalence of bacterial vaginosis was 16%, and the rate of preterm birth was 5.2%. Bacterial vaginosis was significantly associated with low birth weight (OR 1.95, 95% CI 1.3 to 2.9), premature birth of low birth weight babies (OR 2.5, 95% CI 1.6 to 3.9), and preterm labor (OR 2.4, 95% CI 1.4 to 4.1).¹²

CONCLUSIONS AND RECOMMENDATIONS

Iron deficiency anemia, cystitis, and bacterial vaginosis increase the risk for developing preterm labor. To prevent premature labor, it is recommended that mothers should undergo complete blood count, urinalysis, and vaginal swab during antenatal care visit. Thus, iron deficiency anemia, cystitis, and bacterial vaginosis, could be detected earlier, and appropriate therapy may be given.

Table 4. Association between Bacterial Vaginosis and Preterm Labor

		Group		OR	CI 95%	p
		Case	Control			
Bacterial Vaginosis	Positive	23	13	3.24	1.22-8.63	0.017
	Negative	12	22			

REFERENCES

1. Hindeker dalam Fatimah, Hubungan Tingkat Pengetahuan Tentang Gizi dengan Kadar Hemoglobin pada Ibu Hamil. 2011: 1-4.
2. Indryani, Amirudin. Faktor Risiko Kejadian Partus Lama di RSIA Siti Fatimah Makasar. 2006. Retrieved from: <http://ridwanamiruddin.wordpress.com/faktor-risiko-partus-lama-di-rsia-siti-fatimah>, diakses tanggal 22 September 2014.
3. Ani. Pengaruh Pemberian Tablet Besi terhadap Kadar Feritin Serum dan hemoglobin pada Wanita Pra Hamil dengan Anemia Defisiensi Besi Derajat Ringan di Bali. 2007
4. Cunningham FG, Gant NF, Leveno KJ, Gilstrap LC, Hauth JC, Wenstrom KD. *Obstetri Williams*. Ed. 21. Jakarta: EGC, 2006; 18-20; 91; 146-9; 191-93; 1463.
5. Jawetz. *Mikrobiologi Kedokteran*. Jakarta: ECG. 2008; 233: 199-200.
6. Mansjoer A. *Kapita Selekta Kedokteran. Ilmu Kebidanan dan Kandungan*. Jakarta: Media Acsulapius. 2008.
7. Karasahin E, Seyit T, Umit G, Ugur K, Iskender B. Maternal Anemia and Perinatal Outcome. *Perinatal J*, 2007; 15(3): 127-30.
8. Sukandar E. *Infeksi Saluran Kemih Pasien Dewasa*. Buku Ajar Ilmu Penyakit Dalam, Jilid I. Jakarta: Balai Penerbit FK UI. 2004: 553-7.
9. Delzell JE, Lefevre ML. Urinary Tract Infections During Pregnancy in: *Am Fam Physician (AAFP)*. 2010; 1; 61(3): 713-20.
10. Shahira R, Hanan M, El-Tokhy. Urinary Tract Infection and Adverse Outcome of Pregnancy. *J Egy Public Health Assoc*, 2007; 82(3-4): 203-18.
11. Sharon L. Hillier Ph.D., Robert P. Nugent Ph.D., David A. Association Between Bacterial Vaginosis and Preterm Delivery of a Low-Birth-Weight Infant. *New Eng J Med*, 2015; 333(26): 1737-41.
12. Svare JA, Schmidt H, Lose G. Bacterial vaginosis in a cohort of Danish pregnant women: prevalence and relationship with preterm delivery, low birth weight and perinatal infections. *BJOG* 2006; 113: 1419-25.