

## Case Report

# Pulmonary tuberculosis cases in pregnancy: perinatal outcomes and health promotion challenges in Indonesia

Anita Rahmawati<sup>1</sup>, Raden Tina Dewi Judistiani<sup>2,3</sup>, Devi Agustin Setiawati<sup>2</sup>, Radhifan Fajri<sup>4</sup>, Syaquila Putri<sup>4</sup>, Rovina Ruslami<sup>1,2</sup>

<sup>1</sup> Department of Biomedical Science, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

<sup>2</sup> Infectious Diseases Research Center, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

<sup>3</sup> Department of Public Health, Division of Epidemiology and Biostatistics, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

<sup>4</sup> Medical Doctor Program, Faculty of Medicine, Universitas Padjadjaran, Bandung, Indonesia

### Abstract

Tuberculosis remains a serious health problem in pregnant women. Tuberculosis during pregnancy is related to poor perinatal outcomes, including low birth weight, insufficient growth relative to gestational age, perinatal mortality, and maternal morbidity and mortality. Additionally, diabetes mellitus in pregnant women with tuberculosis is associated with a higher risk of maternal and fetal complications such as preeclampsia, preterm birth, hypoglycemia, and giant baby. We report two perinatal outcomes of (1) pregnancy during tuberculosis treatment and (2) tuberculosis in a pregnant woman with diabetes mellitus. Both women completed anti-tuberculosis treatments. This report emphasizes the importance of health promotion through family planning among women with tuberculosis. This case report also underscores the increased risk of developing tuberculosis in pregnant women with diabetes mellitus. Early diagnosis of tuberculosis in pregnant women is vital as it affects the health of both mother and child.

**Key words:** Tuberculosis; pregnancy; diabetes; SGA; LGA.

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### Introduction

Tuberculosis (TB) is recognized as one of the most common infectious diseases causing morbidity and mortality during pregnancy [1]. Neonates born to mothers who have an active TB disease are at a higher risk of poor perinatal outcomes, including low birth weight (LBW), small for gestational age (SGA), and perinatal mortality [1,2]. Clinical diagnosis of TB in pregnancy can be difficult due to non-specific symptoms related to the physiological response to pregnancy [3]. Despite the poor perinatal and maternal outcomes of pregnancy with TB, the global burden of TB in pregnancy has been increasing [4].

The presence of diabetes mellitus (DM) among pregnant women complicates the pregnancy. The World Health Organization defines gestational DM as the onset of carbohydrate intolerance during pregnancy [5]. The true prevalence and distribution of gestational DM are unknown, presumably due to lack of international consensus on screening or diagnosis [6]. The maternal complications of gestational DM include preeclampsia (26–40%) and cesarean delivery (52–

60%). At the same time, there is an increased risk of macrosomia (giant baby), intrauterine fetal death, prematurity, and neonatal hypoglycemia. [6,7].

In terms of the global burden of TB in pregnancy, the presence of gestational DM adds to the complexity. The global prevalence of TB-DM is 16%, and the prevalence in Asia is 17% [8]. DM could severely threaten efforts to control TB in poor resource settings and in areas of high TB incidence.

Although TB infection in pregnancy is often neglected [4], TB in pregnancy can affect health, economy, and social life. We report two cases of TB and pregnancy: (1) pregnancy during TB treatment and (2) TB in a pregnant woman with DM. The report focuses on the perinatal outcomes of TB in pregnancy and the need to implement health promotion in women with TB.

### Case study

#### *Case 1: Pregnancy during TB treatment*

A 44-year-old woman came to the Emergency Department of the Lung Hospital with a complaint of

bloody cough for two days before admission. Upon presentation, the patient also reported a history of persistent cough for two weeks accompanied by chronic fever, night sweating, and poor appetite. A history of recent TB contact was confirmed.

The physical examination upon admission indicated blood pressure of 120/70 mmHg, heart rate of 90 beats per minute, respiratory rate of 20 breaths per minute, body temperature of 36.7 °C, and peripheral oxygen saturation (SpO<sub>2</sub>) of 97% on room air. Auscultation of the chest revealed diffuse fine crepitations throughout the lung fields. Sputum smear samples revealed the presence of acid-fast bacilli (AFB). On routine blood examination, the hemoglobin level was 12.5 g/dL, hematocrit was 40%, leucocyte count was 11300/mm<sup>3</sup>, and random blood sugar was 108 mg/dL. The patient was hospitalized for five days. Treatment with rifampin, isoniazid, ethambutol, and pyrazinamide as a fixed-dose combination (FDC) was started and continued for two months. Isoniazid and rifampin were continued for another seven months and the patient improved. In the third month during the course of the treatment, the patient was pregnant for the fourth time. The patient routinely visited the midwife for antenatal care once a month. She continued the TB treatment for another six months and completed the treatment in the sixth month of pregnancy. The patient delivered an SGA baby weighing 1.7 kg during the 38<sup>th</sup> week of gestation. The baby showed no signs of respiratory distress.

#### *Case 2: TB in a pregnant woman with DM*

A 25-year-old woman in her third pregnancy was referred to the Lung Hospital with a chief complaint of cough. The patient had a cough for two weeks accompanied by a sore throat and fatigue. The patient also had gestational DM. There was no history of direct contact with the TB patient. Physical examination upon admission showed blood pressure of 125/66 mmHg, heart rate of 90 beats per minute, body temperature of 36.8 °C, and respiratory rate of 21 breaths per minute. Auscultation of the chest revealed diffuse fine crepitations throughout the lung fields. The random blood glucose and the post-prandial blood glucose were 87 mg/dL and 122 mg/dL, respectively.

The patient was diagnosed with pulmonary TB and then started the TB treatment consisting of rifampin, isoniazid, ethambutol, and pyrazinamide as FDC. The patient had poor compliance during the first three months of treatment and then did not follow-up. The patient came back to the hospital after about two months and a microbiological examination confirmed the

presence of AFB. The patient received TB treatment with rifampin, isoniazid, ethambutol, pyrazinamide, and levofloxacin injection 50 mg/day for three months, followed by isoniazid and rifampin for the last three months of therapy.

The patient delivered a baby weighing 4.7 kg, classified as large for gestational age (LGA), during the 40<sup>th</sup> week of pregnancy. There was an episode of respiratory distress in the newborn due to macrosomia. Eight weeks after the delivery, the patient completed six months of the treatment with a negative sputum smear result.

#### **Discussion**

In this case report, we describe two perinatal outcomes in pregnant women with TB, including SGA in the first case and LGA in the second case. Our finding is consistent with a previous study, which stated that neonates born to mothers with TB have a higher risk of poor perinatal outcomes, including SGA and perinatal mortality [1,2]. Additionally, poor perinatal outcomes of gestational DM are LGA, intrauterine fetal death, and neonatal hypoglycemia [6,7].

There was an increased risk of active TB during both pregnancy and the postpartum period [4]. The diagnostic challenge of TB in pregnancy includes diagnostic delay due to non-specific symptoms, especially in situations with combined risk factors such as poverty, undernutrition, lack of social support, and poor health systems. It is necessary to improve prevention and management of TB during pregnancy for better perinatal and maternal outcomes [1,9]. The combination of improvement of nutritional and socioeconomic factors as well as health system support and health literacy is essential in TB control programs [9]. Pregnancy during TB treatment presents a significant risk to the mother and the fetus. Therefore, the provision of family planning services for affected women is necessary. One study in India showed that the integration of family planning programs and TB control programs had a mutual impact [10]. Additionally, early detection and intervention should be implemented for women at high risk of developing TB, such as those with DM to avoid poor glycemic control [6].

The first case reported in this article lacked implementation of health promotion through family planning to avoid pregnancy. Initial interaction with the physician should be the first step towards health literacy, such as the importance of postponement of pregnancy. Meanwhile, in the second case reported in this article, identifying active TB cases among vulnerable subjects, including gestational DM, is

necessary [9]. These remain challenges in Indonesia as TB is a significant burden to the health services in the country.

The complex symptoms of pulmonary TB consist of cough, fever, night sweats, weight loss, and hemoptysis, and these were demonstrated in both the cases. These signs can be considered advanced symptoms and showed poor awareness despite the risk factors, including household contact (case 1) and DM in pregnancy (case 2). Case 2 had an additional issue with poor compliance caused by side effects of anti-TB or the pregnancy itself.

Monitoring maternal and fetal well-being is of utmost importance during antenatal care. TB may increase pro-inflammatory cytokine release, and tuberculous bacillemia in pregnancy may infect the placenta with a decrease in the number of maternal and fetal blood vessels that may lead to detrimental effects on placental function [2]. Consequently, it may alter fetal growth, resulting in intrauterine growth restriction, as observed in case 1. It has been shown that TB in pregnancy is associated with a higher risk of LBW, despite completion of TB treatment [1,2]. In the case of gestational DM with TB, uncontrolled maternal hyperglycemia might have a more profound impact on macrosomia [6]. Higher blood glucose passes through the placenta into the fetal circulation and stimulates fetal insulin secretion, resulting in hyperinsulinemia. It leads to an increase in fat and protein stores in the fetus, resulting in macrosomia [6,11]. Fetal macrosomia could persist despite vigorous attempts at optimum metabolic care [12]. In both cases, it was fortunate that no serious complication of the newborn was found, except respiratory distress of the newborn in case 2.

TB therapy should not be withheld from patients with the active disease during pregnancy [3]. Anti-TB treatment is safe for the pregnant patient, except for streptomycin in the first trimester [13]. In this study, the patient received anti-TB therapy for nine months in the first patient and six months with the initial addition of levofloxacin for the second patient possibly because there was suspicion of drug-resistant TB due to poor compliance and lack of follow up.

The cases described above highlight the unfavorable perinatal outcomes of TB in pregnancy and demonstrate the need for family planning programs for health promotion in women with TB. Additionally, early detection and treatment should be tailored to women at high risk of developing TB.

## Conclusions

This report highlights the importance of health promotion through family planning to avoid pregnancy in TB patients. Pregnancy in TB patients increased the risk of LBW infants, despite treatment completion. This case report also underscores the increased risk of developing TB in pregnant women with DM. Determining an early diagnosis of TB disease in a pregnant woman is vital as it affects the health of both mother and infant. Integration of health literacy, active case-finding, and early therapy, is important, as part of efforts to reach the goal of TB elimination.

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### **Corresponding author**

Dr. Raden Tina Dewi Judistiani SpOG  
Department of Public Health, Division of Epidemiology and Biostatistics, Faculty of Medicine, Universitas Padjadjaran  
Eijkmann Street No. 38, 4th floor, Bandung, West Java, Indonesia 40162  
Phone: +62-811249731  
E-mail address: tina.d.judistiani@unpad.ac.id;  
judistiani@gmail.com

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