Case Report

Pregnancy Complicated by Preeclampsia and Malaria in a 12-Year-Old Resulting in Neonatal Death: A Case Report

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Received: February 3, 2026 | Accepted: July 2, 2026 | Published: July 10, 2026

Abstract
Introduction: Very early adolescent pregnancy is associated with significantly increased maternal and neonatal risks, particularly in resource-limited and malaria-endemic settings. The coexistence of hypertensive disorders and infectious diseases may further worsen outcomes, especially when antenatal care is absent.
Case Report: A 12-year-old primigravida from a malaria-endemic area presented with fever and back pain and had no prior antenatal care. Examination at 29 – 30 weeks' gestation revealed hypertension and severe oligohydramnios. Laboratory testing showed anemia, thrombocytopenia, and proteinuria, and confirmed Plasmodium falciparum and genitourinary infections. Management included magnesium sulfate, antimalarial therapy, and antibiotics. Despite treatment, preterm labor ensued, resulting in vaginal delivery of a 1,200 g neonate who required resuscitation and intensive care. The neonate developed prematurity-related complications and died on the sixth day of life. The mother recovered without major postpartum complications.
Conclusion: This case highlights the cumulative impact of very early maternal age, hypertensive disease, endemic infection, and a lack of antenatal care on adverse pregnancy outcomes. Reports of such complex presentations among very early adolescents remain limited. Strengthening early detection and integrated care is essential to improving outcomes in vulnerable populations.

Keywords: Adolescent pregnancy; Preeclampsia; Preterm birth; Malaria in pregnancy; Neonatal mortality

Kehamilan pada Usia 12 Tahun dengan Komplikasi Preeklamsia dan Malaria yang Mengakibatkan Kematian Neonatal: Sebuah Laporan Kasus

Abstrak
Pendahuluan: Kehamilan pada usia remaja awal memiliki kaitan erat dengan peningkatan risiko maternal dan neonatal secara signifikan, terutama di daerah dengan sumber daya terbatas dan endemis malaria. Koeksistensi antara gangguan hipertensi dan penyakit infeksi dapat semakin memperburuk luaran klinis, khususnya jika tidak terdapat pemeriksaan antenatal (ANC).
Laporan Kasus: Seorang remaja primigravida berusia 12 tahun berasal dari daerah endemis malaria datang dengan keluhan demam dan nyeri punggung tanpa riwayat pemeriksaan antenatal sebelumnya. Pemeriksaan fisik didapatkan adanya hipertensi dan oligohidramnion berat pada usia kehamilan 29 – 30 minggu. Hasil pemeriksaan laboratorium menunjukkan anemia, trombositopenia, proteinuria, dan terkonfirmasi infeksi *Plasmodium falciparum* serta infeksi saluran kemih. Pasien ditatalaksana dengan magnesium sulfat, terapi antimalaria, dan antibiotik. Meskipun telah mendapat tatalaksana, pasien tetap mengalami persalinan prematur per vaginam. Neonatus lahir dengan berat 1.200 gram, memerlukan resusitasi dan perawatan intensif, namun meninggal pada hari keenam akibat komplikasi prematuritas. Ibu pulih tanpa komplikasi pascapersalinan.
Kesimpulan: Kasus ini menyoroti dampak usia maternal ekstrem, hipertensi, infeksi endemis, dan tidak dilakukannya pemeriksaan antenatal terhadap luaran kehamilan yang buruk. Laporan kasus kompleks pada remaja masih terbatas, sehingga deteksi dini dan perawatan antenatal terpadu perlu diperkuat pada populasi yang rentan.

Kata kunci: Kehamilan remaja; kematian neonatal; malaria dalam kehamilan; persalinan prematur; preeklamsia.

 DOI: 10.24198/obgynia.v9i2.1079

Introduction

Adolescent pregnancy is defined as pregnancy in girls aged 10–19 years, with the vast majority being unintended. The highest risk of adverse outcomes occurs among very young adolescents (aged 10–14 years), whose global birth rate was estimated at 1.5 per 1,000 women in 2023.[1] Compared with older reproductive-age groups, very young mothers face substantially elevated obstetric risks due to biological immaturity. These cases are often precipitated by a multitude of risk factors, including poverty, limited education, limited access to healthcare, early marriage, and psychosocial vulnerabilities, which collectively predispose these young mothers to severe obstetric consequences. As a result, very early adolescent pregnancies are closely linked to increased incidence of preeclampsia, severe anemia, sexually transmitted infections (STIs), preterm birth, low birth weight, and higher maternal and neonatal mortality.[2,3]

Recent individual-level evidence from approximately 140,000 mothers showed that pregnancies among girls aged 10–14 years carried higher risks of preterm birth, perinatal and neonatal mortality, low birth weight, and small-for-gestational-age infants than pregnancies among women aged 20–29 years. This supports the view that pregnancy at age 12 is an exceptionally high-risk obstetric condition, distinct from older adolescent pregnancies.[4]

In Indonesia, geographic disparities in maternal and neonatal outcomes remain striking. The eastern region of Indonesia, including Papua, consistently reports the country's highest Maternal Mortality Ratio (MMR) and Infant Mortality Rate (IMR), according to 2020 national health data.[5,6] The high malaria endemicity in this region further compounds these obstetric challenges. Papua bears a disproportionate burden of the disease, accounting for over 88% of national malaria cases and recording an annual parasite incidence that is dramatically higher than the national average.[7,8] Malaria in pregnancy is a well-established contributor to adverse maternal and fetal outcomes, creating an exceptionally high-risk environment when it intersects with very early adolescent pregnancy.[9]

The convergence of very young maternal age, multiple obstetric complications, and limited antenatal care in a malaria-endemic, resource-limited setting is rarely described in the literature. Therefore, this case report aims to describe the clinical management of a 12-year-old primigravida in Papua who presented with severe compounding factors, including preeclampsia, oligohydramnios, an STI, and malaria, which ultimately resulted in neonatal mortality. Through this report, we seek to highlight the extreme vulnerability of very early adolescent pregnancies in resource-limited regions and underscore the urgent need for comprehensive, targeted interventions.

Case Presentation

A 12-year-old Papuan primigravida was brought to the hospital by her in-laws with a two-day history of lower back pain and fever. There were no signs of labor, such as regular uterine contractions, vaginal bleeding, or rupture of membranes. The patient had not received any antenatal care during the pregnancy. Her last menstrual period (LMP), sexual history, and estimated time of conception could not be determined due to a limited history. There was no known past medical illness. Social history revealed that the patient lived in a malaria-endemic area in Timika, Papua, with limited access to healthcare services.

On admission (23 April 2024), the patient appeared ill. Her vital signs were blood pressure 140/90 mmHg, pulse 88 beats per minute, respiratory rate 22 breaths

per minute, and body temperature 37.3°C. Obstetric examination revealed a gravid uterus consistent with gestational age, without uterine tenderness or contractions. The fetal heart rate ranged from 140 to 150 beats per minute. Obstetric ultrasonography demonstrated a singleton intrauterine pregnancy with an estimated gestational age of 29–30 weeks, a cephalic presentation, and markedly reduced amniotic fluid volume (amniotic fluid index < 2 cm), consistent with severe oligohydramnios. No gross fetal structural abnormalities were identified.

Laboratory testing revealed a hemoglobin level of 8.1 g/dL, an erythrocyte count of 3.4 million/mm³, and a platelet count of 82,000/mm³, indicating moderate anemia and thrombocytopenia. The mean corpuscular volume was 71 fL, suggestive of microcytic anemia. Serum creatinine was 0.8 mg/dL, slightly elevated for pregnancy, and serum albumin was 2.8 g/dL, indicating hypoalbuminemia. A peripheral blood smear and rapid diagnostic testing confirmed a Plasmodium falciparum infection with a parasite density of 2,880 parasites/µL (Table 1).

Significant proteinuria (+2) was detected. Microscopic urinalysis showed leukocyturia (11–12 cells/high-power field) and mild hematuria (2–3 cells/high-power field), along with bacteria (++), suggesting a urinary tract infection. A vaginal wet mount was positive for *Trichomonas vaginalis*. Nitrite, ketone, bilirubin, and glucose were negative (Table 2). These findings supported the presence of a genitourinary infection, although a urine culture could not be performed due to limited laboratory facilities.

Based on clinical and laboratory findings, the patient was diagnosed with a very early adolescent pregnancy complicated by preeclampsia with severe features (indicated by thrombocytopenia), severe oligohydramnios, falciparum malaria, a suspected urinary tract infection, trichomoniasis, anemia, and hypoalbuminemia. The baseline diagnosis of preeclampsia was established on elevated blood pressure (≥140/90 mmHg) and significant proteinuria (+2).

The patient was admitted and managed conservatively. Magnesium sulfate was administered for seizure prophylaxis, with a 4 g intravenous loading dose followed by a 6 g maintenance infusion over 6 hours. Antimalarial therapy with dihydroartemisinin-piperaquine was initiated per standard dosing protocols. Broad-spectrum intravenous antibiotics, including ceftriaxone 1 g every 12 hours and metronidazole 500 mg every 8 hours, were given to treat the suspected bacterial infection and the confirmed trichomoniasis. Supportive management included intravenous fluids and close maternal-fetal monitoring.

Despite conservative management, the patient's condition worsened, and she

Table 1 Blood Test Results

Parameter	Result	Reference Range	Interpretation
Hemoglobin	8.1 g/dL	12–15 g/dL	Anemia
Erythrocytes	3.4 million/mm³	4.1–5.1 million/mm³	Decreased
Platelets	82,000/mm³	150,000–400,000/mm³	Thrombocytopenia
MCV	71 fL	80–96 fL	Microcytic
Creatinine	0.8 mg/dL	0.3–0.7 mg/dL	Slightly elevated
Albumin	2.8 g/dL	3.5–5.2 g/dL	Hypoalbuminemia
Malaria (blood smear/RDT)	2880 parasites/µL	Negative	*Plasmodium falciparum* infection

Table 2 Urinary Test Results

Parameter	Result	Reference Range	Interpretation
Color	Dark yellow	Light–dark yellow	Concentrated urine
pH	5.5	5–9	Normal
Specific gravity	1.025	1.005–1.030	Normal
Protein	+2	Negative	Proteinuria
Glucose (reduction)	Negative	Negative	Normal
Urobilinogen	Positive	Positive	Normal
Bilirubin	Negative	Negative	Normal
Ketones	Negative	Negative	Normal
Nitrite	Negative	Negative	Normal
Epithelial cells	++	Negative–few	Suggestive of inflammation
Leukocytes	11–12 /HPF	0–5 /HPF	Leukocyturia
Erythrocytes	2–3 /HPF	0–1 /HPF	Mild hematuria
Bacteria	++	Negative	Suggestive of infection
Trichomonas vaginalis	Positive	Negative	Infection

developed preterm labor on 25 April 2024. During labor, meconium-stained amniotic fluid was noted. She subsequently delivered a preterm female infant weighing 1,200 grams. The newborn had APGAR scores of 5 and 7 at 1 and 5 minutes, respectively, and required immediate resuscitation before admission to the neonatal intensive care unit (NICU).

The neonate was diagnosed with prematurity and low birth weight, complicated by hypoglycemia (initial blood glucose level of 26 mg/dL). Management included thermoregulation, continuous positive airway pressure (CPAP) initiated at a PEEP of 5 cmH_2O and FiO_2 of 21% and subsequently titrated as clinically indicated, and intravenous glucose therapy consisting of an initial 40% dextrose bolus followed by a 10% dextrose maintenance infusion, with serial blood glucose monitoring and adjustments made as required. During hospitalization, the neonate remained at high risk due to extreme prematurity and limited neonatal care resources. Despite intensive supportive care, the neonate's condition progressively deteriorated, and the neonate died on the sixth day of life.

The maternal postpartum course was complicated by a second-degree perineal laceration. The patient remained hemodynamically stable, with a blood pressure of about 130/90 mmHg, though she appeared clinically anemic. By the second postpartum day, uterine contractions were adequate, vaginal bleeding had decreased, and no further complications were noted. A follow-up malaria evaluation on postpartum day 2 showed no detectable parasites. The patient was discharged in stable condition with scheduled outpatient follow-up.

Discussion

Pregnancy at age 12 is an extreme case of adolescent pregnancy and is associated with increased risks of maternal and neonatal complications. This age group is clinically important because adverse outcomes appear most pronounced among the youngest adolescents. In a large individual-level analysis, mothers aged 10–14 years had higher risks of preterm birth, perinatal and

neonatal mortality, low birth weight, and small-for-gestational-age infants compared with mothers aged 20–29 years.[4] Biological immaturity and limited access to healthcare may contribute to a higher incidence of hypertensive disorders, anemia, preterm birth, and adverse neonatal outcomes.

In Papua, these risks may be further influenced by geographic and healthcare access barriers.[1,6] This contextual vulnerability is particularly relevant to Mimika, Central Papua, where malaria remains highly endemic despite national progress toward malaria elimination. Recent data indicate that malaria transmission in Papua remains disproportionately high, with more than 88% of Indonesia's reported malaria cases in 2022 originating from Papua, and several regencies reporting an annual parasite incidence exceeding 100 cases per 1,000 population.[7,8] More specifically, Mimika Regency has been reported to carry one of the highest malaria burdens in Indonesia, with an annual parasite incidence greater than 400 per 1,000 population in 2023.[10] These epidemiological data support the interpretation that falciparum malaria in this case should not be viewed merely as an incidental comorbidity but rather as a context-specific maternal infection occurring within a high-transmission environment that may amplify obstetric and neonatal vulnerability.

In this case, the absence of antenatal care (ANC) may have contributed to the delayed identification of multiple coexisting conditions, including preeclampsia, falciparum malaria, and genitourinary infections. The lack of ANC also limited accurate pregnancy dating, early blood pressure monitoring, screening for anemia and infections, and timely recognition of fetal compromise. This is particularly relevant because the gestational age had to be estimated using late-pregnancy ultrasonography rather than first-trimester dating. ANC is essential for the early detection and management of maternal complications, and its absence has been associated with poorer pregnancy outcomes.[11]

The development of preeclampsia in very young adolescents may be related to incomplete uterine and vascular adaptation, leading to impaired placentation. In this patient, a platelet count of 82,000/mm³ was clinically significant because thrombocytopenia below 100,000/mm³ is considered a severe feature of preeclampsia.[12,13] However, interpretation should be cautious because falciparum malaria can also independently cause thrombocytopenia. Therefore, the thrombocytopenia in this case may reflect overlapping hypertensive and infectious mechanisms rather than a single etiology. In addition, maternal anemia may have further reduced oxygen delivery to the placenta, though the relative contribution of each factor cannot be definitively determined.[9]

Plasmodium falciparum malaria may also have contributed to adverse outcomes through placental involvement and impaired uteroplacental perfusion. Placental malaria is marked by sequestration of *P. falciparum*-infected erythrocytes and maternal inflammation in the intervillous space, which may promote placental injury, oxidative stress, and fetal compromise.[14] In this case, these mechanisms likely act synergistically with preeclampsia-related placental dysfunction, maternal anemia, and severe oligohydramnios.

Coexisting infections, including a suspected urinary tract infection and Trichomonas vaginalis, may have added an inflammatory burden, although the independent roles of each remain uncertain. This interpretation is supported by evidence that urinary tract infections in pregnancy are associated with increased rates of preterm delivery and low birth weight, and that trichomoniasis has been associated with preterm delivery, prelabor rupture of membranes, and low birth weight.[15]

Nevertheless, because a urine culture was not available, the independent contribution of each infection could not be determined.

Preterm delivery at 29 – 30 weeks' gestation and low birth weight indicate significant intrauterine compromise. Neonatal death on the sixth day of life aligns with the known high mortality risk associated with extreme prematurity, particularly in settings with limited neonatal care resources. Globally, complications of preterm birth remain a leading cause of under-five mortality, and survival gaps are especially pronounced in low-resource settings where access to advanced respiratory support, infection control, thermoregulation, and nutritional support may be limited.[16,17]

This report has several limitations. First, an incomplete history and the absence of first-trimester ultrasonography limited the ability to accurately assess gestational age and baseline risk factors. Second, some diagnostic evaluations, including urine culture, additional sexually transmitted infection testing, and placental histopathology, could not be performed because of limited laboratory facilities. As a result, placental malaria, chorioamnionitis, or other placental pathology could not be confirmed. Third, because this is a single case report with multiple overlapping maternal conditions, causal relationships between individual comorbidities and neonatal death cannot be established.

Conclusion

In conclusion, this case illustrates the cumulative impact of very early adolescent pregnancy, hypertensive disease, endemic infection, and lack of antenatal care on adverse maternal and neonatal outcomes. To our knowledge, reports of pregnancy in a 12-year-old with concurrent preeclampsia, falciparum malaria, and multiple infections remain limited. This case highlights how overlapping risk factors may contribute to preterm birth and neonatal death, particularly in resource-limited, malaria-endemic settings. Strengthening access to early antenatal care and the integrated management of high-risk pregnancies remains essential to improving outcomes in vulnerable populations.

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