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CASE STUDIES

Intrauterine fetal death in adolescent pregnancy complicated by maternal syphilis: A case study in nursing

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Abstract
Maternal syphilis during pregnancy remains a major risk factor for intrauterine fetal death (IUFD), particularly among adolescents. However, detailed case studies on this presentation remain limited in the current literature, underscoring the need to enhance nursing knowledge and clinical management in this case. A 15-year-old primigravida (G1P0A0) presented with an absence of fetal heart tones during a routine antenatal evaluation. Ultrasound examination confirmed IUFD with no detectable cardiac activity. Although a prior ultrasound had established a gestational age of 22 weeks and 2 days, current biometric measurements revealed an average ultrasound age (AUA) of 18 weeks and 3 days, with an estimated fetal weight of 287 g—suggesting severe early-onset intrauterine growth restriction prior to fetal demise. Serological testing confirmed active maternal syphilis, with a reactive *Treponema pallidum* hemagglutination assay (TPHA 1:2560) and Venereal Disease Research Laboratory test (VDRL 1:16), with no documented record of prior penicillin treatment. The patient subsequently underwent uncomplicated vaginal delivery of a stillborn fetus. Nursing assessments identified critical risks, including postpartum infection secondary to untreated maternal syphilis, postpartum haemorrhage following IUFD delivery, and psychosocial distress associated with perinatal loss. Accordingly, nursing care focused on monitoring for physiological complications, promoting adherence to penicillin, delivering comprehensive reproductive health and sexually transmitted infection (STI) education, and providing grief support. As learned in this case that integrating nursing care plans into antenatal and postpartum management is essential to improve quality of care, maternal coping mechanisms, and mitigate the risk of adverse outcomes in future pregnancies.

Keywords: Adolescent pregnancy, intrauterine fetal death, maternal syphilis, maternity nursing, nursing care

Introduction

Syphilis is a sexually transmitted infection caused by bacterium *Treponema pallidum* and remains a major global public health concern (Rosset et al., 2025). Globally, syphilis infected an estimated 8 million adults (aged 15–49) in 2022, severely impacting key populations and causing adverse birth outcomes in 50–80% of inadequately treated pregnancies (World Health Organization, 2025). Recent cohort study reported prevalence of prenatal syphilis in certain populations, with rates reaching 7–8% among younger women and vulnerable groups (Castilho et al., 2024). Although the availability of effective screening and curative therapy, syphilis contribute to maternal morbidity, perinatal mortality, and congenital infection (Pascoal et al., 2023; Sayal et al., 2024; Swayze et al., 2022). Maternal syphilis during pregnancy is associated with adverse pregnancy outcomes. Studies highlighted that untreated or inadequately treated syphilis increases the risk of adverse outcomes, including congenital syphilis, preterm birth, congenital infection, respiratory distress syndrome, multi organ damage, low birth weight, Intrauterine Fetal Death (IUFD), and neonatal death (Gao et al., 2023; Kielaite et al., 2025). The primary mechanism underlying these severe outcomes is the transplacental transmission of the pathogen to the developing fetus. *Treponema pallidum* can cross the placenta and cause chronic placental inflammation, impaired placental perfusion, and fetal infection, which may compromise fetal oxygenation and development (Tetteh-Quarcoo et al., 2025). Importantly, maternal syphilis is considered one of the most preventable infectious causes of stillbirth when

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early antenatal screening is followed by timely and adequate penicillin treatment (Anselem et al., 2025; da Silva et al., 2024).

IUFD defined as fetal death occurring after a specified gestational age prior to birth (Cramez et al., 2024). The condition remains a major global concern in low-resource settings, and is often associated with infection, hypertensive disorders, placental insufficiency, and inadequate antenatal care (Jovanovic et al., 2023). Among infectious causes, syphilis remains one of the most important contributors because of its strong association with placental damage and vertical transmission (Tantengco et al., 2024). Certain maternal populations may experience an even higher risk of adverse pregnancy outcomes, including adolescents who often face biological and social vulnerabilities during pregnancy (Lesinskienė et al., 2025; Matasariu et al., 2026; Moganedi & Mudau, 2024). Adolescent pregnancy represents another factor contributing to poor maternal and perinatal outcomes (Amoadu et al., 2022; Cagli et al., 2025). Moreover, adolescents face limited reproductive health knowledge, delayed access to antenatal care, and increased exposure to sexually transmitted infection (STI) (Smith et al., 2024). Study shown that adolescent pregnancy is associated with higher risks of anemia, preeclampsia, preterm birth, and fetal death (Azimirad, 2023). This situation is further exacerbated by the presence of syphilis. Most of cases of congenital syphilis and syphilis related stillbirth can be prevented by several measures (Mugabi et al., 2026). For instance, early antenatal screening, timely treatment with penicillin, partner notification, and continuous follow-up are effective strategies to reduce vertical transmission and adverse outcomes (Desjardins et al., 2025). However, its implementation is often hindered by limited health literacy, stigma associated with STI, lack of partner involvement, and inadequate access to health services.

Nurses serve a vital role in managing case of infection among pregnant women. Within antenatal services, nurses are responsible for screening, education, counseling, monitoring treatment adherence, and coordinating multidisciplinary care (Mersiovsky, 2026). In cases of IUFD, nurses also provide psychosocial support, grief counseling, and health education aimed at preventing future reproductive complications (Bezerra et al., 2024). Bridging these diverse care priorities requires an approach to clinical decision-making. The application of nursing frameworks such as North American Nursing Diagnosis Association International-Nursing Interventions Classification-Nursing Outcomes Classification (NANDA-NIC-NOC) allows for identification of patient needs and implementation of nursing interventions (Herdman et al., 2024; Rodríguez-Suárez et al., 2023). Previous literature has reported cases of adverse pregnancy outcomes associated with maternal syphilis, including congenital infection, preterm birth, and fetal demise (Kielaite et al., 2025). However, previous studies, including have primarily focused on the medical or obstetric management of syphilis-associated IUFD, with limited attention to the comprehensive nursing care in patients experiencing IUFD related to syphilis infection (Anselem et al., 2025; Desjardins et al., 2025; Mugabi et al., 2026; Swayze et al., 2022). Besides, case reports integrating clinical findings with nursing care planning and psychosocial management in adolescent pregnancy remain scarce. To address this, the case report aims to describe the occurrence of IUFD in a 15-year-old pregnant adolescent with reactive syphilis and inadequate treatment during pregnancy. The novelty of this report lies in highlighting the intersection of adolescent pregnancy, untreated maternal syphilis, and IUFD from a nursing perspective. Integrating clinical observations with evidence-based nursing frameworks demonstrates that improving maternal-fetal outcomes requires an approach combining early serological identification, managed treatment completion, grief counseling, and preventive strategies. This case further demonstrates that preventive strategies must integrate medical interventions with broader family, sociocultural, and ethical considerations. Long-term prevention of similar cases hinges on integrating comprehensive reproductive health education as efforts to reduce STI-related stigma, empowerment of family support, and counseling services.

Case presentation

Clinical data were obtained retrospectively from the medical records of patients treated at the hospital. Information collected included patient demographic characteristics, obstetric and medical history, physical examination results, supporting examinations (laboratory and ultrasound), management during treatment, and maternal clinical outcomes. Verbal and written informed consent were obtained from the patient prior to data collection and publication. On August 27, 2025, a 15-year-old primigravida (G1P0A0) was evaluated in the Emergency Department due to unidentifiable fetal heart tones during antenatal care. Upon initial assessment, the patient denied active labor symptoms, including contractions, hemorrhage, or rupture of membranes. Concurrently, the patient reported an absence of trauma, physical injury, pyrexia, or systemic infectious manifestations prior to admission. Additionally, lifestyle risk factors were absent, as the patient denied both smoking and alcohol intake. An abdominal examination revealed a fundal height of the uterus at the umbilical level. As the patient could not recall her last menstrual period, gestational age was estimated based on fetal biometric parameters obtained during ultrasound examination **(Figure 1).**

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A previous ultrasound examination estimated the gestational age at 22 weeks and 2 days. In contrast to these earlier findings, the fetal biometric parameters obtained during the current ultrasound corresponded to a significantly lower average ultrasound age (AUA) of approximately 18 weeks and 3 days, with an estimated fetal weight of 287 g. Most importantly, no fetal cardiac activity was detected, thereby confirming the diagnosis of IUFD. Regarding secondary complications, no sonographic evidence of hydrops fetalis (such as ascites, pleural effusion, or skin edema) was documented in the available records. Furthermore, placental morphology and amniotic fluid volume were not formally assessed or recorded. Ultimately, no chromosomal analysis, placental histopathology, or Toxoplasmosis, Other infections, Rubella, Cytomegalovirus (CMV), Herpes Simplex Virus (HSV) (TORCH) screening was performed due to limited clinical resources and the patient's personal preference. Serologic testing conducted earlier in pregnancy showed a reactive *Treponema Pallidum* Hemagglutination Assay (TPHA) titer of 1:2560 and a reactive Venereal Disease Research Laboratory (VDRL) titer of 1:16, consistent with active maternal syphilis infection.



Figure 1. Ultrasound examination (Official permission was obtained by authors).

After the diagnosis of reactive syphilis in early pregnancy (TPHA 1:2560; VDRL 1:16), the patient was referred for further management. However, based on available medical records and patient history, there was no documented evidence of complete and adequate penicillin therapy during pregnancy. The patient reported limited understanding of the importance of treatment adherence and follow-up. No documentation regarding partner notification or partner treatment was available. These conditions may have contributed to an increased risk of complications during pregnancy. The patient was then consulted with an obstetrician-gynecologist. Management was performed by induction of labor using misoprostol 400 mcg orally every 3 hours, accompanied by a drip of oxytocin 5 IU in 500 ml of Ringer's Lactate. The patient was closely observed for vital signs, contractions, bleeding, and labor progress. On the evening of August 27, 2025, the patient began to feel contractions followed by the expulsion of the amniotic membranes. Labor occurred spontaneously vaginally on August 28, 2025, at 00:30 AM. Postpartum conditions were stable. The uterus was well contracted, with the fundus two fingers below the umbilicus. Lochia was minimal (<1/3 of the pad), no blood clot was found, no perineal wounds, and no breast milk production occurred. The patient was discharged on the afternoon of August 28, 2025, in good general condition, with stable vital signs, no significant pain, minimal bleeding, and able to mobilize independently.

However, from a psychological perspective, the patient demonstrated significant emotional distress following the diagnosis and delivery. The patient reported experiencing mixed emotions, including profound sadness and feelings of guilt regarding the IUFD. The patient repeatedly questioned whether the loss was her fault. During interactions with healthcare providers, the patient spoke minimal and often remained silent for extended periods during nursing care. Furthermore, the patient reported that she had discontinued attending school and preferred to remain at home, as felt uncomfortable returning to social environment after the pregnancy and fetal loss. This behavioral change suggested a tendency toward social withdrawal and avoidance. These findings supported nursing diagnoses of Grieving, Anxiety, Ineffective Coping, Impaired Social Interaction, Inadequate Health Knowledge, Risk for Infection, and Risk for Excessive Bleeding. Nursing interventions were implemented based on the NIC for two days. Interventions included emotional support, active listening, grief support, and coping enhancement to help the patient express her feelings and process the experience of fetal loss. Health education was also provided regarding reproductive health, STI, and the importance of completing syphilis treatment to prevent future complications. Nurses also emphasized the importance of follow-up care and encouraged the involvement of family members to strengthen social support. Through these interventions, nursing care aimed to maintain the patient's physical stability, address the psychological impact of IUFD and promote adaptive coping. Evaluations demonstrated that physical recovery remained stable with minimal lochia and well-contracted uterus, while the patient showed reduced verbalization of guilt, improved emotional expression, and willingness to participate in post-discharge outpatient follow-up and syphilis treatment adherence.

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Discussion

Although IUFD is a multifactorial condition and maternal syphilis remains a well-recognized risk factor, a broad range of alternative etiologies must be carefully evaluated. Chief among these differential diagnoses are chromosomal abnormalities and placental insufficiency, both of which can compromise fetal viability (Derikvand & Janani, 2025; Wang et al., 2022). Compounding these risks are hypertensive disorders of pregnancy and undiagnosed maternal infections, particularly those within the TORCH spectrum (İnan et al., 2024; Pesch et al., 2024). Underlying maternal conditions such as thrombophilia, alongside structural issues like umbilical cord abnormalities, must also be ruled out to establish a definitive cause (Song et al., 2025; Tantengco et al., 2024). In this case, the patient had no documented history of hypertension, diabetes, trauma, or bleeding. There were no clinical signs of preeclampsia or placental abruption. However, due to the absence of genetic testing and placental histopathological examination, other etiologies cannot be completely excluded. Nevertheless, the presence of high syphilis serologic titers combined with the lack of documented adequate penicillin therapy strengthens the likelihood that untreated maternal syphilis was a major contributing factor to IUFD. Nurses help prevent these complications by screening patients early, supporting regimen compliance, educating clients, and maintaining continuous follow-up with high-risk individuals. Stigmatization and poor social support are challenges faced by individuals living with STI, which can impact their healthcare (Rutledge et al., 2025). Research documented those levels of stigmatization among pregnant women with HIV or syphilis, remain high (Zhang et al., 2022). This stigmatization has been shown to be a significant predictor of low social support received by pregnant adolescent with transmitted infections, which can affect their engagement in health services and treatment (Machoka et al., 2024). Therefore, implementing strategies that focus on reducing stigma and strengthening social support for pregnant women with transmitted infections is important in increasing the effectiveness of programs and eliminating mother-to-child transmission.

Syphilis screening is recommended to be performed at the first prenatal visit, ideally during the first trimester of pregnancy (Anselem et al., 2025). For pregnant women with high-risk factors or those living in areas with a high prevalence of syphilis, repeat screening is recommended in the third trimester and at the time of delivery. Serological screening remains the most effective approach for the early detection and management of syphilis, particularly during pregnancy, as clinical diagnosis alone is often challenging (Asher et al., 2025). World Health Organization (WHO) emphasizes the use of non-treponemal tests, such as the VDRL or Rapid Plasma Reagin (RPR), for screening and monitoring treatment response, in combination with treponemal tests, such as the TPHA for confirmation of diagnosis (World Health Organization, 2017). From a nursing perspective, adherence to WHO recommended syphilis screening protocols is essential in antenatal care. Nurses play a critical role in implementing routine screening, educating pregnant women about the importance of testing, facilitating early referral and treatment, and ensuring follow-up and treatment adherence (Chaki & Hardy, 2023). After syphilis screening is performed, pregnant women with reactive or positive serological results should undergo prompt clinical evaluation and receive appropriate treatment without delay to prevent maternal complications and vertical transmission to the fetus. The recommended treatment for syphilis during pregnancy is penicillin therapy, administered according to the stage of infection, as it remains the only proven effective treatment for preventing adverse perinatal outcomes and congenital syphilis (Salomè & Tzialla, 2026). Treatment should be initiated as early as possible, and completion of the full therapeutic regimen is essential.

In the present case, serological examination revealed a reactive syphilis infection. Such high serological titers suggest ongoing infection and are associated with an increased risk of placental inflammation, impaired placental perfusion, and transplacental transmission of *Treponema pallidum* (Swayze et al., 2022). These pathological processes may compromise fetal oxygenation and nutrient exchange, thus increasing the risk of IUFD. Furthermore, the absence of timely and complete penicillin therapy may have allowed the infection to persist and progress, further increasing the risk of fetal compromise (Swayze et al., 2022). In adolescent pregnancies, barriers such as limited health literacy, psychosocial vulnerability, stigma, and gaps in follow-up care may contribute to delayed or missed treatment (Lesinskienė et al., 2025). Despite the strong association between untreated maternal syphilis and adverse perinatal outcomes, several limitations must be acknowledged. Placental histopathology, genetic testing, and comprehensive infectious screening were not performed, which limits the ability to definitively exclude other potential causes of IUFD. Additionally, documentation regarding the exact timing, dosage, and completeness of syphilis treatment was incomplete. As a single case report, this study cannot establish causality but rather illustrates a clinically plausible association. These limitations highlight the importance of comprehensive diagnostic evaluation and complete documentation in managing complex obstetric cases.

Within the framework of nursing care, nurses can identify nursing problems, plan appropriate interventions, and evaluate expected outcomes in a measurable manner. The nursing diagnosis obtained in this case reflects the

adolescent's emotional response to fetal loss, which is often exacerbated by immature coping mechanisms, social stigma, and limited family support. Postpartum conditions may also result in physical complications, Risk for Excessive Bleeding and Risk for Infection as mentioned in nursing diagnosis. Inadequate Health Knowledge regarding reproductive health, prevention of sexually transmitted infections, and adherence to syphilis treatment is commonly identified. Furthermore, adolescents who experience IUFD often face stigma and discrimination, which may lead to Impaired Social Interaction or Social Isolation due to feelings of shame and withdrawal from social environments. In this case, the patient indeed exhibited social withdrawal, having dropped out of school and staying at home due to shame and discomfort with her social environment post-loss. Based on the identified diagnoses of Grieving, Anxiety, Ineffective Coping, Impaired Social Interaction, and Inadequate Health Knowledge, nurses planned and implemented tailored interventions focusing on structured emotional support and health education, nurses planned and implemented interventions focusing on emotional support and education (Fernández-Férez et al., 2021). Relevant interventions include grief support, emotional support, active listening, and coping enhancement, which aim to help adolescents' express feelings of loss and develop more adaptive coping strategies (Vidal & Millán, 2023). Nurses play a role in identifying psychosocial risk factors that can exacerbate the grieving process, such as lack of family support, interpersonal conflict, social stigma, and a history of mental health disorders. In adolescents, pregnancy loss can be accompanied by an identity crisis and changes in social roles, so nurses need to provide a safe space for patients to express their feelings.

In daily practice, nurses serve as essential facilitators who build trusting relationships with pregnant adolescents and their families. This empathetic connection is particularly vital given that teenagers frequently navigate emotional uncertainty, family conflict, and severe social stigma surrounding early pregnancy. Consequent to these complex vulnerabilities, nurses must extend their scope far beyond routine clinical care; they must actively step into roles as educators, emotional pillars, and vital liaisons between these young patients and the healthcare ecosystem. Ultimately, anchoring care in a humanistic, non-judgmental, and adolescent-centered framework is not just a preference, but the clinical key to maximizing antenatal engagement and preventing devastating complications, including IUFD. Admittedly, this case report is subject to several critical clinical limitations. Foremost among these is the lack of detailed documentation regarding the precise timing and completeness of the maternal syphilis treatment regimen. Compounding this issue, essential secondary investigations—such as genetic analysis or comprehensive TORCH screening—were omitted due to resource constraints and parental preference. Furthermore, the diagnostic picture remains incomplete because the available ultrasound documentation lacked a formal assessment of placental morphology and amniotic fluid volume. Consequently, a definitive causal relationship between maternal syphilis and the IUFD cannot be conclusively established; therefore, these findings must be interpreted with strict caution.

Conclusion

This case demonstrates that IUFD can occur in adolescent pregnancies complicated by reactive syphilis when treatment is inadequate or uncompleted, although early identification through antenatal screening. The absence of documented penicillin therapy likely permitted persistent maternal infection may lead to placental compromise and adverse perinatal outcomes. Consequently, strengthening nurse-led follow-up systems, promoting treatment adherence, and delivering holistic, adolescent-centered care are essential to optimize maternal syphilis management and prevent similar fetal losses. Further investigation is needed to evaluate educational interventions and psychosocial support for pregnant adolescents with STIs. Future research should also examine implementation strategies for school- and community-based reproductive health programs to minimize social stigma and encourage early healthcare utilization.

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AI statements

The authors utilized AI-based language editing tools solely for the purpose of writing improvement. Then, the authors reviewed, edited, verified the content, accuracy, and integrity of the published work.

Author's declaration

All authors contributed to clinical care delivery, manuscript drafting, and final review prior to publication.

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Availability of data and materials
All relevant data supporting the findings of this case report are fully contained within the manuscript. Any additional inquiries regarding the case may be addressed to the corresponding author.

Competing interests
The authors declare that there is no conflict of interest.

Ethical clearance
This study was reviewed and approved by the Institutional Ethics Committee of University Indonesia Hospital (Protocol Number: 2025-09-168). Verbal and written informed consent were obtained from the patient who participated in this study prior to data collection and publication.

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Publishers and journal's note
This unique case highlights an essential learning opportunity for inpatient pediatric and maternal care nursing staff. Collaborative management represents a critical mechanism for controlling syphilis transmission and delivering comprehensive risk-reduction education regarding sexual health.

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Authors' insight

Key points

- Combines biological risks with adolescent psychosocial factors (stigma, delayed care-seeking, low health literacy), illustrating how complex health disparities directly drive adverse perinatal outcomes.
- Early serological detection via antenatal screening is ineffective without robust nurse-led tracking, patient education, and follow-up protocols to ensure completed penicillin therapy.
- Emphasizes the integration of evidence-based nursing care plans to manage both the physical postpartum risks (infection, hemorrhage) and acute psychological distress (grief, ineffective coping) in adolescent loss.

Emerging nursing avenues

- How does the nursing care specifically explain the multi-level barriers—individual, interpersonal, and structural—that led to incomplete penicillin therapy in this adolescent patient?
- What specific nurse-led follow-up mechanisms or adolescent-centered care protocols are recommended to bridge the gap between initial syphilis diagnosis and treatment completion in community and hospital settings?
- How does this case report expand upon existing literature on recurrent fetal loss and congenital syphilis prevention in low- and middle-income country (LMIC) contexts?

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