

Intrauterine Fetal Demise with Antenatal Care Challenges, Socio-Demographic Factor and Cultural in Atambua, East Nusa Tenggara: A Case Report

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Abstract

Introduction: Intrauterine fetal demise (IUFD) is fetal death at ≥ 20 weeks of pregnancy or ≥ 350 grams birth weight. In 2015, the stillbirth rate was 18.4 per 1,000 live births worldwide, with Indonesia having one of the highest infant mortality rates. Despite the recommendation for antenatal care (ANC) to be performed six times, it is typically only conducted twice in NTT, particularly in Atambua. Limited ANC, low education, and cultural practices such as betel chewing and alcohol intake affect maternal and fetal health.

Case Illustration: A 32-year-old multigravida (G7P4A2) woman with IUFD at 33 weeks had only one ANC visit during her first pregnancy. She consumed alcohol three times daily and chewed betel nut four times a day. The patient complained of weakness, sore throat, and mild abdominal pain. Examination revealed an absent fetal heart rate and pale conjunctiva. Lab tests confirmed HSV-1 infection and anemia. She was treated with acyclovir and ferrous sulfate.

Conclusion: The lack of ANC increases susceptibility to infections, while other challenges include socio-demographic problems and cultural concerns. Improving ANC for early detection, and education on alcohol and betel chewing are crucial to enhancing maternal and fetal health in high-risk areas.

Keywords: Intrauterine fetal demise, Antenatal care, Socio-demographic, Culture

Kematian Janin Intrauterin dengan Tantangan Pelayanan Antenatal, Faktor Sosiodemografis, dan Budaya di Atambua, Nusa Tenggara Timur: Laporan Kasus

Abstrak

Pendahuluan: Kematian Janin Dalam Rahim (KJDR) adalah kematian janin pada usia kehamilan ≥ 20 minggu atau berat lahir ≥ 350 gram. Pada tahun 2015, angka mortalitas bayi lahir mati secara global adalah 18,4 per 1.000 kelahiran; dan Indonesia merupakan salah satu negara dengan angka kematian bayi tertinggi. Pelayanan antenatal (ANC) direkomendasikan enam kali kunjungan, namun sering terjadi dua kali di NTT, khususnya Atambua. ANC yang terbatas, pendidikan rendah, serta praktik budaya, seperti konsumsi pinang dan alkohol berdampak terhadap kesehatan ibu dan janin.

Ilustrasi Kasus: Wanita berusia 32 tahun (G7P4A2) multigravida dengan KJDR pada usia kehamilan 33 minggu, hanya melakukan ANC satu kali selama kehamilan pertama, mengonsumsi alkohol tiga kali sehari, dan buah pinang empat kali sehari. Keluhan pasien lemas, sakit tenggorokan, disertai nyeri perut. Pemeriksaan fisik terdapat conjungtiva pucat, dan tidak ditemukan denyut jantung janin. Tes lab menunjukkan infeksi HSV-1 dan anemia. Pasien diobati dengan asiklovir dan sulfas ferosus.

Kesimpulan: Kurangnya ANC mengakibatkan kerentanan terhadap risiko infeksi, sedangkan masalah sosiodemografis dan faktor budaya menjadi tantangan. Upaya meningkatkan ANC dalam deteksi dini disertai edukasi terkait konsumsi alkohol dan pinang merupakan kunci untuk meningkatkan kesehatan ibu dan janin, terutama di daerah berisiko tinggi.

Kata Kunci: Budaya, Kematian janin dalam rahim, Pelayanan antenatal, Sosiodemografis

Introduction

Intrauterine fetal demise (IUFD) refers to the death of a fetus that occurs in the uterus at \geq 20 weeks of pregnancy or with a minimum birth weight of 350 grams.¹ The estimated global stillbirth rate worldwide was 18.4 per 1,000 total births in 2015.² Globally, 3 million babies suffer from intrauterine fetal death, with the vast majority in developing countries.³ With 56,000 instances in 2020, Indonesia is among the top 10 countries with the highest infant mortality rates.³

The infant mortality rate (IMR) in Atambua has been rising annually since 2023 when it was 56 per 1,000 live births.⁴ Data from the Atambua City Health Center indicates that there were twice as many infant deaths from IUFD in November 2023 compared to the monthly average.⁴ This trend occurs frequently, increasing every two to four months due to various problems, and thus contributing to the infant mortality rate in Indonesia.⁵

The World Health Organization (WHO) recommends at least eight antenatal care (ANC) visits, but Indonesia requires ANC at least six times during pregnancy.⁵ In 2018, 94% of NTT faced issues with initial visits, with the average number of visits being only 64.3%, and patients typically attending ANC only twice; similar incidents occurred in Atambua.⁶ This figure is clearly much lower than the WHO-recommended ANC guidelines.⁶

Several factors contribute to the lack of ANC in Atambua, mainly economic and educational limitations.⁷ ANC plays a crucial role in early detection, health education, vaccination, and fetal growth monitoring.⁸

The etiology and risk factors of IUFD are closely intertwined, such as bridges.⁸ Risk factors are generally associated with three categories: maternal factors, placental factors, and fetal disorders.⁸ Lack of ANC exacerbates factors contributing to IUFD

mortality, such as maternal health risks and lack of education about risky behaviors during pregnancy.⁹

Low employment and education levels are significant socio-demographic issues in Atambua.⁹ The most cultural traditions and lifestyles are found in Atambua, NTT.¹⁰ Cultural traditions in Atambua, NTT, including betel chewing and alcohol consumption, are prevalent, especially among pregnant women.¹¹ These practices are tied to religious rituals, yearly cultural customs, traditions of respect, and traditional medical practices.¹² The presence of chemicals in these substances may lead to maternal and fetal health issues, making this a serious problem.¹³

This study will examine case reports by referring to literature that explores the role of ANC in IUFD, considering socio-demographic factors, particularly education and employment, as well as the potential impact of substances like alcohol and betel nut on the occurrence of IUFD.

Case Illustration

A 32-year-old woman, G7P4A2, at 33 weeks of gestation, presented to the Emergency Obstetric Neonatal Care Unit at Sito Husada Hospital. The patient had not felt any fetal movements for the past three weeks, and her primary complaints were weakness, sore throat, bloody mucus discharge, and amniotic fluid seeping into the birth canal with minimal abdominal pain. Her medical records indicate that she experienced two miscarriages between 2012 and 2024.

Due to economic and geographic constraints, the patient only saw an obstetrician and gynecologist for prenatal care sessions during her first pregnancy. Hospitals and community health clinics are located far from patients' homes, and many patients do not wish to have their pregnancies

monitored.

The patient only completed junior high school, works as a farmer, and has no known history of chronic illnesses. She did not routinely take vitamins or blood supplements during her pregnancy and enjoyed chewing betel nut. Patients frequently use betel nut as a herbal cure for sore throats and because it is deeply ingrained in their family's cultural beliefs. She chews betel nut four or five times daily. According to her history, the patient drank three or four times a week. She regularly partakes in customary alcoholic drinks like *sopi* at funerals and weddings.

The vital signs examination revealed a blood pressure of 110/70 mmHg, a pulse rate of 98 beats per minute, a temperature of 37.0°C, and a breathing rate of 20 breaths per minute. During the physical examination, anemia symptoms were noted, including pale conjunctiva in both eyes. The capillary refill time was one second. No abnormalities were found during lung and heart examinations

During the active phase of labor, the abdominal examination revealed that the patient experienced moderately intense abdominal contractions three times every ten minutes, with an average duration of 50 seconds. However, she did not report severe pain during the contractions. The Doppler examination did not detect any fetal heartbeat.

A vaginal examination revealed a complete cervical dilation of 10 cm and an incomplete breech presentation. The presenting parts included the buttocks and feet. At Hodge's fourth plane, the station showed positive mucus and blood; the amniotic fluid was absent, and there was a slightly unpleasant odor from the cervical mucus.

During the labor process, the left leg emerged first, followed by the stomach, right leg, and buttocks. The Lovset Maneuver was used to bring out the front and rear arms of the fetus when its shoulder was constrained. An injection of 1 ampoule of IM Oxytocin

was given to the left thigh and 2 ampoules of oxytocin drip in a 20 drops per minute ringer lactate infusion.

According to the follow-up, the baby was born a female, weighing 639 grams and measuring 24 cm in length. The fetus was in grade 3 maceration (Figure 1). The APGAR score was zero, indicating a foul or fishy smell, which can develop if there is an infection, indicating that the fetus had died in the womb. The placenta was manually explored and appeared greenish-yellow (Figure 2).

Uterine contractions became inadequate when exploring the placenta, accompanied by hemorrhage of roughly 600 cc. Treatment for uterine atonia was initiated, consisting of 4 tablets of misoprostol administered rectally, an injection of 1000 mg tranexamic acid, 0.2 mg of methylergometrine IV, an oxytocin drip of 2 ampoules in ringer's lactate, and uterine massage.

Table 1 Complete Blood Count Test

Parameter	Results	Normal Range
WBC 10 ³ /uL	11.3	4–10
HGB g/dL	8.0	11–15
MCV fL	98.2	80–100
MCH pg/mL	37.9	27–34
MCHC g/dL	38.6	32–56

A complete blood test was performed due to the patient's suspected anemic symptoms. Additionally, a serological investigation revealed that the patient had Anti-IgG HSV-1 (+). The patient was discharged and prescribed treatment for the HSV-1 infection, which included 400 mg of acyclovir three times a day for seven days and 60 mg of ferrous sulfate once a day for three weeks. The patient was also reminded to attend ANC check-ups six times to prevent recurrence.

Regarding contraception with IUDs, copper IUDs last up to 10 years, while



Figure 1. Fetal Death Maceration

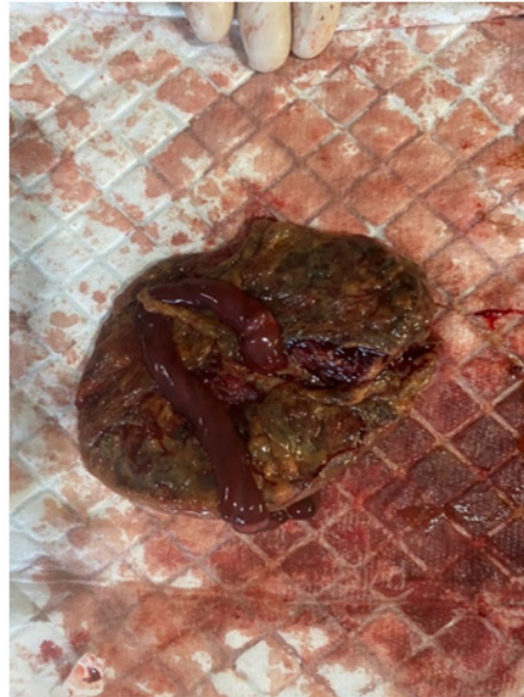


Figure 2. Placental Tissue

hormonal IUDs last 3–5 years, reducing the need for frequent changes. Both types do not increase the risk of HSV flare-ups as they do not directly affect the immune system. A week after giving birth, the patient was checked during a postpartum visit and reported feeling only slightly weak. No other complaints, such as a sore throat, were noted, and no abnormalities were discovered during the physical examination. The patient consistently took ferrous sulfate daily and planned to consider using an IUD after one year for religious reasons.

The diagnostic challenge in this case lies in the presence of several symptoms that resemble other conditions. Additionally, the lack of cooperation during anamnesis complicates differentiation, and the hospital's limited diagnostic instruments for serological examinations require the patient to undergo testing outside the facility.

Discussion

According to a case report, a 32-years old G7P4A2 patient with IUFD at 33 weeks

of gestation complained of discharge and amniotic fluid seeping into the birth canal along with minimal abdominal pain. The patient had not felt any fetal movements for the previous three weeks. The Doppler examination did not detect a fetal heartbeat; the fetus weighed 439 grams, had a grade 3 maceration condition, an APGAR score of 0, and the placenta indicated a foul or fishy smell suggesting an infection.

The patient complained of a sore throat, and during the physical examination, the serology test revealed HSV-1 IgG+. The patient's blood test showed leukocytosis, indicating HSV-1 reactivity. Subsequently, a complete blood test revealed severe normocytic hyperchromic anemia, weakness, and a capillary refill time of one second.

Theories of IUFD signs and symptoms include decreased uterine activity, which prevents the uterus from expanding further due to halted fetal growth.¹ Acidosis will develop from blood gas respiratory problems, affecting the autonomic nervous system's FHR.^{2,3} Asphyxia will activate the sympathetic nervous system, impacting FHR.^{2,3,4} The

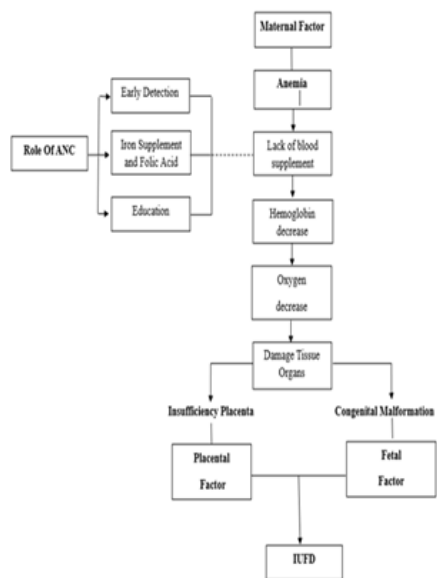
lack of oxygen and blood causes anaerobic metabolism and autolysis, increasing proteolytic enzymes and accelerating tissue deterioration.³

The etiology of IUFD is closely associated with multifactorial risk factors, requiring a comprehensive evaluation of maternal factors, fetal factors, and placental disorders.⁴ These components are interconnected and cannot be separated.^{4,5} Maternal factors linked to IUFD include chronic diseases like autoimmune conditions (e.g., SLE), anemia, uncontrolled diabetes mellitus, hypertension during pregnancy, and TORCH infection.⁵

supplied is reduced, the performance of the affected organs will decrease, and certain processes will be disrupted.^{6,7} Low use of iron supplements and folic acid can lead to neural tube abnormalities, one of the fetal factor disorders.^{6,7} It may result in fetal tissues not developing and functioning according to gestational age, leading to intrauterine fetal death.⁷

Given her history, the patient only visited antenatal care once during her first pregnancy since she lived too far away. According to a study by McDiehl et al. (2021), pregnant women who attended ≥ 4 antenatal care (ANC) visits had a 50% lower odds of stillbirth compared to those who attended ≤ 3 visits.⁷ Additionally, attending ≥ 4 ANC visits was associated with a 34% reduction in the odds of adverse birth outcomes.^{7,8} This may be related to more comprehensive infection screening services, treatments, and preventive care received during ANC visits.⁸

ANC plays a significant role in controlling risk factors directly linked to the causes of IUFD.^{8,9} Early detection through routine Hb level tests in the first, second, and third trimesters helps prevent and manage anemia (Figure 3).⁹ In addition to early detection, ANC provides iron and folic acid supplements from early pregnancy to three months postpartum.^{9,10} Another role of ANC is to provide nutritional advice on foods and drinks to avoid.¹⁰

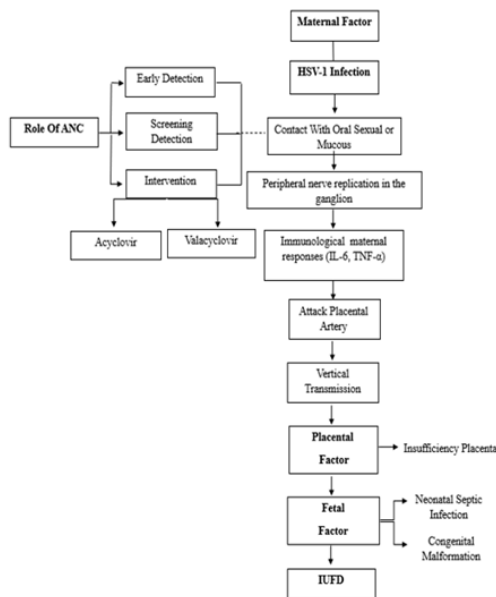


ROLE ANC AND PATOPHYSIOLOGY ANEMIA OF IUFD

Source: Ota E, da Silva Lopes K, Middleton P, Flenady V, Wariki WM, Rabman MO, et al. Antenatal interventions for preventing stillbirth, fetal loss, and perinatal death: an overview of Cochrane systematic reviews. Cochrane Database

Figure 3 Role of ANC and Pathophysiology Anemia of IUFD

Due to the pathophysiology of anemia (Figure 3), IUFD results in a reduction in the amount of oxygen bound to and carried by hemoglobin, preventing it from meeting tissue demands.⁶ If the amount of oxygen



ROLE ANC AND PATOPHYSIOLOGY HSV OF IUGR

Source: De Rose DU, Bompani S, Maddaloni C, Bersani I, Scattoli A, et al. Neonatal herpes simplex virus infection: From the maternal infection to the child outcome. *J Med Virol.* 2023;95(8):e29024.

Figure 4 Pathophysiology IUGR Between Correlation ANC And HSV-1 Infection

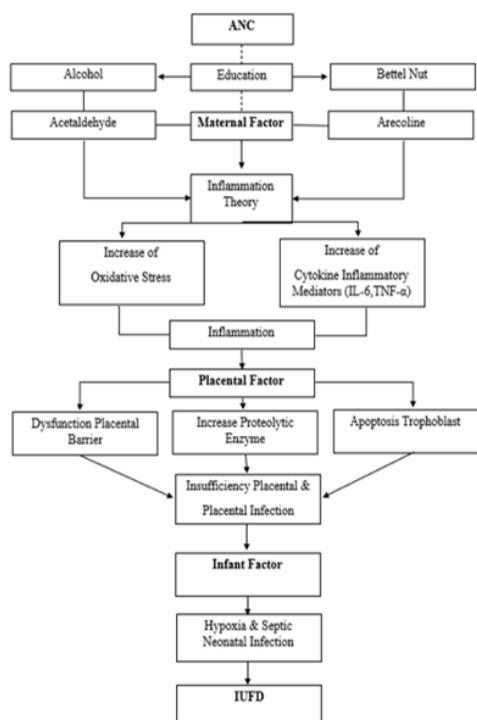
Reducing the risk of vertical transmission to the fetus is possible through antenatal treatment that focuses on HSV-related infections (Figure 4).¹¹ This involves early detection and screening based on the mother’s history of sexual partners, primary or recurring infections, and laboratory and clinical testing if symptoms are present.^{11,12} Viral culture or HSV PCR is carried out, and serological testing is used to differentiate between primary and reactivation infections.¹² As a preventive measure, education will be provided to pregnant women to avoid sexual contact with partners exhibiting active HSV symptoms or to use condoms.^{12,13} Antiviral medications, such as acyclovir or valacyclovir, are recommended to be administered at 36 weeks of gestation.¹³

According to the notion, HSV-1 can most commonly ascend and disseminate from the cervix or vagina to the uterus or trans-placentally infect the fetus, resulting in IUGR, an inflammation of congenital infection.¹³ Placental arteries may be harmed

by the viral genome entering the nucleus, the release of viral DNA for replication, and an excess of maternal immune responses (IL-6, TNF-α).^{13,2,3} HSV infection has a major impact on fetal health, which can result in acute or chronic intrauterine fetal hypoxia, one of the main pathogenetic causes of perinatal death.^{13,3,4}

The patient’s sociodemographic background is as follows: she worked as a farmer and completed junior high school as her final educational level. Throughout her pregnancy, she regularly chewed betel nut four to five times and drank traditional alcoholic beverages three to four times a week for cultural reasons.

Several factors contribute to IUGR, including behavioral, environmental, demographic, and cultural aspects of nutrition.¹⁴ One significant demographic factor associated with IUGR is the mother's socioeconomic level, determined by her occupation and educational achievement.¹⁵ According to research by Agnes et al. (2022), lower maternal health education was linked to a greater risk of fetal death among women engaged in farming (90.6%) compared to teaching (10.4%).¹⁵ A study by Salsabila (2021) found that pregnant women who completed only elementary school (17.5%), high school (45%), or junior high school (35%) were 1,870 times more likely to have fetal health problems.¹⁶



PATHOPHYSIOLOGY IUGR BETWEEN CORRELATION ANC, ALCOHOL AND BETEL NUT

Source: Asp J, Bergman L, Lager S, Axelsson O, Wikström A-K, Hesselmar S. Alcohol exposure prior to pregnancy—does hazardous consumption affect placenta- and inflammatory-mediated pregnancy outcomes? A Swedish population-based cohort study. *Acta Obstet Gynecol Scand.* 2022;101(12):1386–94.

Ngadilah C, Ohi AL, Nubatoru MO. The relationship of pregnant women who consume betel nut to periodontal disease which will affect pregnancy outcome. *J Ilm Permas: J Ilm STIKES Kendal.* 2022;12(2):157–64.

Figure 5 Pathophysiology IUGR between Correlation ANC, Alcohol, and Betel Nut

The incidence of IUGR is significantly influenced by maternal, fetal, and placental risk factors such as education level, diet, and alcohol use (Figure 5).^{16,17,2,3} A study by McDonald (2020) explains that pregnant women who consume alcohol during pregnancy have a 53% chance of giving birth to a child with fetal alcohol spectrum disorder (FASD).¹⁷ Additionally, alcohol intake during pregnancy can impair blood circulation to the fetus and reduce oxygen levels.¹⁷

When ingesting alcohol, the liver's alcohol dehydrogenase (ADH) enzyme converts it to the harmful chemical acetaldehyde (Figure 5).^{17,18} Acetaldehyde affects the morphology of the placenta by disrupting the structure of the chorionic villi and causing apoptosis of trophoblast cells. It

increases the expression of oxytocin stress markers and pro-inflammatory cytokines (IL-6, TNF- α).¹⁸ The placenta becomes inflamed, and the reaction to elevated cytokines triggers proteolytic enzymes. This results in placental barrier malfunction and vasoconstriction of placental blood vessels, which lowers the fetus's oxygen supply and causes hypoxia.^{18,19}

Betel chewing is common in various regions of Indonesia and has been a topic of discussion among the public and medical professionals.^{19,3,4} The dangerous content in betel nut, namely arecoline, is a carcinogenic substance.¹⁹

A study by Redwanul (2024) explained that pregnant women who chew betel nut have a higher chance of developing fetal disorders (57%) compared to those who do not chew betel nut (43%).¹⁹ According to a 2017 study by Khuurshed and Madhudas, chewing betel nut during pregnancy is highly linked to anemia, and periodontal disease increases the risk of infection for the fetus.^{19,13,14}

Arecoline increases oxidative stress and releases pro-inflammatory cytokines (TNF- α , IL-6).^{19,20} These cytokines interfere with endothelial function in the placental blood vessels, disrupting the fetus's oxygen supply and resulting in hypoxia (Figure 5).²⁰ Additionally, oxidative stress will cause the fetus's mitochondria to malfunction, resulting in cell apoptosis.^{20,9,10}

Conclusion

This case highlights the various causes of IUGR, such as inadequate prenatal care, sociodemographic circumstances, and cultural customs. By ensuring that pregnant women receive iron supplements, ANC plays a critical role in preventing IUGR, especially in cases of anemia. Early screening and appropriate treatments can prevent HSV. Occupations like farming and educational background may also impact the risk of

IUFD. Alcohol's acetaldehyde content can contribute to IUFD, and arecoline, found in betel nuts, may further increase the risk.

This study's limitations include the inability to compare IUFD cases with pregnant women who have similar characteristics but did not experience IUFD, making it difficult to establish a stronger causal relationship. Additionally, the language barrier with patients made it challenging to conduct interviews regarding their complaints, possibly resulting in biased data. Despite these limitations, further investigation using more rigorous study designs like cohort studies or intervention trials is essential to validate these findings and strengthen health policy recommendations.

References

1. Alzeus O, Tantengco G, Diwa MH, Michael P, Millagrosa M, Velayo CL. Epidemiology and placental pathology of intrauterine fetal demise in a tertiary hospital in the Philippines. 2024 Jun;23:100338.
2. Sariunita N, Idris H. Regional perinatal mortality differences in Indonesia: Evidence from Indonesian demographic health survey. *Public Health Pract.* 2024;7:100501.
3. Sariunita N, Idris H. Regional perinatal mortality differences in Indonesia: Evidence from Indonesian demographic health survey. *Public Health Pract.* 2024;7:100501.
4. Nahak MPM, Isu YK, Nu'a FJ, Dos Santos JC. Upaya peningkatan pengetahuan terkait pentingnya pemeriksaan kehamilan (Antenatal Care) pada ibu hamil di Puskesmas Haliwen. *Abdimas Galuh.* 2024;6(1):39-48.
5. Soeyono DW, Putri RA. Asuhan kebidanan continuity of care (COC) pada Ny "J" umur 20 tahun di Puskesmas Kota Atambua. In: *Prosiding Seminar Nasional dan CFP Kebidanan Universitas Ngudi Waluyo.* 2024 Jun;3(1):544-52.
6. Ota E, da Silva Lopes K, Middleton P, Flenady V, Wariki WM, Rahman MO, et al. Antenatal interventions for preventing stillbirth, fetal loss, and perinatal death: an overview of Cochrane systematic reviews. *Cochrane Database Syst Rev.* 2020;(12).
7. McDiehl RP, Boatman AA, Mugenyi GR, Siedner MJ, Riley LE, Ngonzi J, Bebell LM. Antenatal care visit attendance frequency and birth outcomes in rural Uganda: a prospective cohort study. *Matern Child Health J.* 2021;25:311-320. doi:10.1007/s10995-020-03023-0.
8. Hamzah RN, Asmin RY. Relationship between anemia and placenta previa with intrauterine fetal death at RSKDIA Pertiwi Makassar City in 2022. *Jurnal EduHealth.* 2023;14(1):143-7.
9. Elkafrawi D, Sisti G, Araji S, Khoury A, Miller J, Rodriguez Echevarria B. Risk factors for neonatal/maternal morbidity and mortality in African American women with placental abruption. *Medicina.* 2020;56(4):174.
10. Loussert L, Berveiller P, Magadoux A, Allouche M, Vayssiere C, Garabedian C, et al. Association between marked fetal heart rate variability and neonatal acidosis: A prospective cohort study. *BJOG: An Int J Obstet Gynaecol.* 2023;130(4):407-14.
11. De Rose DU, Bompard S, Maddaloni C, Bersani I, Martini L, Santisi A, et al. Neonatal herpes simplex virus infection: From the maternal infection to the child outcome. *J Med Virol.* 2023;95(8):e29024.
12. Andrievskaya IA, Zhukovets IV, Dovzhikova IV, Ishutina NA, Petrova KK. The Effect of HSV-1 Seropositivity on the Course of Pregnancy, Childbirth and the Condition of Newborns. *Microorganisms.* 2022;10(1):176.
13. Mirambo MM, Mushi MF, Kihunrwa A, Chuma C, Nyadema AC, Aboud S,

- et al. High Seropositivity of Markers of Viral Infections among Women with Unfavorable Pregnancy Outcomes in Mwanza, Tanzania: The Urgent Need for Control Interventions. *East Afr Health Res J.* 2020;4(2):113-127.
14. Rogers VL, Roberts SW. Anemia in pregnancy [Internet]. In: Papadakis MA, McPhee SJ, Rabow MW, McQuaid KR, editors. *Current Medical Diagnosis & Treatment 2023*. New York: McGraw-Hill Education; 2023 [cited 2025 Feb 20]. Available from: <https://accessmedicine.mhmedical.com/content.aspx?bookid=3212§ionid=26916037>.
 15. Edo JU, Artawan IM, Sasputra IN. Efek pemberian minuman sopi dibandingkan alkohol jenis lainnya terhadap gambaran histopatologi pankreas tikus putih (*Rattus Norvegicus*) galur Sprague Dawley. *Cendana Med J.* 2020;8(1):501–5.
 16. Ngadilah C, Obi AL, Nubatons MO. The relationship of pregnant women who consume betel nut to periodontal disease which will affect pregnancy outcome. *J Ilm Permas: J Ilm STIKES Kendal.* 2022;12(2):157–64.
 17. Asp J, Bergman L, Lager S, Axelsson O, Wikström A-K, Hesselman S. Alcohol exposure prior to pregnancy—does hazardous consumption affect placenta- and inflammatory-mediated pregnancy outcomes? A Swedish population-based cohort study. *Acta Obstet Gynecol Scand.* 2022;101(12):1386–94.
 18. Islam MR, Aktar S, Pervin J, Rahman SM, Rahman M, Rahman A, Ekström EC. Maternal betel quid use during pregnancy and child growth: a cohort study from rural Bangladesh. *Glob Health Action.* 2024;17(1):2375829.
 19. Salsabiila JH, Joewono HT. Maternal educational status as one of the risk factors affecting the incidence of infants with low birth weight in Dr. M. Soewandhie General Hospital Surabaya. *JUXTA: Jurnal Ilmiah Mahasiswa Kedokteran Univ Airlangga.* 2021;12(1):10–3.
 20. de Jesus HM, Pratiwi CS. Impact of IUFD on Mothers in Developing Countries: A Rapid Review. *Women, Midwives and Midwifery.* 2024;4(3):63-81.