

Literature Review: Factor Related to Neonatal Asphyxia in Newborn

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Article Info	Abstract
Article History Submitted, 2026-05-11 Accepted, 2026-05-19 Published, 2026-06-30 Keywords: Asphyxia, newborn baby, maternal age	Neonatal asphyxia is a condition in which a newborn fails to initiate and maintain spontaneous and regular breathing after birth, leading to metabolic disturbances and increasing the risk of morbidity and mortality. This study aimed to determine the relationship between maternal age, education level, and occupation with the incidence of neonatal asphyxia at Kendari City Hospital. The research method used in this study is a literature review. Data were obtained through a search of relevant scientific publication articles in electronic databases. Articles meeting the inclusion criteria were then collected, reviewed, and descriptively analyzed to draw conclusions related to the research topic. The results showed that there was a significant relationship between maternal age (p=0.000), education level (p=0.001), and occupation (p=0.012) with the incidence of neonatal asphyxia. Mothers aged 20–35 years tended to have newborns with mild asphyxia, while mothers aged less than 20 years or more than 35 years had a higher risk of severe asphyxia. In addition, mothers with higher education levels were more likely to have better knowledge regarding pregnancy care, while heavy workload and limited rest among certain occupations contributed to increased risk. In conclusion, maternal age, education, and occupation are significantly associated with the incidence of neonatal asphyxia. Improving maternal knowledge through health education and ensuring adequate antenatal care (ANC) services are essential to reduce the risk of neonatal asphyxia and improve maternal and neonatal health outcomes.

Introduction

The Childbirth is a natural process that every mother must naturally undergo. However, this process does not always go smoothly because various complications can arise that are harmful to both the baby and the mother. A serious complication that is commonly experienced by newborns is Neonatal Asphyxia (Manuaba, 2015). The occurrence of Asphyxia Neonatorum is seen when the baby does not breathe regularly and spontaneously after birth, Asphyxia greatly interferes with the body's metabolism and can increase the risk of pain and can lead to death (Saifuddin, 2020).

Neonatal mortality is an urgent global issue, with an estimated 4 million babies dying in the first four weeks of life each year. Most of these deaths occur in low- and middle-income countries, with 6,700 newborn deaths every day, and 2.4 million children dying in the first month of life in 2020. Data shows that 75% of neonatal deaths occur within the first week, and 1 million babies die within the first 24 hours of birth in 2019. The leading causes of neonatal deaths include preterm birth, complications of childbirth (asfiksia), infections, and birth defects (WHO, 2020).

Indonesia is among the top ten countries with the highest newborn mortality rate, in 2022 there were 18,281 infant deaths in the neonatal period (0-28 days), of which 75.5% occurred at the age of 0-7 days and infant mortality at the age of 8-28 days at 24.5%. Asphyxia is the second highest cause of death after low birth weight (BBLR), with 25.3% of the total neonatal deaths (Kemenkes RI, 2022).

There are several factors that can cause asphyxia including maternal factors, umbilical cord factors and baby factors. The factors related to asphyxia are: long partus, mothers who have

experienced labor with complications, prematurity, BBLR, antepartum hemorrhage, premature rupture of amniotic membranes (KPD), breech birth aid, and umbilical cord circumference (Yanti et.al, 2023) (Amallia et.al, 2020). Other factors from mothers that are often found increase the risk of the occurrence of neonatal asphyxia are: anemia during pregnancy, maternal age and hypertension during pregnancy (Widiani, Kurniati and Windiani, 2019). In addition to these factors, parity is also one of the causes of asphyxia where primipara parity is more at risk for neonatal asphyxia because the mother is not medically or mentally ready to face childbirth, the stiffness of the perenium and cervical muscles can prolong the delivery process. However, multipara parity allows for complications in pregnancy and childbirth which can cause disruption of blood and oxygen circulation from mother to fetus which can cause neonatal asphyxia which we can assess from the APGAR Score the first minute after birth (Tandiallo, Devianti, Jumriana, Astuti, 2023). The results of other studies on risk factors for asphyxia in babies are the mother's gestational age and the type of delivery. Where is the largest group of cases at age 20 – 35 tahun as many as 27 people (75%), the control group at the age of 20 – 35 years as many as 60 people (83.3%), while the childbirth variable showed that mothers who experienced childbirth with SC had a 2.469 times greater risk of experiencing asphyxia than mothers who experienced normal or spontaneous vaginal delivery. (Mariana and Ashriady, 2020).

Some of the health efforts to improve newborn survival and health and end stillbirths can be prevented and can be done by achieving quality antenatal services, skilled childbirth services, postpartum services for mothers and babies, and small and sick newborn services (WHO, 2020). In addition to these efforts, the government also made efforts to reduce the neonatal mortality rate through the Decree of the Minister of Health of the Republic of Indonesia in 2020, it was stated that one of the competency standards of midwives is related to the care of newborns, therefore, the knowledge, expertise and skills of a midwife are a decisive part in reducing the neonatal mortality rate (Viera Valencia and Garcia Giraldo, 2023).

Methods

This This study employed a literature review method to identify the factors influencing the incidence of neonatal asphyxia. Article retrieval was conducted through electronic internet browsing on the Google Scholar and PubMed databases. The search was performed using specific keywords, including 'asphyxia', 'newborn baby', 'maternal age', and 'causes'. The publication period for the retrieved articles was limited to the last 5 years, spanning from 2021 to 2026. Based on this search strategy, a total of 13 relevant articles met the eligibility criteria and were retrieved for further analysis.

Results and Discussion

A summary of the research findings is presented in the following table:

Table 1. Results of Journal Analysis			
No	Research	Method	Results
1.	Predictors of birth asphyxia in Ethiopia: an updated systematic review with meta-analysis (Worke et al., 2025)	The systematic review and meta-analysis protocol was not registered for this systematic review and meta-analysis. The new version of the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guideline for reporting protocol was used [35] (Fig. 1) and the PRISMA 2020 Checklist was used to write this article.	This meta-analysis revealed an obstetric procedurerelated variables such as labor induction (OR=2.94, 95% CI: 1.87, 4.61), emergency cesarean sections (OR=2.87, 95% CI: 2.15, 3.83), deliveries during night time (OR=3.26, 95% CI: 1.06, 10.01) (Fig. 14A-C), and instrumental deliveries (OR=3.52, 95% CI: 2.74, 4.52) (Fig. 15) were significantly associated with birth asphyxia in Ethiopia.
2.	The Relationship between Quantity and Quality of Antenatal Care and Newborn Outcomes at the Kediri Health Center, West Lombok (Lovely et al., n.d.)	This research is a quantitative research with an observational study with an analytical design type. Data collection was carried out in a cross-sectional manner by collecting secondary data from KIA books and patients' medical records at the Kediri Health Center, as well as primary data such as last education, employment, and economic level from structured interviews.	In the results of statistical tests in each ANC quality on the level of asphyxia in the first minute, a p value of > 0.05 was also obtained, except in the aspect of administering blood tablets the value of p = 0.038 (p < 0.05) was obtained, which means that there is a relationship between the administration of blood tablets and the level of asphyxia
3.	The population studied consists of all babies who	This study used a quantitative approach with an analytical survey design and a cross	The p-value of 0.000 (<0.05) confirms that there is a real

	experience asphyxia during 2024, as many as 112 cases (Harni, 2025)	sectional method aimed at identifying factors related to the occurrence of Asphyxia Neonatorum in newborns. The population studied consists of all babies who experience asphyxia during 2024, as many as 112 cases	relationship between the mother's age and the appearance of asphyxia in newborns. This study showed a significant relationship between the two variables, with a p value of 0.001. Low levels of education affect the mother's understanding of the importance of maintaining health during pregnancy, recognizing red flags, and the importance of regular antenatal check-ups.
4.	Factors Influencing Pregnant Women's Knowledge of Neonatal Asphyxia	The research design used was an analytical survey with a crosssectional approach	Based on the chi-square p test $< \alpha$ ($0.001 < 0.05$). This statistically shows a significant influence between the mother's age and knowledge of asphyxia at the Kolakaasi Health Center. Based on the chi-square test $p < \alpha$ ($0.004 < 0.05$), this data statistically shows a significant relationship between mother's education on knowledge about asphyxia at the Kolakaasi Health Center
5.	Factors Related to the Incidence of Neonatal Asphyxia at Bima City Hospital (Sumantia & Jannah, 2024)	This study uses a quantitative research method with a retrospective approach and a cross sectional study design. The study population was Newborn patients at Bima City Hospital from January 2023 to December 2023.	The results of the Chi-square statistical test in the results of this study were obtained that there was a relationship between the mother's age and the incidence of neonatal asphyxia. Where $p = 0.001 < 0.05$.
6.	Determinants of birth asphyxia in urban south Ethiopia (Jena et al, 2024)	This study was conducted in five urban settings of the Hadiya zone, namely Hossana, Shone, Gimbichu, Jajura, and Homecho towns.	This study aimed to elucidate the determinants of birth asphyxia in cohorts of pregnant women who were followed up until childbirth in urban south Ethiopia. Accordingly, the progress of labor, duration of labor, mode of delivery, and birth weight were found to be independent determinants of birth asphyxia
7.	Prevalence and risk factors associated with birth asphyxia among neonates delivered in China: a systematic review and meta-analysis (Su et al, 2024)	This study was registered with PROSPERO (CRD42023458261) and conducted in accordance with the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines	The overall prevalence of birth asphyxia in newborns was 4.8% (95% CI, 4.5%–5.2%). In the subgroup analyses, the northern area presented the highest prevalence (5.1%; 95% CI, 4.1%–6.3%), followed by the southern area (4.1%; 95% CI, 3.3%–5.1%). The rural setting presented the highest prevalence (6%; 95% CI, 4.6%–7.4%), followed by the urban (4.2%; 95% CI, 4.6%–7.4%) and mixed (5.8%; 95% CI, 5.3%–6.3%) settings. The Apgar score demonstrated the highest prevalence (4.6%; 95% CI, 3.8%–5.4%), followed by the Apgar score with the umbilical artery blood pH (3.7%; 95% CI, 2.2%–5.7%). A significant difference in prevalence was found between studies with sample sizes greater than 5,000 (2.2%; 95% CI, 1.6%–3%) and those with 5,000 or fewer participants (6.2%; 95% CI, 5.5%–7.1%). Furthermore, there was a significant decrease in the incidence of birth asphyxia from 1995–2016 (4.9%; 95% CI, 4.2%–5.9%) to 2017–2023 (3.7%; 95% CI, 2.6%–5%). Placental abruption

			(OR=5; 95% CI, 3.08–8.13), placenta previa (OR=2.57; 95% CI, 1.84–3.58), advanced maternal age (OR=3.94; 95% CI, 1.46–10.62), primigravida (OR=5.33; 95% CI, 0.41–68.71), premature birth (OR=3.36; 95% CI, 2.61–4.32), intrauterine distress (OR=4.48; 95% CI, 3.47–5.80), stained amniotic fluid (OR=3.28; 95% CI, 2.25–4.79), macrosomia (OR=6.30; 95% CI, 0.61–65.22), foetal malformation (OR=7.44; 95% CI, 1.46–38.02), breech birth (OR=2.42; 95% CI, 1.24–4.73), caesarean
8.	The Relationship between Early Rupture of Amniotic Membrane and the Incidence of Neonatal Asphyxia at Bhayangkara Lumajang Hospital	This study is an observational analytical research with a cross sectional approach. The population in this study was all mothers who gave birth to premature rupture of amniotic tissue in the Maternity Room of Bhayangkara Lumajang Hospital from April to August 2022	Based on the Chi Square test, the p-value was 0.021, because the p-value was < α (0.05), H0 was rejected and Ha was accepted, which means that there is a relationship between premature rupture of amniotic membranes and the incidence of neonatal asphyxia
9	Contributing factors of birth asphyxia in Thailand: a case-control study (Rattanaprom et al, 2023)	The case-control study was designed to collect data from 4256 intrapartum care charts recorded in 23 hospitals in Thailand from 2016 to 2017.	The odds of birth asphyxia increases in the university and advanced hospitals but the university hospitals had the highest quality of care. The advanced and secondary hospitals had average nurse work-hours per week of more than 40 h. Multivariable logistic regression analysis found that intrapartum care services and maternal-fetal factors contributed to birth asphyxia. The odd of birth asphyxia increases significantly in late-preterm, late-term pregnancies, low-birth weight, and macrosomia. Furthermore, maternal comorbidity, non-reassuring, and obstetric emergency conditions significantly increase the odd of birth asphyxia. In addition, an excellent quality of intrapartum care, a combined nursing model, low nurse work-hours, and obstetrician-conducted delivery significantly reduced birth asphyxia
10	Factors Influencing the Incidence of Asphyxia in Newborns at Fauziah Bireuen Hospital in 2021 (Nufra & Ananda, 2021)	The research design used is an analytical research with a cross sectional approach	a. There is an influence between the mother's age and the incidence of Asphyxia, shown by the p value (0.001) < p value (0.05). b. There is an influence between gestational age and the incidence of Asphyxia, shown by the p value (0.000) < α (0.05) c. There is an influence between birth weight and the incidence of Asphyxia shown by the p value (0.000) < α (0.05)
11	Analysis of Factors Causing Asphyxia in Newborns at Siti Aisyah Hospital in Lubuklinggau	This type of research uses observational research with a case control study approach	a. Based on the results of chi-square, it can be seen that χ^2 counts which is 12.476, this is also seen at the value p 0.000, this value < 0.05. so it can be said that Ho was rejected and Ha was accepted. This means that there

	City (Elvira et al, 2022)		is a relationship between preeclampsia and the incidence of asphyxia in newborns at Siti Aiyah Hospital, Lubuklinggau City. b. Based on the results of chi-square, it can be seen that χ^2 is calculated which is 5.309, this is also seen at the value p 0.021, this value is < 0.05. so it can be said that H_0 was rejected and H_a was accepted. This means that there is a relationship between premature delivery and the incidence of asphyxia in newborns c. Based on the chi-square results, it can be seen that χ^2 counts which is 14.433, this is also seen at the value p 0.000, this value < 0.05. so it can be said that H_0 was rejected and H_a was accepted. This means that there is a relationship between postmature labor and the incidence of asphyxia in newborns d. Based on the chi-square result, it can be seen that χ^2 counts which is 23.042, this is also seen at the value p 0.000, this value is < 0.05. so it can be said that H_0 was rejected and H_a was accepted. This means that there is a long association with the incidence of asphyxia in newborns
12	Description of Risk Factors in Asphyxia Neonatorum Cases at RSIA Budi Kemuliaan Jakarta	This research is a type of quantitative research using a control case design.	There was a significant relationship between old partus and premature rupture of amniotic membranes with asphyxia as shown by a P Value (0.015) $<$ of Pvalue 0.05
13	The effect of gestational age, low birth weight and parity on birth asphyxia among neonates in sub-Saharan Africa: systematic review and meta-analysis: 2021 (Techane et al, 2022)	The Preferred Reporting Items for Systematic Review and Meta-Analysis statement (PRISMA) guideline was used to report the results of this systematic review and meta-analysis.and,it is registered in the Prospero database as (PROSPERO 2021: CRD42021288351)	Findings from this study indicated that birth asphyxia in Sub-Saharan was Still the major public health problem. This study also noted that birth asphyxia was significantly associated with low birth weight and meconium-stained amniotic fluid. Hence, it is better to assess all neonates with birth asphyxia for low birth weight and intrapartum meconium-stained amniotic fluid. Moreover, further research is needed to identify other predictors of birth asphyxia in Sub-Saharan Africa.

The Relationship between Maternal Age and The Incidence of Neonatal Asphyxia

Value p-value 0,000 ($<0,05$) confirms the real link between the mother's age and the appearance of asphyxia in newborns. Pregnancy in a mother who is too young or too old carries a greater risk than at the ideal age of 20-35 years. In youth, immaturity of the reproductive and emotional organs becomes an obstacle, while in old age, the decline in the function of vital organs such as the heart, kidneys, and blood vessels can trigger pregnancy disorders. The combination of these factors increases the chance of complications such as placental solution, bleeding, placenta previa, and uterine rupture, which can inhibit the flow of oxygen to the fetus and end in asphyxia (Saifuddin, 2020).

The age of the mother during pregnancy has an important role in determining the mental and physical readiness to undergo pregnancy and give birth safely. Mothers aged 20-35 years generally have excellent body condition and good emotional stability, so they are better able

to maintain health during pregnancy. The reproductive organs function optimally and are able to adapt to changes at the age of 20-35 (Lubis, 2020). Research (Lili Sumantia, 2024) and (Gina Sari, 2024), both found a significant relationship between Neonatal Asphyxia and maternal age.

The increasing age of the mother (>35 years) and the age of the mother who gives birth too young (<20 years) will increase the possibility of complications due to unprepared reproductive organs and functional deterioration so that it will affect the health of the mother and trigger the onset of degenerative diseases so that the risk of complications in pregnant women increases because it is influenced by health factors. Due to the existence of these diseases, it can increase the difficulties in pregnant women during childbirth and the risk of babies being born with asphyxia.

The Relationship of Education to The Incidence of Neonatal Asphyxia

This study shows a significant relationship between the two variables, with the p by 0,001. Low levels of education affect mothers' understanding of the importance of maintaining health during pregnancy, recognizing danger signs, and the importance of regular antenatal checkups. This lack of knowledge can lead to suboptimal pregnancy care, increasing the likelihood of asphyxia in the baby during labor.

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Education plays an important role in a person's awareness and knowledge, including in terms of health. Educated mothers are more likely to understand care during pregnancy, the importance of antenatal checkups, and efforts to prevent complications. Mothers with low education often have limitations when accessing various health information, so they lack a clear understanding of the red flags or how to maintain a healthy pregnancy (Mahyar, 2023). The majority of mothers have an elementary and junior high school education, which is included in the low category, so it is likely to affect the limited knowledge about the risks and prevention of asphyxia in newborns (Annisa, 2024).

Research (Hernah Riana, 2024) with Chisquare ($p=0,004$) < 0,05 shows that there is an influence between maternal age on knowledge about asphyxia. Research (Anjela Fatma Lovely, 2025) said that a person's level of education will form an attitude of awareness of the health information obtained, namely when education is low, the mother will have difficulty in finding and understanding health information so that during pregnancy the mother will not know about abnormal conditions or detect early related to the condition so that if it continues to childbirth there will be complications or complications that can result in the outcome of the newborn experiencing problems, one of which is a baby with asphyxia (Anjela Fatma Lovely, 2025).

The Relationship of Education to The Incidence of Neonatal Asphyxia

Maternal work is also associated with the incidence of neonatal asphyxia. Mothers with a high workload or strenuous physical activity during pregnancy are at risk of fatigue and stress, which can affect the health condition of the mother and fetus.

Housewives and self-employed women in this study tended to have quite strenuous activities without good rest time. This condition can cause disruption of oxygen supply to the fetus, increasing the risk of neonatal asphyxia. On the other hand, mothers who work as civil servants tend to have a more regular work schedule and better access to health services, so the risk of complications can be minimized.

Research (Annisa Y Febrianti, 2025) states that working with high physical intensity and a working duration of more than 3 hours/day can cause fatigue which has an impact on weakening the protective tissue of the fetus and triggering the rupture of premature membranes. Research (Anjela Fatma Lovely, 2025), also revealed that heavy workloads, including unassisted household activities, can cause stress, fatigue, and physiological disorders that have implications for fetal health.

Conclusion

The mother's age, education, and occupation greatly influence the appearance of Neonatal Asphyxia experienced by newborns. Pregnant women who are less than 20 years old or over 35 years old are more at risk of giving birth to a baby with severe asphyxia. This is due to mental and physical conditions that are not fully prepared at a young age, as well as a decline in bodily function and increased complications in old age. In addition, the level of education and type of work also affect the mother's understanding of pregnancy health and her ability to get optimal medical services. Mothers who are poorly educated are more likely to have limited knowledge about pregnancy care and danger signs of childbirth, so the risk of complications increases. Housewives and self-employed women are more likely to experience cases of

shortness of breath in babies due to lack of rest time and heavy workload. Fatigue conditions can affect the health of the mother and fetus, causing disturbances during childbirth. Health workers, especially midwives, need to improve communication, conduct thorough examinations and histories, and provide education on early detection of danger signs during pregnancy.

It is hoped that pregnant women can actively participate in health counseling and routinely conduct antenatal care (ANC) examinations so that the risk of Neonatal Asphyxia can be prevented and the health of the mother and baby is maintained.

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