THE RELATIONSHIP GESTATION AGE WITH INCIDENT OF NEONATAL SEPSIS: LITERTURE REVIEW

Utari Ermawati[1*], Umi Hanik Fetriyah[1], Desilestia Dwi Salmarini[2]

[1]*Bachelor of Nursing, Faculty of Health, Sari Mulia University*
[2]*Diploma in Midwifery, Faculty of Health, Sari Mulia University*
[*]*E-mail: utariermawati58@gmail.com*

Abstract

Background: Neonatal sepsis has increased every year, causing high morbidity and mortality. Risk factors associated with the incidence of neonatal sepsis include several factors, namely maternal, infant and nosocomial factors. Infant factors that affect neonatal sepsis is gestational age. Gestational age or gestational age is the time it takes a mother from conception to birth. Gestational age is divided into three namely premature, mature and postmature. Aim: To analyze the relationship between gestational age and the incidence of neonatal sepsis through the Literature Review. Method: This study uses a Literature Review, in searching literature sourced from five databases (Biomed Central, Pubmed, Plus One, Elsevier and Garuda), using keywords. Journals in accordance with PICOS are 15 journals and are reviewed. Results: The results showed that from 102,226 samples from 12 journals, there were 2,874 experiencing neonatal sepsis and the results from 11 journals that discussed gestational age were 522 premature, 1,008 mature and 62 postmature. Babies with gestational age (premature) had a higher risk of developing neonatal sepsis. The results of the analysis of 10 journals whose results were associated with an average P value of 0.000 (highest) – <0.05 (lowest), and OR = 6.256 (highest) – 0.71 (lowest). Conclusion: Gestational age affects the risk of neonatal sepsis. Efforts are made by nurses to identify risk factors for neonatal sepsis in neonates by anticipating early pregnancy for mothers who are <37 weeks of gestation and recognizing signs and symptoms of neonatal sepsis.

Keywords: Neonatorum, Prematurity, Sepsis, Gestational Age.

Introduction

Sepsis is currently a major problem in the field of neonatal care and care. Sepsis is currently a major problem in the field of neonatal care and care. Neonates born prematurely have weak physical defenses and immature immune function, making them susceptible to infection. Neonatal sepsis is a clinical syndrome of systemic disease accompanied by bacteremia and occurs in the first month of birth (Ningsih et al., 2016).

Neonatal sepsis is one of the leading causes of newborn death in the world. Globally, the number of newborn deaths was 5 million in 1999 and fell to 2.5 million in 2017. More than 40% of all deaths in children under the age of five occur during the neonatal period.(Belachew & Tewabe, 2020).

The infant mortality rate in Indonesia in 2019 was 21.12 per 1000 live births, this figure decreased from records in 2018 when the infant mortality rate in Indonesia still reached 21.86 per 1000 live births or in 2017 which reached 22.62 per 1000 live births. (Harismi, 2020). Although the infant mortality rate has decreased, this figure is still far from the target of the Sustainable Development Goals (SDGs) in 2030, which is 12 per 1000 live births (Kemenkes RI, 2020).

Based on South Kalimantan Health Profile data in 2020, it was stated that the number of neonatal deaths in 2019 amounted to 460 neonatal deaths caused by LBW as many as 209 deaths, sepsis as many as 19 deaths, and others (Kemenkes RI, 2020). Based on Dr. H. Moch Ansari Saleh Banjarmasin obtained data on infant mortality in 2016 as many as 55 cases (1.2%) and in 2017 the incidence of newborns with neonatal sepsis was 256 cases (11.2%). In 2018 there was a decrease in the incidence of newborns with neonatal sepsis by 152 cases (7.4%). In 2019, the incidence of neonatal sepsis increased to 176 cases (12.6%) (Selviawati, 2020).

Clinical manifestations of neonatal sepsis vary, namely in the form of hypothermia, hyperthermia, tachycardia, hyperventilation, lethargy and show positive blood cultures that occur in the first month of birth (Dini et al., 2016, Ningsih et al., 2016). Risk factors related to the incidence of neonatal sepsis include maternal, infant, and nosocomial infections. One of the baby factors that influence neonatal sepsis is gestational age (Jaya et al., 2019). Gestational age or gestational age is the time it takes a mother from conception to birth(Fanni & Adriani, 2017). Gestational age is divided into three namely prematurity, maturity and postmaturity. Prematurity and postmaturity have a high risk of morbidity and mortality during gestation for the occurrence of neonatal sepsis (Dini et al., 2016).

Every year it is reported that there are 15 million babies born prematurely in the world with the incidence of premature birth always increasing in almost all countries. Premature babies have immature immune systems due to a lack of IgG antibodies. These antibodies do not cross the placenta from the mother to the fetal blood at the end of pregnancy, increasing the risk of infection after birth and eventually leading to neonatal sepsis. Infants born at gestational age > 42 weeks (posmaturity) also have a high risk of morbidity and mortality with the incidence of neonatal sepsis at 5%. Postmature infants often have asphyxia and meconium aspiration syndrome, thereby increasing the risk for neonatal sepsis (Dini et al., 2016).

Several investigators have documented a significant association between gestational age and the incidence of neonatal sepsis, although prematurity is the most common. Research conducted by Sari and Mardalena (2016) at Moehammad Hoesin Hospital Palembang which conducted an analysis of the relationship between the level of premature maturity and the incidence of neonatal sepsis, it was

found that the value of = 0.022 < 0.05 which means that there is a relationship between the level of premature maturity and the incidence of sepsis in neonatorum. Based on the odds ratio, neonates from mothers with premature maturity are 3.2 times more likely to experience neonatal sepsis with OR = 3.257(Sari & Mardalena, 2016).

The results of research conducted in the perinatology room and the Neonatal Intensive Care Unit (NICU) of Wangaya Hospital, Denpasar city, obtained a p-value of 0.005 which indicates that the p-value <0.05 which can be concluded that there is a significant relationship between prematurity and neonatal sepsis and from the calculation results obtained prevalence risk (RP) is 2.73. This means that prematurity affects the occurrence of neonatal sepsis by 2.73 times(Jaya et al., 2019). The results of the study at the Ulin Hospital Banjarmasin in June 2014-June 2015 where the results of the P analysis test were 0.000 which means P <0.05, therefore it can be concluded that there is a relationship between gestational period and the incidence of neonatal sepsis at Ulin Hospital Banjarmasin and from the calculation odds ratio (OR) of 6.256 which indicates that the gestational period has a risk of developing neonatal sepsis 6 times greater(Dini et al., 2016).

Different results were obtained in a study conducted at the Benyamin Guluh hospital, Kolaka district, which showed that there was no relationship between preterm labor and the incidence of neonatal sepsis with the result value (P value 0.494). Research conducted by Adatara et al., (2019) found that there was no relationship between gestational age and the incidence of neonatal sepsis (P value < 0.056).(Adatara et al., 2019). Nurses have a big role from the early pregnancy history to the neonatal period in infants with neonatal sepsis and nurses also have a role in various prevention strategies that can be carried out based on risk factors that contribute to the incidence of neonatal sepsis such as providing adequate nutrition and oxygenation to neonates at risk. sepsis, namely gestational age, especially in premature and postmature infants so that they can carry out comprehensive neonatal nursing care (Prawesti et al., 2018).

Materials and Methods

The research method uses a literature review. The literature review method is the form of research conducted through search by reading various sources both books, journals, and other publications related to the research topic, for answer existing issues or problems (Neuman, 2011). Search literature sourced from five databases (Biomed Central, Pubmed, Plus One, Elsevier and Garuda), using keywords. The strategy used in finding articles using the PICOS framework

Table 1. Inclusion and exclusion criteria according to PICOS

PICOS framework	**Inclusion Criteria**	**Exclusion Criteria**

Population	Studies focused on neonates based on gestational age	In addition to those that do not discuss neonates based on gestational age
Intervention	study discusses the problems of gestational age which include: premature, mature and post mature.	Study not discusses the problems of gestational age which include: premature, mature and post mature.
Comparators	No Inclusion criteria	No exclusion criteria
Outcomes	Results that explain the relationship between gestational age and the incidence of neonatal sepsis	Results that do not explain the relationship between gestational age and the incidence of neonatal sepsis
Design Study	*Qualitative Study, Quantitative Study, Cross Sectional Study, Descriptive Study, Literature Review, Case Study, Systematic Review.*	*Case Report*
Publication Years	2016-2020	< 2016
Language	Indonesian and English	Apart from Indonesian and English

The process of searching for literature review stages in this study is as foll

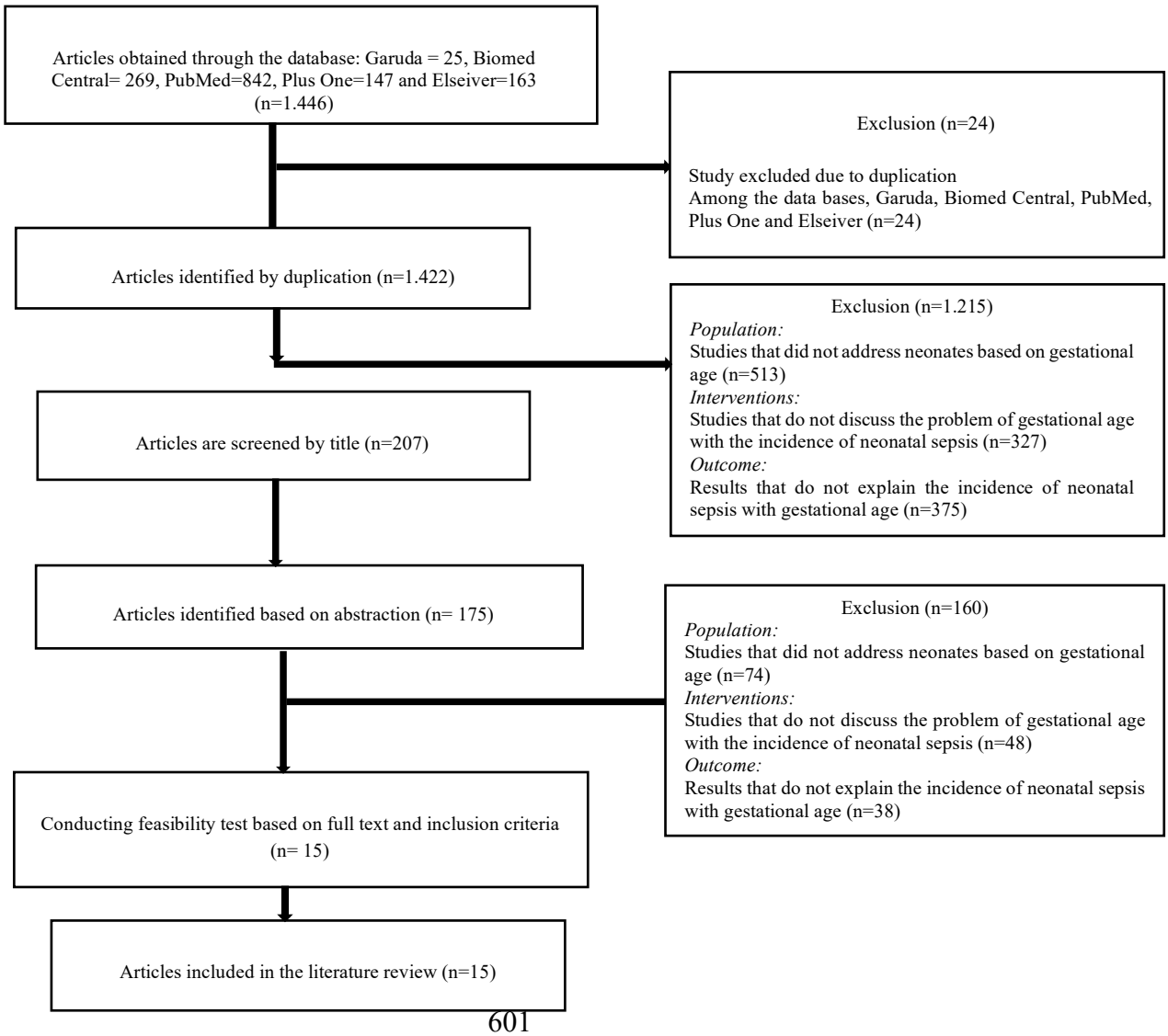

Figure 1. Flow Diagram of Literature Search Relationship of Gestational Age with the Incidence of Sepsis Nornatorum

Results and Discussion

Results

The study showed that of 102,226 samples from 12 journals, a total of 2,874 had neonatal sepsis. Babies with gestational age (premature) are at higher risk of neonatal sepsis. The results of the bivariate analysis showed that there was a significant relationship between age and the incidence of neonatal sepsis with (P value = 0.000 with OR = 6, 256). The efforts of health workers are to be able to recognize risk factors for sepsis in neonates. The risk factors that cause neonates to experience neonatal sepsis are multifactorial and are more common in premature infants.

Discussion

1. Identify the incidence of neonatal sepsis

   Neonatal sepsis is a clinical syndrome of systemic disease accompanied by bacteremia and occurs in the first month of birth. Sepsis is a major problem in the field of neonatal care and care. Neonates born prematurely have weak physical defenses and immature immune functions, making them susceptible to infection (Ningsih et al., 2016). The classification of neonatal sepsis based on the time of occurrence is divided into two, namely Early-Onset Neonatal Sepsis occurring 48-72 hours after birth and Late-Onset Neonatal Sepsis occurring after the first 72 hours of birth. Clinical manifestations of neonatal sepsis vary, namely in the form of hypothermia, hyperthermia, tachycardia, hyperventilation,

   The results of the study from year to year the incidence of neonatal sepsis increased, seen from the research of Balderrama, Bulkowstein and Dini (2016) the incidence of sepsis reached 108 events, in the G/Eyesus study (2017) the incidence of neonatal sepsis reached 117 events, in 2018 the number The incidence of sepsis reached 1,295 according to research by Yadav, Nyishime and Kim (2018), then in 2019 there was still an increase of 1,334 events so that if added up from 2016-2020 the number of neonatal sepsis events that occurred in the last 5 years amounted to 2,876 events with a total samples were 102,226, 2,874 had sepsis and 99,352 who did not have sepsis with a total prevalence of 527, 16%.Complications of neonatal sepsis are very severe diseases and cause high morbidity and mortality (Ningsih et al., 2016).

   The role of nurses in neonatal sepsis is to be able to recognize the signs and symptoms of neonatal sepsis, because early diagnosis is very important to increase the life expectancy of neonates to survive and reduce the possibility of permanent neurological damage. Efforts to recognize the signs of neonatorum species found in neonatal sepsis include general signs, the circulatory system, the

respiratory system, the central nervous system, the gastrointestinal system and the hemopoietic system (Wijayanti, et al., 2019).

Risk factors related to the incidence of neonatal sepsis include maternal, infant, and nosocomial infections. One of the baby factors that influence neonatal sepsis is gestational age (Jaya et al., 2019). This is in line with Dini's research (2016) showing that there is a relationship between gestational age and the incidence of neonatal sepsis in Banjarmasin Hospital (p value = 0.000) with an odds ratio (OR) of 6.256. In addition to gestational age, there are many other factors that influence neonatal sepsis, namely the Adatara study (2019) Maternal factors for the occurrence of neonatal sepsis, namely parity (P < 0.027), APGAR scores in the first and fifth minutes (p < 0.001), resuscitation at birth (p < 0.001). 0.004). And in Balderrama's research (2016) the factors that influence the incidence of neonatal sepsis are mothers with infection (p < 0.001), birth weight <

Table 2. Analysis of Neonatal Sepsis Events

No.	Journal Writer	Sample	Neonatal Sepsis	Prevalence
1.	Jaya et al.,	50	20	40%
2.	Adatara et al.,	900	900	100%
3.	Balderrama et al.,	3694	43	1.17%
4.	Ogundare et al.,	72	72	100%
5.	Braye et al.,	93.584	65	0.07%
6.	Bulkowstein et al.,	184	23	12.5%
7.	Guo et al.,	1048	297	28.34%
8.	Yadav et al.,	350	59	16.86%
9.	G/eyesus et al.,	251	117	46.61%
10.	Nyishime et al.,	1,723	1.112	64.54%
	Dini et al.,	246	42	17.07%
11.	Kim et al.,	124	124	100%
12.				
	Total	102.226	2.874	-
	Average	8,519	240	47.92%

Based on table 2 above, from 12 journals with a total sample of 102,226 with an average value of 8,519, 2,874 had sepsis. of the total 102,226 samples. The highest incidence of neonatal sepsis was in the study of Nyishime et al., 2018 as many as 1,112 incidences of neonatal sepsis and the incidence of neonatal sepsis was the least in the study of Jaya et al., 2019 as many as 20 incidences of neonatal sepsis.

2. Identify the gestational age at risk for the incidence of neonatal sepsis

Gestational age or gestational age is the time it takes a mother from conception to birth. Gestational age is divided into three groups, namely premature gestational age (pre-term) with gestational age

<37 weeks, mature gestational age (term) with gestational age between 37-42 weeks, and post-maturity (post-term) with gestational age >42 weeks.(Fanni & Adriani, 2017).

Every year it is reported that there are 15 million babies born prematurely in the world with the incidence of premature birth always increasing in almost all countries. Premature babies have an immature immune system, which makes premature babies more susceptible to sepsis. Premature infants have very low immunoglobulins, because immunoglobulins are passively transferred across the placenta during the last trimester of pregnancy. In addition, premature infants require intervention, longer hospitalization so that it can increase the risk of nosocomial infections that can cause neonatal sepsis.(Jaya et al., 2019). This is in line with Afonsu's research (2017) babies who are premature at 21-25%, mature at 8-11.1% and postmature at 6.2-7.3%.

Babies born at gestational age > 42 weeks (posmature) also have a high risk of morbidity and mortality with the incidence of neonatal sepsis at 5%. Postmature infants often have asphyxia and meconium aspiration syndrome, thereby increasing the risk for neonatal sepsis (Dini et al., 2016).

Table 3. Gestational Age Journal Analysis

No	Journal Writer	Sample	Gestational Age		
			Prenature	mature	Postmature
			n(%)	n(%)	n(%)
1.	Jaya et al.,	50	14 (28%)	6 (12%)	0
2.	Adatara et al.,	900	102 (11.3%)	735 (81.8%)	62 (6.9%)
3.	Afonsu et al.,		- 21-25%	- 8-11.1%)	- 6.2-7.3%
4.	Balderrama et al.,	3694	35 (81.4%)	8 (18.6%)	0
5.	Braye et al.,	93.584	43 (0.06%)	22 (0.02%)	0
6.	Bulkowstein et al.,	184	49 (26.64%)	0	0
7.		1048	165 (55%)	132 (45%)	0
8.	Guo et al.,	350	22 (31.4%)	37 (13.2%)	0
9.	Yadav et al.,	251	75 (64.1%)	42 (35.9%)	0
10.	G/Eyesus et al.,	246	17 (40.48%)	25 (59.52%)	0
11.	Dini et al., Kim et al.,	124	- (0.73)	0	0
	Total	100,431	522	1.008	62
	Average	9,130	522	1.008	62

Based on table 3 of the 11 journals above, there are 2 journals that list gestational age values (premature, mature and post-mature), 6 journals list gestational age values (premature and mature) and 2 other journals only list gestational age values (premature). 522 premature, 1,008 mature, and postmature 62 of the total sample of 100,431.

3. Analyze Relationship between gestational age and the incidence of neonatal sepsis

In Jaya's Research (2019), which was to find out the relationship between prematurity and the incidence of neonatal sepsis, 23 samples (46%) were premature and 27 samples (54%) were not premature, from 50 samples, 20 samples had neonatal sepsis. The results showed that the p value of 0.005 and OR = 2.73, it can be concluded that there is a significant relationship between prematurity and neonatal sepsis.(Jaya et al., 2019). The results of this study are in line with previous research conducted by Dini FN (2016) which showed that there was a relationship between gestational age and the incidence of neonatal sepsis at Ulin Hospital Banjarmasin (p = 0.000) with an odds ratio (OR) of 6.256.

Research conducted by Sari (2016) which states that there is a relationship between the maturity level and the incidence of neonatal sepsis is statistically proven, which obtained 43 samples of neonatal sepsis, while those who were premature and suffered from neonatal sepsis were 34 samples with a P Value of 0.017 with odds ratio (OR) 3,257. The association between prematurity and neonatal sepsis is due to a lack of humoral and cellular immunity. The formation of the immune system in premature babies is less than perfect and causes premature babies to be more prone to sepsis. Transplacental maternal antibodies that initially produce humoral immunity (immunoglobulin), tend to be accepted by premature infants but not as much as in term infants. Premature infants have very low immunoglobulins,

Two studies said there was a relationship between gestational age (premature and mature) with the incidence of neonatal sepsis, premature (21-35%) and mature (1.9-5.1%) infants caused by Streptococcus B in Early Onset Sepsis (EOS) with V Palue < 0.001 (95% CI, 0-0, 2). This is in line with Yadav's research (2018) that premature gestational age <37 weeks has a risk of 31.4%, babies born prematurely have a risk of infection three to ten times higher than term babies. Research conducted by Balderema (2016) is related to preterm gestation with a P Value = < 0.05, because the more premature the baby, the greater the risk of infection (Heubach et al., 2016).

Afonso's research (2017) says that there is a relationship between gestational age and the incidence of neonatal sepsis, at the premature age of 21-25%, mature by 8-11% and postmature by 6.2-7.3%, which means that the premature age has the most influence. to the incidence of neonatal sepsis, because premature infants are at higher risk of late-onset sepsis and death. Mortality is higher when sepsis is caused by gram-negative bacteria. This is in line with the research of G/Eyesus (2017).

The results of multivariate analysis showed that preterm pregnancies (<37 weeks) were almost nine times more likely to develop sepsis compared to term infants with P Value <0.001.

The Balachew study (2019) stated that neonatal sepsis was associated with gestational age OR 3.36 (95% CI: 2.50, 4.54). Premature infants are 3.36 more at risk for neonatal sepsis than term infants because premature infants have immature immunity and organs that are not ready to fight infection (Balachew et al., 2019). However, the research conducted by Adatara (2019) is different, where there is no relationship between gestational age and the incidence of neonatal sepsis with P Value <0.056.

Table 4. Analysis of the Relationship of Gestational Age with the Incidence of Neonatal Sepsis

No.	Journal Writer	Hypothesis testing	
		P Value	**OR**
1.	Jaya et al.,	*P value*=0.005	OR =2.73
2.	Adatara et al.,	*P value* <0.056	COR=4.70
3.	Balderrama et al.,	*P value < 0.05*	-
4.	Braye et al.,	*P value<0.001*	-
5.	Bulkowstein et al.,	*P value<0.001*	-
6.	Guo et al.,	*P value<0.0001*	-
7.	G/Eyesus et al.,	*P value<0.001*	-
8.	Dini et al.,	*P value 0.000*	OR=6,256
9.	Ogundare et al.,	*P value0.01*	OR=1.41
10.	Kim et al.,	*P value 0.10*	OR=0.71
11.	Belachaw et al.,	*P value0.000*	OR=3.36

Based on table 4, from the 11 journals above there are 10 journals whose results are related to the average P value of 0.000 (highest) - <0.05 (lowest), and OR = 6.256 (highest) - 0.71 (lowest) . And 1 journal whose results are not related to the research of Adatara et al., 2019 with p Value <0.056. The efforts of health workers, especially nurses, can conduct assessments on pregnant women to pay attention to gestational age at the time of delivery to be able to provide nursing care to neonates so that they can anticipate to reduce the incidence of neonatal sepsis and nurses must also be able to recognize risk factors for sepsis in neonates. The risk factors that cause neonates to experience neonatal sepsis are multifactoral and are more common in premature infants (Kardana, 2011).

Conclusion

Babies born with preterm (premature) are at risk of infection because the immune system in premature babies is less than perfect and causes premature babies to be more prone to sepsis. Premature babies have very low immunoglobulins. Early Research (2016) showed that there was a relationship between gestational age and the incidence of sepsis neonatorum sepsis with a P value of 0.000 with an Odds Ratio of 6, 256.

Acknowledgments

Thanks to Sari Mulia University for allowing me to conduct research using the journal review method and thanks also to supervisors 1 and 2 Umi Hanik Fetriyah and Desilestia Dwi Salmarini, who has guided in conducting this journal review research.

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Table 5. Search for Literature Studies

Author (Year)	Country	Source	Aim	Research Type and Design	Results
Elsa & Stijn Blot To 2017	English	*PubMed*	To find out whether gestational age can affect sepsis	*Reviews, Expert Reviews.*	The results showed that there was no significant difference between the gestational age groups and the baby's birth weight. Premature and low birth weight infants are at higher risk for late-onset sepsis.
Jaya et al., 2019	Indonesia	Garuda	To determine the relationship between prematurity and the incidence of neonatal sepsis	*Cross sectional*	The results showed that there were 23 samples (46%) premature and 27 samples (54%) not premature, from 50 samples, 20 samples had neonatal sepsis. The results of hypothesis testing using the Chi Square test obtained a p-value of 0.005, and a prevalence risk of 2.73.
Amare Belachew and Tilahun Tewabe, 2020	Ethiopia	BMC	To assess the prevalence of neonatal sepsis and its relationship to birth weight and gestational age.	*Systematic review and meta-analysis*	The results of the study were 952 studies reviewed, 8 studies with the prevalence of neonatal sepsis in Ethiopia was 49.98% (CI: 36.06, 63.90). In the cross-sectional study it was 53.15% while the cohort was 40, 56%. Premature infants have a possible prevalence risk of 3.36 compared to term infants.
Adatara et al., 2019	Ghana	*PubMed*	To determine the risk factors for neonatal sepsis	*Retrospective case control study*	The results showed that the factors influencing the occurrence of sepsis in neonates were parity ($p < 0.027$), mode of delivery ($p < 0.001$),

					bleeding disorders ($p < 0.001$), and PROM ($p < 0.001$). Infant factors that influenced the occurrence of sepsis were APGAR scores in the first and fifth minutes ($p < 0.001$), resuscitation at birth ($p < 0.004$), length of stay in the facility ($p < 0.001$), and neonatal age at admission ($p < 0.001$).
Puopolo et al., 2018	America	*PubMed*	To guide the risk assessment of sepsis among preterm newborns.	*Retrospective studies*	The results showed that gestational age was the strongest single predictor of early-onset sepsis (EOS) and most preterm births occurred at risk for early-onset sepsis (EOS).
Kim et al., 2018	Korea	*BMC*	To determine the incidence and associated factors of late onset sepsis (LOS) in premature infants.	*Retrospective study*	The results of the study were in a multivariate analysis, during period I, prolonged intubation, especially in infants with gestational age of 25-26 weeks, and necrotizing enterocolitis, especially in infants at 23-24 weeks gestation, was significantly associated with late onset sepsis (LOS). .
Balderrama et al., 2016	Mexico	*ELSEVIER*	for early diagnosis of neonatal sepsis	*Observational study and diagnostic test*	The results of the study, risk factors for neonatal sepsis were: infected mother ($p < 0.001$), body weight < 1500 g (< 0.001), gestational age < 28 weeks (< 0.05), APGAR score < 6 in 5 minutes ($p < 0.05$).
Ogundare et al., 2019	Africa	*PubMed*	For risk factors, presentation and outcome of care between early-onset neonatal (EOS) and late-onset neonatal sepsis (LOS).	*Cross-sectional study*	The results showed that low birth weight ($p = 0.01$) and perinatal asphyxia ($p = 0.01$) were significantly associated with early-onset sepsis (EOS) while for late-onset sepsis (LOS), delivery outside a health facility ($p = 0.01$) was the only significant risk factor.
Braye et al., 2019	Australia	PLUS ONE	To describe the epidemiology of early-onset sepsis (EOS).	*Retrospective cohort study*	The results of the study were that among 93,584 live births, 65 had confirmed Early-onset sepsis (EOS) (0.69/1000 live births). In the 4 largest birth units, the proportion of infants who had blood cultures within 72 hours of birth varied from 1.9–5.1% for term infants and 21–35% for preterm infants.
Bulkowstein et al., 2016	Israel	BMC	Comparing the demographic and clinical characteristics of early-onset sepsis (LOS) and late-onset sepsis (EOS).	*Compared demographic and clinical characteristics*	The results of the study were 70 cases of Early-onset sepsis (EOS) and 114 CA-LOS were recorded. The annual mean ± SD rates per 1,000 live births were 0.66 ± 0.16 and 1.03 ± 0.23, respectively. Prematurity (42.9% vs. 17.0%), premature rupture of membranes (PROM; 22.9% vs. 1.9%), leukopenia (29.0% vs. 11.6%), thrombocytopenia (44.9% vs.

					14.3%) and Streptococcus agalactiae infections (22.7% vs. 8.1%) were more common in early-onset sepsis (EOS).
Guo et al., 2019	China	*PubMed*	To identify common organisms that cause neonatal sepsis	*Retrospective study*	The results of the study of a total of 1048 bacteria isolated from patient samples, detailed clinical and microbiological data from 297 cases were available. Escherichia coli, Klebsiella pneumoniae, and coagulase-negative Staphylococcus (co-NS) were the top 3 isolated pathogens.
Yadav et al., 2018	Nepal	BMC	To determine the bacteriological profile of neonatal sepsis	*Cross-sectional study*	The results of the study (gender, age, birth weight, gestational age, and mode of delivery) showed the highest growth of positive bacteria in males (52.3%); Age 3 days or above 3 days (71.2%); low birth weight (62.7%); premature gestational age (31.4%); and cesarean method (63.3%).
G/eyesus et al., 2017	Ethiopia	BMC	To identify risk factors associated with neonatal sepsis in neonates.	*Cross-sectional study*	Outcome The independent risk factors for the development of neonatal sepsis were; Apgar score <7/5 min (adjusted odds ratio [AOR] = 0.5), birth weight <1.5 kg (AOR = 12.37), birth weight, 1.5–2.5 kg (AOR = 2.6), gestational weeks <37 weeks (AOR = 9) and cesarean delivery (AOR = 5.2).
Nyishime et al., 2018	Rwanda	BMC	To explain management and newborn presentations.	*Retrospective review*	The results of the study were Prematurity (27.8%), neonatal infection (23.6%) and asphyxia (20.2%) were the top three main diagnoses.
Dini et al., 2016	Indonesia	Garuda	This study aims to determine the relationship between gestational age and the incidence of neonatal sepsis at Ulin Hospital Banjarmasin.	*Cross sectional study*	The results of the study on the incidence of neonatal sepsis were more commonly found in infants born with a gestation period of 37-42 weeks, as many as 25 cases (59.52%). Data on neonates who were not septic born with a gestation period of <37 weeks or >42 weeks were obtained as many as 20 cases (9.80%) and a gestation period of 37-42 weeks obtained as many as 184 cases (90.20%). The chi square test showed that there was a relationship between between gestation and the incidence of neonatal sepsis at Ulin Hospital Banjarmasin (p=0.000) with an odds ratio (OR) of 6.256.