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Original Research

Analysis of birth outcomes with incidence of hepatitis B in pregnant women

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ABSTRACT

Background: Hepatitis B in Indonesia is highest endemic, second mostly in the South East Asian Region. Hepatitis is generally rare in pregnant women. However, the most common sign is gestational jaundice, which is the cause of viral hepatitis.

Objective: To know birth outcomes with an incidence of hepatitis B in pregnant women.

Method: Type of analytical quantitative research, case-control design. The total data sample was 60 pregnant women, including 30 hepatitis B cases and 30 non-hepatitis B controls. Secondary data collection came from birth reports. Data collected included types of delivery, condition, and weight of newborns, and complication incidences. Statistical analysis was carried out using the Statistical Program for Social Sciences.

Results: This research shows that the highest type of vaginal delivery (85%) was found in non-sufferer mothers, but it was not associated with hepatitis B (p-value 0.718). The condition of normal newborn babies had the highest incidence (95%) and was also found in the non-sufferer group, but was also not related to cases (p-value 0.553). Normal birth weight babies showed the highest incidence and were mostly found in the non-hepatitis B group [86.7%], but were unrelated to cases (p-value 0.129). Indicators of postpartum hemorrhage complications, the highest results were in the non-postpartum hemorrhage category [91.6%], hepatitis B group; however, the incidence of this bleeding was also not related to hepatitis B (p-value 0.640).

Conclusion: Hepatitis B cases in this study were not associated with birth outcomes.

1. Introduction

Hepatitis B is a liver disease caused by the hepatitis B virus (HBV), and belongs to the hepadnavirus family. HBV causes acute or chronic liver inflammation, which can progress to liver cirrhosis or liver cancer (Alamudi et al., 2018). HBV has now been recognized as a public

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health problem throughout the world. According to WHO data, as many as 1.34 million deaths were due to HBV in 2015, and this figure is higher compared to tuberculosis and HIV infections. Globally, in 2015, an estimated 257 million people were living with chronic HBV infection (Kesty & Bernolian, 2022).

The number of hepatitis B sufferers in Indonesia is still high. WHO stated that Indonesia has moderate to high endemicity. Data shows that as many as 7.1%, or 18 million Indonesians, are infected with hepatitis B. Of this number, 50% are at chronic risk, and 900,000 have the potential for liver cancer. In fact, hepatitis B is the fourth largest cause of death in Indonesia, with an estimated 51,100 deaths each year (Tarmizi, 2023). Based on the endemicity of hepatitis in a region/country, the prevalence of HBsAg is categorized as low or less than 2%, medium-low 2-4%, medium-high 5-7%, and high ≥ 8%. Indonesia has high endemicity, the second highest in the Southeast Asian Region (SEAR) countries after Miyanmar. The magnitude of this problem will certainly have a huge impact on the health and productivity of women and society.

Furthermore, the main problem here is that pregnant women are a risk group and are susceptible to exposure to opportunistic infections and viruses due to decreased cell activity. Liver disease is generally rare in pregnant women, but if gestational jaundice occurs, the most common cause is viral hepatitis. Pregnancy jaundice can be caused by several conditions, namely jaundice which occurs due to acute fatty liver, toxemia, and intra-hepatic cholestasis. Jaundice that appears during pregnancy includes hepatitis, gallstones, use of hepatotoxic drugs, and liver cirrhosis. In Indonesia itself, the government's efforts are to carry out Early Detection of Hepatitis B (DDHB) in pregnant women and provide Hepatitis B Immunoglobulin (HBIG) ≤ 24 hours to newborns from mothers who are reactive to Hepatitis B. The results of early detection of hepatitis B in 2022, as many as 50,744 pregnant women will be positive for hepatitis B in 2022. Of this number, there will be 35,757 babies born to women who are positive for hepatitis B. However, most have received Hb0 and HBg immunization in less than 24 hours (Kesty & Bernolian, 2022). This control model is expected to be able to reduce transmission of the Hepatitis B virus from mother to child by up to 95%. This research aims to know four indicators of birth outcomes regarding the incidence of hepatitis B in pregnant women and also their benefits so that they can become a reference for midwives in providing midwifery care to pregnant women who are positive for hepatitis B in the future.

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2. Method

This type of research is quantitative analytical with a case control approach. A sample of 60 people was taken from data on women who gave birth in 2023. The sample was divided into two groups. First, a group of 30 hepatitis B cases. Second, a non-hepatitis B control group of 30 people. The independent variables studied were four indicators/sub variables, namely type of delivery, condition of newborn at birth, birth weight, and complications of post-partum haemorrhagia. Meanwhile, the dependent variable is the incidence of hepatitis B in pregnant women. The data used is secondary data collected from birth reports in 2022. Statistical analysis was carried out using the Statistical Program for Social Sciences.

3. Results

Table 1 shown that of the four indicators of birth outcomes regarding the number of hepatitis B case samples n=30 (50%) and non-hepatitis B control samples n=30 (50%) all of them had the highest frequency in the normal category without complications/risks. The highest frequency of delivery was in the vaginal category, n=51 (85%). The highest condition of newborn category is normal n=57 (95%). For the largest birth weight category in normal category, n=52 (86.7%). And, indicator of complications in non-post-partum haemorrhagia category was mostly post-partum haemorrhagia, namely n=56 (93.3%).

Table 1. Frequency distribution of type of delivery, condition of newborn, birth weight, and complications

Indicators	Frequency		Indicators	Frequency	
Type of Delivery	n	%	Birth Weight	n	%
Vaginal	51	85	Normal	52	86.7
Caesarean Section	9	15	LBW	8	13.3
Total	60	100.0	Total	60	100.0
Condition of Newborn	n	%	Complications	n	%
Normal	57	95	Non-PPH	56	93.3
Asphyxia Neonatorum	3	5	PPH	4	6.7
Total	60	100.0	Total	60	100.0

Note: LBW: Low Birth Weight; PPH: Post-Partum haemorrhagia

The bivariate analysis includes four birth outcome indicators, which include the type of delivery, condition of newborn, birth weight, and complications with the incidence of hepatitis B in pregnant women, which are presented in Table 2 as follows:

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Tabel 2 Crosstab of birth outcomes with the incidence of hepatitis B in pregnant women

	Incidence				Total		Chi-Square		
	Hepatitis B		Non- Hepatitis B				value	*p-value*	min expected count
	n=30	%	n=30	%	N=60	100%			
Type of Delivery									
Vaginal	25	83.3	26	86.6	51	85	0.131	0.718	4.50
Caesarean Section	5	16.6	4	13.3	9	15			
Condition of Newborn									
Normal	28	93.3	29	96.6	57	95	0.351	0.554	1.50
Asphyxia Neonatorum	2	6.6	1	3.3	3	5			
Birth Weight									
Normal	25	83.3	27	90	52	86.7	2.308	0.129	4.00
LBW	5	16.7	3	10	8	13.3			
Complications									
Non-PPH	29	96.7	27	90	56	93.3	0.218	0.640	2.50
PPH	1	3.3	3	10	4	6.7			

Based on the information in Table 2, cross-tabulation data on the incidence between the hepatitis B case group and the non-hepatitis B control group were obtained, as seen in Table 1, that all the highest frequencies were in the normal category without complications/risks in both groups were almost the same, but in the control group non-hepatitis B is greater. Type of delivery was vaginal (83.3%; 86.6%), condition of a newborn was normal (93.3%; 96.6%), birth weight was also normal (83.3%; 90%), and for complications in the non-HPP category were (96.7%; 90%). Furthermore, Chi-square test requirements use Pearson's alternative value in Fisher's Exact Test. Judging from the minimum expected count value, the expected value smaller than 5 is 1.50, and the largest is 4.50. It can be seen from the results of the Chi-square test that all p-values are > 0.05. Thus, the data concludes that the null hypothesis (Ho) is accepted and the alternative hypothesis (Ha) is rejected. This means that for the four indicators of birth outcomes, each of them has no relation with the incidence of hepatitis B in pregnant women, as shown below: type of delivery p-value 0.718; condition of newborn p-value 0.554; birth weight p-value 0.129; and complications p-value 0.640.

4. Discussions

Type of delivery with incidence of hepatitis B

Based on results, it is known that the most common type of delivery is vaginal and

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statistically there is no significant correlation between type of delivery and hepatitis B in pregnant women. This shows that pregnant women with hepatitis B have opportunity to give birth normally without need for surgical procedures such as caesarean section, unless there are obstetric indications or direct causal factors related to difficult labor. Caesarean section is not main delivery choice because it has several disadvantages, including; non-physiological labor, expensive and has additional costs, risk of complications due to the procedure and anesthesia, and must be assisted by a specialist doctor. The results of previous research conducted by Palimbo, Salmah & Sari, (2019), show that diseases that espouse pregnancy and childbirth are included in category of indirect causes, where the indicators shown include age, parity, history of previous illnesses, routine examinations during pregnancy. The most frequently used delivery method is caesarean section due to high number of complications, delays in referrals and the majority of cases occur during postpartum period. Meanwhile, for the category of direct obstetric causes, the indicators are postpartum hemorrhage and preeclampsia/eclampsia, average number of cases is almost the same as the frequency (Palimbo et al., 2019).

According to Peraturan Menteri Kesehatan Nomor 52 Tahun 2017 concerning Guidelines for Eliminating Transmission of HIV, Syphilis and Hepatitis B from Mother to Child, states that pregnant women with reactive HBsAg results are referred to hospitals or health centers after early detection of Hepatitis B in pregnant women. Childbirth can be carried out normally using standard operational procedures at First Level Health Facilities (FKTP) if there are no obstetric problems such as dystocia, malpresentation, twins, etc., or clinical contraindications such as heart, lung and other abnormalities in mother and baby (Kemenkes, 2017). Therefore, choice of delivery method for Hepatitis B patients must be considered carefully, considering maternal and child morbidity that occurs in elective caesarean section. This has been anticipated in the United States through a policy that does not recommend caesarean section for Hepatitis B patients with a purpose of reducing transmission. Based on the research results of Sun et al, (2017) it was stated that in two groups (A, B) HBV positive pregnant women were given antiviral treatment and one group (C) did not receive antiviral therapy. The findings of group A and group B were significantly lower compared to group C. For the characteristics of pregnant women, namely postpartum hemorrhage [17.7(11/62) 14.7(9/61) 18.4(12/65)] and type of delivery by caesarean section [19.3(12/62) 16.4(10/61)

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20.0(13/65)] almost the same, but group C is more numerous than groups A and B, with p-value > 0.05 (0.844/0.859) or the three groups are not related significantly affect birth outcomes (Sun et al, 2017). Birth outcomes are more related to babies born exposed to HBV from their mothers (Sun et al., 2017).

Condition of newborn with incidence of hepatitis B

The indicator of the condition of the baby being born was in the normal category at delivery, the largest in both groups. In the case group, there were two people (6.6%) in the case group aspyxia neonatorum, while there was one person in the control group (3.3%). The statistical results concluded that there was no significant correlation between the condition of the baby at birth and the incidence of hepatitis B in pregnant women. In line with previous systematic review studies and meta-analyses, HBV infection has no effect on adverse pregnancy outcomes. Therefore, HBV infection in pregnancy may not require special treatment (Sirilert & Tongsong, 2021).

The incidence of asphyxia in newborns occurs due to many factors such as prematurity (15%), LBW (20%), congenital abnormalities (1-3%), amniotic fluid mixed with meconium. Types of labor (prolonged labor, caesarean section, vacuum extraction, forceps) include prolonged or obstructed labor (2.8-4.9%), labor with complications (breech position, twins, shoulder dystocia, vacuum extraction, forceps) (3- 4%), and current rupture of membranes (10-12%) (Mutiara, Apriyanti, 2020). Based on a study by Batubara & Fauziah (2020), the late pregnancy variable is related to incidence asphyxia, p-value = 0.039 and OR/Exp(B) 5.836, which means that postdate has a 5-fold effect on the baby experiencing asphyxia. The variable placenta previa is related to incidence asphyxia p-value=0.002 and OR/Exp(B) 3.531, which means that placenta previa has 3 times effect on babies at risk of asphyxia, and the variable prematurity is related to incidence asphyxia p-value=0.004 and OR/Exp(B) 2,614, which means that premature babies are twice as likely to be at risk of asphyxia (Batubara & Fauziah, 2020). Other research states that the causes of asphyxia based on the APGAR diagnosis in the fifth minute of birth include obstetric complications during pregnancy, fetal malpresentation, premature rupture of membranes and amniotic fluid mixed with meconium (Bayih et al., 2021).

Birth weight with incidence of hepatitis B

From the results of the chi square test analysis, it is known that there is no significant

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correlation between hepatitis B in pregnant women and the incidence of low birth weight, p-value 0.446. The results of this study are in line with the results of research by Ginting (2020), which stated that there was a significant correlation between positive HBsAg in pregnant women and the incidence of low birth weight (LBW), the more positive HBsAg in pregnant women, the higher the risk of LBW. The results show that the majority of pregnant women are at risk of giving birth to LBW with positive HBsAg status or as many as 100 respondents (85%) and p-value is 0.463 > 0.05 (Ginting & Kurniawan, 2020).

The factor that influences LBW is prematurity. A study by Permana and Wijaya, (2019) states that pregnant women with preterm gestational age have a 3.1 times higher risk of giving birth to LBW compared to women with preterm gestational age. There was no significant relationship between maternal age, number of parities, anemia status, nutritional status, and pregnancy interval with the incidence of low birth weight (P>0.05). However, multiple pregnancies showed a significant association with LBW (OR: 14.9; 95%CI 3.2-68.5; P=0.0001) and gestational age (OR: 3.1; 95%CI 1.02-9.50; P=0.038). A retrospective study by Wei Qin et al, (2022), concluded that premature babies and LBW of pregnant women with positive HBV are not directly related to the act of giving birth or results of preterm weight and gestation, but rather to intervention of how the pregnant woman is given appropriate treatment without any effect in addition to the mode of delivery and birth outcomes (Qin et al., 2022).

LBW may occur due to three main factors, namely fetal, placental and maternal factors. However, fetal growth restrictions are often caused by multifactors, for example macronutrient deficiencies due to chronic energy deficiency (LILA <23.5cm), as well as micronutrient deficiencies such as anemia (Hb <11) which also have a risk of inhibiting fetal growth due to lack of oxygen supply to the fetus. Fajriana's study (2018) concluded that pregnant women who gave birth to premature babies had a 6.2 times greater risk of experiencing LBW, while pregnant women who had CED had a 6.6 times greater risk of experiencing LBW. In CED pregnant women, lack of energy for a long time, inadequate nutritional intake during the embryo implantation period can have fatal consequences for the development of the fetus in the next trimester. In fact, before and during pregnancy, women need optimal nutritional intake to prepare and support the growth and development of the fetus, so that if a woman experience mal-nutrition then the nutritional intake given to the

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fetus will also be difficult to fulfill, resulting in obstacles to fetal growth and low birth weight (Fajriana & Buanasita, 2018).

Complications with incidence of hepatitis B

Based on the research results, it is known that pregnant women in the group of hepatitis B cases with post-partum hemorrhage category were 1 respondent lower (3.3%), compared to pregnant women in the non-hepatitis B group, there were 3 respondent (10%) with a p-value of 0.640. The determinants of the direct causes of high maternal mortality in Indonesia are known as 4T, namely too old, too young, too many and too short. One of the most common cases is postpartum hemorrhage. Postpartum hemorrhage is bleeding that exceeds 500 ml in the first 24 hours after birth. It is estimated that postpartum hemorrhage occurs in approximately 5% of all vaginal deliveries, and approximately a quarter of all maternal mortality are caused by postpartum hemorrhage (Main et al., 2015).

Risk factors for pregnant women's age, such as being too young and too old, are the most common compared to reproductive age which is without risk. Under the age of 20 years, a woman's reproductive function has not yet developed perfectly, so it is not recommended for pregnancy and childbirth, whereas at the age of over 35 years the function of the reproductive organs actually declines. Likewise, the risk factors for age and number of parities, seen from the determinant factors, these indicators are indirect causes found in several previous research. In the control group (not cases), the risk factor category actually also contributed quite a large frequency. If related to the findings of this research, the factor of good and regular antenatal care services is an important discussion where detection and treatment from the beginning to the end of pregnancy leading to delivery can be an option for care management for midwives and the implementation of other standard ANC services to minimize the occurrence of ongoing complications (Palimbo et al., 2020; Wu et al., 2020).

Too many factors or high parity will also result in various health problems for mother and baby. Repeated pregnancies and childbirth cause damage to blood vessels in uterine wall and a decline in the flexibility (elasticity) of tissue that has been repeatedly stretched by pregnancy so that abnormalities in location or growth of placenta and fetal growth tend to arise. Women who have given birth >3 times are more at risk of experiencing postpartum hemorrhage than mothers of parity 1-3. With increasing parity, there will be more connective tissue in uterus, which will result in decreased contractions and reduced pressure on the

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blood vessels that open after separation of placenta. Apart from that, endometrial wounds cause fibrosis at the placental implantation site so that vascularization is reduced (Chen & Xu, 2021). This explains that the incidence of Hepatitis B during pregnancy and childbirth does not directly affect the complications of vaginal or postpartum bleeding.

Meanwhile, other factors that influence incidence of post-partum bleeding apart from two factors mentioned above are prolonged labor, anemia, excessive stretching of uterus, oxytocin drip, surgical delivery and others. Post partum bleeding that is not handled properly can result in shock and decreased consciousness, due to large amount of blood that comes out. This causes disruption of blood circulation throughout the body and can cause severe hypovolemia. If this happens it can cause a serious emergency condition (Kristianingsih et al., 2020). So, if it is concluded from results of this study that there is no correlations between the incidence of postpartum hemorrhage and hepatitis B in pregnant women, this is clarified by the study by (Sirilert & Tongsong, 2021), that the risk of complications in pregnant women is low in the early stages of HBV infection. The risks in pregnancy and childbirth will increase if they appear in pregnant women with chronic hepatitis virus infection.

5. Conclusion

Of the four indicators of birth outcomes, namely type of delivery, condition of the newborn, birth weight and complications, it was concluded that there was no have significant relations with HBV positive pregnant women. However, it is also necessary to consider other determinant factors such as the management of regular and adequate antenatal care for pregnant women who run to Hepatitis B for the welfare of the mother and baby.

6. Conflict of interest

All authors declare no conflict of interest.

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