

# Analysis of Determinants of Risk Factors for Hepatitis B Incidence in Pregnant Women in Makassar City

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## ABSTRACT

Hepatitis B (HBV) infection in pregnant women has become a global concern because the most common transmission occurs worldwide, especially in endemic areas, namely mother-to-child transmission during the prepartum or perinatal period with the risk of contracting hepatitis B (HBV) infection. in children more than 90%. Quantitative research using observational analytic methods and case control study design was used to find risk factors. The sample size was obtained by means of "Total Sampling" for the case group as many as 45 respondents with a 1:1 ratio between the case and control groups. Data were processed and analyzed using chi-square test and logistic regression test. Statistical tests show that education level, parity, and sexual partners are risk factors for the incidence of hepatitis B in pregnant women. Meanwhile, age group and type of work are not risk factors for hepatitis B incidence in pregnant women. Education level, parity, and sexual partners are risk factors for hepatitis B incidence in pregnant women. Among all the risk factors found, sexual partners were the most at risk for the incidence of hepatitis B in pregnant women in Makassar City (p-value = 0.022; OR: 12.920; 95% CI: 1.440-115.894).

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## INTRODUCTION

Hepatitis B virus (HBV) is a cause of infectious disease that is still a serious public health problem throughout the world, and is one of the top 10 causes of morbidity and mortality that attacks almost every class of society and even all age groups in the world (Abongwa LE et al., 2016). This virus is considered a major cause of chronic liver disease worldwide. More than 2 billion people have been infected with the hepatitis B virus and 350 million of them are chronically infected with more than 1 million deaths from chronic liver disease each year associated with the hepatitis B virus (Amsalu et al., 2018).

Hepatitis B (HBV) infection in pregnant women has become a global concern because the most common transmission occurs worldwide, especially in endemic areas, namely mother-to-child transmission during the prepartum or perinatal period with the risk of contracting hepatitis B

(HBV) infection. in children more than 90% (Umare A et al., 2016). Efforts to prevent mother-to-child transmission of hepatitis B (HBV) are only possible if the disease is diagnosed during pregnancy or before delivery. Therefore, the key elements for controlling infection and establishing a prevention program for this disease include epidemiological patterns, prevalence, and risk factors (Badfar G et al., 2018). Based on this, the researchers are interested in conducting research on risk factors for the incidence of hepatitis B in pregnant women.

## RESEARCH METHOD

This research is a quantitative research using observational analytic method with case control study design. The population in this study were all pregnant women who participated in Antenatal Care services during the period January - March 2022 at the Makassar City Hospital. The total population in this study were 1,337 pregnant women, consisting of a case population and a control population. The case population in this study were pregnant women whose results of HBV surface antigen examination showed HBsAg reactive as many as 45 people, while the control population, namely mothers whose results of non-reactive HBsAg examination were 1,287 people. Determination of the sample size by "Total Sampling" for the case group as many as 45 respondents with a comparison of the case group and control group that is 1: 1 so that the total sample in this study is 90 respondents. The collection of HBsAg data is carried out by laboratory testing using the principle of Double Antibody Sandwich Immunoassay with a Rapid Diagnostic Test (RDT) device that has received BPOM certification. While the data for other research variables were obtained by means of interviews using questionnaires and observation sheets. The data obtained, processed and analyzed bivariate with chi-square test and multivariate analysis with logistic regression test using SPSS application.

## RESULTS AND DISCUSSIONS

The findings of this study indicate that pregnant women in the high-risk age group, 54.4% were the case group and 45.6% were the control group. The results of statistical tests showed that the age group was not a risk factor for the incidence of hepatitis B in pregnant women ( $p$ -value = 0.177). Based on the education level of high-risk pregnant women, 60.7% were the case group and 39.3% were the control group. The results of statistical tests showed that education level was a risk factor for hepatitis B incidence in pregnant women ( $p$ -value = 0.027; OR = 2.705; 95% CI: 1.197-6.113) (Table 1).

Judging from the type of work, pregnant women with formal work as much as 75.0% are the case group and as many as 25.0% are the control group. The results of statistical tests showed that the type of work was not a risk factor for the incidence of hepatitis B in pregnant women ( $p$ -value = 0.059). Based on parity, mothers with multigravida parity as many as 69.7% were the case group and 30.3% were the control group. The results of statistical tests showed that parity was a risk factor for the incidence of hepatitis B in pregnant women ( $p$ -value = 0.023; OR = 2.846; 95% CI: 1.228-6.697). And based on sexual partners (husbands), 88.8% of mothers with HBsAg reactive sexual partners were the case group and 11.2% were the control group. The results of statistical tests showed that sexual partners were a risk factor for the incidence of hepatitis B in pregnant women ( $p$ -value = 0.031; OR = 9.333; 95% CI: 1.121-77.704) (Table 1).

The results of the logistic regression test in table 2 show that of all the variables that are risk factors for the incidence of hepatitis B in pregnant women, the sexual partner variable is the variable most at risk of increasing the incidence of hepatitis B in pregnant women in Makassar City ( $p$ -value = 0.022; OR = 12,920; 95% CI: 1,440-115.894).

**Table 1.** Risk Factors for Hepatitis B Incidence in Pregnant Women

Faktor Risiko	Hepatitis B pada ibu hamil		<i>p-value</i>	OR(IK 95%)
	Kasus n(%)	Kontrol n(%)		
Kelompok Umur				
Risiko Tinggi	37 (54,4)	31 (45,6)	0,177	2,061 (0,832-5,104)
Risiko Rendah	8 (36,4)	14 (63,3)		
Tingkat Pendidikan				
Risiko Tinggi	31 (60,7)	20 (39,3)	0,027	2,705 (1,197-6,113)
Risiko Rendah	14 (35,8)	25 (64,2)		
Pekerjaan				
Formal	6 (75,0)	2 (25,0)	0,059	7,977 (0,872-67,456)
Nonformal	39 (47,6)	43 (52,4)		
Paritas				
Multigravida	23 (69,7)	10 (30,3)	0,023	2,846 (1,228-6,697)
Primigravida	22 (38,6)	35 (61,4)		
Pasangan Seksual				
Reaktif	8 (88,8)	1 (11,2)	0,031	9,333 (1,121-77,704)
Nonreaktif	37 (45,7)	49 (54,3)		

**Tabel 2.** Analisis Multivariat

	Koefisien	S.E	Wald	df	Nilai p	OR	IK 95%	
							Min	Maks
Pendidikan	0,934	0,446	4,392	1	0,036	2,545	1,062	6,096
Paritas	1,187	0,457	6,741	1	0,009	3,277	1,338	8,029
Pasangan Seksual	2,559	1,119	5,225	1	0,022	12,920	1,440	115,894
Konstanta	-1,154	0,389	8,799	1	0,003	0,315		

Hepatitis B is an infectious disease caused by the hepatitis B virus (HBV). And is an infectious disease that is the leading cause of chronic liver disease worldwide, with a very high mortality rate, mostly due to cirrhosis or hepatocellular carcinoma. Hepatitis B virus (HBV) is transmitted through parenteral or mucous exposure to infected blood and other body fluids, including semen and saliva. Risk factors related to hepatitis B in pregnant women include age, education, occupation, sexual partners, parity (Ngaira JAM et al., 2016).

Age is one of the risk factors for pregnant women to be infected with hepatitis B, especially for mothers of productive age because productive age is the peak period of social interaction between the opposite sex so that it becomes a vulnerable phase in household life through the reproductive cycle. Productive age is also the peak of sexual activity, indicating the role of sexual intercourse in hepatitis B transmission because apart from blood, hepatitis B virus is also found in body fluids such as saliva, tears, semen and vaginal mucus which can infect horizontally (Umare A et al., 2016).

Although based on age group, most of the respondents who experienced hepatitis B were in productive age, but the results of statistical tests showed that age group was not a risk factor for hepatitis B incidence in pregnant women, this was possible because the proportion of mothers in the productive age group was very far from the percentage. respondents as a whole. This finding is in line with the research of Metaferia et al (2016) which found most hepatitis B cases were in the productive age category, but no statistically significant difference was observed by age group. Likewise, the study of Molla et al (2015) which showed that there was no statistically significant relationship between the distribution of HBsAg and age category, where hepatitis B transmission in pregnant women was generally associated with other risk factors such as blood transfusions and intravenous drugs.

Education level has a strong relationship with a person's awareness of the risk of diseases including hepatitis B infection. People who have a high level of education usually have better knowledge so they are more likely to avoid the disease. Those who have a good level of education tend to have good information, especially about risk factors for certain diseases. Better knowledge

and information especially for those who are educated can increase awareness of various risk factors (Hang Pham TT et al., 2019).

The findings of this study statistically indicate that the education level of the respondents is a risk factor for the incidence of hepatitis B in pregnant women. Where pregnant women with basic education (high risk) have the possibility of experiencing hepatitis B incidence 2 times greater than pregnant women with higher secondary education levels (low risk). In line with these findings, the research of Metaferia et al (2016) also revealed that education is a risk factor for hepatitis B incidence in pregnant women, where mothers without formal education are 3 times more likely to be infected with HBV than those who have completed at least secondary school.

The level of education is also associated with the awareness and willingness of pregnant women to vaccinate. Pregnant women with better levels of education generally have better awareness of prevention efforts, so they are more willing to vaccinate. A quite significant difference can be seen from the willingness to vaccinate between those with high education compared to those with low education ( $p = 0.000$ ). Thus, educational attainment of pregnant women has a strong relationship with awareness of HBV infection and immunization uptake (Ngaira JAM et al., 2016).

Work in this study is defined as the main activity that mothers do routinely every day, both in the formal and non-formal sectors. In doing his job, a person can involve other people as a form of social interaction as well as certain objects that can be a medium for transmitting the hepatitis B virus. routine examination of HBV-infected blood or serum. Among these types of work are doctors, nurses, health workers in the operating room and laboratory workers (Molla S et al., 2015).

In this study we found different results. The data of this study indicate that the majority of pregnant women (respondents) are housewives. Based on statistical tests, it was found that work was not a risk factor for the incidence of hepatitis B in pregnant women. This explains that the transmission of hepatitis B to pregnant women in the study area is not a work-related exposure. Rather it is exposure or transmission between family members in the household through sharing personal items. In line with these findings, the study of Molla et al (2015) also found that HBV transmission in pregnant women generally occurs between family members in the home through personal items such as toothbrushes, razors with infected people and exposure to blood from needles or syringes. other sharps contaminated with HBsAg from chronically infected persons.

The high group of hepatitis B cases in pregnant women who are housewives (non-formal) in this study also explains the lack of knowledge of pregnant women in the study area regarding risk factors for HBV transmission. Because housewives or those who do not work in the formal sector, have minimal social interaction so they lack knowledge and awareness of the risk of infection either directly or indirectly. This is in line with the statement of Manyahi et al (2017) which states that the work environment can provide experience and knowledge through social interaction in the work environment so that it is better to protect oneself.

In line with this, the research of Tanga et al (2019) showed that based on their work, the prevalence of HBV in unemployed pregnant women was much higher at 12.08%, while the prevalence of HBV infection in working pregnant women was 1.92%. Statistical tests show that based on occupation, pregnant women who do not work have an eight times higher risk of HBV infection than those who work (Tanga AT et al., 2019).

Parity is one of the risk factors for hepatitis B in pregnant women. Parity is defined as the number of live births and stillbirths that the mother has ever passed. Regarding the incidence of hepatitis B, the findings of this study indicate that the majority of mothers with multigravida are the hepatitis B case group, namely 65.8% and the remaining 34.2% are the control group. Meanwhile, mothers with primigravida and first pregnancy, as many as 40.3% were the hepatitis B case group and 59.7% were the control group. Statistical test results show that maternal parity is a risk factor for hepatitis B incidence. Multigravida mothers have a 2 times greater risk of hepatitis B infection compared to primigravida mothers or mothers with first pregnancy.

This finding is in line with a study conducted in Nigeria which also found that parity was a risk factor for HBV infection ( $p = 0.024$ ), and mothers with high parity were more at risk for HBV infection in pregnancy. Likewise, the study of Liu et al (2020) found that parity was a risk factor for hepatitis B in pregnant women, where mothers with multigravida were more likely to be infected with HBV compared to primigravida mothers.

The risk of hepatitis B in pregnant women with high parity or multigravida is related to horizontal exposure. Where mothers with high parity or multigravida show repeated exposure to sexual activity so that it can increase the risk of hepatitis B infection horizontally when compared to mothers with low parity or primigravida. As research by Abongwa et al (2016) showed that mothers with high parity or multigravida had a higher prevalence of HBsAg (9.8%). This high prevalence among the multigravida group results from repeated exposure to risky sexual activities (1). This is in line with the research of Ngaira et al (2016) which showed that there was a relationship between maternal parity and the incidence of hepatitis B.

The increase in hepatitis B in pregnant women with high parity or multigravida can also be explained by repeated exposure to delivery instruments. Mothers with high parity or multigravida show frequent contamination of medical equipment during delivery so that it can increase the risk of hepatitis B infection. In line with this, research by Anaedobe et al (2015) also found that around (73.34%) of HBsAg positive women were multigravida. Where based on observations, pregnant women are considered to be at higher risk of HBV infection due to increased exposure to risk factors (such as blood transfusion, intravenous drugs or surgery) during delivery.

Thus, mothers with high parity or multigravida will be more at risk of experiencing hepatitis B compared to primigravida mothers or first pregnancy due to horizontal exposure such as repeated exposure from sexual activity or frequent contamination of medical equipment during childbirth.

Sexual activity is one of the risk factors for hepatitis B transmission, and has been known as the main source of HBV transmission in the world for a long time. Mothers who have sexual partners infected with hepatitis B are at risk of transmitting hepatitis B through sexual activity. The results of the hepatitis B examination in the mother's sexual partner (husband) using the Rapid Diagnostic Test (RDT), as many as 91.0% non-reactive HBsAg. However, 9.0% of maternal sexual partners are HBsAg reactive and have the potential to increase the transmission of hepatitis B to pregnant women.

Of all sexual partners who were HBsAg reactive, 88.9% of pregnant women were in the hepatitis B case group and 11.1% were in the control group. The results of the statistical test of this study also showed that sexual partners were a risk factor for the incidence of hepatitis B in pregnant women ( $p = 0.031$ ). Where pregnant women with reactive sexual partners are 9 times more likely to be infected with hepatitis B compared to pregnant women with non-reactive sexual partners.

The results of this study are in line with other studies which have found that sexual activity is a major risk factor for HBV infection, ie those who have sexual contact with people who are known to be HBV positive are 3 times more likely to be infected with HBV. Likewise, the study of Cetin et al (2018) found that a history of contact with an infected partner was significantly associated with the risk of HBV infection and an 11 times greater risk of being infected with HBV (Cetin S et al., 2018).

Transmission of hepatitis B through sexual activity occurs because hepatitis B is a virus that can be transmitted by infected blood, semen, and other body fluids so that sexual contact serves as a mode of transmission. Mothers who do not know their partner's hepatitis B status will find it difficult to protect themselves, so they are more easily infected with hepatitis B from their sexual partners if their sexual partners are infected. Thus, maternal knowledge about the hepatitis B status of sexual partners is important to prevent transmission of hepatitis B to pregnant women (Nguyen AT Le et al., 2019).

Thus sexual activity is a risk factor that is significantly associated with hepatitis B in pregnant women. This explains the importance of mother's knowledge about health status, especially hepatitis B status of sexual partners in order to prevent transmission of hepatitis B through sexual activity. As well as avoiding risky sexual behavior that can increase the risk of transmitting hepatitis B to the mother.

## CONCLUSION

This study concludes that education level, parity, and sexual partners are risk factors for the incidence of hepatitis B in pregnant women. Among all the risk factors found, sexual partners were the most at risk for the incidence of hepatitis B in pregnant women in Makassar City (p-value = 0.022; OR: 12.920; 95% CI: 1.440-115.894). The importance of making efforts to control the incidence of hepatitis B in pregnant women through comprehensive screening and routine HBV vaccination for pregnant women.

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