ORIGINAL ARTICLE

Overview of Hepatitis B (Passive) Vaccine in New Birth to The Event of Hepatitis B Infection in Infants from HbsAg Reactive Mothers, 2017 - 2021, in Lamongan Regency, East Java

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ABSTRACT

Introduction: Between 25 and 50 percent of hepatitis B infections are transmitted vertically from mother to fetus. One way to prevent maternal-to-fetal hepatitis B virus infection is to administer hepatitis B (passive) or HBIG to newborns. The purpose of this study was to determine the description of hepatitis B immunization (passive) against the incidence of hepatitis B infection in infants aged 9 months who were born to HBsAg reactive mothers. **Materials and Methods:** This study is a descriptive observational study with a cross-sectional design. The data used are secondary data on the administration of hepatitis B vaccine (passive) to newborns from hepatitis B positive mothers and hepatitis B examination in infants aged 9 months from hepatitis B positive mothers obtained from the Lamongan District Health Office. The data were analyzed using SPSS and the results of the analysis were presented in the form of tables and graphs. **Results:** Of the 72,982 pregnant women who were tested, 22 (2.9%) were HBsAg-reactive. Hepatitis B immunization (passive) was given to 1,963 (92.5%) newborns of HBsAg reactive mothers and 1,246 (63.5%) infants underwent HBsAg examination at the age of 9 months with the result 10 (0.8%) infants were reactive HBsAg and 1236 (99.2%) non-reactive. **Conclusion:** HBsAg examination in infants aged 9 months was carried out on all newborns from HBsAg-reactive mothers who received hepatitis B (passive) immunization. There are several things that affect the effectiveness of the vaccine so that the HbsAg results of infants aged 9 months are reactive.

Keywords: Hepatitis B, Infant, HBsAg, HBIG, Vaccine

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INTRODUCTION

Indonesia is among the countries contributing to the Sustainable Development Goals (SDGs). In the third SDGs goal, the government seeks to ensure a healthy life and improve the welfare of the population of all ages by promoting healthy living and paying attention to health priorities. There are three things that are the government's priorities in the third goal of the SDGs, the prevention of infectious diseases, reproductive health and maternal and child health. Indonesia is a country that has a high case of infectious diseases (1). Infectious Disease Control in Indonesia prioritizes promotive and preventive aspects (2). Some of these infectious diseases can be transmitted from mother to child during pregnancy, childbirth and breastfeeding, in which can have a bad impact. One of the infectious diseases that can be transmitted from mother to child is Hepatitis B (1). Hepatitis is one of those infectious diseases, which is a public health issue that can affect morbidity, mortality, public health status, life expectancy, and other socio-economic impacts (3). The prevalence of HBsAg is 9.4%, so it is estimated that there are 28 million people infected with Hepatitis B, consisting of 50% who will become chronic and 10% have the potential to develop liver cirrhosis (3,4). In pregnant women, the prevalence of Hepatitis B was 1,9% (5).

In mothers who are positive for hepatitis B, the risk of transmitting hepatitis B vertically to the fetus is 25-50%. About 90% of infants with hepatitis B are chronically infected and approximately 1 in 4 of them die (6). Hepatitis infection that occurs vertically carries a chronicity risk of 80-90% while horizontal infection is only 5% (7). In 2020, 45,108 (1.68%) hepatitis B cases were reported in 2,682,297 pregnant women in Indonesia (5,8,9). In the same year, in East Java, 7,950 (1.87%) cases of Hepatitis B were found from 424,114 pregnant women who were examined. Meanwhile, in Lamongan Regency, there were 395 (2.78%) cases of Hepatitis B from 14,198 pregnant women who were examined (9). Based on this, every pregnant woman is obliged to carry out integrated antenatal care in health

facilities (10,11).

HBsAg examination is performed during antenatal care, which is the first step to prevent transmission of Hepatitis B from mother to child. One of the ways to prevent hepatitis B virus infection from mother to fetus is by administering immunization to newborns (12). All bewborn from HBsAg reactive mothers are required to be given the hepatitis B vaccine (passive) called HBIG (Hepatitis B Immunoglobulin) within 12 hours after birth. Infants born from HBsAg positive mothers and receiving hepatitis B vaccine (passive) are required to be tested for HBsAg at the age of 9 months (3).

The Lamongan District Health Office reported that in Lamongan Regency, the government has carried out a government program for early detection of Hepatitis B (DDHB). That is, pregnant women are tested for HBsAg and newborns receive the Hepatitis B (Passive) vaccine and HBsAg is checked for infants at the age of 9 months. The program was also explained in a study conducted at the Kasui Public Health Center, Way Kanan Regency, namely 50% of pregnant women were tested for HBsAg in 2019 with 2 births of babies from HBsAg reactive mothers but it was not explained about the administration of the Hepatitis B vaccine (passive) (11). Meanwhile, research conducted at Haji Adam Malik General Hospital Medan, it was stated that of 140 babies born to HBsAg reactive mothers, 3 babies were HBsAg reactive and 137 babies were non reactive (16). This study was conducted with the aim of knowing the description of hepatitis B (passive) immunization in newborns against the incidence of hepatitis B infection in infants aged 9 months. With this description, it is hoped that the public can know the important role of the Hepatitis B (Passive) vaccine needed by newborns, especially babies born to HBsAg reactive mothers.

MATERIALS AND METHODS

Samples

Collecting the data has approved by Ethical Board of Dental Medicine Faculty, Universitas Airlangga No. 524/HRECC.FODM/XI/2021. This study is a descriptive observational study with a cross-sectional design. The population in this study were all newborn from HBsAg reactive mothers in 2017-2021 in Lamongan Regency, East Java, as many as 1,963 babies. The sampling technique used was total sampling and found 1,246 infants who met the inclusion criteria as samples. The variables used in this study were the administration of hepatitis B vaccine (passive) to newborns from hepatitis B positive mothers and hepatitis B examination to infants aged 9 months from hepatitis B positive mothers. Data collection was carried out in February 2022 at the Lamongan District Health Office. The data obtained in the form of secondary data from routine health center reports in 2017-2021 which contains HBsAg examination data for pregnant women, use of Hepatitis B vaccine (passive) in newborns and HBsAg examination results for 9 month infants from HBsAg reactive mothers. Data collection was carried out according to procedures, without coercion and without harm.

Data analysis

The data that has been collected is processed and analyzed. Statistical analysis in this study used chi square analysis with SPSS. The results of the analysis are displayed in the form of tables and graphs.

RESULTS

In 2017-2021, 2.9% pregnant women tested positive HBsAg and 92.5% newborn received Hepatitis B (Passive) vaccine in Lamongan District. 7.5% of babies who did not received the Hepatitis B (Passive) vaccine in Lamongan Regency were babies who died at birth and babies who bought the Hepatitis B (Passive) vaccine independently. Only 58.3% of infants aged 9 months who were tested for HBsAg received the Hepatitis B (Passive) vaccine in Lamongan Regency (Figure 1).

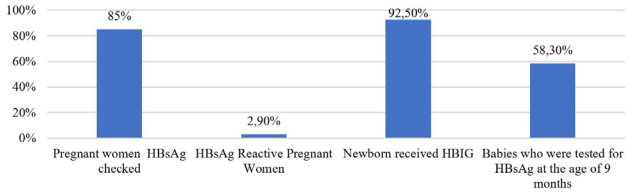

Fig. 1: Diagram of the Hepatitis B program in Lamongan Regency in 2017-2021

In the characteristic data, there is only data on the characteristics of pregnant women who were tested for HBsAg without knowing the results. The characteristic data available at the district level is only age and HIV status and only in 2017 and 2018 due to changes in the report format. It can be seen that the majority of pregnant women who were tested for HBsAg in 2017 and 2018 were aged 20-29 years (55.48% and 55.79%) (Table I).

Table I: HbsAg examination of pregnant women based on characteristics in Lamongan Regency in 2017 – 2018

	2017		2018	
	n	%	n	%
Age				
< 20	604	4.76 %	691	4.47 %
20 – 29	7043	55.48 %	8632	55.79 %
30 – 39	4652	36.64 %	5628	36.38 %
> 40	396	3.12 %	520	3.36 %
HIV				
Positive	4	0.03 %	3	0.02 %
Negative	12691	99.97 %	15468	99.98 %

Babies who were tested for HBsAg at the age of 9 months in Lamongan Regency, 99.9% were babies who received Hepatitis B (Passive) vaccine. There were 10 babies aged 9 months with positive HBsAg consisting of

9 babies who received Hepatitis B vaccine (Passive) and 1 other baby who did not receive Hepatitis B vaccine (Passive) at birth (Table II).

Table II: HBsAg examination for infants aged 9 months from reactive HBsAg mothers in Lamongan Regency in 2017 – 2021

	Reactive HBsAg		Non Reactive HBsAg		*p Value*
	n	%	n	%	
Receive HBIG	9	0.7 %	1236	99.2 %	0.000
Didn't receive HBIG	1	0.1 %	0	0 %	

DISCUSSION

Newborn from HBsAg reactive mothers who received Hepatitis B (Passive) vaccine and recorded at the Lamongan District Health Office were mostly babies who received vaccines from government programs, while babies who received vaccines personally tended not to be reported to the Lamongan District Health Office. The Hepatitis B (Passive) vaccine given can help the body to make antibodies or immunity directly without having to produce active substances for its own immunity (13). A few hours after being given the Hepatitis B (Passive) vaccine, the body can produce anti-HBs antibodies (14). Hepatitis B vaccine (Passive) has a protective effectiveness of 85-95% within a period of 3-6 months (15). To evaluate the administration of Hepatitis B vaccine (Passive), every baby who gets Hepatitis B vaccine (Passive) must be checked for HBsAg status at the age of 9 months. In Lamongan Regency, not all newborn from HBsAg reactive mothers have been tested for HBsAg. This is because babies who are die before the age of 9 months and because they change their place of residence without confirmation, so they are lost to follow-up.

Not all babies who receive the Hepatitis B (Passive) vaccine at birth will be immune to Hepatitis B infection. This is because the effectiveness of the vaccine can decrease in certain circumstances. The effectiveness of the Hepatitis B (Passive) vaccine will be maximized if it is given with the Hepatitis B (HB0) vaccine because the Hepatitis B (Passive) vaccine works directly and lasts for 3-6 months while the Hepatitis B (HB0) vaccine works indirectly by stimulating the immune system to produce antibodies (16). So that the administration of the Hepatitis B vaccine (Passive) together with the Hepatitis B vaccine (HB0) has more significant protection than the Hepatitis B vaccine (Passive) alone (10,17). This is directly proportional to the results of research conducted in Surabaya, namely Hepatitis B (Passive) can prevent transmission from mother to fetus by 85-95% when combined with active hepatitis B immunization (18). In addition, to maintain the effectiveness of the vaccine, the exposure of the vaccine to heat, the expiry period of the vaccine and the time of distribution of the vaccine must be considered (19). Vaccine storage at inappropriate temperatures, exposure to heat or sunlight can damage the vaccine so that its effectiveness decreases or even cannot be used so that antibodies cannot be formed and the baby is HBsAg reactive at the age of 9 months. If implemented properly, hepatitis B vaccine can effectively reduce the prevalence of hepatitis B in 1-2 decades post-vaccination in some countries (20). Based on these things, the administration of hepatitis B vaccine (passive) has a very high contribution in breaking the vertical transmission of hepatitis B infection, so it is important for the community, especially pregnant women, to know their hepatitis status and babies born to get hepatitis B vaccine (passive). In addition, health workers need to direct pregnant women to immediately check for HBsAg during Integrated Antenatal Care.

CONCLUSION

Every baby born to an HBsAg positive mother is expected to receive the Hepatitis B vaccine. In addition, at the age of 9 months, a baby from an HBsAg positive mother is tested for HBsag. Babies who get Hepatitis B vaccine (passive) do not mean they are immune to Hepatitis B virus infection. There are several things that can affect the effectiveness of the vaccine and the results of the HBsAg examination for infants aged 9 months are reactive.

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