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REVIEW ARTICLE

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**FACTORS ASSOCIATED WITH THE
OCCURRENCE OF HEPATITIS B**

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ABSTRACT

Hepatitis was process of inflammation or necrosis of liver net that could be caused by infection, drugs, toxin, metabolic disturbance, or autoimmune disorder. Infection that was caused by virus, bacteria, or parasite were the most causes of acute hepatitis. Hepatitis B virus was spread through contact with body liquid. Human were the only host (*pejamu*) of this virus. Blood was important factor for spreading media. Other body liquid was also important factor for spreading. The design of this study was case control study, that was a research which started with selection of individual and HBsAg positive as the case and HBsAg negative as the control or they who were not suffered with hepatitis B, then those groups were compared about the cause or past experience that might be relevant with the disease cause.

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INTRODUCTION

Hepatitis was process of inflammation or necrosis of liver net that could be caused by infection, drugs, toxin, metabolic disturbance, or autoimmune disorder. Infection that was caused by virus, bacteria, or parasite were the most causes of acute hepatitis. (Gastrology dan Hepatology, 2011)

Virus of hepatitis B (HBV) of human (*Human HBV*) included into class of hepadna virus type 1 and was hepadna virus that was found for the first time. Hepadna virus was also found at marmot, squirrel, and duck; but the virus that infected those animals couldn't spread on human. Human HBV also

could infect chimpanzee (Gastroentologi dan Hepatologi, 2011).

Hepatitis B virus had infected one third of world's population. It was estimated about 400 million people had been infected with this virus. The highest prevalence of this disease was in Sub Sahara Afrika, South East Asia, and some other Latin America (WHO, 2015).

The research about Hepatitis B cases, hat was conducted by researcher from Nigeria showed that knowledge factor influenced toward the Hepatitis B incident, Olelekan (2015), *Prevalence and risk factor for hepatitis B and C among sexual active undergrounds of southeastern Nigeria*.

The research that was done in Arab Saudi showed that the highest prevalence of hepatitis B virus infection contained in the gender factor, family history, and procedure of dentistry and history of blood transfusion Aglee et al (2015).

Indonesia was country with high endemic of hepatitis B, second biggest in South East Asia after Myanmar. Based on the basic health research, study and filtering test of blood donor PMI, estimated about one hundred Indonesia people, ten of them were infected with hepatitis B and C. The national prevalence for hepatitis B was 1,2 %, estimated about 28 million of Indonesia people were infected with hepatitis B and C, 14 million had chance to be chronically and 1,4 million had chance to be liver cancer. (Kemenkes, 2014).

The highest prevalence of Hepatitis B in Indonesia occurred in five provinces, they were NTT (4,3 %), Papua (2,9 %), Sulsel (2,5%), Sulteng (2,3%), Maluku (2,3%). (Rikesda, 2013). The prevalence of Hepatitis B in North Maluku was above 2%. (Rikesda, 2013).

In Indonesia, Hepatitis B cases still became resinous problem and ut was estimated that one of twenty people in Jakarta were infected with Hepatitis B virus (Profesor Candra), in seminar of liver research Indonesia in Jakarta.

The data got from health department of Halut in 2013 there were 17 cases, 2014 were 15 cases, 2015 were 17 cases and 2016 had been detected new cases.

Formulation of Problem

Based on the background, the writer would know the factors that related with Hepatitis incidents in Tobelo, North Maluku.

Objective of the Research

1. General Objective

Knowing the factors that related with the Hepatitis B incidents in RSUD Tobelo, North Maluku.

2. Specific Objective

- a. Knowing the relationship between age factor with Hepatitis B incidents in RSUD Tobelo, North Maluku.
- b. Knowing the relationship between education factor with Hepatitis B incidents in RSUD Tobelo, North Maluku.
- c. Knowing the relationship between profession factor with Hepatitis B incidents in RSUD Tobelo, North Maluku.
- d. Knowing the relationship between factor of blood transfusion history with Hepatitis B incidents in RSUD Tobelo, North Maluku.
- e. Knowing the relationship between factor of using tattoo with Hepatitis B incidents in RSUD Tobelo, North Maluku.

Advantage of the research

1. This research result could be the consideration material for the health department of North Halmahera Regency in solving Hepatitis B.
2. Increasing the societies' knowledge about Hepatitis B and the prevention of Hepatitis B.
3. This research could be the basic reference in developing the health Epidemiology field.

EPIDEMIOLOGY of HEPATITIS B

1. Natural History of the Disease

Hepatitis B virus was spread through contact with body liquid. Human were the only host (*pejamu*) of this virus. Blood was important factor for spreading media. Other body liquid was also important factor for spreading. Recently, there were three ways of spreading Hepatitis B virus, they were prenatal transmission, sexual, parenteral and perkutaneus (using the same hypodermic needle commutatively). There was no prove that the spreading could be through free air or infected human feces. Hepatitis B virus wasn't spread through water, food, insect, and other animals.

Prenatal transmission was transmission of hepatitis B virus from mother to the baby during the prenatal period. This transmission was the most important prevalence in the high endemic area especially in China and South East Asia. Before the vaccine was used as routine immunization program, the proportion of infected baby was about 10 – 30 % from mother with Hepatitis B positive (HbsAg positive) whose the sign of virus replication was non active (HbeAg negative).

While, the prenatal incident was bigger occurred at mother with HbsAg and HbeAg positive that was around 70 – 90 %. For the new born baby and children under 1 year who infected with Hepatitis B at the prenatal period, so the possibility become chronically infection was 90%.

Sexual transmission was main source of hepatitis B spreading in the world especially in the low endemic area such as America. Homosexual behavior in the period of 5 years would be the high risk of being infected with hepatitis B at around 70%. Factors at the heterosexual that influence the increasing of hepatitis b infection were the duration of sexual activities, number sexual partners, history of previous spreading disease. And positive serology syphilis.

Parenteral transmission could be in the form of using the hypodermic needle collectively, blood transfusion, dialysis (blood wash), acupuncture, health worker, and tattoo. The risk of infected hepatitis b through blood transfusion now had been decreased because there was screening of hepatitis B although the possibility was extant.

At the chronically hepatitis B that occurred because of vertical spreading, there were three phases of its clinical history: first stage was period of immune tolerant. During this phase there was occurred the replication of active virus, but there was no symptoms and worsen of liver. This phase could settle during 10 years or more that could cause chronically history such as sirosis. Second phase was immune active that signed with the worsen of liver function that could grow progressively. Third phase was response of immunologist host toward virus. At this phase, there was normalization or resolution of inflammation process from the liver.

At the acute sufferer of hepatitis B at prenatal and child, there was estimated would get complete recovery 10 – 70 %, while the rest 30 – 90 % would get chronically infection. While, at the adult, infection of acute hepatitis A that would be chronically was around 5%, and that get complete recovery was around 95%. At the sufferer with chronically hepatitis B, the incidents during 5 years would become sirosis of around 8 – 20 %. Without therapy, liver sirosis could become worse condition (liver sirosis that was not compensated) so that cause comma and some of those liver sirosis could become liver cancer.

2. Prevention, Vaccination, and Its Success

Three main prevention strategies, they were modification of live style to prevent the transmission,

active immunization, and passive immunization. The change of sexual behavior and screening toward the blood product for transfusion could reduce the risk of infected with hepatitis B. (Keyvani H, Agah S, Kabir A, Alavian SM. *Prevalence and risk factors of isolated anti-HBc antibody and occult hepatitis B infection in hemodialysis patients: A nationwide study. Ann Hepatol. 2013;12:213–9*)

The prevention with vaccination was important strategy to decrease the risk of infected with chronically hepatitis B and its complication. The first generation was plasma derived vaccine that was not active, that introduced in 1982. The second generation was recombination of DNA that widely used in 1986. Both vaccines were safe enough and effective in preventing infection of hepatitis B. in 1991, World Health Organization (WHO) had recommended vaccination of hepatitis B for all countries. In 2002, 154 countries had done hepatitis B vaccination at all newborn babies. (WHO, report, 2014)

The first vaccination program in the world was done I Taiwan in 1984. During 2 years of that program, vaccination was given at baby and mother with hepatitis B (HbsAg positif). Then that vaccination was expanded for all newborn babies, pre-school age, and school age which hadn't been vaccinated. Those programs decreased the prevalence number of children at the age under 15 years old with hepatitis B from 9,8% in 1984 became 1,3% in 1994. In 1999, vaccination covered around 80 – 86 % at children and 90% at the school ages so the prevalence of hepatitis B sufferer decreased until 0,7% at children of under 15 years old.

Taiwan was area of hepatitis B endemic and with the vaccination that widely introduced in July 1984, average number of liver cancer at children of 6 – 14 years old was decreasing from 0,7 per 100.000 children in the period of 1981 – 1986 became 0,57 in 1986 – 1990, and became 0,36 in 1990 – 1994.

Passive immunization was in the form of Immunoglobulin Hepatitis B (HBIG) that used as antibody to fight Hepatitis B virus. HBIG was used for 4 conditions, they were (1) newborn baby and mother with hepatitis B, (2) people who infected hypodermic needle that infected with hepatitis B, (3) people who had sexual activity with partner of positive of hepatitis B, (4) after doing liver transplantation. For the newborn baby, although it had given the passive immunization, the possibility to be infected was around 3,7 – 9,9 %. The giving of combination active and passive immunizations gave high enough protection, that was more than 90%.

3. Current Hepatitis B Therapy

At the acute hepatitis B, it didn't need to give specific treatment, only supporting therapy. While for the chronically hepatitis B, it was needed more specific treatment. The main purpose of chronically hepatitis B treatment was to eliminate or pressure permanently the process of virus replication that would reduce pathogenitas and infectivity and finally would stop or reduce liver inflammation so that the progressivity to be sirosis and cancer could be prevented.

There were two options of medicines that were used for chronically hepatitis B. First option, medicine that pressured the virus replication and to modulate immune system of the sufferers, that known with the name of interferon. Interferon that currently used was pegylated interferon that gave satisfied result. The benefit of this medicine were it could press the virus replication in big number, the duration was special (6 month to 1 year), relatively safe, and good tolerated at the patients who had got sirosis especially which still compensated. However, the price was too expensive. Second option was from analog nucleoside group that could pressure the virus replication. Some of them were lamivudine, adenovir, entecavir and that was still in the

trial stage were telbivudine and tenofovir. The benefit of this group was the price is cheap enough than the first option but the disadvantage were relatively long term using (more than 1 year), could be the resistance of Hepatitis B virus toward those medicines, especially lamivudine reached 70% after 5 years using. Number of success of chronically hepatitis B therapy by using those medicines was still under 20%. So, the prevention steps were better than treatment.

Liver transplantation was definitive therapy toward the problem of chronically liver disease. It was around 4.000 liver transplantations were done 100 central per year. It was estimated 18.000 candidates of liver transplantation per year, this number was estimated would be increasing in the future. At the central of liver transplantation, it's waiting lists was around 2 – 3 years. Number of spark of live in 1 year was estimated around 85% and in 5 years closes to 75%. The number of success was higher at the patients who were referred at the early stage than they who were referred getting liver decomposition.

THEORETICAL FRAMEWORK

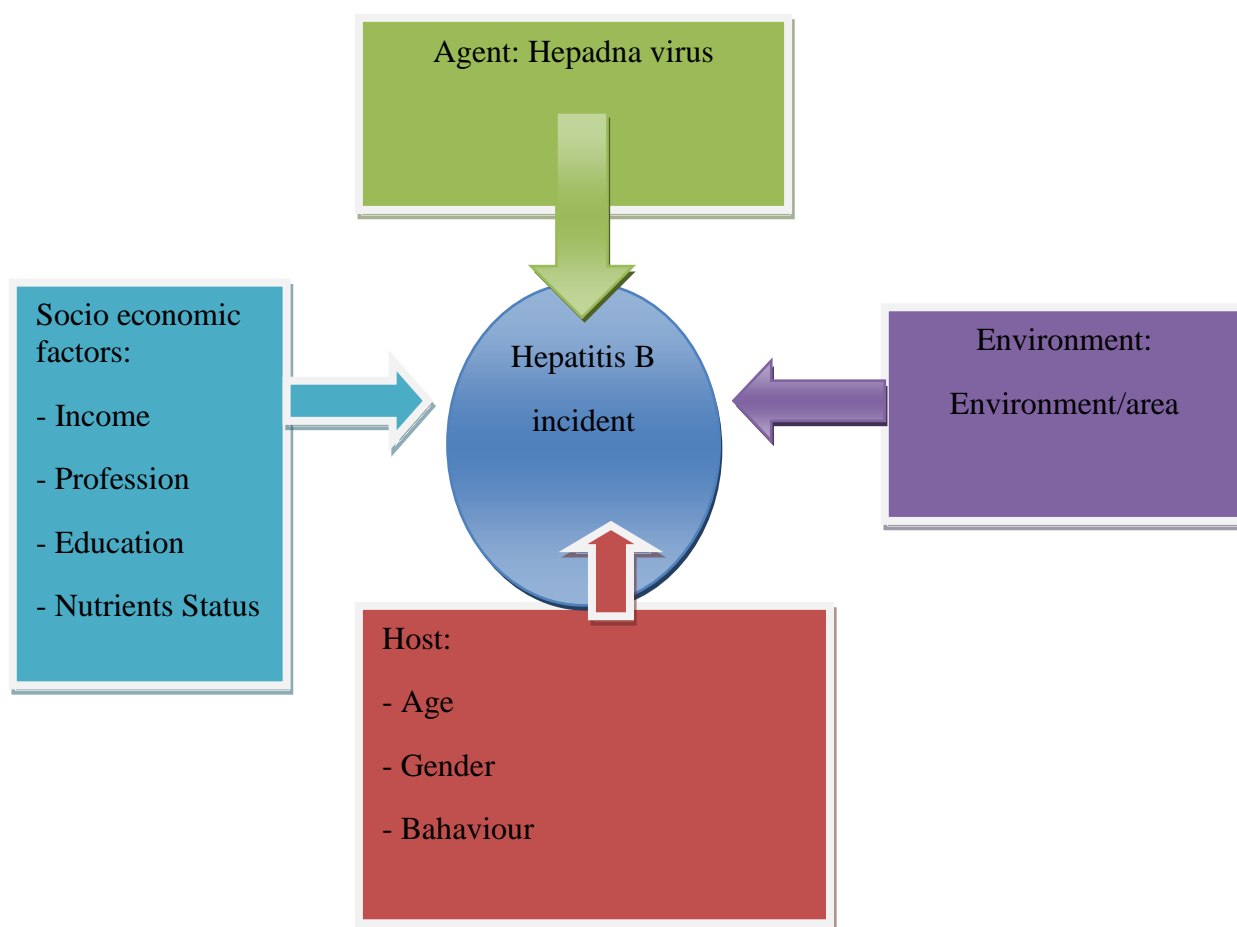


Figure 1. The theoretical framework of this research

CONCLUSION

TYPE OF RESEARCH

This research was analytical observational study, that was observing and analyzing the relationship between independent variable and dependent variable. The design of this study was case control study, that was a research which started with selection of individual and HBsAg positive as the case and HBsAg negative as the control or they who were not suffered with hepatitis B, then those groups were compared about the cause or past experience that might be relevant with the disease cause.

Variables of the Research

1. Independent Variable
 - a. age
 - b. education
 - c. profession
 - d. blood transfusion
 - e. tattoo
 - f. free sex without safety
2. Dependent Variable: Hepatitis B Incidents

Operational Definition of Variable

1. Dependent Variable

Hepatitis B incidents: Status of painful from the hepatitis B sufferer that signed with the clinically symptom of blood serum examination that contained of HBV HBsAg inside the blood.

Measurement procedures ;

Laboratory examination

Measurement result

1. Case ; HBSAG positive
 2. Not Case: HBSAG negative
- Measurement Scale; nominal

RESEARCH PROCEDURE

The data of this research was collected by interview and observation.

1. The data collecting was done by directly interview with the respondents by using structured questionnaire that was conducted in order to get the data about relationship of characteristic, behavior, blood transfusion history factors.
2. Observation was done by directly observation toward the patients, in order to get the data about the existence of symptomatic and asymptomatic symptoms.

Data Tabulation and Analysis

a. Univariate Analysis

This analysis was done in order to observe the characteristic description of each variable studied and served in the table of frequency distribution.

b. Bivariate analysis was done in order to know the relationship between independent variable and dependent variable. This analysis was also aimed to view the relationship of some other risk factors with the hepatitis B incidents.

1. Chi-square test was to observe the relationship between independent variables of education, age, transfusion history, tattoo using and free sex without safety. The basic principle of this test was in order to compare the frequency occurred (observed) with desired frequency (expected). The determination of significant correlation was by using value of $p < 0,05$

2. The counting of Ods Ratio(OR) and Confident Interval (CI) 95% in order to know the relationship strength of each research variable. Assessment of OR and CI 95% were:

- a. $OR > 1$ studied factor was risk factor
- b. $OR = 1$ studied factor was not risk factor
- c. $OR < 1$ studied factor was protective

For the meaning of association relationship between the two meant variables, it could be seen from the interval value of trust at the trust level of 95% (95%) CI

c. Multivariate analysis was done in order to know the most influenced variable and get the model in predicting the hepatitis B incidents. This analysis was done by using logistic regression test. The data tabulation and analysis were done with computer by using program of SPSS for window versi 21.0.

1. Selecting of Variable Model Candidate

Making the independent variable, that were age, education, blood transfusion history, tattoo, using the unsterile hypodermic needle, free sex behavior without safety in the form of dichotomy that was appropriate with the operational definition.

- a. Doing the selection toward the independent variable in order to be model candidate variable, that was in order to do bivariate test toward each variable with hepatitis B incidents.
- b. Assessing whether it was possible or not an independent variable became model candidate with the criteria of $p < 0,005$ at the bivariate test

and variable that substantially important and considered related with the hepatitis B incidents.

2. Interaction Test

This test was done in order to examine the existence of interaction between variables which presumed substantially that there was an interaction, and it was not needed to be done if substantially there was no interaction. (Hastono,2006)

3. Confounding Test

Confounding test was done in order to count the disturbance coefficient by :

Disturbance coefficient = $(OR_a - 1) / (OR_c - 1) \times 100\%$ - 100%

OR_a = value of OR adjusted

OR_c = value of rough OR

If there was any change of OR > 10% from certain variable, so the variable that had been released would be re entered into the model.

4. Determination of final model of regression

The determination of final model of regression, that was found the value of OR Adjusted from independent variable toward hepatitis B incidents.

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