

# Risk Factor for Blood-borne Disease (Study in Blood Donors at Semarang District)

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## Conference Paper

## Risk Factor for Blood-borne Disease (Study in Blood Donors at Semarang District)

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### Abstract

Blood-borne disease is one of communicable disease through blood contamination. The aims of this study to determine risk factors for diseases transmitted from blood donors in Semarang District. The design study was a cross sectional with analytic approach. The subjects were blood donors (400 people) using an accidental sampling method. Statistical analyzed with fisher exact test and prevalence ratio with 95% significance level. Results showed the prevalence of hepatitis B and HIV was 1.5% (6 people) and 0.5% (2 people). Hepatitis C infection in this study was not found. From the statistical test showed that history of sexual behavior as a risk factor incidence of infectious disease through blood POR = 30.992; 95% CI (6.908 – 139.041) with p = 0.001. Knowledge, types of injection drug use, sharing needles, blood transfusions, organ transplants, surgery, dialysis, dental examination, tattooing and piercing, and contact with the patient were not risk factors for the incidence of infectious diseases through blood in Semarang District. Indonesia Red Cross in Semarang District should conduct dissemination to the blood donors on the sidelines of the implementation of activities related blood donor infectious diseases transmitted by blood including agent, transmission, natural history, prevention and treatment.

**Keywords:** Blood-borne disease, hepatitis B, hepatitis C, HIV, blood donor

### 1. INTRODUCTION

Bloodborne pathogen is pathogenic microorganism in blood (such as viruses, bacteria, or parasites) caused disease in human (Phillips et al. 2007) [28]. They are virus hepatitis B virus, hepatitis C virus dan *Human Immuno-deficiency Virus* (Yami et al. 2011) [5, 17]. Hepatitis B and hepatitis C are disease that infects the liver and mostly spread through blood and blood products. Hepatitis B virus is DNA virus from Hepadnavirus family. Hepatitis C virus is a RNA virus with a lipid coat similar to Flaviviridae family [10], and HIV virus is single stranded RNA virus [2]. Hepatitis B has an incubation period ranging

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from 6 weeks up to 6 months to clinical symptoms [7]. Hepatitis C has an incubation period of between 15-160 days, an average of about 50 days [8, 16] (Safioleas & Manti 2007). HIV has a varied incubation period, from transmission to can be done detection antibody, typically 1-3 months, but the time of contracting HIV as a diagnosis of AIDS until about 1 year < 15 years or older [22].

HIV becomes the major health problems of the global community. Based on WHO report, there are about 35.3 (32.2-38.8) million people living with HIV in 2012 and over 9.7 million people living with HIV reside in developing countries [4, 11]. About 2 billion people have been infected with hepatitis B worldwide. More than 240 million people worldwide are chronically infected with the hepatitis B virus, between 500 up to 700,000 people die every year because of heart. More than 350,000 people die annually due to the disease hepatitis C [18, 29]. According to the data of the Basic Health Research from the Ministry of health of Indonesia by 2013, the prevalence of hepatitis in Indonesia infected with virus hepatitis was 1.2%, two times higher than in 2007 [15]. Every year 3-4 million people are infected with the hepatitis C virus. Approximately 150 million people are chronically infected are at risk of developing liver cirrhosis or amounted to 0.6%. An increase in the prevalence of hepatitis sufferers in the population above the age of 15 years. Hepatitis B is the most widely known to infect the population of Indonesia namely 21.8% [27].

Many patients who need transfusion did not have the right to obtain access to blood safety. HIV, hepatitis B, hepatitis C as well as *Treponema palladium* (syphilis) is the fourth infection that recommended by WHO to do screening as an attempt to get a blood transfusion is safe to the fourth infection due to this pathogen can cause chronic and infectious disease transmission risk being from donors to recipients of transfusions [1].

Hepatitis B, hepatitis C and HIV are classified in infection transmitted through transfusion or transfusion transmissible infection (TTI) is a contagious infection from person to person through the granting of parenteral blood or blood products.

The purpose of this research is to find out what are the risk factors associated with the incidence of hepatitis B, hepatitis C, and HIV in blood donor volunteers in Semarang. The results of this study are expected to provide benefit to reveal the problem infection in charities that seem healthy, provides information to formulate management strategies increase the safe blood supply, and provide an overview of the magnitude of the infection prevalence of infectious disease through blood transfusions.

## 2. METHODS

### 2.1. Design

Design research using the analytic cross sectional study.

### 2.2. Population and sample

The population of the research was the whole blood donors in the Semarang aged 17-60. Large sample using a specified sampling total system by way of accidental sampling based on the willingness of the respondent. Criteria for inclusion in this study is if qualify as charities established by PMI and donors are willing to participate as respondents research. Terms to be blood donor, namely the age of 17 to 60 years, minimum weight 45 pounds, sistol blood pressure 110-160 mmHg blood pressure dias-tol and 70-100 mmHg, pulse rate of 50-100 times/min, levels of hemoglobin  $\geq 12.5$  gr% as well as a history of previous blood minimum 3 months.

From blood donation is obtained as much as 610 blood donors, where the number of donors who are willing to participate and have met the requirements of the Indonesian Red Cross were 400 people.

### 2.3. Location

The research was carried out in 12 locations i.e. Tuntang sub district, Village Lerep Village, Ungaran, PT. Politama, Bina Insani boarding schools, PT. Sidomuncul, SMK Bancak, PT Batamtex, PT, PT Formulatrix Pepsi, village of Genting, and Semarang Regency Polres.

### 2.4. Statistical analysis

Statistical analysis for bivariate analysis using chi-square test. However, in this study, the p value of all variables (except the knowledge variables) is taken from the fisher exact number because the expected value of the cell in the cross tabulation table is less than 5, with confidence interval 95% and the value of significance  $p < 0.05$ . If chi square test showed significant (p value less than 0.05) or  $p < 0,25$ , that variable becomes predictor variable for multivariate analysis with binary logistic regression model. Relative risk for this research is reflected in the prevalence odds ratio (OR).

TABLE 1: Characteristics of Subject According to Age, weight, And Blood Pressure.

Characteristics	Mean	SD	Min	Max
Age				
Blood donor Subject	29.94	9.878	17	58
Blood-borne Case	35.62	13.060	17	57
Weight				
Blood donor Subject	62.01	11.452	45	105
Blood-borne Case	68.75	13.583	53	90
Blood Pressure (sistole)				
Blood donor Subject	125.18	9.844	110	163
Blood-borne Case	133.38	5.731	121	140
Blood Pressure (diastole)				
Blood donor Subject	77.46	6.352	64	99
Blood-borne Case	77.50	6.256	70	86
Frequency of blood donation				
Blood donor Subject	3.93	6.075	0	41
Blood-borne Case	2.00	2.390	0	6

### 3. RESULTS

From the results of the examination of a blood donor 400 obtained that 8 people infected with an infectious disease through blood, with the prevalence of hepatitis B 1.5% (6 persons), 0.5% of HIV (2 people) and not found the existence of a hepatitis C-infected respondents.

Based on table 1 average age of donors as a whole are 29, 94 years old. In this study the number of respondents ages 29 to 30 years because most of the blood donor activities are implemented in the workplace than place school. The average weight of respondents is 62.1 kilograms. The rest of the respondents had normal blood pressure.

Most of the respondents have already donate their blood earlier by 60%. Respondents most frequently donate their blood, i.e. 41 times based on table 1 of the whole of the respondents have been eligible from PMI to donate their blood.

Frequency distribution of respondents according to marital status, level of education, a job, a history of the donor, the donor and routines are shown in table 2.

Estimate 75% of cases had been married. Half of the cases of educated finished high school. The work is largely a case of private employees. 62.5% of cases ever donate their blood and yet does not do routine blood donor.

TABLE 2: Characteristics of Subject based on Marital Status, Level of Education, Occupation, Experience in Blood Donation, and The Frequency of Blood Donor.

Characteristics		f	%
Marital Status	unmarried	176	44.0
	Married	217	54.2
	Widow/Widower	7	1.8
Education	Elementary School	14	3.5
	Not finish junior high school	7	1.8
	Junior high school	84	21.0
	Not finish Senior High School	10	2.5
	Senior High School	184	46.0
	Academy/Diploma	41	10.2
	Under graduate	60	15.0
Occupation	Civil servant	10	2.5
	Employees	224	56
	Student	93	23.2
	Police	27	6.8
	Merchant	5	1.2
	Farmer	18	4.5
	Entrepreneur	1	0.2
	Housewife	12	3.1
	Village clerk	4	1.0
	Others	6	1.5
Experience of blood donation	Yes	240	60.0
	No	160	40.0
consistency of doing blood donation	Every 3 month	53	13.2
	Not consistent	345	86.2
	Never	2	0.5

Based on table 3, the only variables that are associated with the incidence of blood-borne disease on blood donors in Semarang is risky sexual behavior history. Risky sexual behavior in this research-based views of a person who has a sexual partner or more than one person, same-sex sexual relations, has conditioned workers to have sex with sex workers, or had sex with drug users in particular drug injection type.

There were two variables associated with the incidence of blood-borne disease on blood donors in Semarang (Table 3). The variable is risky sexual behavior history

and knowledge. Sexual behavior risk in this research-based views of a person who has a sexual partner or more than one person, homosexual relations, had sex with prostitutes, or had sex with drug users in particular drug injection type. On this research obtained value POR = 31; 95% CI (6.914-138.987) with  $p = 0.001$  means that blood donors who have a history of risky sexual behavior has the possibility of 31 times the infectious disease through infected blood, and there is a significant relationship. We then perform multiple logistic regression using the backward method to analyze which variables are most influential on the incidence of blood-borne disease. Then it was found that a history of risky behavior was the most influential variable on the incidence of blood-borne disease ( $p = 0.001$ ) (Table 4).

TABLE 3: The Risk Factors Related to Blood-borne Disease in Semarang District.

Variabel	Hepatitis B, Hepatitis C, or HIV				POR	p value	95% CI
	(+)	%	(-)	%			
Knowledge							
Less	7	2.3	377	97.7	2.867	0.336	0.33- 24.82
Good	1	6.2	15	93.8			
Gender							
Male	6	2.6	228	97.4	2.158	0.478	0.43 - 10.82
Female	2	0.2	164	98.8			
Previous Risky Occupation							
Yes	0	0	0	0	0	0	0
No	8	2	392	2			
History of Hepatitis C Disease							
Yes	0	0	0	100	0	0	0
No	8	2	392	100			
History of HIV							
Yes	0	0	0	100	0	0	0
No	8	2	392	100			
History of Other Bloodborne Disease							
Yes	0	0	0	100	0	0	0
No	8	2	392	100			
History of Drug Injection							
Yes	0	0	0	0	0	0	0
No	8	2	392	8			
History of Sharing Needles							
Yes	0	0	0	0	0	0	0

Variabel	Hepatitis B, Hepatitis C, or HIV				POR	p value	95% CI
	(+)	%	(-)	%			
No	8	2	392	98			
History of Blood Transfusion							
Yes	0	0	10	100	1.021	1.00	1.006-1,035
No	8	2.1	382	97.9			
History of Organ Transplantation							
Yes	0	0	0	0	0	0	0
No	8	2	392	8			
History of Surgery							
Yes	0	0	23	100	1.020	1.00	1.007-1.037
No	8	2.1	369	97.9			
History of Hemodialysis							
Yes	0	0	0	100	0	0	0
No	8	2	392	98			
History of dental care							
Yes	0	0	46	100	1.023	0.605	1.007-1.039
No	8	2.3	346	97.7			
History of tatto							
Yes	0	0	2	100	1.021	1.00	1.006-1.035
No	8	2	390	98			
History of Piercing							
Yes	0	0	6	100	1.021	1.00	1.006-1.035
No	8	2	386	98			
History of contact with patients							
Yes	0	0	2	100	0	0	0
No	8	2	390	98			
History of Sex behavior risk							
Yes	5	20	20	80	31	0.001	6.914-138.987
No	3	0.8	372	99.2			

TABLE 4: Relationship Between Independent variables with *blood-borne disease*.

Independent variables	p value	POR	95%CI
Knowledge	0,991	1,009	0,240 - 4,237
Sexual Behaviour Risk	0,001	30,992	6,908 - 139,041



## 4. DISCUSSION

The prevalence of the result was different with the results of previous research by Akcam et al. in 2008 in the rural areas of southwest Turkey, the prevalence of hepatitis B is found higher i.e. amounting to 2.5% [1]. Respondent's positive hepatitis C was not found in this research. Research conducted by Rahayujati et al. in the Yogyakarta branch of the PMI UTDC in 2006 reported that of 0.6% of the respondents which is the blood donors infected with hepatitis C [23]. HIV prevalence is found in the amount of 0.5% on the respondent's blood donors in Semarang. Prevalence is greater than research conducted by Bembde et al. in 2012 found HIV prevalence of 0.15% among blood donors in MGM'S teaching hospital, Aurangabad, Maharashtra [4].

Sentjens et al. in his research proves that having more than one sexual partner strongly associated with HIV infection (OR = 2.90; 95% CI = 2.31-3.64;  $p = 0.001$ ) [26]. Those who engage in risky sexual behavior have six times the risk of infection is greater than those who do not engage in risky sexual behavior ( $p = 0.0001$ ; OR = 5.79; 95% CI = 4.66-7.19) [3, 12]. Rahayujati et al. stated that anyone who has ever done a an intimate sex besides husband/wife were at risk 5.85 times more likely to suffer from hepatitis B than the man who does not undertake sex with other than husband/wife. In addition, there is a meaningful relationship with a history of hepatitis C incidence ever not to have sex with husband/wife (OR = 14.62; 95% CI = 2.29-93.45) [23]. Dandona et al. reported that men who have female partners more than one or ever had a history of conditioned sexual intercourse with commercial sex workers as a risk factor for HIV incidence in Andhra Pradesh, India (OR = 6.38; 95% CI = 2.96-13.77) [6]. Mucous membranes genitalia (vagina) can be the entrance of Virus Hepatitis B/VHB [14, 20]. Sexual transmission from infected men to women about 3 times faster than transmission on the infected women to men. Sexual intercourse through anal, either the recipient or the giver, posting have the same risk for the onset of infection [3, 13]. Sexual transmission is more prevalent in countries with low additional infection VHB. In a study, 70% of homosexuals infected with VHB after five years of active sexual intercourse [30]. Sexual intercourse repeatedly, alternated with a couple of people who have a history of ever suffering from sexual diseases will facilitate someone contracted the infection VHB [13, 19]. Having a sexually transmitted disease such as HIV, sex with many couples, or sexual violence increases the risk of someone infected with hepatitis C [9, 25].

## 5. CONCLUSION

From 400 blood donors, subject of the research, we found 6 people infected with Hepatitis B, 2 persons infected with HIV and there was no subject infected with Hepatitis C. Only risky sexual behaviour history that statistically proved as a risk factor for incidence of infectious disease through blood in Semarang District (POR: 30.992; 95% CI: 6.908–139,041, p value: 0.001).

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