INJECTING DRUG USERS' SOCIO-ECONOMIC STATUS AND PROBABILITY OF HIV INFECTION IN BANDUNG

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ABSTRACT

The transmission of HIV/AIDS in Indonesia is predominantly by risky sexual activities and needle-sharing. Of 33 Indonesian provinces, West Java ranks fourth for cases of HIV/AIDS. An individual's behaviour in engaging in risky sexual acts or drug use can be influenced by their social and economic status. This research uses cross-sectional surveys. The subjects for the surveys were injecting drug users in Bandung. The sampling is respondent-driven and there were 222 respondents used in this study. Collected data were analysed using a logistic regression test. The strength of the effect is expressed in odds (or risk) ratios and the marginal effect is used for the interpretation. Individuals who are in employment have a marginal effect of -0.2422 (CI, -0.445 to -0.392), which is smaller than for individuals who do not work; income has a marginal effect of 0.375 (CI, 0.0928 to 0.657) for people with monthly incomes under IDR500,000.00. For individuals whose monthly income is between IDR1,500,000.00 and IDR2,000,000.00, the value of the marginal effect is 0.236 (CI, 0.015 to 0.456), and for those whose monthly income is between IDR2,000,000.00 and IDR2,500,000.00, the marginal effect is 0.261 (CI, 0.0025 to 0.52). Using syringes for more than 12 years has a marginal effect of 0.235 (CI, 0.121 to 0.349), which is a higher value than for those who have used a needle for fewer than 12 years. Socio-economic status can affect the likelihood of HIV infections. The government should encourage the drug using community to participate in activities that reduce the risk of HIV/AIDS.

Keywords: HIV, Injecting drug users, Socio-economic status

**JEL classification**: I19, I12, Z13

1. INTRODUCTION

The human immunodeficiency virus (HIV) is the virus that can cause AIDS by attacking white blood cells (CD4), resulting in a weakening of the human immune system. AIDS is the increasing effect of the HIV virus on the body of human being (Ministry of Health 2006).

An HIV infection decreases the antibodies of a person's immune system, a condition that can result in death. The HIV virus can be transmitted in several ways; by blood, semen or vaginal fluid and by breastfeeding. In general, the most rapid HIV transmission is through contaminated blood and by contaminated syringes: blood is the fastest transmitter of the virus for it to attack a person's immune system (Spiritia Foundation, 2009).

Globally, an estimated 35.3 (32.2–38.8) million people were living with HIV in 2012. An increase from previous years as more people are receiving the life-saving antiretroviral therapy. There were 2.3 (1.9–2.7) million new HIV infections globally, showing a 33% decline in the number of new infections from 3.4 (3.1–3.7) million in 2001. At the same time the number of AIDS deaths is also declining with 1.6 (1.4–1.9) million AIDS deaths in 2012, down from 2.3 (2.1–2.6) million in 2005 (UNAIDS 2013).

In the past five years, however, the overall numbers of new infections have remained largely unchanged. Emerging epidemics are becoming evident in a number of countries. For example, between 2001 and 2012, new HIV infections increased 2.6 times in Indonesia; Pakistan has seen an eight-
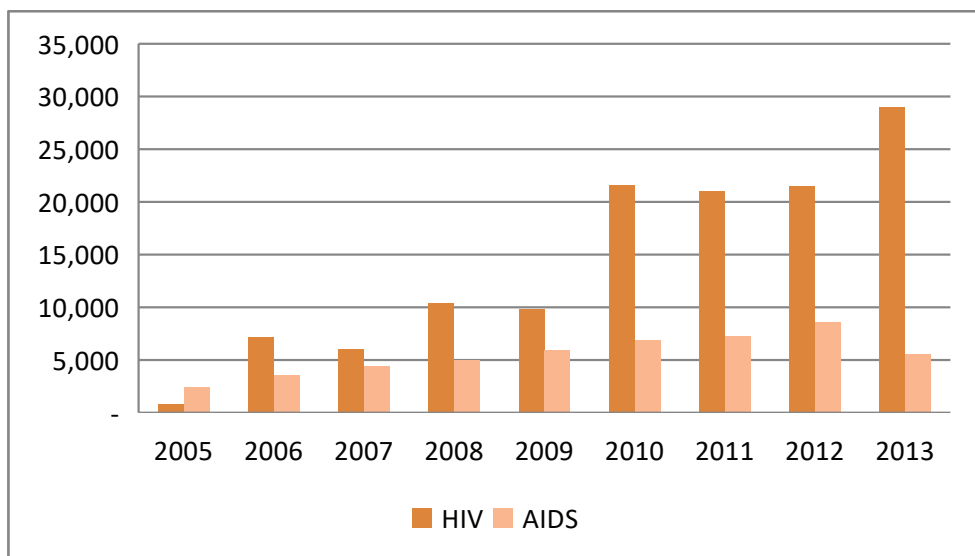
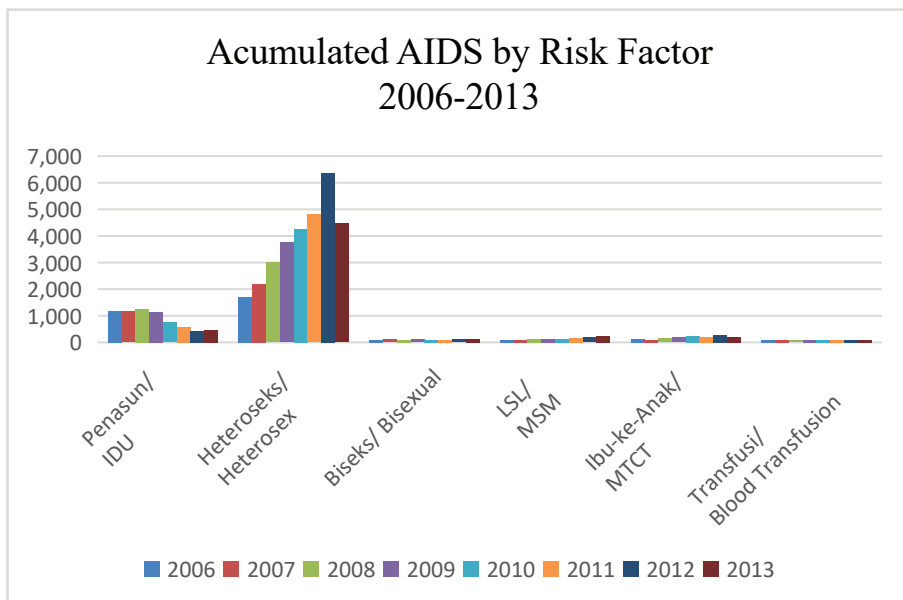*Source: Ministry of Health Indonesia, 2014*

fold increase and new infections in the Philippines have more than doubled (UNAIDS 2013). The prevalence of HIV/AIDS in Indonesia is a result of reduced social and cultural restrictions on sexual activity and of needle sharing by drug users. A prediction, based on research using mathematical models, was that the HIV epidemic in Indonesia would result in as many as 541,700 people being HIV positive in 2014; that is, assuming there were no prophylactic measures (National AIDS Commission Indonesia, 2012). This can be shown by making a graph of HIV/AIDS cases in Indonesia from 2005 to 2013.

Each year, the number of HIV has increased significantly; in 2013 approxi-mately 29,000 cases were reported. AIDS is also increasing, although in 2013 there was a slight decrease, by approximately 5000, in the number of cases reported.

There are six categories of behaviour that carry the risk of transmitting an AIDS infection. These are by injection of drugs; by heterosexual, bisexual, homosexual activities, by breastfeeding mothers to children, and by blood transfusion.

According to studies and surveys in West Java, it is mostly men who contract HIV/AIDS. This relates to the previous data that suggests that most AIDS infection cases are the result of casual and unprotected sexual encounters.

Source: Ministry of Health Indonesia, 2013

There are several predisposing factors that can lead to HIV infection; these include socio-economic and behavioural factors, that is, occupational status and the frequency of injecting drugs (Iskandar et al., 2010). The likelihood of a person engaging in casual sex or taking illicit drugs can be influenced by their social and economic status, especially in upper-middle-income neighbourhoods. As well as social and economic status, education can be an influence on someone to use narcotics and other illicit drugs and to behave in a way that can lead to the spread of HIV/AIDS.

Human behaviour is varied and complex, positive and negative. Bloom (1956) categorises human behaviour as exposure of the individual to information (knowledge), attitudes to information (attitude), and the actions of individuals to information received (practice). The environment can affect the health of individuals, but, healthy or not, an individual depends on the behaviour of other members of a community.

HIV/AIDS is a world-wide health problem that has significant and potentially harmful effects on an economy (Bloom, 1995). Put simply, if a member of a household is infected with HIV, that household's welfare suffers. When a person contracts HIV, their health and consequently their productivity decreases. In addition, the presence of HIV has an effect on the social structure of the immediate population and on economic growth (Pio et al., 2001).

Research shows that in most Sub-Saharan African countries, the concentration of HIV/AIDS is greater among groups with high socio-economic status. Swaziland and Senegal are the only countries in the region where HIV/AIDS is concentrated in poor households. Analysis accounting for gender shows HIV/AIDS is generally concentrated among men and women who are well off (Hajizadeh et al. 2014) the region that accounts for two-thirds of the global HIV/AIDS burden.\n\nMETHODS: The relative and generalized concentration indices (RC and GC.

A better educated person will be more knowledgeable about the risks of behaviour that might result in an HIV/AIDS infection and better understanding will reduce the chances of HIV / AIDS infection. Education can be classified into four stages: elementary, junior high school, senior high school and university. Net school enrolment rates in West Java have increased every year from 2008 to 2013. There was also, until 2011, an increase in average earnings in the province of West Java, according to data from Statistics Indonesia.

Age is one of the factors relevant to HIV/AIDS infection rates. Members of older age cohorts are more likely to be affected by HIV/AIDS compared with younger cohorts because they have been injecting drugs for a longer time, which increases their chances of contracting the disease. The longer the time period over which

a user injects drugs, the greater the chance of being infected with HIV/AIDS. This is also consistent with research (Mugusi et al. 2009) that shows that the people affected by HIV are more likely to be in an adult age range.

Risky behaviour is influenced by several factors; some are related to the level of education, some to income and some to employment status. Higher education will improve knowledge about health and, indirectly, will change behaviour to enable better health. This is because people with better education will have, generally, a higher income and will be more concerned about, and able to maintain, their own health. In addition, people with a better education will also have more knowledge about health than those with less education. There is a strong and positive relation between education and health (Grossman 1972).

In addition, negative relation between education and mortality which are the most basic measures of health. Education, the more the better, can improve the quality of employment and enable workers to be more productive. When someone is more productive, he/she can get more income to spend on improving health (Kitagawa 1973)

HIV/AIDS risk factors include the use of hypodermic syringes; heterosexual, bisexual, and homosexual sexual congress; breastfeeding (mother to child transmission), and blood transfusion. The causes of HIV/AIDS transmission are heterosexual copulation (61.5 per cent), drug taking by injection (15.2 per cent), mother to child transmission (2.7 per cent) and homosexual practices (2.4 per cent) (Kementrian Kesehatan 2014). Unsafe sex or drug use can be influenced by social and economic factors. From surveys, it is known that HIV/AIDS infections are contracted mostly by males. There are several factors related to HIV infection, such as socio-economic status and social behaviour (Iskandar et al. 2010). The number of new cases of HIV/AIDS per year is from 200 to 400.

In Bandung, the proportion of AIDS sufferers by occupation, from 1991 to 2012, was private-sector workers (20.33 per cent), unemployed (18.80 per cent), self-employed (17.69 per cent), housewives (10.58 per cent), and post-secondary education students (10.13 per cent). From 1995 to 2010, the important factors contributing to the risk of AIDS transmission were heterosexual sexual practices (55 per cent), drug use by injection (34 per cent) and others (11 per cent). According to these results, there is a relation between occupation, education and income that affects the infection rate of HIV/AIDS (Dinas Kesehatan Kota Bandung 2012).

The social economy in middle-income countries, in which the socio-economic variables used are income, education and occupation and their effect on the use of anti-retroviral therapy, which is one way of halting the spread of HIV/AIDS. Of people infected and who have tested

positive for HIV/AIDS, for as many as 55.6 per cent the prime factor can be ascribed to their higher income, for 71.4 per cent it is education, and for 81.5 per cent is occupation (Peltzer and Pengpid 2013).

Health is the need of every individual: good health will lead to higher productivity. The success of health measures and health services can be assessed from the improvements in the quality of and satisfaction with life (Santerre E. 2010). From the perspective of health economics, there are two aspects that must be considered; these are

1) Effects of consumption: Good health directly gives satisfaction, you feel better when you are in a healthy condition.
2) Investment securities: with good health, a person has more time to participate in all activities and their economic and other productivity will not decline.

Factors that influence the need for health care include age and severity or absence of a disease, education, and a person's general state of health.

These factors seem to be related. Thus, an awareness that health matters is a long-term investment and will be more important in the future. This increases the need for health care.

2. METHODS

In general, an individual health production function, according to Santerre and Neun (2010), is

Based on this function, health is an inherent part of the community, of how individuals live their lives. Either

$$Health = F(Profile, Medical\ Care, Life\ Style, \\ Socioeconomic\ Status, Environment)$$

by habit or behaviour, the quality of an individual's health differs one from another. Their health depends on their behaviour, their environment and other social factors.

This study was conducted in Bandung. The primary data were obtained by interviewing injecting drug users (IDU) whose age is at least 18 years. These interviews were while working with communities and in cooperation with LPPM–FK Unpad[1].

Lawrence Green (1979) contended that personal health is influenced by two factors; behaviour and factors apart from the behaviour (non-behavioural causes). Such behaviour comprises three constituents.

1) The driving factor, which is an aggregation of an individual's knowledge, attitudes, beliefs, traditions, values, norms (social and perceptual), and other elements that can encourage people to action.

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[1]LPPM–FK Unpad is an abbreviated for Laboratorium Penelitian dan Pengabdian pada Masyarakat (LPPM), Fakultas Kedokteran (FK), Universitas Padjadjaran (Unpad)., which is a research laboratory in the faculty of medicine at Padjadjaran University.

2) The supporting factors that are part of the physical environment, such as the availability of health services and other facilities that enable well-being.

3) Reinforcing factors that are generated by the nearby neighbourhood; the attitudes and behaviour of family, peers or other groups that can be influential.
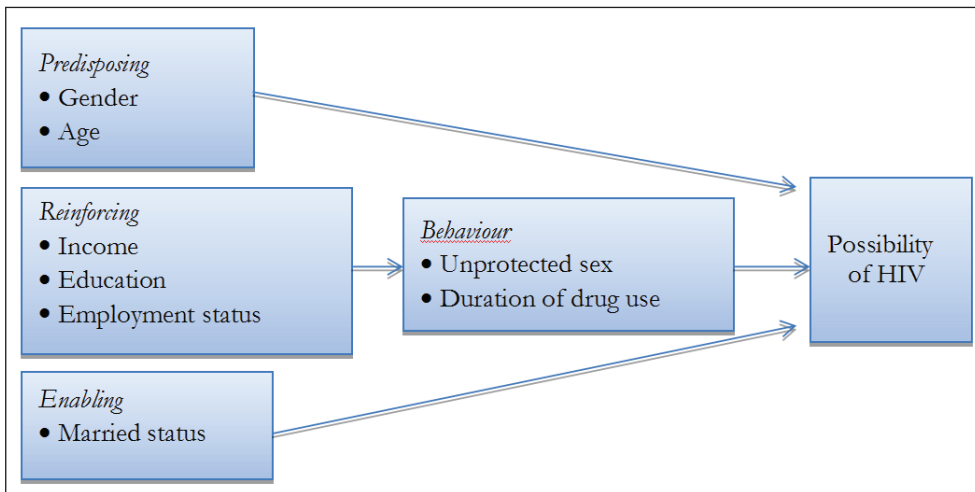
Figure 1. Risk factors

From Figure 1, it can be seen how socio-economic status (education, occupation and income) can affect behaviour positively or negatively.

If or when a person unprotected sexual intercourse with casual partners or uses a syringe to self-inject drugs, the chances are that these activities will adversely affect their health and, in particular, that they will be infected with HIV/AIDS. Mindful of Green's (1979) three classes of factors that influence personal health and that those factors are more likely to play a part in the lives of those with higher socio-economic standing, it does not follow that such status reduces the chance or possibility of contracting HIV/AIDS. The potential for infection is independent of socio-economic status. On the other hand, positive behaviour will result in an increase in the quality of their health.

This study uses primary data, that is, data obtained directly in the field from interviews using a questionnaire. Our questionnaire was developed from questionnaires that have been designed by LPPM–FK Unpad. Researchers followed the work programs organised by LPPM–FK Unpad to run the program proposed by the World Health Organization on strategies for HIV testing and treating and in which researchers ask questions relating to individual behaviour that is influenced by social and

economic status. Data were collected from interviews with IDUs who were 18 years of age or over. The interviews were managed by working together with communities and also with cooperation from LPPM–FK Unpad.

The study used cross-sectional surveys because IDUs are a hidden population and difficult to reach, thus the sample used respondent-driven sampling. Individuals, who were known by outreach workers to be drug users, were asked to nominate one to three of their IDU associates willing to participate as subjects in this study. Data were collected from March to June 2014 in different areas of Bandung.

The method used to process the data was a logit model with an econometric approach. Logit modelling is used to find an indication of positive or negative alteration in individual behaviour as a function of their socioeconomic status.

This study looks at how socioeconomic status can affect a person's behaviour. The behaviour can be positive or negative: if someone is behaving positively, it will have a positive effect on their health but if their behaviour tends to be negative, it will decrease their quality of life and can have an effect on contracting infections, such as HIV/AIDS.

The logit model to estimate is as follows

$$P_i = E(Y = 1|X_i) = \frac{1}{1 + e^{-\beta_1 + \beta_2 X}} \quad (1)$$

If simplified, the equations that arise are

$$P_i = \frac{1}{1 + e^{-z}} = \frac{e^z}{1 + e^z} \quad (2)$$

However, the above equation cannot be regressed by the OLS procedure because the resulting ranges are from $-\infty$ to $+\infty$, whereas P1 ranges from 0 to 1. It is not linear, therefore, it needs to be manipulated and the equation becomes

$$\frac{P_i}{1 - P_i} = \frac{e^z}{1 + e^z} \div \frac{1}{1 + e^z} = \quad (3)$$
$$\frac{e^z}{1 + e^z} \times \frac{1 + e^z}{1} = e^{z_i} \frac{P_i}{1 - P_i}$$

With the advent of the ratio $\frac{P_i}{1 - P_i}$ then it can be called a risk ratio (odds ratio) of an event, that is, the ratio of the likelihood of an event.

The odds should range from zero to positive, but there is no upper limit so it can be infinite. The equation must be manipulated again through natural logarithms so that the equation becomes

$$\ln Odds_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \ln e^{z_i} = Z_i \quad (4)$$

$$Y_i = \beta_0 + \beta_n X_{ni} + u_i \quad (5)$$

(Wooldridge 2009), (Gujarati 2004)

There are several considerations in the maximum likelihood present in the logit model, including that the maximum likelihood method uses a large sample so that it has a value for the standard error that is asymptotic; t-test statistics cannot be used so the z-test was used; f-test statistics are not used, and the test used was a logit model likelihood ratio (LR). In this case, LR distribution χ^2 is used, where the value of the degree of freedom is the number of independent variables. The value of R^2 in logit models is not like the value of R^2 in OLS models; the value of R^2 in logit models uses pseudo R^2. A logit model is unlike linear models, it cannot be directly interpreted and, therefore, to make it easier to interpret, marginal effect is used to foresee the probability of an event.

The first step was to select the subjects of the research, that is, injecting drug users in Bandung. Researchers worked with the community of injecting drug users and outreach officers were able to co-opt research subjects. Furthermore, the researchers determined the number of samples to be taken. Based on an estimated population of injecting drug users in Bandung, there are around 684 people who would make suitable subjects for the project and researchers, using respondent driven sampling, collected data for analysis from as many as 222 respondents.

In the questionnaire, there are four categories examined in accordance with, inter alia, the outcome variable, demographics, socio-economic status and risk behaviour. Researchers wanted to identify the respondents who fitted these categories. Within these categories, the researchers asked questions about HIV status (positive or negative), gender, age, marital status, income, education, employment status, risky sex and the length of time a respondent had been using syringes. Table 1 shows the variables studied and HIV status based on the questionnaires that were distributed.

The analysis used categorical data for the variables of HIV status, gender, education, marital status, sexual risk, duration of needle use and employment status. Individual age used nominal variables and income used intervals.

Table 1. Model variables

Variable	Description
Variable outcome	
HIV	1 = Positive, 0 = Negative
Demographic	
Age	Year
Marital status	1 = Married, 0 = Other
Gender	1 = Male, 0 = Other
Socio-economic status	
Income monthly (IDR)	1 = No income 2 = <500,000 3 = 500,000–1,000,000 4 = 1,000,000–1,500,000 5 = 1,500,000–2,000,000 6 = 2,500,000–2,500,0000 7 = 2,500,000–3,000,000 8 = >3,000,000 9 = Do not know 10 = No answer
Education	1 = Over 9 years, 0 = Other
Employment status	1 = Employed, 0 = Other
Risk behaviour	
Sexual risk	1 = No sexual risk, 0 = Other
Years of needle use	1 = 13–24 years 0 = 1–12 years

Table 2. Percentages of research subjects, based on HIV status (N = 222)

|	Total	Positive	Negative
HIV status			
HIV test		34.70%	65.30%
Demographic			
Age (average)	29.47		
Gender			
Male	108	33.65%	66.35%
Female	14	50%	50%
Marital status			
Married	97	34.02%	65.98%
Other	125	35.20%	64.80%
Socio-economic status			
Income monthly (IDR)			
No income	30	37.93%	62.07%
<500,000	10	40%	60%
500,000–1,000,000	29	20.69%	79.31%
1,000,000–1,500,000	44	15.90%	84.10%
1,500,000–2,000,000	38	42.10%	57.90%
2,000,000–2,500,000	22	50%	50%
2,500,000–3,000,000	18	38.89%	61.11%
>3,000,000	31	48.39%	51.61%
Education			
Less than or equal to 9 years	42	21.43%	78.57%
Over 9 years	180	37.78%	62.22%
Employment status			
Employed	185	33.51%	66.49%
Unemployed	37	40.54%	59.46%
Risk behaviour			
Sexual Risk			
Sexual Risk	86	40.70%	59.30%
No Sexual Risk	136	30.88%	69.12%
Years of needle use			
1 to 12 years	131	21.37%	78.63%
13 to 24 years	91	53.84%	46.15%
IDU status			
Active	199	33.67%	66.33%
Inactive	33	43.48%	56.52%

3. RESULTS

STATA 12 is used for the regression, using the logit method with robust standard errors. A Wald test is used to decide whether the overall independent variables significantly affect the dependent variable. If the value from a Wald test is less than 0.05, it means that the independent variables do jointly affect the dependent variable.

The estimation results, at the significance level of 5 per cent, show that the factors influencing HIV infection in injecting drug users are found in socio-economic status and duration of syringe use.

N	Wald chi-square (14)	Prob.	A
221	32.38	0.0035	0.05
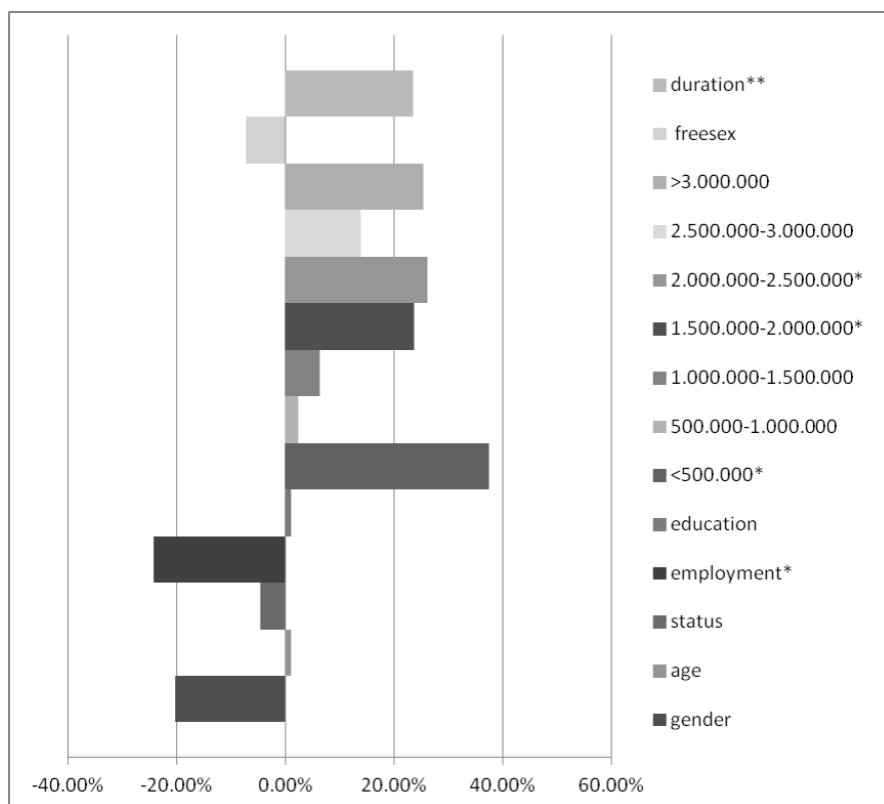
Table 3. Marginal effect of estimation
*Significance 5%, **Significance 1%

Based on estimation results, an individual who injects drugs for 12 years or more has a risk of contracting HIV that is 23.54 per cent higher than one who injects drugs for fewer than 12 years and the result is significant at 5 per cent. It is also consistent with studies by Iskandar et al., (2010), which report that the average drug user who gets infected by HIV is one who has been injecting drugs for 18 years. In addition, the risks taken over time by drug users who inject, found that for those who have used needles for more than five years have a risk of HIV infection that is 3.11 times higher than for those who do not inject drugs (Zhou et al. 2012). Furthermore, the risk of HIV infection for people who have injected drugs for over 10 years is 6.4 times higher (Chikovani et al. 2011).

Individuals who have used syringes for more than 12 years are more likely to share needles that are not sterile and by doing so, increase their potential for HIV infection. To prevent the spread of HIV from one individual to another, needles should never be shared.

Considering the category of socio-economic status, that is, income, education and employment, it is employment and income that have significant effects. For the category of employment status, being in work has a negative effect, that is, for such a person; the probability of becoming infected by HIV is diminished by 24.22 per cent, in comparison to an unemployed person.

This is also supported by research by (Mayer et al. 2014), whose study proves that an unemployed person is 1.9 times more likely to become infected by HIV.

Individuals who work have less potential for infection than those who do not, probably because those in work are more productive than those not. Individuals who work have an income, which can be used to for health services and to prevent a possible infection of HIV. On the other hand, the unemployed do not have an income, they cannot use health services, which results in their having a higher potential for HIV infection compared to those who work (Mayer et al. 2014).

Income has a positive relation with the risk of HIV infection. For this study, several brackets of income have been considered. For those whose income is less than IDR500,000.00 a month, the risk of infection by the HIV virus is 37.5 per cent higher; for those in the income brackets IDR2,000,000 to IDR2,500,000 and IDR1,500,000 to IDR2,000,000 a month, the figures are 23.6 per cent and 26.2 per cent, respectively. Research by (Durevall and Lindskog 2014) and (Hajizadeh et al. 2014)the region that accounts for two-thirds of the global HIV/AIDS burden.\n\nMETHODS: The relative and generalized concentration indices (RC and GC shows that individuals who have higher social well-being have a higher risk of HIV infection, probably because wealthier people have a advan-

tages in the community, but it is easier for them to get HIV/AIDS treatment and to survive longer than those on lower incomes. It is also supported by research conducted by Kenneth H. Mayer et.al., the study proves that individual who does not work infected by HIV 2.6 times more.

This study found that individuals who have an income below IDR 500,000.00 per month have a higher risk of HIV infection than do individuals with an income between IDR 2,000,000.00 and IDR2,500,000.00 a month. Those with an income of less than IDR 500,000.00 a month had a risk factor for HIV of 37.5 per cent. This is because those on low incomes cannot afford health services, so the potential of HIV infection is higher (Mayer et al. 2014).

4. DISCUSSION

Based on the estimation results in Table 3, individuals with a high potential for infection by the HIV virus are those in low-income groups. The results show that those who have the highest potential for an HIV infection are those whose monthly income is IDR500,000.00 or less, followed by people who have income between IDR1,500,000.00 and IDR2,500,000.00. In addition, the length of time spent injecting drugs greatly increases the potential for an infection of HIV. The longer a drug addict uses a syringe, the greater is the risk of an HIV infection. This is because those addict who use syringes for a long time, are more likely to disregard the need to ensure that the syringe they use is sterile. Furthermore, for the category of employment, the chances of being infected with HIV are reduced for productively employed persons.

People infected by HIV/AIDS have an average age of around 30 years, so information about HIV/AIDS must be spread early among the community. The government should intensify health promotion to increase knowledge about the spread and transmission of HIV/AIDS for young people and for injecting drug users. Youngsters and injecting drug users must understand the dangers of HIV/AIDS and know how to prevent it, to avoid infection.

The government should encourage communities of drug users to participate in activities that are to help reduce the risk of HIV/AIDS. One such activity is a program to reduce drug addiction by administering methadone and, in turn, lower the risk of contracting HIV.

5. LIMITATIONS

The limitation of this study is that a person's HIV status is self-reported and respondents can be biased or mistaken. Ideally, a blood test should be performed to ensure that the HIV status of the respondents is accurate.

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