

Seroprevalence of HIV, HBV, HCV and syphilis in obstetrics and gynaecology patients in West Java, Indonesia

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Abstract

High prevalence rates of human immunodeficiency virus (HIV), viral hepatitis and syphilis have been reported among most-at-risks group in Indonesia, but relatively little is known about transmission of these infections among pregnant women. This study aimed to determine the prevalence rates of HIV, hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis infections, to give an indication of the burden of these diseases in obstetrics and gynaecology patients including pregnant women as normal risk groups, particularly in West Java Province. A cross-sectional, confidential-linked anonymous serosurvey with informed consent for syphilis routine testing was conducted during the period of July-September 2009 in the Obstetrics and Gynaecology Department of Hasan Sadikin teaching hospital in West-Java, Indonesia. Whole blood testing for serum antibody was performed using rapid tests for HIV, enzyme linked immunoassay (ELISA) for HBV and HCV, while VDRL (RPR) with confirmation by the TPHA test was performed for syphilis. Descriptive data and prevalence rates of infections were further calculated. Overall, 797 pregnant women and gynaecology patients participated. The prevalence of HIV was 0.5% (CI 0.01-0.9), HBsAg seropositivity was 2.76% (CI 1.6-3.9) while the prevalence of HBeAg among HBsAg positive patients was 13.6% (CI 10.7-15.3). The prevalence of anti HBeC was 18.4% (CI 15.3-20.6) and increased significantly with age. The prevalence of HCV was 1% (CI 0.3-1.7) and syphilis was 0.25% (CI 0.09-0.5). The low prevalence of HIV infection points out that the epidemic is still concentrated in the most-at-risk groups, while HBV and syphilis infections tend to be lower compared to previous study.

Keywords: Obstetrics and gynaecology departments, hospital; Seroepidemiological studies; hepatitis B virus; hepatitis C virus; HIV; Syphilis.

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Introduction

Bloodborne infections are still a problem in many countries, however prevalence rates of these diseases, particularly HIV, HBV and HCV in normal risk groups, is difficult to find. This study tried to figure out the burden of these diseases by conducting a seroprevalence survey among patients in the Obstetrics and Gynaecology Department in West Java Province through routine screening for syphilis.

Background

The global burden of bloodborne infections, especially HIV, HBV and HCV, has been increasing, both in high and middle income countries. HIV infection is the most rapidly growing epidemic in Asia. Indonesia is facing an increasing problem with HIV/AIDS given the fact that 2,682 AIDS subjects were identified in 2004, while up to 16,110 cases have been reported at the end of 2008.¹

High rates of HIV are found mostly among most-at-risk groups with high risk behaviour mainly from sexual transmission (such as sex workers or males having sex with males) as well as injection drug users (IDUs). Integrated Biological Behavioural Surveillance in 2007 found that in West Java, Indonesia, the prevalence of HIV in female sex workers was 11.6%.² However, currently the prevalence of HIV in the general population is still estimated to be low at 0.20%.³

Indonesia is also an endemic country for HBV infection; a serosurvey by Sulaiman in 1995 found a prevalence rate of 8.8% among voluntary blood donors,⁴ while in pregnant women the prevalence was 4.7% in 1987⁵ and decreased almost 20 years later to 1.9% in 2005.⁶

Globally, the prevalence of hepatitis C infection is five times that of HIV, affecting at least 170 million people (3% of the population).⁷ Prevalence varies widely throughout the world and in different risk populations. Darmadi *et al.* found the prevalence of HCV was 2.3% among voluntary blood donors in Indonesia,⁸ while a study conducted among pregnant women found it to be 0.04% (1/2450).⁶

In Indonesia, the prevalence rate of syphilis was relatively low both in high risk groups and the general population. A survey among direct female sex workers

in West Java showed a prevalence of 2.9%,² while among pregnant women with bacterial vaginosis, the syphilis rate was 0.4% in 1996.⁹ A recent survey in pregnant women from 15 health centres and three hospitals in four districts in Indonesia showed syphilis prevalence of 1.97% (52/2640).¹⁰

Since there are limited data published on prevalence rates of HIV, viral hepatitis and syphilis in general population, this survey aimed to determine the prevalence of HIV, HBV, HCV and also syphilis infection to give an indication of the burden of these infections in normal risk groups such as pregnant women in West Java Province.

Methods

The prevalence was obtained from a confidential-linked serosurvey at the Obstetrics and Gynaecology Department of the Hasan Sadikin teaching hospital in Bandung, West Java Province, Indonesia, during the period of July-September 2009. All patients who attended the polyclinic, ward and emergency room of the Obstetrics and Gynaecology Department were included, except those who were not eligible to give a blood sample or who refused to participate.

We offered a screening test for syphilis which is also a routine test for all pregnant women. Informed consent for routine syphilis testing was given before withdrawing a blood sample only to first-time attendees, to minimize the chance of the patients being included more than once.

All blood samples were recorded. Afterwards the serum was separated into four different tubes, one tube for syphilis testing, one tube for HBV and HCV testing, one tube for HIV testing, and one tube for storage.

The required sample size for the patient group was estimated with a formula for single proportion. In this calculation we used a prevalence rate of 0.2% for HIV as the lowest prevalence among the three diseases (HBV 8.8%, HCV 2.1% and HIV 0.2%).^{1,4,6} This prevalence rate estimation represents the population in the Obstetrics and Gynaecology Department, although this number might be an overestimate for the population due to the fact that all respondents will be women. A minimum sample of 764 respondents for pregnant

women and gynaecology patients was required to participate. The serosurvey was conducted using non-probability consecutive sampling which included all available patients who came to the Obstetrics and Gynaecology Department consecutively during the study period.

HBsAg were measured by an electrochemiluminescence immunoassay screening rapid test, SERATEC HB600 (Ges. F. Biotechnologie mbH Gottingen Germany), a visual immunoassay with cut off value of 1 gr/ml (format: cassette/strip). HBeAg, anti-HBs and anti-HBc were determined by an electrochemiluminescence immunoassay (ECLIA) using Elycsys 2010 (Hitachi) with reagents from Roche, Inc. The cut off values for titer results as low 20 IU/ml to as high $1.7E+0.8$ IU/ml had sensitivity and specificity of 100%.

Anti-HCV antibodies were determined by ECLIA, The COBAS® AMPLICOR HCV MONITOR Test, v2.0, that allows for the detection of HCV RNA levels as low as 50 IU/mL and quantification of HCV over the range of 600-500,000 IU/mL with sensitivity and specificity of 100%.

Anti-HIV antibodies were determined by a rapid test kit (SD HIV ½ 3.0, Standard Diagnostic, Inc, Kyonggi-do, Korea). This is an immunochromatographic assay for qualitative detection of all isotype (IgG, IgM, IgA) antibodies specific to HIV-1 (p24, 9p41) and HIV-2 (9p36). Differentiation of test results by clear band formation (three lines) has sensitivity of 100% and specificity 99.8%. If the result was reactive, further confirmation by ECLIA and VIROLISA was done, based on regulations of the Ministry of Health of the Republic of Indonesia that diagnosis of HIV should be done by at least three different methods. The ECLIA test used was the COBAS® AMPLICOR HIV-1 MONITOR Test v1.5 (Index Union Diagnostics), with a domain of linearity from 50 to 750,000 copies/mL with > 99.85% specificity. The VIROLISA test used was HIV 1/2.

External quality control of HBV and HCV serology was done by the National Serology Reference Laboratory, Australia. Syphilis testing was done using an agglutination method for VDRL (RPR), and a positive result was confirmed by the TPHA test (Antec, England Inc).

All information collected was coded and stored in the health research unit office using a SPSS 13.0 databank (SPSS Inc., Chicago, USA), while all of the serum was stored in the Clinical Pathology Laboratory of Hasan Sadikin Hospital. We used different codes between patients' forms and tubes for serum storage, to protect the patient confidentiality; only the research team had the right to access the code. Treatment was given only to patients having positive results of syphilis testing. The ethical clearance was approved by the Ethical Committee of Medical Faculty/Hasan Sasikin Hospital. The prevalence of infection was defined as the percentage of positive cases for each seromarker, and 95% of confidence intervals (95%CI) were calculated for each prevalence rate.

Results

A total of 817 patients were asked to participate; 20 (2.5%) of them were unwilling to participate because of personal reasons, yielding a response rate of 97.5%. A total of 797 patients participated in the study, consisting of 398 pregnant women and 399 non-pregnant women.

All socio-demographic data were dissimilar between the pregnant and non-pregnant group. The mean age of all respondents was 33.7 with age distribution from 14–75 years old. Mostly non-pregnant patients came to the hospital for gynaecology treatment; this group was older with average age 38.6 years (range 14-75), compared to pregnant women whose average age was 28.7 years old (range 14-46). They were also less educated, half of them were illiterate or only finishing elementary school. Since this hospital is the top referral hospital for West-Java Province, most of the patients were referred by other hospitals or primary health care.

Table I shows the seropositivity for each infection, as well as the overall prevalence rate. The patients with HbeAg are highly infectious and one cannot examine HbeAg from HbsAg as a separate test, consequently HbeAg test was done only for samples that were HbsAg seropositive.

Table II demonstrates the prevalence rates between the two patient groups. There was no significant difference between two groups except for the prevalence of

Table I. Prevalence of seromarker

Seromarker	Number of seropositivity	Prevalence rate % (95%CI)
HIV	4/797	0.5% (CI 0.01-0.9)
HBV	HbsAg	22/797
	HbeAg	3/22
	Anti-HBc	147/797
HCV	8/797	1% (CI 0.3-1.7)
Syphilis	2/797	0.25% (CI 0.09-0.5)

Table II. Prevalence rate according to patient group

Seromarker	Pregnant		Non pregnant		P-value	
	n/N	%	n/N	%		
HIV	1 /398	0.25	3 /399	0.75	0.624	
HBV	HbsAG	11 /398	2.75	11/399	2.75	1
	HbeAG	2 /11	18.2	1 /11	9.1	0.624
	Anti HBc	41 /398	10.3	106 /399	26.56	0.001
HCV	3 /398	0.75	5 /399	1.25	0.725	
Syphilis	1 /398	0.25	1 /399	0.25	1	

anti-HBc ($p=0.001$), which in the non-pregnant group seems to be 2.6 times higher compared with the pregnant group. Furthermore, we analyzed the potential confounder of age, therefore age-standardized prevalence for anti-HBc was performed in Table III.

Table III explains the difference of both groups when we stratified anti-HBc seropositivity by age. If we modified the age group by not counting the age group

of < 15 years old to eliminate zero seropositivity, the prevalence rate with age-standardization for the pregnant group was found to be 12.28%, and for the non-pregnant group was 22.6%. At this point when we compared the prevalence between the two groups, it was 1.8 times higher the prevalence in the non-pregnant group. Double infections were found only in two patients who were infected by HCV and also positive for anti-HBc (previously infected by HBV). Both patients were non pregnant patients.

Table III. Anti-HBc seropositive stratified by age

Age stratification	Pregnant		Non pregnant		All respondents	
		%		%		%
< 15	0/1	0	0/2	0	0/3	0
15-24	6/114	5.2	6/67	8.95	12/181	6.62
25-34	21/196	10.7	19/89	21.3	40/285	14.03
35-44	13/82	15.8	26/103	25.2	39/185	21.08
≥ 45	1/5	20	55/138	39.8	56/143	39.16

Discussion

The overall prevalence of HIV was 0.5% which is slightly higher than the estimation made by UNAIDS in 2008; however if we look only at the pregnant patient group, the prevalence rate 0.25% found in this study is more less similar with the estimation of UNAIDS 0.2% for the general population in Indonesia. Probably it is because the setting of this study was in a teaching hospital which is also the top referral hospital in West-Java Province, therefore the prevalence of the non-pregnant group is higher. This finding might indicate that currently the transmission of HIV infection in Indonesia remains concentrated in subgroups with high risk behaviour.

Despite the fact that Indonesia is known for the fastest HIV epidemic growth in Asia, the generalized epidemic is not yet a concern except in Tanah Papua (the two provinces of Papua and West Papua) which "illustrates a case of extreme inequity in HIV infection patterns in Indonesia".¹⁰ UNICEF reported that even if the population in Tanah Papua is only 1.5% of all Indonesia, Tanah Papua accounted for over 15% of all new HIV cases in 2011 and a case rate 15 times higher.¹⁰ Tanah Papua is "experiencing a low level generalised HIV epidemic with a prevalence of 3% in youth aged 15-24" which is "driven almost completely by unsafe sexual intercourse".¹⁰ HIV prevalence amongst the indigenous Papuan population is 2.8% higher compared to 1.5% amongst non-indigenous population. The prevalence among men was 2.9%, higher than in women (1.9%). The current issue of the "increasing feminization of the epidemic" in Indonesia emphasizes that "women are more vulnerable due to their traditional roles in society".¹⁰ The proportion of women in new HIV infections in Indonesia has grown from 34% in 2008 to 44 per cent in 2011.¹⁰

Hepatitis B infection (2.76% HbsAg positive and 18.4% anti-HBc positive) found in this study is much lower than the prevalence rate found by Reniers *et al* more than ten years ago among pregnant women in West Java (HbsAg and anti-HBc was 4.7% and 35.6% respectively).⁴ However this result is higher compared to a previous study in Bali Province which reported 1.9%,⁵ or the general population in Sulawesi Island which reported 1.4%.¹⁰

Factors associated with the lower prevalence rate nowadays might be due to effect of vaccination against hepatitis B, a smaller number of people living in one house and better hygiene. Those individuals who were anti-HBc positive might be due to past infection or less immunity against hepatitis B infection, and it would be useful to know the status of hepatitis B immunization in these patients. The number of respondents with anti-HBc is higher in the non-pregnant group; they were also older and less educated, which might indicate that they did not get immunization for HBV previously.

By 1991, the Indonesian government adopted a national policy requiring hepatitis B vaccine for all newborns. Since 1997 hepatitis B immunization has been part of the National Immunization Program. This fact is consistent with the result in Table 3; if we compare the age stratification for anti-HBc, we found that respondents under 15 years old were all negative and anti-HBc was increasing according to older age group. Coverage of hepatitis B immunization, defined as the percentage of children receiving at least three doses of hepatitis B vaccine, in Indonesia in 2007 was estimated by WHO/UNICEF to be 78%.¹² Van Hattum *et al.* surveyed 9,314 children under five years old in Batam Island and still found 1.9% HbsAg positive.¹³ Another study among elementary school children also found 3.1% HbsAg positive and 23.6% anti-HBs positive.¹⁴

In general, hepatitis B immunization is recommended for high risk groups such as healthcare workers, patients with blood transfusion or haemodialysis, sex workers, IDUs, people who travel to endemic area or who live with acutely or chronically HBV-infected persons. Particularly for women, it is highly recommended to ensure that they are screened for active HBV infection before pregnancy and vaccinated in accordance with other immunizations like influenza and tetanus. However if pregnant women are identified to be infected by HBV, they should acquire immunoglobulin for HBV quickly and further prophylaxis for the infant after delivery should be considered.¹⁵

This survey demonstrates only 1% HCV infection among patients in the Obstetrics and Gynaecology Department. This rate is higher than a previous survey which revealed 0.04% among pregnant women in

Bali.⁶ The difference of the rate might be due to the lab method used to determine seropositivity; in this study anti-HCV antibody was determined by ELISA, whereas the previous study used a dipstick/rapid test. The HCV prevalence in this study is similar with another study among pregnant women in Brazil.¹⁶ The prevalence of HCV in the general population is variable among East Asian countries, ranging from about 0.5% in Singapore and Hong Kong to around 6% in Vietnam and Thailand,¹⁷ 2.4%-6.5% in Pakistan¹⁸ and exceeding 10% in Myanmar.¹⁹ This result is higher compared to the Turkish population (0.7%)²⁰ and Korean blood donors (0.16%).²¹ In developing countries, nosocomial transmission because re-use of contaminated or inadequately sterilized syringes is a major problem for new HCV infection.¹⁷

This study showed a low prevalence of syphilis infection in both groups. This finding is slightly lower than the prevalence found by another study in 1996 which was 0.4%,⁹ and also much lower than the survey in 2007 which was 1.97%.²² The differences are possibly due to the differences in the test strategy. In this study we used VDRL (RPR) test and then confirmed by TPHA test and consequently the data shown in this study are only the recent infections. We also found the titre is low which means that it is not an active infection. The serosurvey in 2007 used the treponemal rapid test (immunocromatographic strip) which is simple, and the sensitivity is higher than RPR while the specificity is comparable. However, this test cannot differentiate between active infection and past treated infections, as the treponemal antibodies persist for years, and are also not useful for monitoring the effectiveness of treatment.

Conclusion

In conclusion, the result of this study is representing prevalence rates of the general population in West Java Province. Low HIV rates indicate that the transmission remains in high risk populations, and consequently the prevention and promoting programmes should focus on those groups. The prevalence of HBV and syphilis tends to be lower than in the previous study.

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