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Routine or targeted HIV screening of Indonesian prisoners

Erni Juwita Nelwan, Ahmad Isa, Bachti Alisjahbana, Nurlita Triani, Iqbal Djamaris, Ilham Djaja, Herdiman T. Pohan, Prisca Zwanikken, Reinout van Crevel, Andre van der Ven and Andre Meheus

Abstract

Purpose – Routine HIV screening of prisoners is generally recommended, but rarely implemented in low-resource settings. Targeted screening can be used as an alternative. Both strategies may provide an opportunity to start HIV treatment but no formal comparisons have been done of these two strategies. The paper aims to discuss these issues.

Design/methodology/approach – The authors compared yield and costs of routine and targeted screening in a narcotic prison in Indonesia. Routine HIV screening was done for all incoming prisoners from August 2007-February 2009, after it was switched for budgetary reasons to targeted (“opt-out”) HIV screening of inmates classified as people who inject drugs (PWIDs), and “opt-in” HIV testing for all non-PWIDs.

Findings – During routine screening 662 inmates were included. All 115 PWIDs and 93.2 percent of non-PWIDs agreed to be tested, 37.4 percent and 0.4 percent respectively were HIV-positive. During targeted screening (March 2009-October 2010), of 888 inmates who entered prison, 107 reported injecting drug use and were offered HIV testing, of whom 31 (29 percent) chose not to be tested and 25.0 percent of those tested were HIV-positive. Of 781 non-PWIDs, 187 (24 percent) came for testing (opt-in), and 2.1 percent were infected. During targeted screening fewer people admitted drug use (12.0 vs 17.4 percent). Routine screening yielded twice as many HIV-infected subjects (45 vs 23).

The estimated cost per detected HIV infection was 338 USD for routine and 263 USD for targeted screening.

Originality/value – In a resource limited setting like Indonesia, routine HIV screening in prison is feasible and more effective than targeted screening, which may be stigmatizing. HIV infections that remain unrecognized can fuel ongoing transmission in prison and lead to unnecessary disease progression and deaths.

Keywords HIV, Prison, Indonesia, Effectiveness, Prevention, Screening

Paper type Research paper
often recommended to screen all prisoners for HIV infection (Beckwith et al., 2010), or – as the WHO states – at least provide easy access to voluntary testing (United Nations Office on Drugs and Crime et al., 2009).

Routine HIV testing in a prison setting was found to be cost-effective in the USA (Paltiel et al., 2005). Also for Indonesia, where the present study was conducted, the unit cost of counseling and testing in prisons was lower compared to other settings such as hospital-based clinics or STI/HIV community clinics, while enrollment rates in HIV care were higher (Siregar et al., 2011). Still, prisons in many countries lack the necessary resources and staff to implement routine screening for HIV infection. Furthermore, prisoners that are found HIV-seropositive should have access to treatment and care as well, which even in high-income countries like the USA often is a challenge (Hammnet et al., 2007). It should be noted however that ART may be deferred – possibly even until after release – if HIV is diagnosed earlier when CD4 counts are relatively preserved, as was recently shown in the USA (de Voux et al., 2012). Finally, for a country like Indonesia, sustainability of services for HIV is an issue with routine testing, as they often rely on donor funding or involvement of non-governmental organizations (Nelwan et al., 2009; Siregar et al., 2011).

If resources are limited, prisons can opt for targeted screening of those prisoners with the highest presumed risk. This probably leads to lower case detection, as was shown for symptom based for chlamydia and gonorrhea, both of which often occur asymptomatically, similar to HIV infection (Broad et al., 2009). On the other hand, for many prisons in Indonesia, like elsewhere, the capacity to perform routine screening is simply lacking. Except for Papua, Indonesia has a concentrated HIV epidemic strongly driven by injecting drug use. Drug use is illegal in Indonesia. Between 2002 and 2009 the number of inmates convicted for drug-related offences increased fivefold accounting for 26 percent of people imprisoned (Directorat of Corrections Ministry of Justice and Human Rights, 2010a). A survey in 2009 found an overall HIV prevalence rate of 3.6 percent among prisoners, compared to an estimated zero-prevalence rate of 0.2 percent in the general population in Indonesia at that time (Directorat of Corrections Ministry of Justice and Human Rights, 2010a). A sentinel survey involving 2000 prisoners in 11 provinces in Indonesia in 2011 showed a similar HIV prevalence of 3 percent (Indonesia Ministry of Health, 2011), while a higher prevalence of 7.2 percent was found among 625 unselected incoming prisoners in a narcotic prison in West Java, specifically appointed for individuals convicted for drug-related offences (Nelwan et al., 2010). In 2009 this latter prison changed from routine to targeted screening for budgetary reasons.

While many other studies have described testing strategies in correctional settings (Zaller et al., 2007; Kavasery et al., 2009a, b; Beckwith et al., 2011, 2012), none have systematically compared two distinct testing strategies in terms of feasibility, acceptance, yield, and cost effectiveness, and none have been done in low-resource settings.

The change from routine to targeted screening in this Indonesian prison allowed us to evaluate how this policy change affected HIV case detection rates, expenditures and access to treatment.

**Methodology**

The study was carried out in Banceuy prison, which in 2003 was appointed by the Indonesian government as a “narcotic prison” for West Java, aimed for serving individuals convicted for drug-related offences. Banceuy prison often accommodates more than 1,000 inmates although its official capacity is 450 prisoners. As a referral prison, Banceuy receives about 30-50 inmates every month from detention centers, where individuals wait for their trial, and most serve sentences for more than one year. The prison contained a female section that was abolished between August 2007 and March 2008. For the present study, covering the period between August 2007 and October 2010, only male prisoners were included. Health care, including HIV treatment, is provided by an outpatient clinic and a small inpatient facility by one general practitioner, two dentists and three nurses, in close collaboration with medical specialists of the Hasan Sadikin Hospital in Bandung, the main tertiary referral hospital for West Java.

In August 2007, routine (“opt-out”) screening for HIV was initiated as part of a European Commission funded program called IMPACT aimed at the prevention and treatment of HIV in the
context of injecting drug use in West Java, Indonesia. IMPACT supported medical staff, medical and laboratory supplies in prison and interventions were scientifically evaluated. From August 2007 to January 2009, the prevalence of HIV, hepatitis B virus (HBV) and hepatitis C virus (HCV) was determined among all incoming prisoners; all inmates were registered and medically examined within one day after arrival (Nelwan et al., 2010). During registration, inmates were interviewed about personal characteristics and legal status. A medical examination was done including a brief history and physical examination. All incoming prisoners were referred to the prison clinic, the symptomatic ones immediately, those without symptoms within three months. In the clinic, prisoners were informed about the study and counseled about HIV. Experienced counselors asked for informed consent to collect medical information and to test for HIV, HBV and HCV. If consent was given, an extensive medical history, physical examination and blood taking followed. Information about socio-demographic data, medical history, physical status, risk behavior and knowledge related to HIV infection was recorded using a structured questionnaire.

In March 2009, routine screening for HIV was changed to targeted screening for budgetary reasons. Prisoners were registered and medically examined within one day after admission. During the medical check-up, all inmates were asked if they had ever injected drugs and examined for needle track changes or other signs of injecting drug use. An opt-out approach to Provider Initiated HIV Testing and Counseling (PITC) was applied to all inmates with a history or signs of injecting drug use. These inmates were classified as “PWIDs.” Procedures were identical as described for routine screening, only that referral to the prison clinic was done within two weeks and serological screening was limited to HIV as no treatment options were available for HCV. In addition, specific information on signs or symptoms of HIV/AIDS or TB were collected. Besides targeted screening of individuals classified as PWIDs, an opt-in approach to Voluntary Counseling and Testing (VCT) in the prison was offered to all other prisoners, classified as “non-PWIDs” entering Banceuy. Both during the period of routine (August 2007-February 2009) and targeted screening (March 2009-October 2010), prisoners were asked about their HIV status, but none reported being HIV-positive or taking ART. For any prisoner found HIV-positive, the counselor arranged referral to the medical doctor for care, support and treatment as needed. All HIV-infected prisoners received CD4-cell testing and ART if indicated. There were no individuals who entered Banceuy prison twice during the study period.

Ethical considerations and responsibility

Ethical clearance for systematic and prospective data collection and analysis during both screening periods was obtained from the Ethical Committee of the Padjadjaran University Bandung (UNPAD) and the Research Ethics Committee of the Royal Tropical Institute, Amsterdam, The Netherlands. HIV counseling and testing was done by trained personnel in close collaboration with psychologists from UNPAD. All testing was voluntary, free of charge and confidential. After informed consent was obtained from the prisoners, data were collected in the prison clinic. The confidentiality of the subjects was assured and strictly maintained.

Laboratory testing

HIV antibodies were measured using commercially available rapid tests (Determine HIV-1/2, Abbott Laboratories, Tokyo, Japan) or (SD HIV-1/2 3.0, Standard Diagnostics, Inc., Kyonggi-do, Korea); followed by commercial EIA methods (Viroliisa HIV-1/2, Index Union Diagnostics, Korea) and ECLIA methods (HIV combi, Roche Diagnostics, Mannhein, Germany). External quality control of HIV testing was done (National Serology Reference Laboratory, WHO Collaborating Center, Victoria, Australia) showing a 100 percent accuracy.

Estimation of the screening costs

To determine costs of screening, we used the unit cost of 23 USD for HIV testing from the health provider’s perspective as determined in a recent health-economic study in the same prison (Siregar et al., 2011). The total cost during routine or targeted screening was calculated by multiplying the total number of inmates tested by the unit cost of 23 USD. To compare the
cost per individual diagnosed with HIV infection using routine or targeted screening, the total costs of testing was divided by the number of prisoners with a positive test result for each period separately.

Statistical analysis
Nominal and ordinal values were expressed as percentages, continuous data were expressed as mean (SD) if normally distributed. Comparisons between groups were made using $\chi^2$-test for nominal and ordinal variables, $t$-test for normally distributed and non parametric Mann-Whitney $U$-test for non normally distributed continuous variables. Data were analyzed using SPSS 18.0 (SPSS) for Windows.

Findings
Number of prisoners tested and HIV prevalence
During the period of routine screening, 871 inmates entered Banceuy prison; 209 inmates (24.0 percent) were excluded from analysis because they were transferred elsewhere before PiTC could be implemented. The remaining 662 inmates were offered HIV testing through PICT as an opt-out approach, of whom 37 (5.6 percent) declined testing: 15 were afraid of venapuncture, nine were not ready to know their HIV status, eight “felt healthy,” and five gave no reason. From 625 tested, 45 prisoners (7.2 percent; 95 percent CI 5.2-9.2) were found HIV-positive (Figure 1).

Figure 1 Flowchart of incoming inmates during routine and targeted screening

<table>
<thead>
<tr>
<th>August 2007 - January 2009</th>
<th>March 2009 - October 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Routine screening</strong> n=871</td>
<td><strong>Targeted screening</strong> n=888</td>
</tr>
<tr>
<td>Offered HIV test n=662</td>
<td>Offered HIV test n=189</td>
</tr>
<tr>
<td>Transferred n=209</td>
<td>PWIDs n=107</td>
</tr>
<tr>
<td>Came to clinic n=189</td>
<td>Non-PWIDs n=781</td>
</tr>
<tr>
<td>HIV tested n=625</td>
<td></td>
</tr>
<tr>
<td>HIV-positive n=45</td>
<td>HIV tested n=187</td>
</tr>
<tr>
<td>HIV-positive n=4</td>
<td>HIV tested n=76</td>
</tr>
<tr>
<td>HIV-positive n=19</td>
<td></td>
</tr>
</tbody>
</table>
During the targeted screening period, 888 inmates entered Banceuy prison. They had the same gender (100 percent male), the average age of 31.1 to 31.9 years during routine screening, and similar educational level, classified as “high school and above” in 38.6 percent of prisoners during targeted and 38.2 percent during routine screening. From 888 prisoners, 107 (12.0 percent) were classified as PWIDs and referred to the prison clinic for PICT. HIV testing was declined by 31 prisoners (29 percent) for several reasons: unreadiness to know the HIV status; refusal to come to the clinic; detention in high-security block; came to the clinic more than three months after intake. Nineteen of the remaining 76 (25 percent; 95 percent CI 15.3-34.7) were found HIV-positive. The prisoners who denied current or previous injecting drug use during intake (n = 781) were considered at low HIV risk and were offered to come to the prison clinic for counseling and testing (“opt-in”). From this group 189 (24.2 percent) came to the clinic for fear they might be at risk. Two declined testing and ultimately four of 187 (2.1 percent; 95 percent CI 0.04-4.2) were found HIV-positive (Figure 1). During targeted screening a total of 23 out of 263 prisoners who were screened were HIV-positive (8.7 percent; 95 percent CI 5.3-12.1).

**Self-reported injecting drug use in relation to HIV screening and its results**

Self-reported injecting drug use was strongly associated with HIV seropositivity. During routine screening, 115 (17.4 percent) inmates reported a history of injecting drug use and 37.4 percent of this group were HIV-positive, vs 0.4 percent in the non-PWIDs group (Table I). During targeted screening period, 107 (12.0 percent) of inmates were classified as PWIDs and 25.0 percent of this group tested were HIV-positive compared to 2 percent of those classified as non-PWIDs, who came later to the clinic for HIV test (Table I).

**Differences between routine and targeted screening in terms of yield and costs**

The change from routine to targeted screening was associated with lower detection of HIV infection, and detection at a later stage of disease. During routine screening, 100 percent of PWID and 93 percent of inmates without a history of injecting drug use accepted HIV testing. During the period of targeted screening, only 71 percent of PWID and 24 percent of non-PWIDs were tested. Overall, 94 percent of all 662 prisoners during the period of routine screening vs 89 percent of 296 approached during the period of targeted screening agreed to be tested (p < 0.001). During the period of routine screening, HIV infection was detected in 45 of 662 prisoners, compared to 23 infections in 888 prisoners during the period of targeted screening.

No significant differences in CD4-cell counts were found between prisoners with a positive test result during routine and targeted screening, but the number of HIV-infected prisoners with an early clinical stadium was significantly higher during routine screening (Table I). Lower CD4-cell counts were found among those prisoners classified as PWIDs during both testing periods (Table I).

Using the unit costs of 23 USD for delivering testing in Banceuy prison as determined previously (Siregar et al., 2011), the total costs amounted to an estimated 15,226 USD (662×23 USD) during

<table>
<thead>
<tr>
<th>Table I</th>
<th>Characteristics of prisoners during routine and targeted screening according to PWIDs-status</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Routine screening</td>
</tr>
<tr>
<td></td>
<td>Non-PWIDs</td>
</tr>
<tr>
<td></td>
<td>n = 547</td>
</tr>
<tr>
<td>Age (mean years±SD)</td>
<td>31.5±8.2</td>
</tr>
<tr>
<td>Graduation high school or more</td>
<td>36.2%</td>
</tr>
<tr>
<td>Length of previous imprisonment (mean months ±SD)</td>
<td>9.8±6.2</td>
</tr>
<tr>
<td>Accepted HIV test</td>
<td>510 (93%)</td>
</tr>
<tr>
<td>HIV-seropositive</td>
<td>2 (0.4%)</td>
</tr>
<tr>
<td>HIV WHO stadium 1&amp;2</td>
<td>1 (50%)</td>
</tr>
<tr>
<td>CD4 (mean±SD)</td>
<td>439±270</td>
</tr>
</tbody>
</table>
routine screening, and 6,049 USD (263x23 USD) during targeted screening. Based on these figures, the estimated costs per HIV infection detected were 338 USD during routine screening and 263 USD during targeted screening.

Discussion

We evaluated two HIV screening strategies in a narcotic prison in Indonesia. During routine screening, the “routine” aspect was well accepted. All inmates reporting injecting drug use agreed to be tested, while only 6.8 percent of those that did not report injecting drug use refused testing. Unfortunately, due to delays in the process approximately one fourth of the prisoners could not be approached for testing before transfer to other prisons or release. However, routine testing could only be implemented with external resources of staff and testing reagents. When these additional funds were no longer available, targeted screening of inmates with a history or signs of injecting drug use, as the most important risk factor, could not be implemented.

It is unlikely that the lower rate of HIV diagnosis during the period of targeted screening was due to an overall decline in the rate of HIV infection in Indonesia, as epidemiological data suggest the opposite (Indonesian Ministry of Health, 2014). It may be due to a lower proportion of PWID among prisoners, or rather, due to a lower number of PWID who got tested. During the period of targeted screening, PWIDs were approached for HIV using PITC, but almost one in three from this group declined HIV testing. In addition, some prisoners may have falsely denied drug use, probably fearing stigma or discrimination, leading to misclassification (Harawa et al., 2009). Indeed, during this period only 12.0 percent of prisoners admitted having injected drugs, compared to 17.4 percent during the period of routine screening. Although this problem was anticipated and an opt-in approach was available for non-PWIDs, only 24.2 percent of this group came forward to be tested. Therefore, the effectiveness of targeted testing was less than 70 percent, but could even be lower if PWIDs incorrectly reported no injecting drug use.

To increase the effectiveness of targeted screening, the proportion of inmates that falsely deny injecting drug use should be as low as possible. In our study six out of 189 (3.2 percent) non-PWIDs inmates who came for VCT admitted having injected drugs. Second, the refusal rate among those considered at high risk should be low, and reasons for test-refusal should be explored. The medical intake and counseling should be non-judgemental and confidential; inmates belonging to the high-risk groups and particularly the HIV infected should not be stigmatized and discriminated. Indeed, targeted screening in prison based on self-reported drug use can be discriminatory and raise ethical concerns (Harawa et al., 2009). These issues should be continuously monitored and remedial action should be quickly taken for optimal effectiveness of targeted HIV screening. Apart from screening among those classified as PWIDs, an opt-in approach for testing the self-reporting non-PWIDs classified group remains important. Although the yield in terms of HIV infections detected in this group was relatively low (2.2 percent), it provides an opportunity to counsel prisoners who have a higher HIV risk than the general population.

Like in many countries, Indonesian prisons have few resources for health services. Therefore, from the prison point of view, lower costs are an advantage of targeted screening. In our study, only 29 percent of the budget was spent for the targeted screening compared to the required funds to test all 888 incoming inmates. The actual figure might be somewhat less favorable since unit costs per test will be lower if large numbers of prisoners are tested. Furthermore, the costs related to undetected HIV infections were not calculated; during the period of routine screening twice as many HIV-infected cases were detected in a smaller number of prisoners. Inmates with unrecognized HIV infection may develop opportunistic infections and other complications that need treatment and hospitalization. In addition, those with HIV infection who are not aware of their infection are approximately three times more likely to transmit HIV than inmates who are aware (Marks et al., 2006), causing more morbidity and need for treatment. Also, if HIV infection leads to the start of ART, the “prison viral load” will go down, lowering the risk of HIV inside prison (Castel et al., 2012). Therefore, unrecognized HIV-infection progressing to AIDS and transmitted to others during or after imprisonment carries a very high cost for the Indonesian society, and as
such routine testing in prison is probably extremely cost-effective. It should be noted that costs for point-of-care tests have recently come down, further improving the cost-effectiveness of routine testing.

Our experience and that of others shows that HIV testing and care during imprisonment can be successful if implemented in a proper way, with the prisoners’ right to refuse testing, strict confidentiality, and good access to specialized care and support. Data from the USA indicate that about 75 percent of HIV-positive inmates initiate treatment while incarcerated and that effective HIV treatment in prisons has led to a 75 percent reduction in AIDS-related mortality (Nunn et al., 2010), a decline mirroring to that of non-incarcerated populations (May et al., 2006; Panos et al., 2008). In our study, since the introduction of HIV treatment and care inside Banceuy prison, all HIV-infected prisoners received CD4-cell testing and ART if indicated and among the first 25 patients initiated on ART in prison during routine testing, no one interrupted treatment and all but one had an undetectable HIV-RNA after six months of ART (Nelwan et al., 2010). Because of this, the AIDS-related fatality rate decreased from around 40 percent in 2006 (before the HIV testing intervention) to 5 percent in 2010 (Banceuy Narcotic Prison, 2011). HIV treatment of PWIDs are often considered cumbersome, but we previously found a similar clinical and virological response to ART among those HIV patients with and without a history of injecting drug use (Wisaksana et al., 2010). Also in other settings, it has been shown that up to 70 percent of prisoners and jail detainees can successfully achieve HIV viral suppression with ART during incarceration (Meyer et al., 2014a, b).

Adequate resources for health in general and for HIV/AIDS in particular are a neglected priority in many prisons around the world. Due to limited resources, prisons are often faced with a lack of nurses and doctors to provide timely HIV screening, and scarce budgets and lack of health insurance for basic laboratory tests, radiological examination and medication including ART (Nelwan et al., 2009). Such circumstances do not easily allow implementation of routine HIV screening in prison. In Indonesia, some prisons have introduced routine screening but was interrupted when donor funds were reduced (Isa, 2011). The national action plan of AIDS provides a budget that is sufficient to counsel and test only 10 percent of inmates (Directorate of Corrections Ministry of Justice and Human Rights, 2010b). Prisons in other low and middle-income countries might face a similar situation, and even in the USA not all prisons could continue to apply routine screening (Walensky et al., 2005). Screening inmates during intake provides an opportunity for early detection and treatment, which may prevent further HIV transmission inside prison.

This study suffers from the limitations of an observational study conducted in a single prison, which limits the generalizability of its findings. In addition, misclassification of prisoners as non-PWIDs may have impacted our estimates of the effectiveness of targeted screening. Finally, the cost analysis in our study did not incorporate the implications of screening in terms of treatment, transmission and disease progression among missed cases. Mathematical modeling could help estimate the costs of the likely missed cases in targeted screening. Despite these limitations, our study provides evidence, particularly for prison authorities, on the importance of HIV testing, treatment and care for prison populations. This is in line with recommendations from United Nations Office on Drugs and Crime et al. (2009).

Conclusion

Routine HIV screening for inmates proved to be effective in this setting, but in case of limited resources, targeted screening may be used for those that reported injecting drugs. In any case, HIV screening, treatment, care and support should be available in prison, particularly in narcotic prisons, to contribute in controlling the spread of HIV epidemic.

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